Health in Asia and the Pacific

World Health Organization

South-East Asia Region Western Pacific Region

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Contents

Contents

Section C: Health Systems Development

Preface

Remarkable economic progress in Asia and the Pacific in recent decades has brought major social improvements to the world's most populous region, not least in health status. Life expectancy has increased significantly, more children survive and receive education, and rising incomes provide hope for a brighter future.

The World Health Organization (WHO) is an active partner in the quest for better health, working with Member States to improve public health programmes and develop new strategies for dealing with changing social, health and environmental conditions. Dissemination of reliable information on health status is one of the Organization's most important contributions to global health.

This book continues a recent trend in reporting by combining information from the WHO South-East Asia and Western Pacific regions. While the two regions differ in some important respects, reports and geographical anomalies often obscure the fact that they are contiguous land and oceanic masses. Member States in both regions expressed a desire for a publication that could serve as a resource for officials, policy-makers and others working in all sectors related to public health by providing a single source of information on public health issues across the 48 countries and areas that form the Asia Pacific Region.

Large average gains in health status in the Region tend to mask persistent social and health inequalities, not only between rich and poor countries but also within countries, where poverty and illness exist amid wealth. Women and young girls often suffer from overwork, discrimination and limited access to quality health services. The majority rural agrarian population in many countries lack access to basic services, while health resources are devoted to urban hospitals. Confidence in local health facilities has sometimes vanished overnight in the face of disasters and new and frightening disease outbreaks that do not respect borders. The challenges in many areas of public health, such as equity, human resources, health promotion, health service delivery and the social determinants of health, cannot be adequately described by numbers alone.

To tell these stories, we have chosen narrative reports on many aspects of the current health situation in the Region, supported by the statistical data that is WHO's great strength. Efforts to achieve better health for all, as well as the trials, successes and the failures encountered, are covered in detail. Where possible, a comparative approach has been taken to underscore differences as well as similarities. This can be useful in generating high-quality evidence crucial for sound policies and decisions.

We hope the comprehensive nature of this book will be helpful to all who seek a greater understanding of the health situation in the Asia Pacific Region.

Shigeru Omi, M.D., Ph.D.
Regional Director
WHO Western Pacific

Samlee Plianbangchang, M.D., Dr.P.H.
Regional Director
WHO South-East Asia

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Acknowledgements

Writers

Dr Abdul Samad Abdullah
Dr Narimah Awin
Dr Sumana Barua
Prof Adrian Bauman
Mr Steven Baxendale
Mr Dorjusen Bayarsaikhan
Dr Supriya Bezbaruah
Dr Rajesh Bhatia
Ms Anjana Bhushan
Dr Richard Brown
Dr Dorin Bustos
Dr Carmen Casanovas
Dr Harry Caussy
Dr Tommaso Cavalli-Sforza
Dr Vijay Chandra
Dr Choi Seung-Hoon
Dr Yok-Ching Chong
Mr Javed Chowdhary
Dr Eva-Maria Christophel
Ms Natasha Dawa
Dr Steve Fabricant
Dr Thushara Fernando
Dr Mario Festin
Mr Burke Fishburn
Dr Anton Fric
Ms Kathleen Fritsch
Dr Suthat Fucharoen
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Dr Jinjing Zhang
Dr Gauden Galea
Dr Gayatri Ghadiok
Dr Gyanendra Gongal
Dr Karen Heckert
Mr Han Heijnen
Mr Alexander von Hildebrand
Dr Marcus Hodge
Mr Robert Hughes
Prof Abhaya Indrayan
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Dr Anand B Joshi
Dr Ardi Kaptiningsih
Dr Takeshi Kasai
Dr Jerzy Leowski
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Dr Khanchit Limpakarnjanarat
Ms Vanchinsuren Lkhagvadorj
Dr Carolyn Maclennan
Dr Akjemal Magtymova
Dr Sudhansh Malhotra
Dr Emmalita Manalac
Dr Susan Mercado
Dr Antonio Montresor
Dr Davison Munodawafa
Dr Dinah Nadera
Dr M Krishnan Nair
Dr Nani Nair
Dr Pem Namgyal
Dr Jai P. Narain
Dr Ezekiel Nukuro
Dr Roderico H Ofrin
Dr Hisashi Ogawa
Dr Babatunde Olowokure
Dr Hitoshi Oshitani
Dr Kevin Palmer
Dr Pang Ruyan
Dr Razia Pendse
Dr Arturo Pesigan
Dr Shalini Pooransingh
Dr Chusak Prasittisuk
Dr Khalilur Rahman
Dr Neena Raina
Ms Vimala Ramachandran
Dr Manju Rani
Dr David Rivett
Dr Sigrun Roesel
Dr Habibullah Saiyed
Dr Reijo Salmela
Dr Subhash Salunke
Dr Chamaiparn Santikarn
Mr Jonathan Santos
Dr Budiono Santoso
Dr Gunawan Setiadi
Dr Kin Shein
Dr Dean Shuey
Dr Alaka Singh
Dr Nihal Singh
Dr David Sniadack
Prof K. Srinivasan
Dr Prakin Suchaxaya
Dr Erna Surjadi
Dr Viroj Tangcharoensathien
Dato' Dr Tee Ah Sian
Dr Arun Thapa
Mr Terrence Thompson
Ms Catherina Timmermans
Dr Jaana Marianna Trias
Dr Le Anh Tuan
Dr Pieter JM van Maaren
Dr Ong-arj Viputsiri
Dr Wang Xiangdong
Dr Krisantha Weerasuriya
WHO SEARO HIV/AIDS/STI team
Dr Yang Baoping
Mr Jun Yoshida

Reviewers

Ms Carla Abou-Zahr
Dr Nugroho Abikusno
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Prof Jim Mann
Dr Osman Mansoor
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Dr V. Mohan
Dr Nguyen Phu Cuong
Dr Joan Ozanne-Smith
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Dr Kenji Shibuya
Mr Oleg Shipin
Dr Dhirendra N Sinha
Dr Kwok Cho Tang
Dr Kiyosu Taniguchi
Dr Joanna Tempowski
Dr Krongthong Thimasarn
Prof Kraisid Tontisirin
Dr Mostafa Zaman
Dr Xiaorui Zhang

Acronyms

AAAH	The Asia–Pacific Action Alliance for Human Resources for Health
ACT	artemisinin–based combination therapy
ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
AFP	acute flaccid paralysis
AFR	WHO Region of Africa
AIDS	acquired immunodeficiency syndrome
ALRI	acute lower respiratory infection
AMR	WHO Region of the Americas
ANC	antenatal care
ANM	auxiliary nurse midwife
APPAN	The Asia Pacific Physical Activity Network
APSED	Asia Pacific Strategy for Emerging Diseases
ART	Antiretroviral therapy
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
AYUSH	The Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy
BHC	Benzene hexa-chloride
BI	Bamako Initiative
BMI	body mass index
BoD	burden of diseases
BSS	behavioural surveillance surveys
CARE	The Cooperative for Assistance and Relief Everywhere
CBHI	community–based health insurance
CBR	crude birth rate
CC	collaborating centre
CDR	crude death rate
CFR	case–fatality rate
CGER	combined gross enrolment ratio
CNG	compressed natural gas
CNS	central nervous system
COHRED	Council for Health Research and Development
COMBI	communication for behavioural impact
COPD	chronic obstructive pulmonary disease
CSR	child sex ratio
CUP	condom use programme
CVD	cardiovascular disease
DALYs	disability-adjusted life years
DDT	dichloro-diphenyl-trichloroethane
DFID	Department for International Development
DHF	dengue haemorrhagic fever

Acronyms

DHS	demographic and health survey
DOTS	directly observed treatment, short-course
DPAS	WHO Global Strategy on Diet, Physical Activity and Health
DRAGONET	Asian Health Systems Reform Network
DRG	diagnostic related groups
DSP	disease surveillance point
DSS	dengue shock syndrome
EMF	electromagnetic field
EMR	WHO Region of Eastern Mediterranean
EQUITAP	Equity in Asia and Pacific Health Systems
ESCAP	Economic and Social Commission for Asia and the Pacific
EUR	WHO Region of Europe
EV	electric vehicle
EVIPNet	Evidence-informed Policy Network
FAO	Food and Agriculture Organization of the United Nations
FCTC	WHO Framework Convention on Tobacco Control
FERCAP	The Forum for Ethical Review Committees in Asia and the Western Pacific
FSSA	Food Safety and Standards Authority
GAVI	Global Alliance of Vaccine and Immunization
GBD	global burden of diseases
GDI	Gender Development Index
GDM	gestational diabetes
GDP	gross domestic product
GEM	gender empowerment measure
GEMs	Global Environmental Monitoring
GFHR	Global Forum for Health Research
GIS	geographic information system
GMP	good manufacturing practice
GNP	gross national product
GOARN	Global Outbreak Alert and Response Network
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HACCP	hazard analysis and critical control points
HALE	health adjusted life expectancy
HBV	Hepatitis B virus
HCC	hepatocellular carcinoma
HDI	Human Development Index
HFMD	hand, foot and mouth disease
HINARI	Health Information Access to Research Initiative
HIV	human immunodoeficiency virus
HMN	Health Metrics Network
HPV	human papilloma virus
HRCP	Health Research Council of the Pacific
HRH	human resources for health
HSIP	Health Services Improvement Programme
HSS	HIV sero-surveillance
HSV	herpes simplex virus
ICCC	The WHO's Innovation Care for Chronic Conditions
ICD-10	International Statistical Classification of Diseases and Related Health Problem, Tenth Revision
ICF	International Classification of Functioning, Disability and Health
ICN	International Council of Nurses
ICT	information communication technology
IDA	iron deficiency anaemia
IDD	iodine deficiency disorder
IDUs	intravenous drug users
IFCS	Intergovernmental Forum on Chemical Safety
IFFIm	International Finance Facility for Immunization Company
IGT	impaired glucose tolerance
IHR	International Health Regulations
ILO	International Labour Organization
IMCI	integrated management of childhood illness
IMR	infant mortality rate
INCLEN	International Clinical Epidemiology Network
INTERPOL	The International Criminal Police Organization
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
IT	information technology
IVD	intrauterine device
IYCF	Global Strategy for Infant and Young Child Feeding
KA	Kala azar

KEVA	The Kathmandu Electric Vehicle Alliance
LBW	low birth weight
LGA	large for gestational age
LI	liaison institute
MB	mulitbacillary leprosy
MDGs	Millennium Development Goals
MDG-NET	Millennium Development Goals Network
MDR	multidrug resistance
MDT	multidrug therapy
MMR	maternal mortality ratio
MOANA	Mobilization of Allies in NCD Action
MoH	ministry of health
MoH-VR	Ministry of Health's Vital Registration
MSA	medical saving accounts
MSM	men who have sex with men
NA	not available
NCDs	noncommunicable diseases
NFHS	National Family Health Survey
NGOs	nongovernmental organizations
NHA	national health accounts
NPAN	National Plans of Action for Nutrition
OECD	Organisation of Economic Cooperation and Development
OIE	World Organization for Animal Health
OOP	out–of–pocket
PAR	population attributable risk
PB	paucibacillary leprosy
PEM	protein energy malnutrition
PFA	Prevention of Food Adulteration Rules
PHC	primary health care
PHEMAP	Public Health and Emergency Management in Asia and Pacific
PLHA	people living with HIV/AIDS
PM	particulate matter
PMTCT	Preventing Mother to Child Transmission
POLHIN	The Pacific Open Learning Health Net
PPP	purchasing power parity
PSR	population sex ratio
RAS	rapid alert system
RDT	rapid diagnostic tests
REMPAN	Radiation Emergency Medical Preparedness and Assistance Network
RHINO	Routine Health Information Network
RR	relative risk
SAARC	The South Asian Association for Regional Cooperation
SACOSAN	The South Asian Conference of Sanitation
SAICM	Strategic Approach to International Chemicals Management
SAM	service availability mapping
SARS	severe acute respiratory syndrome
SBA	skilled birth attendants
SBP	systolic blood pressure
SD	standard deviation
SEANET-NCD	The South–East Asian Network for Noncommunicable Disease Prevention and Control
SEAR	WHO Region of South–East Asia
SEWA	Self–Employed Women's Association
SHI	social health insurance
SHOC	Strategic Health Operations Centre
SIA	supplementary immunization activities
SIDCER	The Strategic Initiative for Developing Capacity in Ethical Review
SOPAC	Pacific Islands Applied Geosciences Commission
SRS	sample registration system
START	The WHO Suicide Trends in At-Risk Countries and Territories
STEPS	STEPwise Approach to Surveillance
STH	soil–transmitted helminthiasis
STI	sexually transmitted infection
SWAp	sector–wide approach
SWIM	sector–wide management
TB	tuberculosis
TCM	traditional Chinese medicine
TFR	total fertility rate
TGP	total goitre prevalence
TRIPS	Trade Related Aspects of Intellectual Property Rights
TTAM	Thai traditional and alternative medicine
UNAIDS	United Nations Joint Programme on HIV/AIDS

Acronyms

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNF	United Nations Foundation
UNFCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UN-HABITAT	United Nations Human Settlement Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UTE	urinary iodine excretion
UV	ultraviolet
VAD	vitamin A deficiency
VCT	voluntary counselling and testing
VIA	visual inspection with acetic acid
VL	visceral leishmaniasis
WHA	World Health Assembly
WHO	World Health Organization
WHO-FIC	World Health Organization – Family of International Classification
WIND	work improvement in neighbourhood development
WISE	work improvement in small enterprises
WPDD	Western Pacific Declaration on Diabetes
WPR	WHO Region of the Western Pacific
WTO	World Trade Organization
YLD	years of life lost due to disability
YLL	years of life lost due to premature death

Executive summary

The Asia Pacific Region comprises the South-East Asia and Western Pacific Regions of the World Health Organization and includes 48 countries and areas with a population of 3.45 billion, 53% of the world's total. The influence of ancient civilizations and cultural bonds that developed across the Asia Pacific Region through trade and the spread of religions have, perhaps, been overtaken by modern development. While much is shared in terms of perspectives and aspirations, the Region is extremely diverse and encompasses some of the world's least and most developed nations, both market and centrally planned economies, and countries with populations in the hundreds of millions and others measured in mere thousands.

The late 1990s and the early years of this decade were tumultuous times of major natural disasters, wars, financial crisis and a SARS epidemic that seemed to foreshadow future insecurity. Today, most of the Region enjoys optimism, stability and unprecedented prosperity, thanks to hard work and committed leadership. Benefits, however, are unevenly distributed, with many countries and a disturbingly large part of the total population left out of the development mainstream, subsisting in poverty and poor health. Even more troubling, evidence suggests these inequalities are widening, both across and within countries.

This report on health in Asia and the Pacific responds to the request of WHO Member States for a single document that summarizes progress made, highlights differences and similarities across the Region, and clarifies remaining obstacles to achieving good health for all. Successes include major progress in reducing or eliminating the burden of infectious diseases, improved awareness of health risks from tobacco and other lifestyle factors, vastly increased numbers of HIV/AIDS patients receiving antiretroviral treatment, and a reduction in high levels of infant and child mortality. Many new technologies and social approaches have proven effective, but the cost of scaling them up is very high, and initiating change is often difficult. Much work remains to be done to ensure health systems in the Region become more inclusive and better capable of responding to the challenges of shifting morbidity patterns and increasing health inequalities.

This report has three main sections. The first examines the determinants of health—the socioeconomic, environmental and demographic factors that cause some people to be more vulnerable to the microbes and toxins that are the direct causes of illness and disability. The second section reviews health status and the important diseases in the Region, the new and re-emerging infectious diseases that can spread rapidly and are a global threat calling for coordinated countermeasures, and the increasingly important "lifestyle" and "life-course" health issues. The third section reviews how health systems in the Region are responding to these challenges and describes the essential functions performed by health authorities. A concluding chapter summarizes the key public health challenges facing the Region in the near future.

Section A

Health determinants

Health is strongly influenced by socioeconomic factors, which include the conditions in which people and communities live and work, their physical and social environments, how others regard them, what society can provide for them, and what they can provide for themselves. Wealth, and how it is distributed, varies widely in the Region, with the five most industrialized countries enjoying US$ 18 000 to US$ 30 000 per capita income (adjusted for purchasing power), but with the least developed countries having only small fractions of this level of wealth. The poorer countries in the Region also have higher proportions of impoverished people, who are generally more vulnerable to serious health risks. Large income disparities within many countries are also reflected in differences in health status. Other key social determinants of health include ethnicity or race, gender, education, employment conditions and location (rural versus urban). Some groups are systematically more disadvantaged with respect to these determinants, resulting in their relatively poorer health. These factors also give rise to inequities between population groups with regard to health risks, health-seeking behaviour, access to services, responsiveness of the health system and health outcomes. There is growing evidence that health inequities are rising, but little information exists on how to best address this.

The Region remains predominantly rural, with agriculture the main occupation. Food production and security have improved markedly, but some countries in the Region still have difficulty meeting their requirements for sufficient, safe and nutritious food. The capacity to fulfil the food needs of the growing world population is limited by rapidly increasing pressures on natural resources in the Region and elsewhere. The recent increase in global food prices also has affected the Region severely. The urgent priority of meeting the immediate needs of vulnerable populations, building longer-term resilience and contributing to food and nutrition security requires intersectoral action on food production, nutrition and other social determinants of health.

Demographic trends provide evidence of a changing situation characterized by declining fertility, longer life expectancy, increased dependency ratios and ageing populations. The transition to an older population has already occurred in countries that developed rapidly and has reduced the fertility of their large working-age populations. These countries are now bearing a heavy "demographic burden" as former workers are supported by a smaller, younger generation. Health systems and programmes in both developed and developing countries will need to cope with the chronic diseases of older persons and new health and welfare issues which could pose overwhelming problems in the near future.

Gender is a major determinant of health risks, disease burden, access to services and health outcomes in the Region. Both maternal and child mortality, as well as a host of other health risks and outcomes, are influenced by the health, education and nutritional status of women, and their access

to health services. The high ratio of male births in comparison to female births, in some countries, including those with most of the Region's population, suggests widespread use of selective abortion due to a male child preference. The higher mortality rate of females under five years of age compared to male children may be attributable to discrimination against girls in provision of sufficient food and timely health care. Appropriate policies in health, education and employment, and women's economic and political empowerment, can help redress the structural disadvantages faced by women.

Environmental trends are linked to population health, and in this respect rapid development has had significant negative effects in the Region. Urbanization is associated with health issues, such as sedentary lifestyle, unhealthy diet, substance abuse, air pollution, occupational hazards, accidents and injuries. Scarcity of urban land and the development of slums create problems of water supply, sanitation and overcrowding. Under these conditions, infectious diseases spread more rapidly than in rural areas. Safe drinking water has been provided to hundreds of millions of people in the Region in recent decades, but over 18% of the population still lack this basic health measure. Diarrhoea remains one of the leading causes of morbidity and mortality in urban slums and in rural communities, where there is the greatest lack of household sanitation. Experience shows that with political will and community participation, rapid improvements in sanitation can be achieved.

Air quality is deteriorating in the Region due to industrialization, increased energy consumption, and urbanization, with urban and indoor air pollution implicated in 1.5 million deaths annually. The immense quantities of chemicals used in the Region have impacted human health and ecosystems. Countries in rapid transition have reduced mortality from traditional agriculture-related hazards, but injuries and diseases due to industrialization may be increasing. Climate change is a serious threat that must be urgently addressed, with better evidence required on its effect on human health to strengthen preparedness and response for climate-sensitive diseases.

Food contamination is a significant public health problem and requires a "farm-to-table" approach involving all stakeholders to establish effective national food safety control systems. While 500 million people in the Region struggle to meet basic food needs, a burgeoning middle class is developing unhealthy lifestyles. Adverse dietary changes, lack of physical activity and stress contribute to "diseases of affluence". Unless health promotion efforts are intensified, tobacco and drug use, unsafe sex, and other high-risk behaviours are expected to increase.

Section B

The regional health situation

In 2002, the Asia Pacific Region contributed 46% of total disability-adjusted life years (DALYs) lost worldwide, but both morbidity and mortality are declining more rapidly in the Region than elsewhere. Given the great variations in economic, social, demographic and environmental factors in the Region, it is not surprising to find large differences in health status. Despite great progress in combating disease, pockets of high mortality and morbidity remain. In general, health indicators for the poorest countries lag far behind the wealthiest, and within most countries they are much worse for the poor. In less-developed countries, most deaths occur at younger ages rather than the older ages that are the norm in more highly developed countries.

Deaths from communicable, perinatal, nutritional and maternal conditions have declined to 20% of total deaths in the Region. The share of deaths from noncommunicable diseases is now over 60%, and injuries account for 10%.

Emerging infectious diseases pose serious public health threats in the Region. Outbreaks of two newly emerging diseases in the 21st century, Severe Acute Respiratory Syndrome (SARS) and highly pathogenic avian influenza A (H5N1) virus, are historically unprecedented in the Region. These outbreaks clearly demonstrate that in today's interconnected and globalized world, new infectious diseases can rapidly spread from country to country and seriously impact economic development and social stability, threatening national, regional and global health security. The Region currently faces the risk of a human influenza pandemic arising from the evolving avian influenza A (H5N1) virus, as well as potential new subtypes of the influenza virus. It is crucial to strengthen the capacity to detect and respond to emerging infectious diseases before the next pandemic to minimize its impact.

One fifth of all deaths in the Region are caused by infectious diseases. HIV/AIDS and other sexually transmitted diseases, tuberculosis (TB), malaria, and vaccine-preventable diseases such as polio and measles, dengue, kala azar and lymphatic filariasis, all remain priority diseases in the Region.

The HIV/AIDS epidemics in the Region are driven by populations whose behaviours carry a high risk of exposure to HIV. Targeted interventions, such as the 100% Condom Use Programme in sex work and harm reduction strategies for injecting drug users, have proven effective in reducing HIV prevalence in a number of countries. Improved health sector response means increased numbers of people are receiving needed antiretroviral treatment. However, the HIV burden is still increasing in several countries. Better quality and scaling up of programmes for comprehensive prevention, care and treatment for HIV/AIDS are needed, including interventions through the health sector and targeted approaches for populations at high risk.

An estimated 5 million people develop TB each year in the Region, resulting in 800 000 deaths, making TB the communicable disease with the highest number of fatalities. Much progress has been achieved in the past decade following the implementation of an effective diagnosis and treatment strategy. Nonetheless, further progress is threatened by the emergence of drug-resistant TB and the TB and HIV coinfection. This situation is exacerbated by weak TB laboratory infrastructure. Increased funding from both government and external sources will help countries further strengthen TB control programmes and keep them on track to reach the Millennium Development Goals (MDGs) target of reducing prevalence and mortality due to TB by half, compared to 1990.

Endemic in 20 countries in the Region, malaria is estimated to cause the loss of 3.2 million DALYs per year. Significant control efforts have resulted in a decreasing trend in several countries, especially in mortality. Meanwhile, drug-resistant strains are spreading steadily in the Region, with reduced effectiveness of mefloquine in the Cambodia and Thailand border region. This could endanger malaria control and elimination globally and thus requires urgent control efforts. Irrational drug use and substandard and counterfeit medicines are considered to be major contributors to antimalarial drug resistance. Rapid diagnostic tests (RDTs) and microscopy are essential tools for early case detection, and a new programme of quality assurance for microscopy and efforts to scale up use of RDTs are ongoing.

Today, immunizations save more than 3 million lives annually worldwide, yet millions of children in the Asia Pacific Region remain unimmunized and continue to die or become disabled from diseases that can be prevented with vaccines available in their own countries. While the majority of countries have remained polio-free for many years, the disease remains endemic in India, and several countries have experienced recent importations of wild poliovirus. Despite a substantial reduction in measles cases and deaths in the Region, compared to the pre-vaccine era, measles continues to be a leading cause of vaccine-preventable morbidity and mortality in children.

Most countries in the Region are either endemic or hyper-endemic for hepatitis B, with an estimated 258 million chronic carriers. Many countries have achieved elimination of maternal and neonatal tetanus however, neonatal tetanus remains one of the most underreported of vaccine-preventable diseases because it tends to occur in areas with poor or no access to health care and goes unidentified within the community. Significant effort has been made to advance these programmes. Recent successes targeting the P1 serotype of wild poliovirus in India provide encouragement that global eradication will be achieved. Many countries have set a measles elimination goal of 2012 and have developed multi-year national plans of action specifically addressing measles elimination or mortality reduction using WHO- recommended strategies. Regional plans have been developed for hepatitis B vaccination programmes. The Region has also initiated expansion of underutilized vaccines such as the vaccine for *Haemophilus influenzae* type b (Hib); vaccine against Japanese encephalitis; for rubella; the introduction of new vaccines against pneumococcus and rotavirus; and a vaccine against major serotypes of human papilloma virus (HPV). This should result in substantial morbidity and mortality reduction.

While dengue case fatality rates have been declining in most countries, possibly as a result of better access to health care and timely case management, dengue fever continues to cause large outbreaks that require significant resources to control. A Dengue Strategic Plan for the Asia Pacific Region has been developed, which will serve as the framework for the development of national plans as a tool for resource mobilization and for advocacy purposes to increase political and financial commitment.

Regular epidemic cycles of kala azar (KA) every 15–20 years put about 200 million people at risk. Resource allocation to control KA is still low, but significant steps have been made, including the signing of a memorandum of understanding to eliminate KA by the health ministers of Bangladesh, India and Nepal.

Significant effort has been made in leprosy and lymphatic filariasis (LF) control in the Region. In the past, the Region accounted for the highest burden of leprosy globally, but now only three countries report more than 5000 cases, and five countries report more than 1000 but fewer than 5000 cases. The Region accounts for about 70% of the global population at risk of LF. Mass drug administration campaigns for LF covered about 370 million people living in 21 endemic countries in 2005. To achieve the goal of elimination, efforts to scale up the programme should be maintained.

The disease burden of soil-transmitted helminthiasis is enormous, with more than 1.2 billion people in the Region estimated to be chronically infected. Although death is rare, soil-transmitted helminthiasis cause morbidity by affecting nutritional equilibrium, reducing growth, inducing intestinal bleeding, causing physical complications and impairing the cognitive development of children. Until recently, very little attention was paid to controlling soil-transmitted helminthiasis, but there are many successful examples of countries that have integrated deworming into general school health programmes.

To confront continuing emerging disease threats more effectively and establish health security in the Region, all countries need to develop and strengthen fundamental surveillance and response systems and capacities that are capable of early detection of and response to emerging infectious disease outbreaks and public health events. The substantially revised International Health Regulations, known as IHR (2005), provide a global legal framework for collectively combating acute public health threats and emergencies of potential international concern, including emerging infectious diseases. The IHR (2005) also emphasize the importance of building national and local core capacities for surveillance and response. Joint efforts are being made to meet IHR (2005) obligations through implementation of the Asia Pacific Strategy for Emerging Diseases (APSED) in an effort to develop health security by the end of 2010.

Cardiovascular disease, diabetes and many cancers are increasing rapidly, but these are amenable to preventive strategies. The prevalence of diabetes in the Region is expected to double over the next 15 years. The global tobacco epidemic is the second major cause of all deaths from noncommunicable diseases, and the Region accounts for almost 2.3 million out of 5 million global tobacco deaths each year. Smoking prevalence has decreased in developed countries, but overall tobacco use is still very high among men and is increasing rapidly among women. Rates and severity of injuries, violence and accidents are also increasing.

Reproductive health, child and adolescent health, nutrition disorders and health care for older persons are "life-course" health issues that affect nearly everyone. Maternal mortality is still unacceptably high in some countries, with approximately 200 000 maternal deaths, nearly 40% of the global figure, occurring annually in the Region. The major risk factor for maternal and neonatal deaths is lack of access to three critical services—skilled care at birth, emergency obstetric care and family planning. Young people (ages 10–24) constitute a significant portion of the population, and early marriage and childbearing is common in many countries. Maternal mortality in girls under 18 is two to five times higher than in women between 18 and 25. There are nearly 8 million unsafe abortions each year in the Region.

Remarkable progress has been made in child survival over the last three decades, but the Region still accounts for about 40% of all infant and child deaths globally. Regional and national averages conceal the large disparities in child mortality among and within countries, a result of geographic, financial and other barriers. Within countries, child health indicators tend to be worse among the poor, where health service utilization is very low, quality of health care delivery is inadequate, and unsafe environments and poor sanitation and hygiene prevail. Infant mortality is declining, but 10 out of 48 countries and areas still have rates above 50 per 1000 live births. Most child deaths (and 99% of neonatal deaths) occur in low-income countries or poor communities in middle-income countries. Over half of these are from preventable diseases or easily treatable conditons and are compounded by undernutrition. Cost-effective child survival interventions are in use but have not received the investments and intersectoral collaboration needed to take them to scale. Neonatal mortality has not been effectively addressed, although it makes up almost half of all child mortality.

Chronic undernutrition in the Region is steadily decreasing, but progress is unevenly distributed and undernutrition rates in some countries remain disturbingly high. Many countries are facing the double burden of underweight and overweight children, as well as adults, especially women. Overweight children are a growing concern. Two trends can be seen: increasing obesity rates with increasing age; and rising obesity rates as time passes. Success in reducing child malnutrition is greatest in countries experiencing economic development and where interventions target groups at highest risk. Effective solutions exist to address nutritional problems, and more and more countries are promoting healthy diets and lifestyles in schools and communities.

Section C

Health systems development

Governments can improve the health of their citizens by taking actions that lead to responsive, well-resourced, efficient and well-regulated health systems. Health systems must be continually oriented to respond to public health challenges. The values of primary health care, as enunciated in the Declaration of Alma-Ata adopted at the International Conference on Primary Health Care in 1978, remain the guiding principles for health systems throughout the Region. Despite this, health systems have become increasingly fragmented, which is generally an obstacle to effective delivery of health

services and efficient achievement of health goals. Systems need to be understood in their entirety. Actions to strengthen health systems need to build system capacity and not just divert capacity from one part of the system to another to meet short-term goals. A recently disseminated and useful analytic framework calls for action across six health system building blocks, while addressing key cross-cutting concerns of equity, quality, gender and human rights.[1] The six building blocks are:

(1) Health service delivery—safe, quality personal and non-personal health interventions.

(2) Health workforce—sufficient numbers and mix of competent staff, who are fairly distributed, responsive and productive.

(3) Health information systems—production, analysis, dissemination and use of reliable and timely information.

(4) Medical products and technology—high-quality, safe, efficacious, cost-effective and scientifically sound.

(5) Health financing—adequate in amount, ensuring access to needed services and raised in ways that protect people from financial catastrophe and impoverishment.

(6) Leadership and governance—effective strategic and policy frameworks, combined with oversight, working with partners, regulation and accountability.

Sufficient financial resources are required to ensure the coverage and quality of health services, but how these resources are used is of equal importance. Some countries in the Region have achieved good overall health relative to available resources by implementing policies that address the greatest health needs and promote preventive activities and healthy lifestyles. A focus on primary health care can increase the efficiency of health systems and improve access and responsiveness. Low utilization of services is an issue in many countries and is associated with high barriers to access and low quality of services, both of which must be tackled simultaneously. The Region has seen innovative methods to improve service delivery, such as contracting out, with private and nongovernmental sectors as valuable partners. The private sector plays a large role in providing health services in the Region, but using the private sector for public benefit requires effective laws and regulatory capacity, something that is lacking in many countries.

Public spending on the health workforce accounts for a large part of government health expenditures in the Region. Relative to need, there is still an overall shortage of human resources for health, as well as imbalances in distribution, with the fewest health workers often found where health needs are greatest. Skill imbalances create inefficiencies and low capacity to meet changing needs. Educated and well-trained health workers save lives, and there is evidence of a direct relationship between the number of health workers and health outcomes. Tackling health workforce challenges in the Region, such as inadequate supply, imbalances in skill-mix and distribution, and migration, requires strong political commitment, government leadership, increased investment and innovative strategic actions, as well as effective partnerships and collaboration among key stakeholders.

National health information systems need to be developed to a level where reliable data is transformed into usable evidence for strengthening health systems, including collecting and analysing information that is disaggregated by relevant indicators of social exclusion, to measure the nature of inequalities between different population groups. While several countries have notifiable disease

[1] Everybody's business: strengthening health systems to improve health outcomes: WHO's framework for action. Geneva, World Health Organization, 2007. Available from: http://www.wpro.who.int/NR/rdonlyres/5BA80B95-DC1F-4427-8E8B-0D9B1E9AF776/0/EB.pdf

surveillance systems and send data regularly to WHO, some are not fully developed or do not work well as early warning systems, nor can they reliably detect and report events caused by unknown diseases. The risk of cross-border transmission of emerging diseases requires greater intercountry collaboration in terms of information sharing and dissemination. Health research capacity is well advanced in most developed countries and is increasing in some developing countries. More targeting of research is required on the largest health needs, namely those of poorer or marginalized groups in poorer countries. In addition, there is still a gap in converting information gained from health systems research into actual policy and implementation.

National medicine policies are a well-established concept globally, but such policies have not been fully implemented. Limited access to and availability of essential drugs in many parts of the Region, as well as irrational drug use, increasing antimicrobial resistance and the high prevalence of counterfeit and substandard drugs, pose serious health threats. Traditional medicine is flourishing with official support, alongside allopathic medicine in many countries, although the links between the two systems could be stronger. Laboratory and blood transfusion programmes are essential parts of health systems. In many countries these services are under-resourced and fragmented. Policies for the selection, management, maintenance and financing of appropriate health technology are a challenge to all countries. Ad hoc decision-making needs to be replaced by coherent, evidence-based policy.

The Region has the world's highest dependence on out-of-pocket expenditure to finance health care systems and the highest number of households driven into poverty by the need to pay for health care at the time of service. Government spending on health tends to be low in the Region, particularly in less developed countries, with half of them spending less than 5% of gross domestic product on health. Countries need to emphasize health-care financing that is prepaid, risk-pooled and progressive. The goal should be universality, ensuring that the most vulnerable and currently underserved populations have access. This may be done through a mix of sources that includes general taxes, earmarked taxes, compulsory social health insurance, other types of health insurance, international aid and even private copayments, as long as the most vulnerable are protected. Health financing mechanisms should provide incentives for rational and efficient use of health services.

Governments, even when not the primary providers of services, have a major role to play in oversight, regulation and guidance of the health sector. Good stewardship by government should ensure that the health sector is accountable to all people. Development partners and earmarked funding can influence, and sometimes distort, health systems, particularly in highly aid-dependent countries, and the international community has recognized this. There is a trend, as embodied in the Paris Declaration on Aid Effectiveness, towards harmonization and alignment of donor assistance with government-led planning and implementation processes in recipient countries.[2] There are multiple methods for moving towards this goal, including sector-wide approaches.

A high level of emergency and humanitarian response preparedness is a necessity in the disaster-prone Asia Pacific Region. Between 1995 and 2005 there were more natural and industrial disasters and casualties than in any other region. Governments are building capacity for disaster preparedness in health, but communities and health systems must become more self-reliant and resilient. Policy-makers and managers are receiving training focused on public health needs and competencies. Emergency response needs to become an intrinsic part of the health system and consistent with its principles.

[2] *Paris Declaration on Aid Effectiveness: ownership, harmonization, alignment, results and mutual accountability.* Washington DC, World Bank, 2005. Available from: http://www1.worldbank.org/harmonization/Paris/FINALPARISDECLARATION.pdf

1

Introduction

The 48 countries and areas of the World Health Organization's (WHO) Asia Pacific Region span a large, heavily populated land area, and an equally vast but sparsely populated ocean. The Region encompasses 21% of earth's land mass and is home to 53% of the world's population. Although the Region has seen remarkable economic progress in recent decades, benefits are unevenly distributed, with many countries and a disturbingly large part of the population left out of the development mainstream, subsisting in poverty and poor health. More poor people live in the Asia Pacific Region than in the rest of the world combined.

While historical and cultural ties are relatively strong, the Region is far from homogenous. Sharp contrasts between and within countries in the Asia Pacific Region present a significant public health challenge. Epidemics and disasters threaten hundreds of millions of people each year, and health inequalities in some rapidly developing countries are growing rather than shrinking. Environmental, workplace and lifestyle diseases have accompanied rapid economic growth.

Periodic assessments of health situations, as well as gauging population health status and trends, are essential functions of national health systems. An active partner in the quest for better health, WHO works with Member States to improve public health programmes and develop new strategies for dealing with changing conditions. Its mandate includes analysing health conditions, disseminating information on health situations and trends, reporting on health development, evaluating the impact of health programmes and the performance of health systems, and synthesizing situations from a regional perspective to assist leaders and policy-makers.

Although the WHO Western Pacific and South-East Asia Regions, which make up the Asia Pacific Region, differ in important respects, regional reports often belie the importance of their geographical contiguity, as diseases, social conditions and events often disregard national and political borders. Contiguous areas, such as Indonesia and Malaysia, or the Republic of Korea and the

Democratic People's Republic of Korea, or Thailand and the Lao People's Democratic Republic, have appeared in separate regional reports. Most of the Member States in both WHO regions share common problems, including inadequate resources for health and a high burden of disease. Significant trends, similarities and relationships, perhaps unnoticed when divided into the 37 countries and areas of the WHO Western Pacific Region or the 11 countries of the South-East Asia Region, are more clearly defined when merged into a single Asia Pacific Region.

Box 1.1: Countries and areas of the WHO Western Pacific and South-East Asia Regions

WHO Western Pacific Region (areas in italics)

American Samoa, Australia, Brunei Darussalam, Cambodia, China, Cook Islands, Fiji, *French Polynesia*, *Guam*, *Hong Kong (China)*, Japan, Kiribati, the Lao People's Democratic Republic, *Macao (China)*, Malaysia, the Marshall Islands, *the Federated States of Micronesia*, Mongolia, Nauru, *New Caledonia*, New Zealand, Niue, *the Commonwealth of the Northern Mariana Islands*, Palau, Papua New Guinea, the Philippines, *the Pitcairn Islands*, the Republic of Korea, Samoa, Singapore, Solomon Islands, *Tokelau*, Tonga, Tuvalu, Vanuatu, Viet Nam, and *Wallis and Futuna*.

WHO South-East Asia Region

Bangladesh, Bhutan, the Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste.

This WHO publication is a response to requests from its Member States for a resource covering the entire Asia Pacific Region and containing up-to-date reports on health trends and health systems for the use of officials, policy-makers and all others with an interest in public health.

Distinctions between the two WHO regions are not emphasized in this report. The South-East Asia Region is less wealthy as a whole than the Western Pacific Region and suffers from more illness, but public health functions and their outcomes in both regions have much in common. Comparisons between countries also generally yield more useful information than between regions. Such a comparative approach is used in this publication to highlight and clarify similarities and contrasts. This provides valuable background data that can support country-based evidence for making effective policy decisions.

Among sources of health information, WHO data are considered reliable and comprehensive, and are often a first source for researchers and policy-makers seeking global data. Regardless of the quality of data, the presentation of graphs and tables of indicators can never fully describe the health situation. Large average numerical gains in health status tend to mask persistent social and health inequalities. Important public health functions and other determinants of health, such as human resources, financing, health research, health promotion and health systems organization, cannot be described quantitatively, nor can many scientific and organizational influences on public health and health systems. Geography, topography, climate, politics, economic and social factors, and random natural events all dramatically affect population health in the Asia Pacific Region.

For these reasons, this book relies on narratives to convey a better sense of the regional health situation. Chapters and subchapters are organized in a way familiar to users of health information. Each subchapter is intended as a self-contained overview, supported by basic tables and graphs, and containing references for further exploration of the chapter topic. Recent country experiences, both successes and failures, are described in text boxes.

Every division in both WHO regions contributed to this book, using the best and most recent information. All efforts have been made to present the most recent data and adhere to WHO's criteria for statistical reporting. However, depending upon the capacity and capability of national health information systems, reported data for some indicators may have limitations. Most subchapters are collaborations between WHO staff and outside experts, and contain a balance of information from the field, as seen in WHO's regional work, and more scientific and speculative constructs, as seen from academia.

This book is intended for a wide audience with the expectation that national health authorities, policy-makers, scholars, researchers, health workers and others committed to the advancement of public health in the Asia Pacific Region will make good use of this resource. While not as specific as might be desired by public health specialists and researchers, the broad scope and moderate level of detail should prove valuable to those seeking more than a basic understanding of the Region's health situation.

Following the introductory Chapter 1, the body of the report is organized into three main sections. The first examines social determinants of health, the common factors that cause many people to be vulnerable to the direct causes of illness and disability. The second section reviews the situations concerning important diseases in the Region. The last section reviews the essential functions that health authorities are performing and how health systems in the Region are responding to health challenges.

Section A approaches the regional health situation through the socioeconomic, demographic and environmental determinants of health, factors that lie largely outside the traditional domain of the health sector. Critical relationships between national income, poverty, inequality and health are examined closely in Chapter 2 because of the low incomes and state of development in much of the Region. Rapid lifestyle changes, especially in diet and tobacco use, are associated with increased chronic disease. Gender-related issues affect health along several dimensions, and human rights concerns have increased the focus on responsiveness and governance of health systems. Participation by civil society in health matters and the use of research-based evidence to improve health policies are discussed. This chapter highlights the multidimensional nature of health, the importance of community participation, and the need for multisectoral planning and action.

The Region's profound demographic transition is reviewed in Chapter 3. Increased longevity, declining birth rates and rapid urbanization are affecting disease patterns and placing new demands on health systems. Chapter 4 examines environmental trends, covering water and sanitation, air quality, chemicals and wastes, occupational health, climate change, food contaminants and safety, and other concerns, not only for the industrializing parts of the Region but also for the large population that remains agrarian.

Section B details the health situation in the Region along the familiar lines of statistical indicators and descriptions of disease-control activities. Regional progress in combating disease has been broad and dramatic, but pockets of high morbidity and mortality remain. Chapter 5 reviews mortality in the

Region, including life expectancy; neonatal, perinatal, infant, child and maternal mortality; and the causes and risk factors for adult mortality. Chapter 6 focuses on the magnitude and causes of the burden of disease, with comparisons between the Region and the rest of the world. This chapter discusses how morbidity can be further reduced and the need for increased health resources.

Chapter 7 describes current prevalence, control measures and challenges of the Region's priority communicable diseases. Subchapters cover SARS (severe acute respiratory syndrome), avian influenza and other emerging and re-emerging infectious diseases, HIV and other sexually transmitted infections, tuberculosis, malaria, vaccine-preventable diseases, dengue and dengue haemorrhagic fever, leprosy, kala azar and lymphatic filariasis, schistosomiasis and other helminthiases, as well as a review of the new International Health Regulations (2005). Chapter 8 is an overview of the growing burden of noncommunicable diseases and conditions in the Region. Its subchapters cover the "lifestyle diseases" of cardiovascular illness, diabetes mellitus and cancer, the tobacco-use epidemic, injuries and violence-caused conditions, mental and neurological illnesses and substance abuse, and thalassaemia. Chapter 9 includes reviews of "life-cycle" health concerns in subchapters on reproductive health, child and adolescent health, nutritional disorders, and social and health care for older persons.

Section C covers the broad field of health systems development. Chapter 10 describes the important dimensions of health systems in the Region, including infrastructure and organization, decentralization, primary health care, the role of the private sector, health policy development, legislation and regulation, governance and responsiveness, equity and access issues, donor coordination and a framework for health systems strengthening. Chapter 11 deals with critical resources for improving population health, with subchapters on human resources, health laboratories and blood safety, health financing, and essential drugs and traditional medicines. Chapter 12 discusses other key public health functions with subchapters on health promotion, communicable disease surveillance and response, emergency and humanitarian action, health and health policy research, and national health information systems.

The final chapter, Chapter 13, is supported by information from preceding chapters and highlights five key public health challenges facing the Region: environmental health; communicable and noncommunicable diseases; reproductive and child health; care for older persons; and health systems development.

If this publication helps promote evidence-based health planning and action, and reinforces the need for strong public health systems with a better balance between clinical care and public health, it will have achieved its goal.

Section A

Health Determinants

2

Social determinants of health

Introduction

"Health is a universal human aspiration and a basic human need. The development of society, rich or poor, can be judged by the quality of its population's health, how fairly health is distributed across the social spectrum, and the degree of protection provided from disadvantage due to ill-health. Health equity is central to this premise. Strengthening health equity—globally and within countries—means going beyond contemporary concentration on the immediate causes of disease to the 'causes of the causes'—the fundamental structures of social hierarchy and the socially determined conditions these create in which people grow, live, work, and age. The time for action is now, not just because better health makes economic sense, but because it is right and just".

Professor Sir Michael Marmot,
Interim Statement of the Commission on Social Determinants of Health[1]

Human health is determined not only by contact with the microbes and toxins that directly cause illness or by organ system failures, but also by other biological and social factors. The terms "risks" and "determinants" are often used interchangeably. The intermediate determinants of health include health services use, dietary and sanitary practices, and behavioural factors. Health inequalities arise from unequal distribution of underlying determinants, including income and assets, knowledge and literacy. They influence the intermediate risk factors, for example by constraining health-seeking behaviour. The underlying determinants of health include environment and infrastructure, which create or ameliorate direct risks or limit the ability of the poor to seek health care and practice healthy behaviour. Accessibility of health services (distance, cost, actual and perceived quality) also determines health outcomes.

These determinants are linked with equity in complex ways. Evidence has only recently begun to accumulate on how public policy can effectively improve the health of the poor. Given the current state of knowledge, it is more useful to present the basic data about individual risk factors and determinants in the Region than to examine their relationship to health outcomes.

Intermediate risk factors, including age, sex, genetic profile and health status, are discussed in the chapters on demography, morbidity and mortality. Noncommunicable diseases (NCD), occupational health, nutrition, and environmental hazards are covered in later chapters in greater detail. This chapter discusses socioeconomic factors (income and education*) and gender, lifestyle, human rights, food security and governance issues.

Box 2.1: Concern for socioeconomic determinants of health in Viet Nam and China

Poor, ethnic minorities and people in remote areas of Viet Nam are the nation's most vulnerable populations. Health indicators show large disparities by income level. Access to health services also varies with socioeconomic status and residence. The poor who are sick face a high financial burden and use less and lower-cost care. The rise in living standards, including among the poor, is accompanied by increased use of tobacco, alcohol and food consumption. Increased pollution, and poor enforcement of occupational health and safety, and traffic safety standards, pose threats to health.

With decentralization of health financing, it is harder for poorer provinces to fund basic health care. Rising costs of care are unaffordable for many, but there is political pressure to invest in more technologically advanced curative services. Poverty reduction and access to health care for the poor are high priorities for the Government. Policies to reduce health gaps include targeted subsidies, investments in infrastructure, training at the grassroots level, and preventive health programmes focused on maternal and child health and infectious diseases.

Along with the traditional health indicators, social health policy in China now also considers potential years of life lost, and disability-adjusted life years (DALYs). Important areas of study include health economics, urbanization and health, immunization, tuberculosis control, health insurance coverage, maternal health, the life-cycle approach, and gender and health.

Analysis shows that a one-year increase in life expectancy is associated with a 4.3% increase in gross domestic product (GDP), and a 1% increase in health investment is associated with a 0.78% gain in GDP. Gender inequities in health expenditure (benefit incidence) exist in all regions but were highest in eastern China. Women are also disadvantaged in access to care and timely diagnosis.

Current analysis of equity focuses on health care transition in cities, factors related to health insecurity in the regions, and the performance and responsiveness of the Chinese health system. Behavioural studies include a surveillance system for behavioural risk factors and the prevention of drug abuse, teenage pregnancies, sexually transmitted infections (STI), and accidents and injuries. Relationships between health outcomes and population, employment, poverty, education and social development are being explored.

Source: *Report of the Consultation on Social Determinants of Health in the Western Pacific Region, 22-24 March 2006, Beijing, China*. Manila, WHO Regional Office for the Western Pacific, 2006.

* Occupation is usually included with socioeconomic status, with exposure to hazards and physical and mental stress obvious determinants of health. This is discussed further in Chapter 4.

2.1 Income, poverty and health

Socioeconomic factors determine where people and communities live, the kind of environment they inhabit, how they are treated by others, the goods and services they can provide for themselves, and what their society can provide for them. Countries and areas in the Asia Pacific Region are quite heterogeneous in terms of their level of socioeconomic development. The grouping of countries and areas in the Region according to this variable is presented in Table 2.1.

Table 2.1 Classification of the 48 countries and areas in the Asia Pacific Region according to level of development, 2008

Low-income countries	Lower middle-income countries	Upper middle-income countries	High-income countries	Classification not known
Bangladesh	Bhutan	American Samoa	Australia	Cook Islands
Cambodia	China	Malaysia	Brunei Darussalam	Nauru
DPR Korea	Fiji	Northern Mariana Islands	French Polynesia	Niue
India	Indonesia	Palau	Guam	Pitcairn Islands
Lao PDR	Kiribati		Hong Kong (China)	Tokelau
Mongolia	Maldives		Japan	Tuvalu
Myanmar	Marshall Islands		Macao (China)	Wallis and Futuna
Nepal	Micronesia, Federated States of		New Caledonia	
Papua New Guinea	Philippines		New Zealand	
Solomon Islands	Samoa		Republic of Korea	
Timor-Leste	Sri Lanka		Singapore	
Viet Nam	Thailand			
	Tonga			
	Vanuatu			

Source: *World development report 2008: agriculture for development*. Washington DC, The International Bank for Reconstruction and Development / The World Bank.

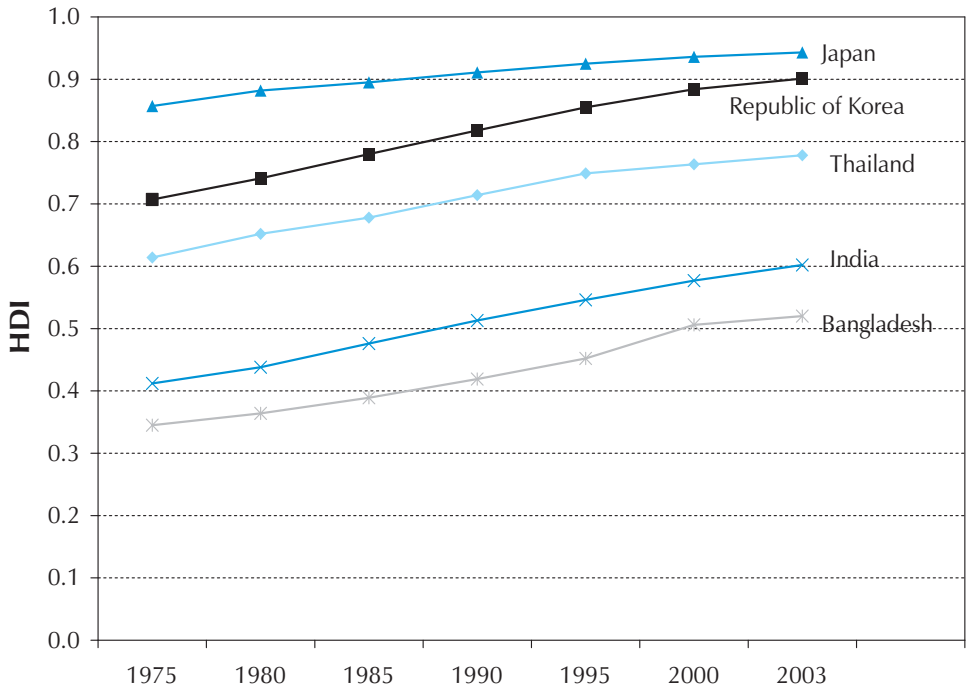
Poverty, both as a social concept and as a measurable characteristic, relates to many of these socioeconomic factors. Poorer countries or areas often cannot provide adequate preventive and curative health services, and poor individuals and households cannot move from unhealthy surroundings, buy enough food or use the services that exist. Poor communities usually do not have the political power needed to get better services.

In many less developed and low-income countries in the Region, health status is relatively low in terms of life expectancy and other indicators. Yet people in some poor countries have good health because they have focused resources on improving the social determinants of health—education and adult literacy, water and sanitation, health promotion and food security.

Good health is a result of many factors other than costly health care, although people living in most wealthy countries do enjoy long life expectancy. Infant mortality is a better indicator of health system effectiveness than life expectancy and generally decreases with increased income and health spending. Health and human development indicators for 29 countries in the Region from the United Nations Development Programme (UNDP)[2] and WHO[3] databases are shown in Table 2.2. These highlight the large differences in the Region, and indicate relationships between poverty and health.

The Human Development Index (HDI) is an average of three indices of (1) a long and healthy life, as measured by life expectancy at birth; (2) knowledge, as measured by adult literacy and school enrolment; and (3) living standard, as measured by adjusted per capita income. The most developed countries in the Region have HDIs nearly double the least developed (Figure 2.1); however, many countries are improving rapidly and narrowing the gap.

Fig. 2.1 Trend in Human Development Index (HDI) in five Asia Pacific Region countries



Source: *Human development reports*. New York, United Nations Development Programme.

Real income per capita (adjusted for purchasing power) ranges from nearly US$ 30 000 in Australia and Japan to well under US$ 2000 in five countries, a ratio of about 15:1. Most of the Region's population live in large countries having real GDPs per capita under US$ 5000. High average income does not always translate into social well-being because wealth may be concentrated in the hands of a few. The Gini Index reflects inequality of income distribution, with values ranging from 24.9 for Japan, which is indicative of the lowest level of inequality, to values nearly twice as high for several poor countries such as Papua New Guinea (Table 2.2). It is interesting to note that the Gini Index is also high even for some upper-middle-income countries such as Malaysia.

Whether at the level of households, communities, or the nation, poverty is a major determinant of ill-health. Nearly everywhere, health outcomes among the poor are much worse than for the wealthy. The poorer countries also have greater proportions of people living below the poverty line and vulnerable to serious health risks. The poor suffer higher rates of malaria, tuberculosis (TB) and HIV/AIDS than the well-off in the Region. Even in countries now achieving high growth rates and rising out of massive poverty, the economic gains are far from equally distributed, with subsistence-level, isolated rural communities and those living in urban slum areas hardly benefiting at all.

While health care can, to some extent, address their greater burden of morbidity, the poor experience systematically lower access to health services than the non-poor. When health services are available, the costs of seeking them are often more than poor patients and households can afford, thus causing the poor to delay or disrupt treatment, and often forcing them deeper into poverty.

Table 2.2 Development and health indicators for 29 Asia Pacific countries, 2002 and 2003

Country	Human Development Index	GDP per capita(PPP) US$	Gini Index	Life expectancy at birth	Infant mortality (per 1000 live births)
Australia	0.955	29 632	35.2	80.4	5.0
Japan	0.943	27 967	24.9	81.9	3.0
New Zealand	0.933	22 582	36.2	78.9	5.3
Singapore	0.907	24 481	42.5	78.9	2.2
Republic of Korea	0.901	17 971	31.6	75.5	6.2
Brunei Darussalam	0.866	...	...	76.1	8.3
Tonga	0.810	6 992	...	70.7	9.8
Malaysia	0.796	9 512	49.2	73.0	6.2
Thailand	0.778	7 595	43.2	69.3	21.5
Samoa	0.776	5 854	...	68.2	19.3
Philippines	0.758	4 321	46.1	68.3	29.0
China	0.755	5 003	44.7	71.1	30.0
Fiji	0.752	5 880	...	67.3	17.8
Sri Lanka	0.751	3 778	33.2	70.3	15.4
Maldives	0.745	...	...	66.1	14.0
Viet Nam	0.704	2 490	37.0	71.3	26.0
Indonesia	0.697	3 361	34.3	66.4	35.0
Mongolia	0.679	1 850	30.3	63.5	23.5
Vanuatu	0.659	2 944	...	68.3	27.0
India	0.602	2 892	32.5	61.0	68.0
Solomon Islands	0.594	1 753	...	65.4	66.0
Myanmar	0.578	...	...	62.3	59.8
Cambodia	0.571	2 078	40.4	54.6	95.0
Lao PDR	0.545	1 759	37.0	55.1	82.2
Bhutan	0.536	...	...	61.3	60.5
Nepal	0.526	1 420	36.7	60.1	64.2
Papua New Guinea	0.523	2 619	50.9	59.8	64.0
Bangladesh	0.520	1 770	31.8	62.6	51.0
Timor-Leste	0.513	...	...	57.5	70–95

... Data not available

Sources: *Human development report 2005: international cooperation at a crossroads: aid, trade and security in an unequal world*. New York, United Nations Development Programme, 2005.

Core indicators 2005: health situation in the South-East Asia and Western Pacific Regions. New Delhi and Manila, WHO Regional Offices for South-East Asia and the Western Pacific, 2005.

Box 2.2: Poverty and tuberculosis

The countries of WHO's South-East Asia Region (Bangladesh, Bhutan, the Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste) account for 3 million new TB cases and 600 000 deaths annually. Nearly 3 million people now have HIV and TB coinfection. Multidrug resistance accounts for 2% of cases overall, with a few "hotspots". Poverty and TB create a vicious cycle. Poorer populations are twice as likely to have TB, three times less likely to access care for TB, four times less likely to complete TB treatment and five times more likely to incur impoverishing payments for TB care. In an effort to cope with the disease, people may decrease food intake, sell assets, borrow, withdraw children from school, leave their families or delay seeking care. There may be direct impact in the form of income loss, stigmatization and homelessness. Poor housing, overcrowding, malnutrition and risky behaviour also play important roles. Tuberculosis is the single leading cause of death among women of reproductive age.

Source: *Report of the WHO Regional Consultation on Social Determinants of Health New Delhi, India, 15-16 September 2005*. New Delhi, WHO Regional Office for South-East Asia, 2005.

In general, the poor suffer much higher child mortality than the better-off. For example, in India, Indonesia, the Philippines and Viet Nam, the under-five mortality rate among the poorest quintile of the population is three times higher compared to the richest quintile (Table 2.3). Poverty generates or reinforces social exclusion due to gender, geographical location and ethnicity. Rural populations usually have worse access to water and sanitation facilities, fewer educational opportunities and higher risk of malnutrition than urban populations. The latter have more exposure to outdoor air pollution and overcrowded, unsanitary housing in underserved slum or shantytown settlements. Urban slums (areas not zoned or adequately serviced) are growing rapidly in nearly all developing countries.

Table 2.3 Under-five mortality rates (U5MR) in selected Asia Pacific countries

Country	Year	U5MR Poorest quintile	U5MR Richest quintile	Ratio of Poor:Rich U5MR
Bangladesh	2004	121	72	1.7
Cambodia	2000	155	64	2.4
India	1998-1999	141	46	**3.1**
Indonesia	2002-2003	77	22	**3.5**
Nepal	2001	130	68	1.9
Philippines	2003	66	21	**3.1**
Viet Nam	2002	53	16	**3.3**

Source: Gwatkin D, *et al. Socioeconomic differences in health, nutrition and population within developing countries: an overview*. Washington DC, World Bank, 2007.

High national income alone does not bring economic well-being unless it is spent efficiently on what people actually need. Judicious choice of interventions helped Sri Lanka achieve good health at low cost.[4] Secure countries can divert resources from defence to health and education. New Zealand spends more than 6% of GDP on health and as much on education, but less than 2% on the military.

2.2 Education and health

Education is a key element of sustainable development and is perhaps one of the most important underlying determinants of health at both individual and community levels. Education reduces poverty through increased employment, and provides skills for attaining better health.

Evidence points to individual and societal health benefits of basic education, particularly for girls. According to the World Bank, "participatory health education for schoolchildren is one of the most timely and effective ways of promoting healthier lifestyles and averting the emerging pandemic of noncommunicable diseases among the next generation of the poor". Education not only enables women to make informed choices and adopt better health and nutrition practices, it also increases the pool of health care service providers and community educators. The health and well-being of children is influenced by the family's social, economic and educational status. At the same time, it also affects the ability of children to attend school, learn and, most importantly, to complete at least 8 to 10 years of schooling.[5]

Two frequently used education indicators are adult literacy rate and the combined gross enrolment ratio (CGER). Adult literacy rate is computed as the percentage of people age 15 and older who can both read and write a short simple statement about their everyday life. On the other hand, CGER is computed by dividing the number of students enrolled in all levels of schooling (elementary, secondary and tertiary) by the total population in the official age groups corresponding to these levels. These two indicators comprise the education component of the HDI, and are used as measures of the coverage, quality and effectiveness of national educational systems.

Table 2.4 shows the adult literacy rates and the combined gross enrolment ratios among 29 countries in the Region in 2003. While 17 out of 29 (58.6%) countries included in the list have adult literacy rates of at least 90%, there are 3 countries (Bangladesh, Bhutan and Nepal) where the illiterate outnumber those who are literate. There is a large variability in CGER across countries, with 2003 levels ranging from 41 in Papua New Guinea to 116 in Australia. Combined gross enrolment ratio values higher than 100 imply the enrolment of people older than school age, while very low values indicate a high proportion of the school-age group being out-of-school. In general, there is a direct relationship between these two indicators, with countries having high adult literacy rates also having high CGERS. These indicators are relevant to health since school attendance and literacy affect access to and understanding of health-related knowledge. This in turn affects health-related attitudes and practices, which are very important determinants of health status.

Education is probably the most critical determinant of health for women, and for society in general, because evidence shows that the benefits of education for women and girls transcend generations. Education means women benefit through increased knowledge to protect health and seek proper health care. In addition, education for women and girls results in better health, education and welfare outcomes for children and families. Female literacy rate is a strong predictor of maternal mortality rate, shown in Figure 2.2. Educated women typically have a better understanding of health-promoting practices and improved nutrition, and are more likely to increase spacing between births, so they are also less likely to die in childbirth than are uneducated women. Estimates suggest that an extra year of education can prevent two maternal deaths per 100 000 live births.[6] There is a similar relationship between female literacy and neonatal mortality due to low birth weight.

Table 2.4 Adult literacy rates and combined gross enrolment ratios among 29 countries and areas in the Asia Pacific Region, 2003

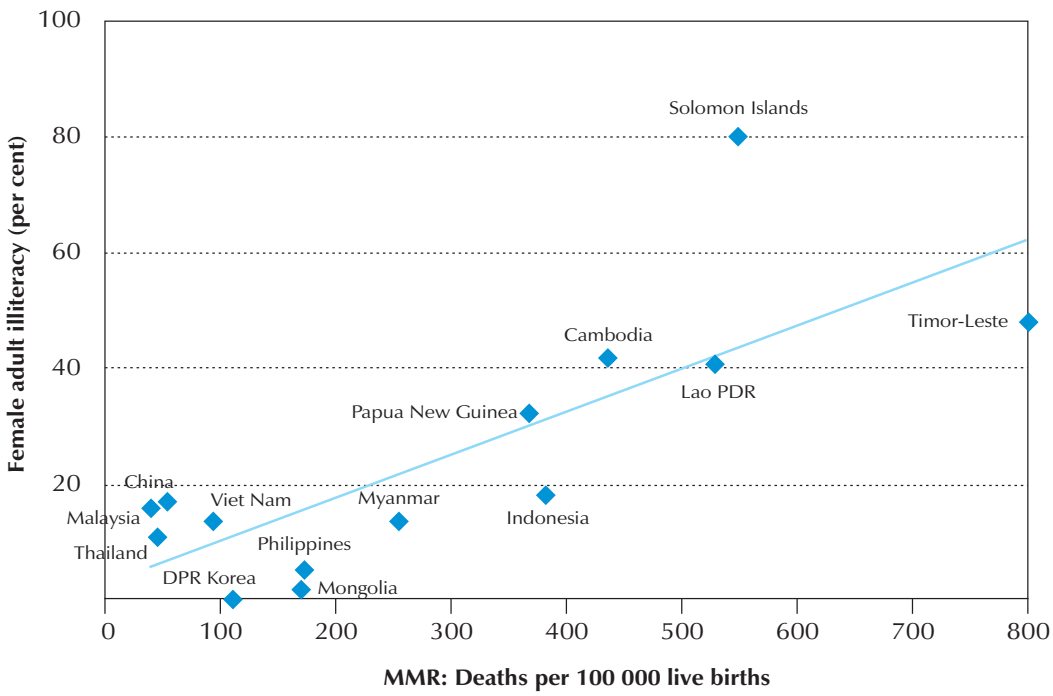
	Adult literacy rate %	Combined gross enrolment ratio
Australia	99	116
New Zealand	99	106
Japan	99	84
Samoa	99	71
Republic of Korea	98	93
Mongolia	98	74
Maldives	97	75
Hong Kong (China)	94	74
Singapore	93	87
Philippines	93	82
Brunei Darussalam	93	74
Fiji	93	73
Thailand	93	73
China	91	69
Sri Lanka	90	69
Viet Nam	90	64
Myanmar	90	48
Malaysia	89	71
Indonesia	88	66
Solomon Islands	77	52
Cambodia	74	59
Vanuatu	74	58
Lao PDR	69	61
India	61	60
Timor-Leste	59	75
Papua New Guinea	57	41
Nepal	49	61
Bhutan	47	...
Bangladesh	41	53

... *Data not available*

Source: *Human development reports*. New York, United Nations Development Programme.

Primary school enrolment of girls is almost equal to that of boys in the Region, except in southern Asia, where only 83% of girls are enrolled, compared to 90% of boys.[7] Data on enrolment at secondary and tertiary levels reveals a narrowing gender gap, but a significant proportion of girls still drop out after primary schooling.

Fig. 2.2 Maternal mortality and female adult illiteracy in 14 countries in the Region



Source: *Towards a region fit for children: an atlas for the sixth East Asia and Pacific ministerial consultation*. Bangkok, UNICEF East Asia and Pacific Regional Office, 2003.

Female educational level is also related to under five mortality rate, which is highest in households where mothers have no schooling.[8] Studies suggest that under-5 mortality rates may be reduced by 5%–10% with every additional year of maternal education.[9] Much of the global decline in malnutrition from 1970 to 1995 is attributable to improvements in education for women.[†, 10]

2.3 Lifestyle and health

The Asia Pacific Region is experiencing a dramatic rise in NCD and STI (see chapters 8 and 7). Diet and physical inactivity are important risk factors, along with sexual behaviour and tobacco use. Rapid economic growth and changing lifestyle patterns, including reliance on foods rich in fat, sugar and salt, increased alcohol and tobacco use, and occupational patterns resulting in more sedentary lifestyles, are causing increasing prevalence of chronic diseases.

Diet and physical activity

Healthy diets and regular, adequate physical activity are major factors in the promotion and maintenance of good health throughout the entire life course. Unhealthy diets and physical inactivity are risk factors for raised blood pressure and blood glucose, abnormal blood lipids, overweight and obesity, and for major chronic diseases, such as cardiovascular diseases, cancer and diabetes.

[†] Gains in women's education accounted for 43% of the total, followed by food availability, the government's commitment to health at local and national levels, and women's relative status.

As a lifestyle risk factor (as opposed to risk of undernutrition), diet is no longer an issue only for wealthier populations. The probability of obesity for low socioeconomic groups exceeds that for higher economic status groups once a country's per capita income reaches US$ 2500.[11]

Much morbidity and mortality in the Region is nutritional in origin, some of which is attributed to low fruit and vegetable intake.[12] Data on dietary consumption of energy, protein and fat for 28 countries in the Region is shown in Annex Table 2.1.

Average calorie intake per day is less than 2200 kcal in Bangladesh and Cambodia, but it exceeds 3000 kcal in Australia, New Zealand and the Republic of Korea. Most of the difference is due to higher consumption of fats. Between 1979 and 2002, the percentage of calories obtained from cereals and root vegetables decreased from 78% to 60% in East and South-East Asia and from 66% to 60% in South Asia. Meat products and vegetable fats increased from 9% to 18% and 7% to 10%, respectively, in the same period. Changes in Pacific island countries were less pronounced. The possible benefits of a diet low in meat and animal fats can be seen in the Region, where hundreds of millions of people are vegetarians for religious reasons.

Box 2.3: Dietary changes and health in Japan

Research in Japan has identified specific negative effects of current dietary trends on health. Life expectancy in Japan's subtropical island prefecture of Okinawa is still the longest in the world, but it has been falling relative to other prefectures since the 1980s. The drop in life expectancy appears to be associated with drastic socioeconomic changes following World War II, especially the introduction of cheap canned pork products, higher incomes, lower vegetable consumption and a more sedentary lifestyle. These have resulted in increased dietary fat intake and average body weight of schoolchildren, and an increase in circulatory diseases in general.

Source: Todoriki H, Willcox DC, Willcox BJ. The effects of post-war dietary change on longevity and health in Okinawa. *Okinawa journal of American studies*, 2004, 1:52-61.

High fat diets contribute significantly to obesity and other causes of NCD. Cooking methods now use more fats, and cheap, readily available high-fat imported food is a major dietary component of the poor. Australia, French Polynesia, Kiribati, New Caledonia, New Zealand and Samoa consume more than 100g of fat per person per day. Imports of fatty meats such as lamb breast and turkey tails contribute to health risks in many Pacific island countries. Fast food, even in some developing countries, contributes to high fat consumption. In some Pacific island countries, obesity is considered a sign of prosperity and well-being, but policy-makers are becoming aware of the burden it places on the health system.

Regular physical activity can reduce premature death and disability. Worldwide, physical inactivity is estimated to cause about 10%–16% of cases of breast cancer, colon and rectal cancers and diabetes mellitus, and about 22% of ischaemic heart disease.[13] Overall, 1.9 million deaths are attributable to physical inactivity. Improvement in levels of physical activity in populations requires intersectoral action, plans with clear implementation strategies, political support and resources for physical activity programmes, and partnerships with multiple agencies and sectors. To support the WHO Global Strategy on Diet, Physical Activity and Health, the Asia Pacific Physical Activity Network (APPAN) was developed to provide current information about physical activity programmes, policy development and surveillance

in the Region, using a website portal.[14] The Asia Pacific Physical Activity Network has been working on a project to provide data on the prevalence and trends of physical activity participation in countries in the Asia Pacific Region.

Physical activity programmes can be designed as single-risk factor interventions focusing on physical inactivity only, or multi-risk factor interventions that include other lifestyle factors (e.g. unhealthy diets, tobacco use, alcohol consumption and psychosocial stress).

Several countries, including Fiji, Malaysia, Samoa, Thailand and Tonga, initiated programmes as part of the implementation of a national action plan or strategy, such as for NCD prevention and control, health promotion, or physical activity promotion in particular. Some countries set up specific committees on physical activity promotion within a leading government agency (e.g. the ministries of health, education or sport) or NGOs.

Box 2.4: Physical activity research and policy in Australia

The Australian Department of Health and Aging has commissioned a number of research reports, projects and surveys to better understand physical activity participation in the population, in addition to implementing intervention projects to improve health through regular physical activity. Epidemiological evidence is reasonably strong, suggesting a causal relationship between physical inactivity and the increased risk of mortality and/or incidence of coronary heart disease, non-insulin dependent diabetes mellitus and colon cancer. Research also provided evidence that physical activity can improve health and well-being, reduce the risk of some chronic diseases, and help to maintain a healthy weight. The Australian Government provides a leadership role in developing physical activity policies, and as part of this, aims to encourage participation in 30 minutes of moderate-intensity physical activity on most or all days of the week, to gain a health benefit.

Sources: Healthy weight resources. Canberra, Department of Health and Aged Care. Available from: health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-active-index.htm

Stephenson J *et al. The costs of illness attributable to physical inactivity in Australia, a preliminary study.* Canberra, Commonwealth Department of Health and Aged Care and the Australian Sports Commission, 2000.

Alcohol, drugs and tobacco

Excessive alcohol use is associated with lower socioeconomic status, and contributes to high levels of hypertension and a range of physical and psychosocial pathologies as well as injuries. Heavy alcohol consumption is reported among rural Indian labourers in Malaysia. In China, 26.3% of men and 1.3% of women with less than 6 years of school reported drinking more than once a day, compared with only 7.4% of men and 0.2% of women with more than 13 years. Alcohol advertising is specifically targeted to poorer sections of the community in many Asian countries. The cost of regular heavy drinking also exacerbates poverty.

High alcohol consumption is associated with difficulties in finding and gaining employment. Family and social networks are affected by alcohol dependency, and alienation from these networks can exacerbate existing health problems. High levels of alcohol consumption and other forms of substance abuse can be seen as a means of coping with social isolation and other effects of poverty, while at the same time, alcohol abuse can be a cause of poverty.

The incidence of drug abuse is comparatively low in the Region. Cannabis use is high in Australia, the Federated States of Micronesia and Papua New Guinea, and somewhat less in Cambodia and the Philippines. Abuse of amphetamines, a more damaging substance, is high in the latter two countries. Opiates are abused significantly in many parts of China and South-East Asia.

Illness due to tobacco use currently results in nearly 5 million deaths annually worldwide, more than those due to AIDS, drugs, homicides and accidents combined. Tobacco products kill more than 2 million people a year in the Region, accounting for 12.8% of all male and 2.7% of all female deaths. There are also clear links between tobacco use and poverty.

Strong measures are needed to control the menace of tobacco because the addictive habit is promoted by the influential tobacco industry. About two thirds of men smoke in Phnom Penh, Cambodia, and in China and the Republic of Korea, and nearly half do in Japan and Malaysia. Smoking is gaining a foothold among teenagers, youth and females in the Region. In China, about a third of male and nearly 8% of female teens smoke, versus 4% of women smokers in the population. In Japan, the prevalence of smoking has risen to 10% among women, and nearly 40% of adolescent boys smoke in the Philippines.

Health warnings on tobacco products are used in the Region but may not be effective because of low literacy in some countries. Most countries have banned advertisement of tobacco products in the electronic media. Tobacco taxes can have a significant effect on reducing rates of smoking while providing revenue for other health activities. Studies show that for every 10% increase in tobacco prices via taxation, tobacco consumption declines by 5%–8%, with most impact on poor smokers.[15,16] However, reducing tobacco consumption is a contested policy issue in China and other countries where taxation of tobacco is a significant revenue source.[¥]

Box 2.5: Smoking cessation in Maldives

Since the President of Maldives made a public appeal for tobacco control in 1982, many regulations and measures were put in place, including a total ban on tobacco advertising and smoking in many public places. A high-level intersectoral committee for tobacco control was established in 1996. The first national tobacco prevalence survey, conducted in 1997, showed that 57% of males and 29% of females were smokers. This changed significantly by 2001, when tobacco use decreased to 37.4% and 15% respectively. Since then, several islands have declared themselves tobacco-free, and all women in several other islands have stopped smoking.

Source: *Multisectoral mechanisms for comprehensive tobacco control: report of a regional consultation Bangkok, 9-11 July 2003*. New Delhi, WHO Regional Office for South-East Asia, 2003.

[¥] According to figures of the Tobacco Free Initiative, WHO Regional Office for South-East Asia, tobacco revenue is as high as 10%–12% of total government revenue in Nepal and Sri Lanka. In Nepal, annual tobacco revenue was about US$ 48 million between 1999 and 2000; it was about US$ 270 million in Sri Lanka in 1999. In India, Indonesia and Thailand, tobacco revenue accounts for 3% of total revenue.

Sexual behaviour

The rapid emergence of HIV and re-emergence of other STI in the Region has brought sexual behaviour into sharp focus (see section 7.2). Nearly 5% of deaths worldwide and 2% in the Region are attributable to unsafe sex (Chapter 5 Annex Table 5.12). An estimated 5 million people in the Region are living with HIV and close to 1.1 million became newly infected in 2003, among them 194 400 women. The prevalence of HIV infection is rising, and the large population makes even low infection rates a matter of concern. With a prevalence of less than 0.4%, India alone has about 2.5 million people living with HIV.[€,17] The stigma and discrimination associated with HIV infection has severe personal consequences, and also drives the infection underground, out of reach of the health system. The risk of being infected with HIV is closely linked to gender inequality, the inability to negotiate safe sex, and in some areas HIV rates are also high among injecting drug users.

2.4 Food production and security

Healthy, well-nourished people are essential for national development. More than 500 million people in Asia Pacific countries do not have enough food to meet their basic nutritional needs, over 350 million in China and India alone. Food security means access to sufficient, safe and nutritious preferred food at all times to meet the requirements of an active and healthy life (see sections 4.6 and 9.3). This basic need remains unfulfilled in many countries. The high prevalence of undernutrition in the Region (see Chapter 9) is an indicator of food insecurity. At the household level, nutritional status of family members depends on sufficient food availability, equitable distribution of food within the household, and sufficient variety, quality and safety of food. Basic good health is also necessary to receive benefit from the food consumed.

Production substantially determines the availability of food, strongly affecting a population's nutritional status. Efficient distribution systems and adequate reserves are also needed to achieve food security. According to the Food and Agricultural Organization of the United Nations (FAO), per capita food production has grown 3% to 4% annually since 1990 in East and South-East Asia, but in south Asia it has decreased since 2000. Thailand and Viet Nam are the world's largest rice exporters.

Food aid is primarily used as a safety net for the poor and to stabilize food grain prices and alleviate famine. Food aid to the Region has declined rapidly in recent years, especially to South Asia, and is now about 22% of the world's total food aid.[18] Bangladesh maintains a public food grain distribution system through food for work, food for education, and vulnerable group feeding and development programmes, as well as open market sales of food.

Given the projected increase in world population and pressures on natural resources, the problems of hunger and food insecurity have global dimensions and are likely to persist and even increase dramatically in some regions unless concerted action is taken. Widespread rapid increases in the cost of basic foods in 2007 in China and other countries have raised awareness of this problem and have highlighted relationships between economic growth, food production, energy use and global warming.[19] This should strengthen the call for intersectoral action on nutrition, as well as other socioeconomic determinants of health.

€ The estimate of HIV prevalence rate in India was recently reduced by nearly 100%, but it still accounts for one quarter of the cases outside sub-Saharan Africa.

Box 2.6: Food security in the Asia Pacific Region

Many countries in the Region have improved food production markedly, yet cannot consistently meet nutrient requirements. Rice production increased substantially in Bangladesh, but self-sufficiency is constrained by rapid population growth, traditional farming practices, limited land for agriculture production and frequent natural disasters.

India has made determined efforts since the 1960s to achieve self-sufficiency and improve household food security. Average per capita energy availability currently stands at 2440 kcal per day. The prevalence of poverty is still relatively high, but targeted anti-poverty measures have reduced vulnerability to famines and maintained the status of food security.

In China, per capita availability of food has increased steeply to more than 2900 kcal in 2002, but annual fluctuations and uneven distribution across regions continue to cause concern. In addition, rapid industrialization has led to competition for resources between agricultural and non-agricultural sectors.

Indonesia has pursued self-sufficiency in rice since the late 1960s, and food availability has increased to around 2910 kcal per day. Household food security also improved significantly. Part of this success is due to an integrated policy of marketing interventions, introducing high yielding varieties of rice and making the required inputs available.

In Cambodia, nearly 30% of the population lives below the poverty line and 30% of communities face chronic food shortages. Localized food insecurity is due to lack of crop diversification and inadequate irrigation, and the loss of productive assets due to indebtedness. Food security and nutrition have a high priority in national strategies and plans.

In Viet Nam, food security improvements have mainly benefited urban and wealthier households. Among the poor, the amount of calories consumed has increased but micronutrients are lacking. Significant differences remain between rich and poor and between regions within the country.

Sources: *The state of food insecurity in the world 2004*. Rome, Food and Agriculture Organization of the United Nations, 2004.

Molini V. *Food security in Vietnam during the 1990s: the empirical evidence*. Tokyo, United Nations University, World Institute for Development in Economics Research, 2006 (Research paper 2006/67).

2.5 Gender and health

Gender and health are related through multiple pathways. Gender roles and norms and the gender-based division of labour interact with education, employment status, income, culture, household position, age, and physical and social environments.

The growing feminization of poverty has been increasingly noted. In the Asia Pacific Region, intra-household distribution of resources and division of responsibilities between men and women, boys and girls differ with social status and economic conditions. Gender issues in health, therefore, need to be addressed within the broader framework of poverty and social inequity. Gender is not a "stand-alone" category, but is enmeshed in social, economic and cultural situations and practices.

Box 2.7: The Beijing Declaration and Platform for Action (1995)

"The explicit recognition ... of the right of all women to control all aspects of their health, in particular their own fertility, is basic to their empowerment.... We are determined to ... ensure equal access to and equal treatment of women and men in ... health care and enhance women's sexual and reproductive health".

"Women have the right to enjoy the highest attainable standard of physical and mental health. The enjoyment of this right is vital to their life and well-being and their ability to participate in all areas of public and private life.... Women's health involves their emotional, social and physical well-being and is determined by the social, political and economic context of their lives, as well as by biology.... To attain optimal health, ... equality, including the sharing of family responsibilities, development and peace are necessary conditions."

Source: *Beijing Declaration*. See: http://www.un.org/womenwatch/daw/beijing/platform/declar.htm

The Human Development Index does not consider the status and participation of women, aspects of development central to gender equity. The differentials between countries in the Region seen in two specialized indices are as wide as for the HDI. The Gender-related Development Index (GDI) incorporates an index of equality between men and women with respect to life expectancy, education and income. The Gender Empowerment Measure (GEM) reflects opportunity rather than capability. It includes dimensions of political participation and decision-making power as measured by women's share of parliamentary seats, economic participation and decision-making power. The relatively greater opportunities for women in employment, education and other spheres of life in industrialized countries are reflected in their higher levels on these indices, although there are notable exceptions. These are shown for some countries in the Region in Table 2.5, with trend data for the GEM in Annex Table 2.2.

Gender as a determinant of health risk[¥]

Gender inequality is a strong determinant of health. Men and women have different exposure to risk factors, and different access to health information and use of health services. These lead to unequal health outcomes, which have different social and economic consequences for women and men. For example, men are more likely than women to work in and around motor vehicles and outside near roads, and are therefore more subject to injury and death from vehicle accidents. Women are more likely to be exposed to risks such as indoor household smoke and have worse access to adequate sanitation facilities. Women are more susceptible to STI, with more serious consequences than for men, including infertility.

Health and health outcomes are inseparable from how people experience the health care delivery system. Women face more serious health risks than men but have difficulty seeking care because they work longer hours and have poorer access to and control over resources. Being poor or being a woman is often a cause for being discriminated against, and may result in abuse, neglect and poor treatment, and poorly explained reasons for procedures. Service providers have been observed to rarely discuss reproductive goals with couples seeking abortion services, but rather reprimand the woman for getting pregnant.[20] In some societies there are cultural barriers to women seeking care from male providers which further restrict their access to care.

[¥]See also Chapter 5

Table 2.5 Gender-related development indexes for 21 countries and areas in the Asia Pacific Region, 2005

	Gender Development Index (GDI)	Gender Empowerment Measure (GEM)
Australia	0.954	0.826
Japan	0.937	0.534
New Zealand	0.929	0.769
Hong Kong (China)	0.912	...
Republic of Korea	0.896	0.479
Malaysia	0.791	0.502
Thailand	0.774	0.452
Philippines	0.755	0.526
China	0.754	...
Sri Lanka	0.747	0.370
Fiji	0.742	0.381
Viet Nam	0.702	...
Indonesia	0.691	...
Mongolia	0.677	0.388
India	0.586	...
Lao PDR	0.540	...
Papua New Guinea	0.518	...
Bangladesh	0.514	0.218
Nepal	0.511	...
Cambodia	...	0.364
Singapore	...	0.654

... Data not available

Source: *Human development report 2005: international cooperation at a crossroads: aid, trade and security in an unequal world*. NewYork, United Nations Development Programme, 2006.

Although they use primary care relatively more than men, overall women have worse access to health care.[21,22] Even in industrialized countries, women are at increased risk for receiving suboptimal care for serious illness. In Canada, women age 50 or older were less likely than older men to be admitted to the intensive care unit, to receive life-saving interventions, and more likely to die when admitted because of a critical illness.[23]

In some communities, society, care providers and family place lower value on women's health and survival compared to men's. Girls may be less likely to be hospitalized than boys and more likely to die prematurely. Women who work at home and on family land may be dependent on husbands or the head of the family for mobility and the ability to access services.[24] This often results in inadequate care, nutrition and rest for women.[25] A woman in prolonged labour might not be taken to the hospital, both because the decision to do so rests with her husband and not with her, and because pain and difficulty in childbirth are seen as the natural lot of women.

Health status in turn affects social and economic status. This is especially true for infertility, HIV/AIDS, STI, TB and other debilitating physical and mental diseases. Stigma, social ostracism, desertion, abandonment and domestic violence can dramatically exacerbate the already lower status of women. Women are vulnerable to different forms of violence over their life cycle. Battering, coerced pregnancy and mass rape in conflict situations are dangers to women and their unborn children. Female infanticide, differential access to food and medical care, discrimination against girls in nurturing and care, and the inability of girls to attend school have been documented.[26] Courtship violence and workplace violence, high rates of intimate partner violence, dowry abuse, honour killing, psychological abuse, sexual abuse at the workplace and other forms of sexual harassment affect the health of women.[27]

More healthy years of life are lost by women than by men in the Region, the result of persisting patterns of social discrimination against women and unfulfilled responsibilities of men. This poses a challenge to policy-makers, because many of these determinants are amenable to guided changes. For example, rates of TB are generally high in South-East Asia, with higher female mortality rates compared to other regions. The stigma of TB, especially in women, causes impediments to effective treatment.[28,29] Among the reasons identified are that, given their relative status in the family, fewer women go for a sputum test and more tend not to return to the clinic to complete the test.[30] When women do seek help and start taking treatment, they are more likely than men to adhere to the treatment regimen and complete the full course. Women in the reproductive age group are often undernourished and, as for almost all other infectious diseases, for TB they also run higher risk than men of contracting the disease. The rate of progression from infection to disease is significantly higher for women of reproductive age than for men of the same age.

Similar evidence exists for HIV/AIDS. Globally, women already account for 48% of infected adults. In the Region, there has been a steady spread of infection to monogamous women from their partners.

Maternal and child mortality

Maternal mortality rates (MMR) mirror the disparities between wealthy and poor countries more than any other measure of health. As an indicator of inequality, it also reflects women's inferior place in society, with respect to household decision-making power, access to social support, economic opportunities and health care. Countries that have paid special attention to maternal and child mortality, such as Sri Lanka, are exceptions, but in general, poorer countries have higher MMR. Maternal mortality rates per 100 000 live births in the Region range from 800 in Timor-Leste and 407 in India, to 13 in Thailand and 10 in Japan.

The prenatal health and nutritional status of women and their ability to access obstetrical and other health facilities are determinants of maternal and child mortality. In the least-developed countries, high maternal mortality is related to measures of poor health system responsiveness.[31] The percentage of births attended by skilled personnel is an indicator of women's access to health services, and is closely associated with low MMR. The very poor and those living in rural and remote areas have the worst access. The direct and indirect obstetrical causes of maternal death are well known, and some international programmes have had some success in reducing maternal deaths.

Assuming no discrimination in nutrition and health care on the basis of gender, the probability of survival of a girl child is expected to be greater than that for a boy. However, the Region as a whole is more masculine than the rest of the world, with a population sex ratio (PSR) of 103.7 (the number of males per 100 females). Japan and Australia have PSRs of 95.5 and 97.6, compared to 105.5 in China, 105.2 in India, 104.5 in Bangladesh and 106.4 in Papua New Guinea.

The ratio of male to female children under age five (child sex ratio, or CSR) is also an indicator of son preference, and points to the possible prevalence of sex-selective abortion and poorer care and nutrition of girls compared to boys. The most populous countries in the Region also have high CSRs: 111 in China, 107 in India (2001), 104 in Bangladesh and Indonesia and 106 in Japan. China's high CSR is partly attributed to its one-child population policy.

2.6 Human rights, governance and civil society

Human rights and health

Health and human rights are closely linked. Violation or neglect of the human rights of women, men and children can have the most serious health consequences. Such violations can take the form of torture and other forms of violence, denial of food and shelter, and lack of access to health care facilities in times of distress. Vulnerability to ill-health is reduced by promoting and protecting human rights. How health delivery services are designed and positioned in society can either promote or violate people's human rights.

It has been demonstrated that respect for human rights in the context of HIV/AIDS, mental illness and physical disability leads to markedly better prevention and treatment. Respect for the dignity and privacy of individuals can facilitate more sensitive and humane care. Stigmatization and discrimination thwart medical and public health efforts to heal people with disease or disability.[32]

In an approach to health equity based on basic human needs, beneficiaries have no active claim to their needs being met. A human rights-based approach legitimizes those claims, giving them political and legal weight. Fulfilment of rights is an obligation of the duty-bearer, not the dispensation of a charitable or compassionate act.

Most countries of the Region are parties to conventions and agreements on health and human rights, including the Convention on the Elimination of All Forms of Discrimination Against Women (1979), the Convention on the Rights of the Child (1989), the International Conference on Population and Development Cairo Programme of Action (1994), the Beijing Platform of Action (1995), the Social Summit Copenhagen Declaration (1995), the Convention on the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (1999) and the Maternity Protection Convention (2000).

These[33] provide for:

- The right to the highest attainable standard of physical and mental health, including reproductive and sexual health.
- Equal access to adequate health care and health-related services, regardless of sex, race or other status.
- The right of all children, women and men to equitable distribution of food, safe drinking water and sanitation, adequate standard of living and adequate housing and a safe and healthy environment.
- The right to a safe and healthy workplace, and to adequate protection for pregnant women in work proven to be harmful to them.
- Freedom from discrimination and discriminatory social practices, including prenatal gender selection and female infanticide.

- The right to education and access to information relating to health, including reproductive health and family planning to enable couples and individuals to decide freely and responsibly all matters of reproduction and sexuality.
- The human right of the child to an environment appropriate for physical and mental development.

In concrete terms, there are four major criteria by which to evaluate rights to health:

(1) Availability: functioning public health and health care facilities, goods and services, as well as programmes, must be available in sufficient quantity.

(2) Accessibility: health facilities, goods and services have to be accessible to everyone without discrimination, within the jurisdiction of the state party. Accessibility has four overlapping dimensions: non-discrimination, physical accessibility, economic accessibility or affordability, and information accessibility.

(3) Acceptability: all health facilities, goods and services must be respectful of medical ethics and culturally appropriate, sensitive to gender and life-cycle requirements, as well as designed to respect confidentiality and improve the health status of those concerned.

(4) Quality: health facilities, goods and services must be scientifically and medically appropriate and of good quality.

Reducing inequalities in health is an overarching aim of all public health policies. The complexity of the causes of inequalities in health means that multisectoral action is often needed. Interventions must tackle macro-environmental factors, as well as access to health care and adverse health behaviours. Progress towards targets should be evaluated regularly to inform evidence-based policy refinements.

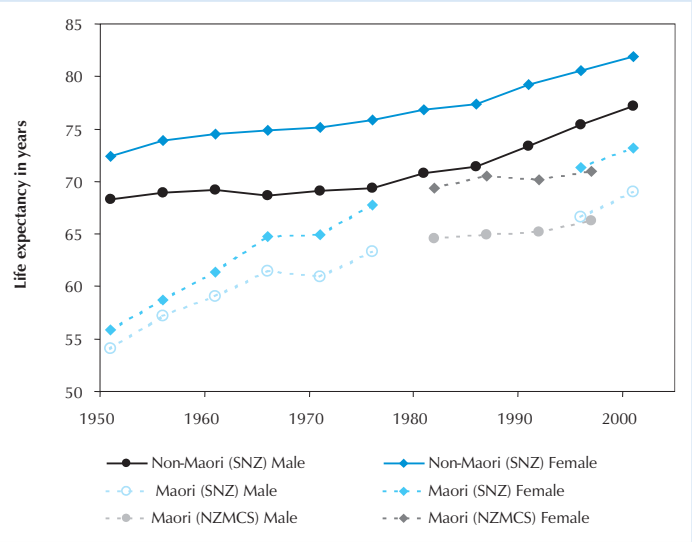
Box 2.8: Mongolia—ultisectoral work for human rights and health

The Government is creating a supportive policy and legal environment through the State Public Health Policy 2001–2015, the Mongolia MDG Strategy 2000–2015, and the Health Sector Strategic Master Plan 2006–2015. These documents emphasize the right to health, well-being and equity, and call for pro-poor, client-centred and gender-sensitive approaches. The National Public Health Council is headed by the Prime Minister. It is responsible for ensuring intersectoral cooperation in implementing health policy and developing partnerships between government, NGOs, the private sector and international organizations. The government intends the National Public Health Council to be an effective tool for addressing the social determinants of health and increasing intersectoral collaboration.

Source: *Report of the Consultation on Social Determinants of Health in the Western Pacific Region, 22-24 March 2006, Beijing, China*. Manila, WHO Regional Office for the Western Pacific, 2006.

Social justice and inclusion policies are motivated by a general concern for human rights and dignity. Improving access to employment, education, health care and other services, and preventing the social exclusion of vulnerable groups also addresses health equity and poverty. In New Zealand, a social justice-oriented policy climate agenda allowed rapid large-scale changes in the way health services interact with communities, and effective intersectoral collaboration. Specific interventions were supported by research evidence from the community level.

Box 2.9: Primary health care and housing improvements in New Zealand



Addressing health inequalities is a priority for health sector planning in New Zealand as well as a key focus in overall social policy. A growing research base about Maori health fostered active discussion in academic and policy circles about health inequalities (life expectancy differentials are illustrated in the chart).

Structural reforms of the 1980s and 1990s disproportionately affected Maori and also Pacific peoples and raised concern that the reforms had undermined the egalitarian ideal and greatly increased inequality. Primary health organizations were introduced in the late 1990s to provide health care focused on the needs and participation of the community. Data also pointed to poor housing as the cause of serious health problems in Maori neighbourhoods. A US$ 45 million housing improvement programme has benefited 5000 families in Auckland.

Source: *High-level Meeting on Promoting Health Equity: Evidence, Policy and Action, Phnom Penh, Cambodia, 16-18 October 2007*. Manila, WHO Regional Office for the Western Pacific, 2007.

Civil society and health

The need to involve communities in planning, implementation, monitoring and evaluation of health programmes has been recognized as essential to comprehensive primary health care. Civil society organizations include health and development NGOs, community health and development training NGOs, health policy resource groups, advocacy for the marginalized, campaigns, social movements, issue-based resource centres, and environment networks. Civil society organizations often work at the grassroots level and are able to articulate the needs and aspirations of communities, especially the poor.

As attainment of health goals has become more influenced by political, legal, investment, trade, employment and social factors, civil society involvement in health has also widened to include organizations whose main mandate lies outside the health sector. For example, youth organizations not specifically set up to deal with health issues have contributed to adolescent reproductive health promotion, and groups such as trade unions, which deal mainly with economic and trade issues, have played an important role in essential medicines lobbying.

Civil society action on social determinants can include participatory research, lobbying and advocacy, and service delivery. Significant advances achieved through interventions by civil society organizations include the India People's Charter for Health (2000), Asian People's Charter on HIV/AIDS (2003), India's National Right to Health Care Campaign (2004–2005), and the Mumbai Declaration for Health for All (2004).

Box 2.10: Civil society actors in health in the Region

People's Health Movement and Self Employed Women's Association, India: Launched in 2000, the People's Health Movement consists of a number of organizations, advocacy groups, movements, trade unions and women's organizations. Activities include development of the People's Charter for Health (2000), engaging with political parties before the parliamentary elections in 2004, campaigning for The National Right to Health Care by organizing public hearings in collaboration with the National Human Rights Commission of India, which led to framing of a National Health Action Plan. The Self Employed Women's Association is a trade union of 700 000 women workers in the informal economy in Gujarat and seven other states in India. The focus is on women-led, community-based organization, self-reliance, and a holistic and integrated approach involving health and microcredit schemes. The Self Employed Women's Association works both at grassroots levels and at policy levels. Its health activities cover 30 wards in three urban areas with 1.2 million people, and 500 villages in rural areas of 16 districts in Gujarat and Bihar states, with a population of 1.5 million.

Tobacco control and HIV/AIDS in Thailand. There are at least two very active civic organizations advocating for tobacco consumption control in Thailand, the Health Promotion Institute under the National Health Foundation and the Action for Smoking and Health Foundation. Their activities are based on knowledge management, social movements and political movements. The social crisis from the epidemic of HIV/AIDS started in the late 1980s. During that period, there were more than 100 000 cases of new infection per year. Although the Government is very active and the Prime Minister himself chairs the National AIDS Committee, the crisis is so severe that the Government alone cannot cope with the problem. More than 100 civil society organizations on HIV/AIDS have been created, which receive strong support from the Government. Budgets are managed and allocated by the public–private coordinating committee. The civic network on HIV/AIDS has participated actively in the Country Coordinating Mechanism under the Global Fund to Fight AIDS, Tuberculosis and Malaria. One of the NGOs has been accepted as the Principal Recipient of the Global Fund.

Health Action International: An international network of individuals and organizations based in the Netherlands involved in health and pharmaceutical issues, Health Action International strives to create a just and equitable society and has organized campaigns on national drug policy, health and trade interface, health financing, traditional medicine, and medical and pharmacy education. The network has partners in several countries in the Region, and works at three levels in civil society—vulnerable groups and people-based organizations, health professionals (encouraged to participate in research activity) and political leadership.

Sources: *Report of the WHO Regional Consultation on Social Determinants of Health, New Delhi, India, 15-16 September 2005*. New Delhi, WHO Regional Office for South-East Asia, 2005.

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Good governance and health

Good governance of the health sector means, among other things, that governments and health systems are responsive to needs of the poor and vulnerable, that management and technical efficiency are constantly evaluated, and that when changes are made, they consider the poor first and base changes on sound evidence (see Chapter 10).

The right to good health with dignity cannot be simply conferred by decree. Policies must be based on evidence and have to be funded and implemented, which means interventions must be efficient, equitable and feasible. The way that governments respond to good evidence of health inequities is a measure of health system governance. Policy-makers are increasingly working closely with academic and other researchers to develop equity-relevant research, and researchers are developing effective ways to present evidence and use it to design cost-effective interventions.

Box 2.11: Improving equity with evidence-based policy

Viet Nam frequently evaluates social determinants and has recently implemented the Health Care Fund for the Poor programme (Decision 139). Studies were conducted on utilization and household expenditure on health, on equity of access to health care and on health outcomes. This evidence was documented and presented in a series of national workshops and forums, which helped to consolidate political commitment among high-level government offices, the national assembly and the finance sector to support the poor in paying for health care. At the same time, the grassroots health-care system was being strengthened, the national health insurance system was growing, and economic growth provided additional revenues. Together, these factors created a synergy that helped influence the highest level of Government.

As also mentioned in Box 2.1, health access for the poor is on the policy research agenda in China. For the large rural population, the Chinese Government is relying heavily on The New Cooperative Medical Scheme to make health insurance available to all farmers. A joint research team from universities and provincial health authorities from Shandong Province and Ningxia Hui Autonomous Region has been working with local policy-makers to find better premium and reimbursement formulas that will benefit the most people at an affordable cost to local governments. Policies based on these research findings now allow gradual increases in premiums and benefits to be implemented.

Cambodia has been systematically exploring health financing and equity for the last 10 years. It introduced user fees as a part of health sector reform in the 1990s, but studies showed that exemptions were not working well, with the worst effect on the poor. Management performance contracts proved successful in raising utilization, and Health Equity Funds were pilot tested in the last four years and found to be pro-poor and an efficient use of donor subsidies. Policy-makers in the Ministry of Health work closely with NGOs and researchers.

In the Lao People's Democratic Republic, a long-term primary health care (PHC) development project in Sayaboury province succeeded in making sustainable improvements in the health of the mostly ethnic minority, isolated rural population. The NGO providing assistance and the provincial health department documented the project activities and results carefully; their community-focused approach is now being replicated in another province.

Source: Report of the High-Level Meeting on Promoting Health Equity: Evidence, Policy and Action, Phnom Penh, 16-18 October 2007. Manila, WHO Regional Office for the Western Pacific, 2007.

Conclusions

Economic, social, and environmental factors are powerful intermediate determinants of health in the Asia Pacific Region. The wide range of issues represented presents policy-makers with challenges as great, if not greater than, the proximal causes of disease. While many can be addressed from within the health sector, many others call for intersectoral action.

Predominant in the cluster of socioeconomic factors are those that determine equity of access to food and preventive and curative health care. As will be seen in following chapters, health systems in the Region can be made more responsive to poverty and other access issues, but many have a long way to go. Education is not a direct health sector issue, yet is among the most important determinants of health, especially female primary education. Some environmental and behavioural risk factors are related to poverty, but many also concern the entire population of a geographic area.

It is encouraging to note rapid increases in the overall level of human development by some low-income countries in the Region. Food security and nutrition have improved markedly, as has primary school enrolment. At the same time, economic development has brought some improvement in gender equality, but also brings environmental degradation and increased competition for all types of resources.

Chapter 2

Annex Tables

Table 2.1 Dietary energy, protein and fat consumption in Asia Pacific countries with available data

Country/area ↓	Dietary energy consumption (kcal/person/day)			Dietary protein consumption (grams/person/day)			Dietary fat consumption (grams/person/day)		
Year →	1979–1981	1990–1992	2000–2002	1979–1981	1990–1992	2000–2002	1979–1981	1990–1992	2000-2002
Australia	3068	3175	3096	105	107	104	115	130	135
Bangladesh	1981	2070	2192	44	44	47	15	19	26
Brunei Darussalam	2592	2798	2851	72	79	82	55	71	72
Cambodia	1713	1862	2058	39	44	51	13	22	31
China	2328	2707	2942	54	66	82	32	55	86
Fiji	2500	2637	2941	62	69	75	88	100	99
French Polynesia	2756	2863	2880	76	90	97	91	102	122
India	2083	2366	2423	51	57	56	33	41	52
Indonesia	2215	2698	2880	47	61	65	35	53	60
Japan	2709	2813	2781	87	94	92	69	80	86
Kiribati	2729	2653	2827	65	65	70	101	94	101
DPR Korea	2295	2466	2144	74	78	63	37	46	35
Republic of Korea	2993	2998	3046	83	81	88	37	60	76
Lao PDR	2074	2111	2291	51	51	60	22	23	28
Malaysia	2757	2830	2878	59	68	75	78	97	84
Maldives	2162	2377	2548	70	78	106	30	46	64
Mongolia	2379	2066	2238	80	74	81	85	79	83
Myanmar	2325	2634	2874	60	65	76	35	42	48
Nepal	1847	2346	2425	49	61	62	26	32	37
New Caledonia	2911	2788	2777	78	78	81	99	104	111
New Zealand	3082	3204	3199	98	96	91	124	129	117
Philippines	2219	2263	2435	51	55	57	36	41	48
Samoa	2463	2569	2887	60	70	83	96	116	132
Solomon Islands	2223	2019	2242	56	49	51	53	44	42
Sri Lanka	2358	2230	2370	47	49	54	47	43	44
Thailand	2276	2201	2399	50	52	57	32	46	51
Timor-Leste	2410	2564	2764	70	68	69	29	36	40
Vanuatu	2564	2528	2582	65	59	60	97	98	88
Viet Nam	2031	2177	2541	47	50	62	19	28	43

Source: *FAOSTAT*. Rome, Food and Agriculture Organization of the Unite Nations. See: http://faostat.fao.org/site/502/default.aspx

Table 2.2 Trends in the gender empowerment measure (GEM) in selected Asia Pacific Region countries, 1999–2005

Country/area	Gender empowerment measure						
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Australia	0.707	0.715	0.738	0.759	0.754	0.806	0.826
Bangladesh	0.304	0.305	0.309	0.223	0.218	0.218	0.218
Cambodia	…	…	…	…	0.347	0.364	0.364
China	0.491	…	…	…	…	...	...
Fiji	0.327	0.384	…	…	…	0.335	0.381
India	0.240	…	…	…	…	…	…
Indonesia	0.362	…	…	…	…	…	…
Japan	0.494	0.490	0.520	0.527	0.515	0.531	0.534
Republic of Korea	0.336	0.323	0.358	0.378	0.363	0.377	0.479
Malaysia	0.451	0.468	0.503	0.505	0.503	0.519	0.502
Mongolia	…	…	…	…	…	0.429	0.388
New Zealand	0.700	0.731	0.756	0.765	0.750	0.772	0.769
Philippines	0.480	0.479	0.470	0.523	0.539	0.542	0.526
Singapore	0.512	0.505	0.509	0.592	0.594	0.648	0.654
Sri Lanka	0.321	0.309	0.409	0.274	0.272	0.276	0.370
Thailand	0.407	…	…	0.458	0.457	0.461	0.452

... Data not available

Source: *Human development reports*. New York, United Nations Development Programme

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3

Demographic trends

Introduction

Although the Asia Pacific Region accounts for only one fifth of the earth's landmass it is home to over 3.45 billion people, more than half the global population. The population density of 127 people per square kilometre is more than twice the world average.[1,2]

The extreme diversities in demographic, economic and health parameters in the Region affect the prioritization of health issues, allocation of public resources for health, formulation of effective strategies and implementation of health programmes. This chapter provides an overview at the national level of demographic conditions, recent trends and future prospects. Statistics quoted are mostly based on United Nations estimates and may differ from national data based on alternate methods.

While an illiterate and sick population is a health and social burden, it becomes a positive national resource when educated and healthy. An adult engaged in productive work supports several others and enhances economic and social development.

3.1 Population structure

The population structure of any area can be studied in terms of socioeconomic parameters and occupational distribution, but the main demographic parameters for health (apart from total population) are age and sex. Health needs and the provision of health services depend substantially on the size of the population and its age and sex structure.

Population size

There is an extremely wide variation in the population sizes of the 48 countries and areas in the Asia Pacific Region, with very small island countries such as Niue, the Pitcairn Islands and Tokelau, each

having less than 2000 inhabitants in 2005, to giants such as China and India with populations of 1.31 billion and 1.13 billion respectively. These two countries alone are home to 38% of the world's population. The United Nations 2005 population estimates for various countries in the Region by age and sex are given in Annex Table 3.1.

Population density

After Hong Kong (China), Macao (China) and Singapore, the countries with highest population densities, expressed in terms of number of people per square km, are Bangladesh (1064), Maldives (991), Nauru (481), the Republic of Korea (481), Tuvalu (402), India (345), Japan (338), American Samoa (322) and the Marshall Islands (313) (Annex Table 3.2). There are often large variations in population densities within countries. In Japan, for example, the prefecture of Aichi has a density of 1427 people per square km (city population, Aichi) whereas Akita has only 106 (city population, Akita).

Population growth and projections

Between 2000 and 2005, the Region's population grew at a rate of 1.15% per year, less than the world average of 1.24%. The annual population growth rate of the Region declined by nearly 50% between 1950 and 1975. Since the 1970s, family planning programmes in China and India contributed to this sharp drop. The rapid decline of 50% in fertility levels in China between 1973 and 1983[3] has no historic precedence and was brought about by vigorous adherence to the one-child family policy. The growth rate in China declined from 1.10% per year during the period 1990–1995 to 0.67% per year between 2000 and 2005. In India, with its two-child norm, the growth rate fell from 2.08% to 1.62% during the same period. Similar reductions in population growth can be expected in the future as fertility levels continue to decline. Population growth rates for countries and areas in the Asia Pacific Region from 1990 to 2005, and projections until 2015, are shown in Annex Table 3.3.

Within the Asia Pacific Region, enormous differences exist between countries in population growth rates. Between 2000 and 2005, rates ranged from 0.14% per year in Japan to 5.31% in Timor-Leste. High population growth rates of over 2% per year are still prevalent in large population pockets. For the period 2005–2010, 13 countries in the Region have projected growth rates below 1% per year, with Japan's growth rate starting to become negative (-0.02%) at this time. While the trend in all countries is to have decreasing growth rates, there are still five countries (Brunei Darussalam, Papua New Guinea, Solomon Islands, Timor-Leste and Vanuatu) with projected population growth rates of at least 2% per year during this period.

There are also significant intra country variations in the Region's population growth rates. For example, population growth rates between 1991 and 2001 among 15 large states in India ranged from 0.9% and 1.1% in Kerala and Tamil Nadu respectively, to 2.5% each in both Bihar and Rajasthan.[4] Such large differentials indicate that periodic revision of estimates of population distributions is required for planning and monitoring population-sensitive health programmes.

Based on the component projection method and taking the "medium variant" as the likely scenario, projections place the population of the Region at 3.8 billion by 2015—an increase of 353 million from 2005. Of this number, 168 million will come from India's growth alone, 76 million from China, 27 million from Bangladesh and 25 million from Indonesia. The population of Japan is expected to decrease by 1.3 million from the 2005 figure of 127.9 million.

During the next decade, India is expected to account for 47.6% of the increase in the population of the Region. India's annual population growth rate of 1.14%, estimated for the period 2015–2020 will be two-and-a-half times the growth rate of China during the same period, estimated at 0.47%. With a projected population of 1.51 billion by 2030, India will be the most populous country in the world, surpassing China's projected population of 1.46 billion the same year.[1]

Sex ratio

The population sex ratio, defined as the number of males per 100 females, is estimated at 103 for 2005 for the Asia Pacific, higher than the world average of 101.6. In 2005, the sex ratios across countries and areas in this Region ranged from 92 in Macao (China) to 111 in Bhutan (Annex Table 3.4). Variations in sex ratios across countries can be attributed to a host of social, cultural and economic factors, such as cultural preferences which favour the birth or survival of one sex over the other (usually the male), practices of sex-selective abortion and infanticide, and the large-scale emigration of male labourers.

A high degree of gender imbalance in the population is undesirable because of social implications that lead to adverse health consequences. The very high sex ratio in Bangladesh, China and India, constituting 75% of the Region's population, indicates strong male-child preference and consequent gender inequities in nutrition and health care. In Bangladesh, India and Nepal for example, mortality for females under age 5 is higher than for male children. This may be attributable to the discrimination against girls in providing food and health-care services.[5]

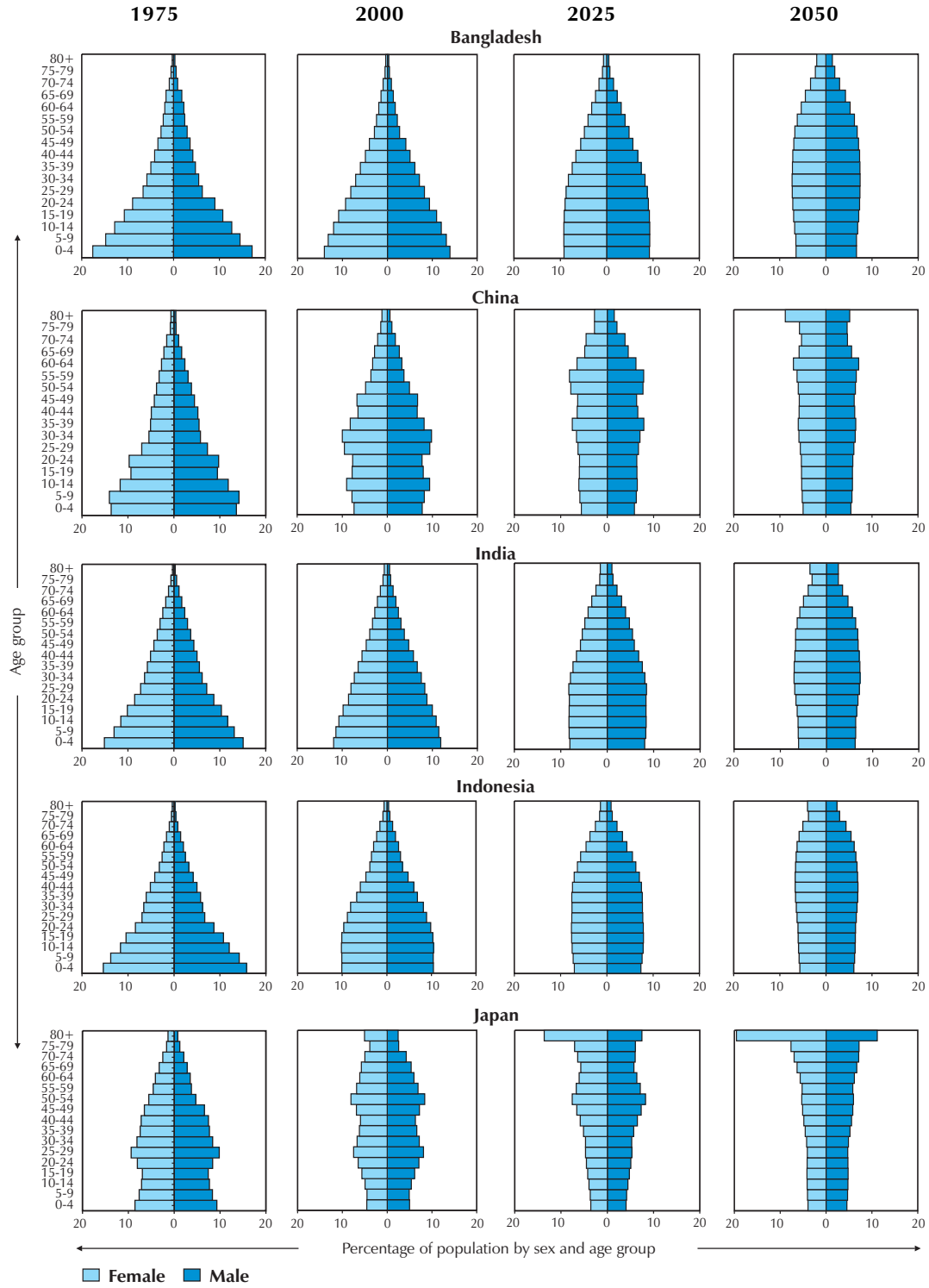
The sex ratio among children under age 5, usually referred to as the "child sex ratio" reflects the possible prevalence of sex-selective abortions and discriminatory health care and medical services against girls. In developed countries, where sex-selective abortions are rare, the sex ratio at birth is nearly 105 males to 100 females. With equal care and nurturing, the natural sex ratio of children in the age group 0 to 4 should also be around 105. This is true for Australia and Japan, where the child sex ratios were 105 and 106 respectively in 2005 (Annex Table 3.4). China, however, had a very high child sex ratio of 116 for the same year. This has become a matter of great concern from social and health perspectives. This high sex ratio has been partly attributed to the one-child policy that China has been pursuing over the years which could have triggered a high number of selective abortions. In the case of Singapore, which also has a high sex ratio of 108, it is partly reflective of the strong gender preferences for male children among Chinese and Indian migrants.

Age structure

The age structure of a population is a blueprint of past trends in fertility and mortality levels and at the same time contains the potential for future demographic and economic growth. With the rapid demographic transition in some countries of the Region during the past three decades, the age structure of the population is rapidly changing, with the median age steadily increasing. The age pyramids for 1975, 2000 and projected for 2025 and 2050 for the five largest countries of the Region are presented in Figure 3.1. Bangladesh, India and Indonesia are likely to have similar structures by 2050, but Japan will have a large elderly population.

Differences in the shapes of the population pyramids presented in Figure 3.1 also reflect differences in the age distributions of the selected countries, across time. In 1975, the population pyramids of Bangladesh, China, India and Indonesia are characterized by a very wide base with gradually decreasing sides and a pointed tip, approximating the shape of a triangle. This shape is indicative of young

Fig. 3.1 Changing age pyramids of five large countries in the Asia Pacific Region, 1975–2050



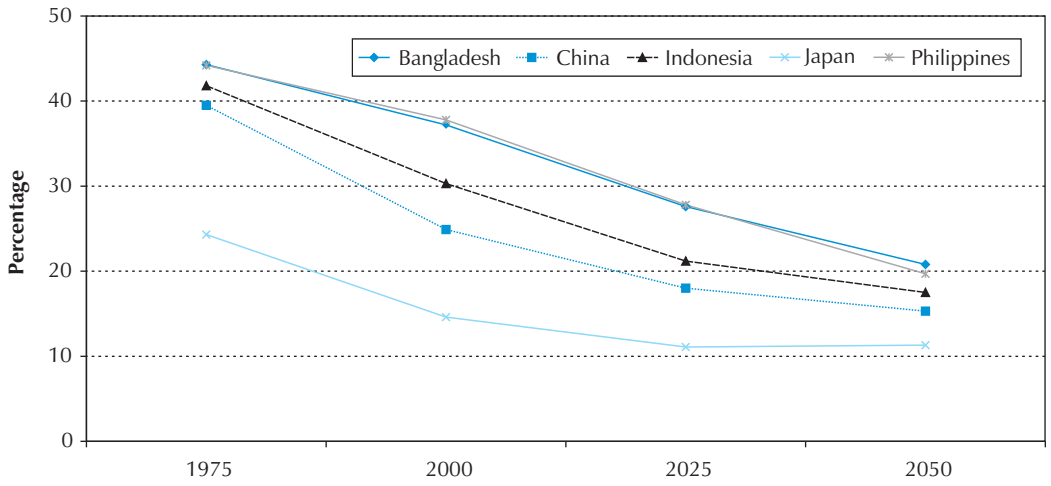
Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: *http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm*

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

populations, with the highest proportion of the population being children 0–4 years, and with the proportion of the population decreasing with advancing age. In the succeeding time periods, however, the pyramids have changed, with the shapes indicative of a decreasing proportion of children, and an increasing proportion of adults and older persons. In the case of Japan, its age distribution is so different from the other countries in the Region, since as early as 1975, the highest proportion of the population were adults 25–29. By 2025 and 2050, Japan is projected to have an odd-shaped population pyramid with the narrowest point at its base and the widest point at its tip, indicative of a population with very few children and a very high proportion of older persons.

A more detailed picture of differences and changes in age composition of countries, specifically in the proportion of children and older persons are shown in Figures 3.2 and 3.3. In 1975, the percentage of children below age 15 was about 44.3% in Bangladesh, 39.5% in China, and 41.8% in Indonesia. By 2005, these percentages had fallen to 35.2% in Bangladesh, 21.6% in China, and 28.4% in Indonesia, largely due to declining fertility rates. Projections indicate that these percentages will decline further.

Fig. 3.2 Percentage of population age 0–14 years in selected countries, 1975–2050

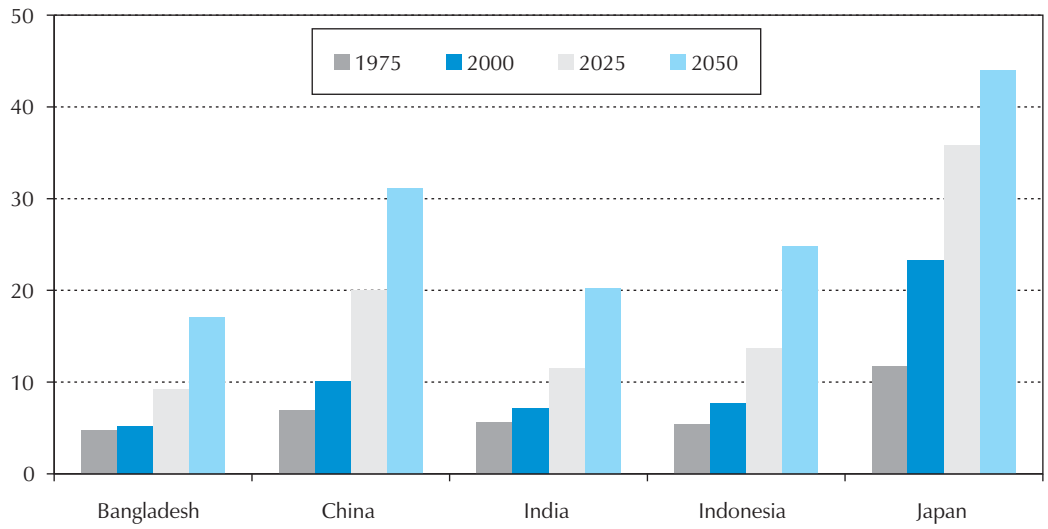


Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

While the age distributions of some countries were almost the same in 1975, wide disparities developed by 2000. This occurred largely due to the differential decline in their fertility levels, and to a lesser extent, to increased longevity. China has led the recent demographic transition in the Region. This has increased the proportion of older people concomitantly with declining proportions in younger ages. In 1975 the percentages above age 60 years were 4.8% in Bangladesh and 5.6% in India. By 2005, these changed to 5.7% in Bangladesh and 7.5% in India. These are projected to increase by 2025 to 9.2% and 11.5% respectively, and further to 17% and 20.2% by 2050 (Figure 3.3). On the other hand, the 11.7% above age 60 in Japan in 1975 increased sharply to 26.4% by 2005, and is expected to increase further to 35.8% and 44% by 2025 and 2050, respectively. By 2050, 44% of the population in Japan will be age 60 and over. If the trend continues in the Region, with a time lag, the ageing of the population will become the norm in all other Asia Pacific countries.

Fig. 3.3 Percentage of population age 60 and over in selected countries, 1975–2050



Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Addressing the health and economic needs of older persons is not an insurmountable problem as long as the working population is growing and the dependency ratio (next section) is actually falling. However, a situation may emerge in the next 50 years in which ageing could become an unbearable burden for some countries. According to the 2002 National Health Survey Report of the Republic of Korea, 87.6% of the older persons suffered from at least one chronic disease[6] suggesting that chronic diseases in older persons may soon overwhelm health systems in some nations.

In response, Singapore has started community health screening of elderly residents. This includes checking blood pressure, blood sugar and cholesterol. The proposal for the Republic of Korea is to provide basic health services at local health centres for the older persons and national lifelong health promotion programmes that aim to correct unhealthy patterns of behaviour. Many other countries are devising plans to meet their own needs.

To help promote a global response to this major societal concern, WHO restructured its programme on health of older persons in 1995 and gave it a new name – Ageing and Health.[7] This area of health care is becoming a dominant concern in the new millennium. The main perspectives which guide programme activities are:

- approaching ageing as part of the cycle rather than compartmentalizing health care for older persons;
- promoting long-term health by increasing awareness of the process of healthy ageing;
- increasing the focus on prevention of noncommunicable diseases;

- observing cultural influences;
- adopting community-oriented approaches;
- recognizing gender differences; and
- strengthening intergenerational links.

Ageing causes not only physical but also psychological problems. Quality of life in old age needs greater attention and future programmes may have to take this into account. Health systems must prepare to take on a different kind of burden associated with older people.

Dependency ratios

Another indicator of the age composition of a population is the age-dependency ratio. It is computed as the ratio of the number of children (<15 years old) and older pesons (≥ 65 years old) in the population, to the number of people in the working-age groups (15–64 year old). In some countries, the cut-off point for older persons is set at a lower age of 60, depending on the retirement age. The resulting value is interpreted as the number of children and older persons who need to be supported by every 100 adults in the working-age groups and it is a measure of the age-induced economic burden on the population. However, the indicator has some limitations since it does not take into consideration the fact that in several developing countries, a number of children, especially those who are out of school, are already economically active. Similarly, there can be a considerable proportion of persons past retirement age who are still earning a living.

From its computational formula, it can be seen that the age-dependency ratio has two components: child-dependency ratio and old-age dependency ratio. Each of these components can be computed separately, or can also be combined to come up with a total dependency ratio for the population. Since children and older persons have very different needs, it is important to analyse the dependency ratio according to its components, otherwise, differences in types of programmes needed to address problems might be masked if focus is placed merely on the total dependency ratio.

The total dependency ratio and its components for the years 1975, 2000, 2025 and 2050 are shown in Annex Table 3.4. In 2000, Timor-Leste had the highest child-dependency ratio while Japan had the highest old-age dependency ratio. In China the child-dependency ratio declined sharply by almost one half from 70 in 1975 to 37 in 2000, and is expected to decline further to 25 by 2050. In India in 1975, this was 71, almost the same as in China, implying their demographic similarities prior to 1975.

The total dependency ratio tends to decrease in the earlier stages of a country's development, when rapid declines in fertility reduce the child population more than the increase in older persons, but subsequently the increase in older persons far outweighs the decline in the child population. Because of the earlier decline in fertility in Japan, a low total dependency ratio of 47 in 1975 was maintained until 2000. It is expected to increase steadily to 68 by 2025 and to 96 by 2050. Thus, Japan will have almost one dependent person, young or old, for every person in the age group 15–64 by 2050. In Mongolia, this ratio declined from 88 in 1975 to 62 in 2000; it is projected to decline to 40 in 2025 and then increase to 53 by 2050. All countries in the Region will see a shift from child dependency to old-age dependency as the fertility rate declines and life expectancy increases.

Demographic bonus and demographic burden

In the late 1990s social scientists began searching for the factors underlying the so-called East Asian miracle when the growth rates of economies in China, Malaysia, the Republic of Korea, and Thailand far surpassed expected levels. A careful analysis revealed that a key factor underlying their rapid economic development was a rapid decline in their dependency ratios, especially the child-dependency ratio. This allowed earning adults to spend a larger portion of their income on consumption or investment, rather than on their children. The change was brought about by a rapid switch from large to small families. As long as there were few retired people in the population, the burden of pensions remained light resulting in a great demographic push toward economic growth. The term "demographic bonus" describes the period when the dependency ratio in a population falls because of declining fertility until it begins to rise again due to increasing longevity.

The duration of the demographic bonus depends on the pace of decline in a population's fertility levels. If the switch to small families is swift, the demographic bonus can give a considerable boost to development. This happened in China beginning in the early 1980s due to its One-child Family Policy. If investments in health care and education for skills development are made during a period of demographic bonus, as happened in East Asian countries, maximum advantage is taken of the demographic transition.

The Republic of Korea, for example, increased net secondary school enrolment from 38% to 84% between 1970 and 1990, while more than tripling expenditure per secondary pupil. Countries that failed to make such investments during periods of demographic bonus did not record such high economic growth rates. It is estimated that 15%–40% of the growth of per capita income of these East Asian countries over the last several decades can be attributed to reduction in their dependency ratios.[8] Changing demographic structures now present similar opportunities and challenges in the South Asian countries which appear poised for similar growth in coming decades.

The term "demographic burden" describes the increase in the total dependency ratio during any period of time, mostly caused by an increased old-age dependency ratio. This is an inevitable consequence of demographic transition, and every country has to face this problem sooner or later. Japan may face this demographic burden by 2050, with other countries in the Region experiencing it soon after. The health consequences of the demographic burden are the same as for the ageing of the population, as discussed earlier.

3.2 Fertility

In addition to describing the age and sex composition of a population, the other areas of concern in demography are measuring and analysing changes in population size and structure. These are brought about by three main factors: fertility, mortality and migration.

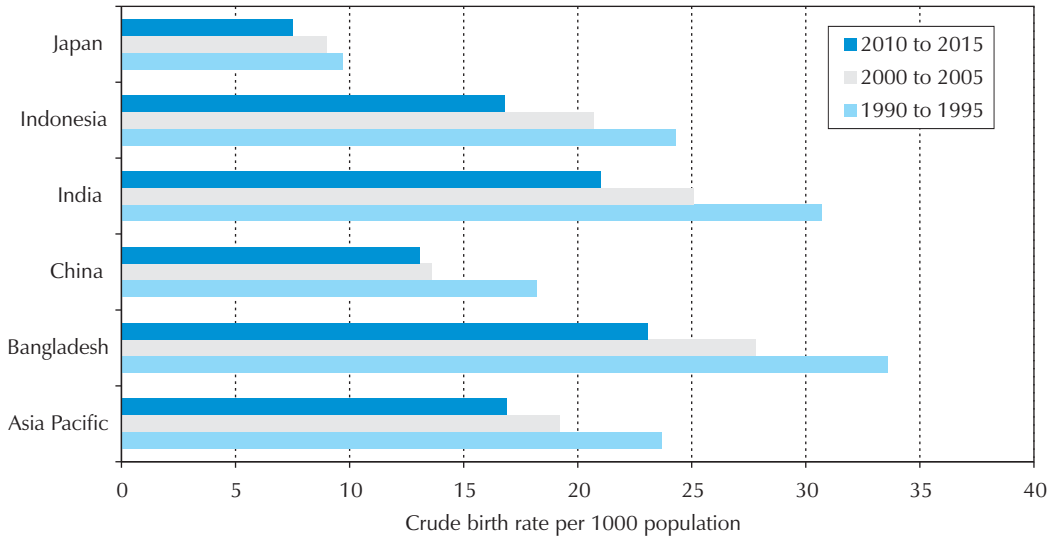
Several indicators are used to measure fertility both at the individual and country levels. These include the number of children ever-born, the crude and age-specific fertility rates, gross and net reproduction rates, and the total fertility rate. There is a large variation in fertility levels across countries and cultures and social and economic conditions, as well as by individual characteristics like age and health status of the woman.

In general, controlling fertility is far more difficult than controlling mortality. In terms of demographic phases, decline in mortality precedes the decline in fertility. Whereas mortality can be controlled by providing nutrition and medical care, lowering fertility requires intensive, coordinated intersectoral efforts to change human values. This is an extremely difficult proposition unless the desire for change comes from within. External interventions, educational or otherwise, take time to show impact. China, however, is an exception where fertility quickly declined due to government policy and its very effective implementation.

Crude birth rate

The crude birth rate (CBR) is measured as the number of live births per 1000 population per year. It is not an adequate measure of fertility since it is very much influenced by the age and sex structure of the population. However, it is an important determinant of the growth rate of a population. During the period 2000–2005 the CBR for the Region was 19.2, ranging from a low of 7.4 in Macao (China) to 41.7 in Timor-Leste (Annex Table 3.5). Projections of crude birth rates for the countries in the Region for the period 2010–2015 range from 7.1 in Hong Kong (China) to 39.9 in Timor-Leste. Data for a few selected countries is shown in Figure 3.4. The number of births estimated to have taken place in the Region during 2000–2005 is approximately 321.4 million or 64.3 million per year. India accounted for 41.6% of these births and this proportion is expected to be maintained over the next 15 years.

Fig. 3.4 Crude birth rates in selected countries, 1990–2015



Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Box 3.1: Case study of demography in Viet Nam

Viet Nam is a mid-sized country of 355 000 square km and nearly 84 million people. It is divided into eight geographical regions and 61 provinces. The demography of the country and projection were recently studied in detail. Projections were based on net migration for men and women, and fertility and mortality in five-year age groups for each five-year projection period. The baseline data on fertility and mortality were obtained from a 3% sample of all enumeration areas in the entire country for the year 1998–1999.

The main results are listed below. These estimates vary from United Nations estimates stated elsewhere in this chapter. International migration is practically zero but there is some internal migration.

Projected birth rate, crude death rate and total fertility rate for geographical regions of Viet Nam, 1999–2004 (declining fertility variant)

Region	1999	Projection period				
		1999–2004	2004–2009	2009–2014	2014–2019	2019–2024
Whole Country						
Birth rate	18.62	17.91	17.75	16.59	14.98	...
Crude death rate	...	6.98	6.74	6.57	6.48	6.50
Total fertility rate	2.33	2.15	2.00	1.95	1.90	1.90
Red River Delta						
Birth rate	...	15.87	16.17	16.09	15.32	13.56
Crude death rate	...	6.76	6.80	6.80	6.81	6.92
Total fertility rate	1.95	1.90	1.85	1.80	1.80	1.80
North-East						
Birth rate	...	17.93	17.74	18.19	17.36	15.51
Crude death rate	...	6.95	6.71	6.61	6.56	6.59
Total fertility rate	2.32	2.15	2.00	1.95	1.90	1.90
North-West						
Birth rate	...	25.98	24.96	23.99	21.15	17.64
Crude death rate	...	8.57	7.63	6.92	6.36	6.09
Total fertility rate	3.57	3.20	2.90	2.65	2.36	2.10
North Central						
Birth rate	...	19.23	18.8	18.95	18.58	16.38
Crude death rate	...	7.80	7.44	7.16	6.96	6.86
Total fertility rate	2.84	2.50	2.30	2.15	2.10	2.05
South Central Coast						
Birth rate	...	20.13	18.67	17.98	17.39	15.83
Crude death rate	...	8.02	7.49	7.16	6.92	6.79
Total fertility rate	2.50	2.35	2.20	2.10	2.05	2.00
Central Highlands						
Birth rate	...	27.46	25.33	25.52	21.13	18.30
Crude death rate	...	8.58	7.51	6.69	6.11	5.79
Total fertility rate	3.93	3.45	3.10	2.75	2.40	2.10

Region	1999	Projection period				
		1999–2004	2004–2009	2009–2014	2014–2019	2019–2024
South-East						
Birth rate	...	17.89	17.42	16.63	15.75	14.45
Crude death rate	...	4.83	4.77	4.77	4.85	5.02
Total fertility rate	1.93	1.85	1.80	1.75	1.75	1.75
Mekong River Delta						
Birth rate	...	18.89	19.02	18.21	16.08	13.84
Crude death rate	...	6.51	6.33	6.18	6.12	6.24
Total fertility rate	2.10	2.05	2.00	1.95	1.90	1.90

... Data not available

The overall population growth rate is declining, with Central Highlands, North Central, North-west and Mekong River Delta showing the fastest declines. The Mekong River Delta is expected to experience a rapid fall in population growth because of high out-migration in addition to fertility decline. The total fertility rate in Viet Nam in 1999 was 2.33, projected to decline to 1.90 by 2024. The replacement level may have already been reached in 2006. Further declines will be slow. In the Central Highlands region, it may decline rapidly, from 3.93 in 1999 to 2.10 in 2024. The South-East region already had a low total fertility rate of 1.93 in 1999 and the decline is likely to slow down to 1.75 by 2024.

Source: *Results of population projections for the whole country, geographic regions and 61 provinces/cities, Viet Nam 1999-2024*. Ha Noi, General Statistical Office, 2001.

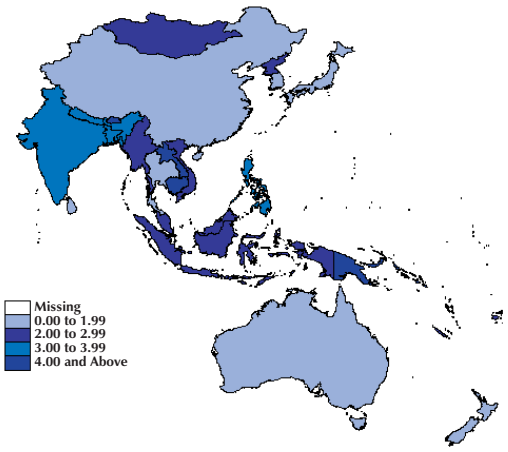
Total fertility rate

The total fertility rate (TFR) is a useful way to express the rate at which women bear children. This represents the average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates. With nearly equal chance of male and female births, a TFR of 2.0 is considered replacement level. Countries with very high fertility (TFR ≥4.0) in 2005 were Timor-Leste (7.0), Samoa and the Solomon Islands (each at 4.4), Papua New Guinea (4.3), the Federated States of Micronesia and Vanuatu at 4.2 (Figure 3.5).

During the past decade, fertility continued to decline in most countries. In the more developed regions of the world, TFR declined from 1.8 children per woman during the period 1985–1990 to 1.6 children per woman from 1995 to 2005, both far below the replacement level (Table 3.1). The average TFR for less developed regions declined from 3.8 children per woman between 1985 and 1990 to 2.9 children per woman from 2000 to 2005.

The average TFR in the Region declined from 5.0 to 2.5 per woman in the past three decades, but there were large differentials between subregions, as seen in Table 3.1. Bangladesh and India are two

Fig. 3.5 Distribution of countries by total fertility rate, 2000–2005



Sources: *World population prospects: the 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

Core health indicators. Geneva, World Health Organization. Available from: http://www.who.int/whosis/database/core/core_select.cfm

populous countries where the pace of decline has slowed. In India, fertility stalled at about 5.5 to 5.7 children per woman between the 1960s and early 1970s, but declined subsequently to about four children per woman by the end of the 1980s. During the 1990s, however, fertility decline slowed again, with TFR reaching 2.9 children per woman at the end of the 1990s.[1] The total fertility rates of countries and areas in the Asia Pacific Region from 1990 to 2015 are presented in Annex Table 3.6.

The situation is different in Eastern Asia. Fertility decline in China was achieved through economic development and a population policy directed at reducing fertility. This led to a steep decline in the total fertility rate from 6.3 births per woman in 1955 to 1.9 in 1990, and 1.7 in 2005.

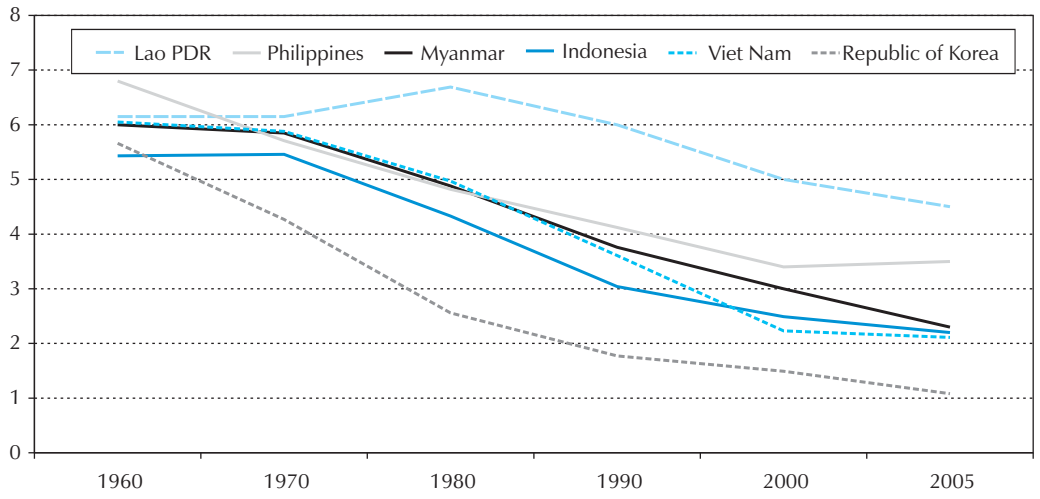
Table 3.1 Trends in total fertility rate by major areas and regions of the world, 1970–2005

Major Areas	1970–1975	1985–1990	1990–1995	1995–2000	2000–2005
World	**4.5**	**3.4**	**3.1**	**2.8**	**2.7**
More developed regions	2.1	1.8	1.7	1.6	1.6
Less developed regions	5.4	3.8	3.4	3.1	2.9
Africa	6.7	6.1	5.7	5.3	5.0
Asia	5.0	3.4	3.0	2.7	2.5
Eastern Asia	4.5	2.4	1.9	1.7	1.7
South-Central Asia	5.5	4.5	4.1	3.6	3.2
South-Eastern Asia	5.6	3.6	3.1	2.7	2.5
Western Asia	5.8	4.5	4.1	3.6	3.2
Europe	2.2	1.8	1.6	1.4	1.4
North America	2.0	1.9	2.0	2.0	2.0
Oceania	3.2	2.5	2.5	2.4	2.4

Sources: *World population prospects: the 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Fig. 3.6 Trend in total fertility rate in selected Asia Pacific Region countries, 1960–2005



Sources: *UC atlas of global inequality.* Available from: http://ucatlas.ucsc.edu

11 health questions about the 11 SEAR countries. New Delhi, WHO Regional Office for South-East Asia, 2007.

Reproductive health: family planning and fertility rate. Manila, WHO Regional Office for the Western Pacific. Available from: http://www.wpro.who.int/sites/rph/data/family_planning.htm

Country health information profiles (1974-2005). Manila, WHO Regional Office for the Western Pacific.

Although there are big disparities in TFR among developing and developed countries, it fell below five children per woman in all countries except Timor-Leste by 2005. However, the trends were diverse (Figure 3.6). There appear to be four groups of countries: (1) countries with stable low TFR, such as Japan and the Republic of Korea; (2) countries where the TFR continues to decline, such as China, Indonesia, Sri Lanka and Viet Nam; (3) countries where the decline in TFR appears to have slowed, approaching three children per woman (Bangladesh and India); and (4) countries where TFR remains high (over 4) and the decline rate is slow, such as the Lao People's Democratic Republic and many Pacific island countries.

As with other parameters, aggregate national fertility levels mask enormous differentials within countries, between ethnic groups or rural and urban populations, especially in larger countries. For example, TFR in 1999 was 2.00 in the province of Bali in Indonesia, 2.37 in Jawa Tengah, 2.80 in Jambi and 3.06 in Nusa Tenggara Timur.[9]

Determinants of fertility decline

The industrialization, urbanization and modernization of societies bring wider access to education, improved child survival and increased adoption of contraception which are the major driving forces of fertility decline. Education also plays a decisive role in fostering fertility decline. Studies in 51 developing countries show that among women with secondary or higher education, TFR is far lower than those with only primary or no education.[10] Besides providing knowledge, education increases exposure to information and the media, builds skills for gainful employment, increases female participation in family decision-making and raises their income. Table 3.2 presents the TFR levels for women in various education categories in selected countries of the Region. A study in India[11] found that there is no time lag between improvement in education and decline in birth rates as both appear to be part of the same developmental process.

Table 3.2 Total fertility rate according to women's level of education in selected countries and years

Country	Year	Total Fertility Rate			
		All levels	No education	Primary	Secondary or higher
Bangladesh	1999	3.3	4.1	3.3	2.4
India	1998	2.9	3.5	2.6	2.0
Indonesia	1997	2.8	2.7	3.0	2.6
Philippines	1998	3.7	5.0	5.0	3.3

Source: *World population monitoring: reproductive rights and reproductive health*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2004: 67. Available from: http://www.un.org/esa/population/publications/2003monitoring/WorldPopMonitoring_2002.pdf

Changes in marriage patterns, postponing marriage, and increasing divorce rates may lead to smaller families because couples have fewer years of childbearing. Women who delay the onset of child-bearing also have smaller families. A shortened childbearing period for women is now an important determinant of persistent below-replacement fertility in many developed countries and in an increasing number of developing countries. Although earlier menarche extends the duration of fecundity, postponement of first birth until age 30 or beyond shortens the effective child-bearing period.

3.3 Mortality

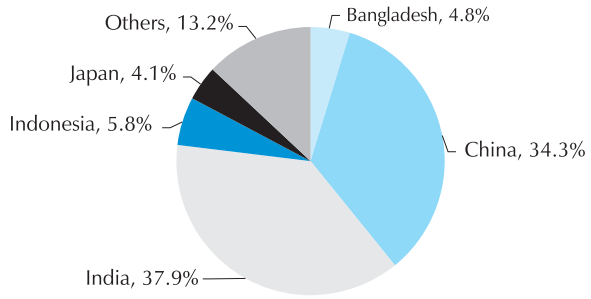
The age at death and the cause of death are important factors in assessing the health of populations. Both these aspects are discussed in detail in Chapter 5. The following discussion is restricted to the larger aspects of mortality that affect demography.

Crude death rate

During the five-year period 2000–2005, an estimated 125.3 million deaths, or 25.2 million per year, occurred in the Region. Among these, India, with 37% of the Region's population, accounted for 9.3 million deaths per year or 37% of total deaths (Figure 3.7). The crude death rate (CDR) is the number of deaths in one year per 1000 population. It is not a very sensitive measure of mortality as it is significantly influenced by the age and sex structure of the population, while the age structure is not taken into account in the measurement. Yet CDR is an important measure that, in combination with the birth rate, determines population growth rate. During the period 2000–2005 the CDR for the countries of the Region ranged from 2.8 in Brunei Darussalam to 10.2 in Timor-Leste and Myanmar (Annex Table 3.7). There is a greater homogeneity in the death rates than in the birth rates of different countries. CDRs projected for the future for the period 2010–2015 range from a high of 10.3 in the Democratic People's Republic of Korea to a low of 3.0 in Brunei Darussalam.

While CDRs in India and Bangladesh are expected to continue their declining trend over the next 15 years, in China, Indonesia and Japan they are expected to increase because of rapid population ageing. Japan will have negative growth commencing in 2010. Unless policy measures are taken now to increase fertility and promote immigration from other countries, Japan's population decline cannot be halted.

Fig. 3.7 Percentage distribution of total deaths in the Asia Pacific Region, 2000–2005



Total deaths in the Asia Pacific Region 2000-2005 – 125 295 000

Sources: *World population prospects: the 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm
World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Standardized death rate

While the CDR in Japan is nearly the same as in Bangladesh and India, the age-specific mortality rates in every age group are significantly lower in Japan. The very high proportion of older persons in Japan due to higher longevity masked the substantial decline in mortality over the years. For this reason, age-standardized death rates need to be considered.

Age standardization is a statistical technique that recomputes death rate on the basis of a common (or standard) population age distribution. This removes the discrepancies arising from age-differentials, and makes rates comparable across countries.

Age-standardized death rates for the countries of the Asia Pacific Region for the year 2002 are shown in the last column of Annex Table 3.7. The lowest is 3.6 per 1000 population in Japan, and the highest is 16.6 in Cambodia, indicating a real measure of great inequalities in death rates. The countries with rates of 14 or more are Cambodia, the Lao People's Democratic Republic, Myanmar, Nauru, Nepal, Papua New Guinea, Timor-Leste and Tuvalu. These countries do not have especially high CDRs because only a small percentage of their populations are in older age groups. High age-standardized death rates truly identify countries with high mortality.

Urbanization and migration

Urbanization and migration are related phenomena that accompany development because people tend to move from rural to urban areas in search of jobs and better amenities. This brings population pressure on cities, often creating slums with a lower quality of life than rural villages. In addition, migration also occurs when another part of the country offers better opportunities. Migration from one country to another is also common.

The population of the Asia Pacific Region continues to be predominantly rural with agriculture as the main occupation for the majority of the people. In 2005 only 38.2% of the population lived in the urban areas compared to the 48.7% world average (Annex Table 3.8). Urban population ranged from a high of 100% in Hong Kong (China) and Singapore, to a low of 11.1% in Bhutan, excluding the Region's small islands. It is 88.2% in Australia, 94% in Guam, but only 17% in Solomon Islands. In absolute magnitude, the 786 million living in rural areas in India is higher than in any other country, including China (784 million).

The urban population projected for the year 2015 for the Asia Pacific Region is nearly 44%. Much is known about the causes and effects of urbanization, and knowledge about its implications for health is increasing.[12,13] Adverse changes in the types of food consumed and lower physical activity

in urban areas gives rise to obesity. In China and Indonesia, adult obesity is twice as prevalent in urban areas as it is in rural areas.[14] These changes can also precipitate diabetes, stroke and hypertension. The pressure of living and housing expenses can reduce household expenditure on food and can cause undernutrition in children, with the paradox of undernutrition and obesity occurring simultaneously in the same household.

Urbanization is associated with health issues related to lifestyle, smoking, drug abuse, polluted air, occupational hazards, accidents and injuries. Scarcity of land and slums create problems of water supply, sanitation, and overcrowding. Under these conditions, infectious diseases are more widespread than in rural areas.

Box 3.2: Living conditions in Mumbai, a megacity

The dream of a better life in cities can easily become a nightmare. The water supply, sanitation and housing conditions of megacities in developing countries, especially in slums, leave much to be desired. This is illustrated by the conditions in Mumbai. The mean number of people per room in houses was 4.2 in the slum and 2.6 in non-slum areas. About half of slum households and a fourth of those in non-slum areas live in houses built fully or partially with mud. Only 59% of families living in slums had access to piped water in their residences. Only 8% of the households had their own flush toilets. Kerosene was used as the cooking fuel by 61% of slum households. All these parameters confirm that the population in megacities can be acutely vulnerable to adverse health conditions.

Selected household amenity indicators of a megacity: Mumbai, India, 1998–1999

Selected indicators	Slums	Non-Slums	Total
Mean number of persons per room	4.2	2.6	3.5
<3 persons per room (%)	26.6	64.5	43.9
Houses built with mud* (%)	48.5	23.1	36.9
Households having electricity (%)	99.2	99.8	99.5
Tap as a source of drinking water within the house/yard/plot (%)	58.9	93.5	74.7
Using drinking water without any purification (%)	38.1	14.2	27.1
Households owning flush toilet (%)	7.6	55.3	29.4
Households without any sanitation facility (%)	4.4	0.2	2.5
Households using kerosene as a cooking fuel (%)	61.2	13.7	39.5

**kaccha* and *pucca* house: *kaccha* houses are made predominantly with mud and low-quality building materials. Semi-*pucca* houses are made partly with low-quality and partly with high-quality building materials.

Source: *National Family Health Survey (NFHS-2) India, 1998-99*. Mumbai, International Institute for Population Sciences and ORC Macro, 2000.

Demographic change and development

Demographic transition describes the transition of a society from high fertility and mortality to low fertility and mortality. This transition takes place over a long time period, usually classified in four phases. The first phase is a situation of high fertility and high mortality. In the second phase, mortality levels decline while the fertility level remains stagnant or even rises moderately. In the third phase, fertility and mortality levels decline. In the final phase, both fertility and mortality settle down to a low level. In some countries a fifth phase also occurs, in which the death rate exceeds the birth rate due to population ageing and decline.

The demographic transition theory relates this process to social and economic development and is based on empirical observations of developed countries in the 19th and 20th centuries. In developed societies no organized national programmes of family planning to reduce fertility levels existed and no public health and medical care were readily available. Such societies had to create these services as a part of their development. In developing countries, public health and medical care for preventive, curative and promotive health was quickly transferred from these developed countries. Hence mortality levels declined rapidly, but not fertility levels. Thus, population growth rates during the 1950s were much higher in many developing countries. This was particularly true for countries in the Asia Pacific Region. In order to reduce spiralling population growth rates, many developing countries in the Region launched national programmes for family planning, which were run and supported by their governments. The demographic transition in many developing countries in the Region occurred at a faster pace than ever experienced in developed western countries. Such situations created an imbalance between socioeconomic development and demographic transition in some countries, which in turn were reflected in their health conditions. In many countries, infectious diseases continued to be prevalent at the same time newer lifestyle diseases emerged due to urbanization and ageing. Large inequities in economic and health conditions between different segments of populations also materialized.

There can be a debate on whether high fertility is the outcome of poor development, its antecedent, or that both go hand in hand. As mentioned earlier, in India, the fertility decline accompanied an increase in the literacy level. China's experience suggests that fertility decline can lead to rapid economic development.

A popular belief that "development is the best contraceptive" implies that economic growth causes fertility to decline. However, fertility declines in Indonesia, the Republic of Korea and Thailand in the 1970s and 1980s were more than that anticipated from economic development alone.[15] It was argued earlier that the fertility decline in developing countries reduces dependency ratios, resulting in a demographic bonus. To make the most of this, the opportunity must be seized to increase investments in education, levels of saving and investment, and provide impetus for economic growth during this period of demographic bonus and transform it into a positive resource for the population. Countries where this has been done have reaped the benefit through rapid development.

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Annex Tables

Table 3.1 Population (thousands) by five-year age groups and sex in the Asia Pacific Region, 2005

Age group (years)	0–4			5–9			10–14			15–19		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
American Samoa	8	4	4	7	4	4	7	4	3	7	4	3
Australia	1 263	648	615	1 308	671	637	1 394	715	678	1 399	717	682
Bangladesh	18 916	9 669	9 247	17 555	8 992	8 563	17 456	8 934	8 522	16 270	8 358	7 912
Bhutan	63	32	31	70	35	34	78	39	38	75	38	37
Brunei Darussalam	40	21	19	36	19	17	34	18	16	32	17	15
Cambodia	1 681	858	823	1 701	867	834	1 864	947	917	1 709	866	844
China	85 287	45 859	39 428	95 506	50 900	44 606	102 979	54 328	48 651	117 009	61 330	55 679
Cook Islands	2	1	1	2	1	1	2	1	1	2	1	1
Democratic People's Republic of Korea	1 661	851	809	1 979	1 011	967	2 069	1 057	1 012	1 855	948	907
Fiji	91	47	44	93	48	45	89	46	43	82	42	40
French Polynesia	23	12	11	24	12	12	23	12	11	28	14	13
Guam	17	9	8	17	9	8	16	8	8	14	7	7
Hong Kong (China)	295	151	144	360	183	177	412	209	203	425	219	206
India	126 894	66 136	60 758	124 494	65 118	59 376	122 755	64 267	58 488	114 126	59 554	54 572
Indonesia	21 754	11 092	10 662	21 176	10 779	10 397	21 217	10 786	10 430	21 370	10 839	10 532
Japan	5 700	2 926	2 773	6 057	3 110	2 948	6 001	3 073	2 928	6 568	3 363	3 206
Kiribati	11	6	5	11	5	5	10	5	5	9	5	4
Lao People's Democratic Republic	716	365	351	760	387	373	778	395	383	683	345	337
Macao (China)	17	9	8	24	12	12	35	18	17	42	21	21
Malaysia	2 752	1 414	1 338	2 655	1 363	1 292	2 646	1 354	1 292	2 518	1 281	1 237
Maldives	30	15	15	32	16	16	38	20	19	39	20	19
Marshall Islands	7	3	3	6	3	3	6	3	3	6	3	3

Age group (years)	0–4			5–9			10–14			15–19		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
Micronesia, Federated States of	15	8	7	14	7	7	14	7	7	13	7	6
Mongolia	234	119	114	231	118	113	281	144	138	317	160	157
Myanmar	4 173	2 118	2 054	4 342	2 200	2 142	4 559	2 308	2 251	4 763	2 409	2 354
Nauru	2	1	1	2	1	1	2	1	1	1	1	1
Nepal	3611	1 853	1 759	3 571	1 836	1 735	3 373	1 737	1 636	2 919	1 504	1 415
New Caledonia	20	10	10	22	11	11	22	11	11	21	11	10
New Zealand	283	145	138	286	147	139	310	160	150	306	156	150
Niue	0	0	0	0	0	0	0	0	0	0	0	0
Northern Mariana Islands	11	5	5	10	5	5	10	5	5	9	5	4
Palau	3	1	1	2	1	1	2	1	1	2	1	1
Papua New Guinea	899	464	435	841	433	408	725	372	353	628	321	306
Philippines	10 924	5 593	5 331	10 012	5 118	4 894	9 642	4 922	4 721	8 906	4 537	4 369
Pitcairn Islands*	0	0	0	0	0	0	0	0	0	0	0	0
Republic of Korea	2 444	1 280	1 164	3 066	1 602	1 464	3 414	1 736	1 677	3 222	1 697	1 525
Samoa	26	13	12	27	14	13	23	12	11	20	10	9
Singapore	216	112	104	288	149	139	341	176	165	287	149	138
Solomon Islands	69	36	33	64	33	31	58	30	28	51	26	24
Sri Lanka	1 503	767	736	1 510	769	741	1 608	821	788	1 760	896	864
Thailand	4 520	2 317	2 203	4 484	2 310	2 174	4 652	2 402	2 251	5 007	2 554	2 453
Timor-Leste	182	93	89	164	84	80	134	69	66	113	58	55
Tokelau	0	0	0	0	0	0	0	0	0	0	0	0
Tonga	12	6	6	13	7	6	13	7	6	11	6	5
Tuvalu	1	1	1	1	1	1	1	1	1	1	1	1

Age group (years)	0–4			5–9			10–14			15–19		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
Vanuatu	30	16	15	29	15	14	27	14	13	24	12	12
Viet Nam	8 067	4 118	3 949	7 844	4 000	3 845	9 286	4 728	4 558	9 260	4 699	4 560
Wallis and Futuna	2	1	1	2	1	1	2	1	1	2	1	1
Asia Pacific Region	304 475	159 206	145 265	310 699	162 407	148 291	318 408	165 903	152 507	321 911	167 212	154 697

Age group (years)	20–24			25–29			30–34			35–39		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
American Samoa	6	3	3	5	3	2	5	2	2	4	2	2
Australia	1 410	720	690	1 366	691	674	1513	755	758	1 467	728	739
Bangladesh	14 897	7 661	7 236	12 675	6 519	6 155	11 340	5 846	5 494	10 026	5 165	4 861
Bhutan	71	40	31	58	32	25	43	23	20	39	22	17
Brunei Darussalam	35	17	17	39	19	20	35	17	18	31	15	16
Cambodia	1 569	791	778	893	442	451	866	426	440	820	387	433
China	100 374	52 475	47 899	95 730	49 205	46 525	120 117	61 630	58 487	125 080	64 231	60 849
Cook Islands	2	1	1	1	1	1	1	1	1	1	1	1
Democratic People's Republic of Korea	1 851	945	906	1 493	761	732	2 116	1 076	1 039	2 201	1 118	1 083
Fiji	82	42	40	68	35	33	52	27	25	50	25	25
French Polynesia	22	11	11	19	10	9	20	10	10	21	11	10
Guam	12	6	6	12	6	6	12	6	6	13	7	6
Hong Kong (China)	482	240	242	519	240	278	570	257	313	601	266	335
India	104 612	54 553	50 060	94 067	48 990	45 078	82 978	43 192	39 786	73 400	38 199	35 201
Indonesia	21 476	10 818	10 657	20 294	10 165	10 129	18 815	9 399	9 417	16 957	8 504	8 454
Japan	7 542	3 855	3 688	8 628	4 413	4 214	9 935	5 054	4 882	8 798	4 449	4 348
Kiribati	8	4	4	6	3	3	6	3	3	6	3	3

Age group (years)	20–24			25–29			30–34			35–39		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
Lao People's Democratic Republic	537	269	268	448	222	226	379	185	194	309	150	159
Macao (China)	37	18	20	30	13	16	37	16	21	43	17	26
Malaysia	2 399	1 208	1 191	2 084	1 056	1 028	1 926	976	950	1 779	905	875
Maldives	33	17	16	26	13	12	21	11	10	17	9	8
Marshall Islands	5	2	2	4	2	2	4	2	2	4	2	2
Micronesia, Federated States of	12	6	6	8	4	4	6	3	3	6	3	3
Mongolia	271	137	134	245	123	122	219	110	109	190	94	96
Myanmar	4 595	2 319	2 276	4 354	2 180	2 174	4 212	2 089	2 124	3 574	1 758	1 815
Nauru	1	1	1	1	1	0	1	0	0	1	1	0
Nepal	2 519	1 284	1 235	2 132	1 060	1 072	1 804	866	938	1 538	715	823
New Caledonia	19	9	9	18	9	9	19	9	10	18	9	9
New Zealand	281	143	138	264	131	133	286	138	149	298	143	155
Niue	0	0	0	0	0	0	0	0	0	0	0	0
Northern Mariana Islands	7	4	4	6	3	3	6	3	3	6	3	3
Palau	2	1	1	2	1	1	1	1	1	1	1	1
Papua New Guinea	548	280	268	478	241	237	447	219	229	380	187	192
Philippines	7 962	4 043	3 920	7 079	3 583	3 496	6 062	3 057	3 005	5 247	2 632	2 615
Pitcairn Islands*	0	0	0	0	0	0	0	0	0	0	0	0
Republic of Korea	3 731	1 919	1 812	3 788	1 939	1 849	4 231	2 158	2 073	4 090	2 083	2 007
Samoa	14	8	6	11	6	5	12	6	6	12	6	6
Singapore	265	137	127	261	135	126	315	160	155	383	189	194
Solomon Islands	46	24	22	40	21	19	35	18	17	26	13	13
Sri Lanka	1 863	933	930	1 471	713	758	1 243	593	650	1 447	705	742
Thailand	5 108	2 574	2 534	5 083	2 520	2 564	5 090	2 443	2 647	5 018	2 362	2 656

Age group (years)	20–24			25–29			30–34			35–39		
Country/area	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**
Timor-Leste	98	51	47	67	35	32	63	33	30	53	25	28
Tokelau	0	0	0	0	0	0	0	0	0	0	0	0
Tonga	11	6	5	8	4	4	6	3	3	5	3	3
Tuvalu	1	1	1	1	0	0	1	0	0	1	0	0
Vanuatu	20	10	10	16	8	8	15	7	8	13	6	7
Viet Nam	8 250	4 163	4 087	7 525	3 777	3 748	6 792	3 373	3 418	6 144	3 037	3 107
Wallis and Futuna	1	1	1	1	1	1	1	1	1	1	1	0
Asia Pacific Region	293 087	151 750	141 339	271 325	139 335	131 985	281 658	144 205	137 456	270 119	138 192	131 928

Age group (years)	40–44			45–49			50–54			55–59		
Country/area	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**
American Samoa	4	2	2	3	1	1	2	1	1	2	1	1
Australia	1 535	764	771	1 460	726	734	1 342	666	676	1 241	624	617
Bangladesh	8 595	4 446	4 149	6 996	3 628	3 369	5 642	2 924	2 718	4 137	2 077	2 061
Bhutan	30	16	14	28	15	13	21	11	10	17	9	8
Brunei Darussalam	24	13	11	22	12	10	17	10	7	10	6	4
Cambodia	716	326	391	582	259	323	467	204	262	372	156	215
China	103 047	52 856	50 192	81 772	42 132	39 640	82 848	42 212	40 636	59 205	30 455	28 750
Cook Islands	1	1	0	1	0	0	1	0	0	1	0	0
Democratic People's Republic of Korea	1 656	838	817	1 552	781	771	876	436	440	1 170	576	595
Fiji	51	26	25	47	24	23	37	18	19	30	15	16
French Polynesia	19	10	9	15	8	7	13	7	6	9	5	4
Guam	12	6	6	11	5	5	9	4	4	7	4	4
Hong Kong (China)	713	323	390	668	320	348	524	257	267	401	204	198

Age group (years)	40–44			45–49			50–54			55–59		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
India	65 196	33 919	31 277	57 040	29 639	27 400	48 777	25 226	23 550	35 403	17 913	17 490
Indonesia	14 694	7 396	7 298	12 414	6 255	6 159	9 657	4 855	4 803	7 369	3 527	3 842
Japan	8 098	4 090	4 008	7 746	3 893	3 853	8 831	4 409	4 421	10 268	5 091	5 177
Kiribati	5	3	2	5	2	2	4	2	2	3	2	1
Lao People's Democratic Republic	264	129	135	218	107	111	177	87	90	102	47	55
Macao (China)	47	21	26	49	24	25	37	20	17	25	14	11
Malaysia	1 696	863	833	1 461	748	712	1 156	595	561	870	449	421
Maldives	15	8	7	12	6	6	10	5	5	6	3	3
Marshall Islands	3	2	1	3	1	1	2	1	1	2	1	1
Micronesia, Federated States of	5	3	3	5	2	2	4	2	2	3	1	1
Mongolia	173	85	88	129	63	66	82	40	42	56	27	29
Myanmar	3 078	1 504	1 574	2 686	1 304	1 382	2 296	1 102	1 194	1 514	723	791
Nauru	1	0	0	1	0	0	1	0	0	0	0	0
Nepal	1 316	607	709	1 105	516	590	922	437	485	721	331	390
New Caledonia	17	8	8	14	7	7	12	6	6	10	5	5
New Zealand	321	156	165	293	144	149	256	126	129	234	116	118
Niue	0	0	0	0	0	0	0	0	0	0	0	0
Northern Mariana Islands	5	3	2	5	2	2	4	2	2	3	2	1
Palau	1	1	1	1	1	1	1	0	0	1	0	0
Papua New Guinea	322	160	162	243	122	122	187	96	91	137	69	67
Philippines	4 478	2 234	2 244	3 768	1 867	1 901	3 131	1 538	1 593	2 301	1 144	1 157
Pitcairn Islands*	0	0	0	0	0	0	0	0	0	0	0	0
Republic of Korea	4 132	2 085	2 047	3 944	1 980	1 964	2 875	1 445	1 430	2 363	1 169	1 194
Samoa	10	6	5	8	4	4	6	3	3	4	2	2

Age group (years)	40–44			45–49			50–54			55–59		
Country/area	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**
Singapore	423	211	212	411	206	205	343	172	170	265	133	132
Solomon Islands	21	10	11	17	8	8	13	7	6	10	5	5
Sri Lanka	1 398	691	706	1 291	639	652	1 199	589	610	965	469	496
Thailand	5 081	2 407	2 674	4 789	2 287	2 502	4 053	1 952	2 100	2 996	1 455	1 541
Timor-Leste	47	23	24	42	21	21	31	16	15	25	11	13
Tokelau	0	0	0	0	0	0	0	0	0	0	0	0
Tonga	4	2	2	3	2	2	3	1	2	3	1	2
Tuvalu	1	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	10	5	5	9	5	4	6	3	3	6	3	3
Viet Nam	5 465	2 695	2 770	4 430	2 182	2 248	3 396	1 670	1 726	2 118	1 032	1 086
Wallis and Futuna	1	0	0	1	0	0	1	0	0	0	0	0
Asia Pacific Region	232 731	118 954	113 778	195 300	99 951	95 347	179 272	91 159	88 107	134 385	67 878	66 508

Age group (years)	60–69			70–79			80+			All ages		
Country/area	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**
American Samoa	3	1	1	2	1	1	0	0	0	65	34	32
Australia	1 714	858	857	1 186	554	632	713	264	449	20 311	10 101	10 209
Bangladesh	5 708	2 819	2 889	2 471	1 167	1 303	600	267	333	153 284	78 472	74 812
Bhutan	26	14	13	14	7	8	3	1	1	636	334	300
Brunei Darussalam	11	7	4	6	3	3	1	0	1	373	194	178
Cambodia	463	179	285	206	67	139	47	16	31	13 956	6 791	7 166
China	80 604	41 332	39 273	48 017	23 069	24 948	15 404	6 164	9 240	1 312 979	678 178	634 803
Cook Islands	0	0	0	0	0	0	0	0	0	19	10	9
Democratic People's Republic of Korea	2 042	917	1 125	881	281	600	215	42	174	23 617	11 638	11 977

Age group (years)	60–69			70–79			80+			All ages		
Country/area	Both	M	F	Both	M	F	Both	M	F	Both	M	F
Fiji	38	18	21	15	6	8	3	1	2	828	420	409
French Polynesia	13	7	7	6	3	3	1	1	1	256	133	124
Guam	9	4	4	5	2	3	1	1	1	167	84	82
Hong Kong (China)	484	250	235	404	193	211	200	75	123	7 058	3 387	3 670
India	50 895	24 941	25 954	25 945	12 263	13 682	7820	3708	4112	1 134 402	587 618	546 784
Indonesia	11 637	5 375	6 262	5 856	2 594	3 262	1 375	569	808	226 061	112 953	113 112
Japan	15 802	7 591	8 211	11 744	5 215	6 530	6 178	1 955	4 223	127 896	62 487	65 410
Kiribati	4	2	2	2	1	1	0	0	0	90	47	44
Lao People's Democratic Republic	174	80	93	95	42	53	24	9	15	5 664	2 819	2 843
Macao (China)	23	12	11	17	7	10	9	3	6	472	225	247
Malaysia	1 068	534	535	493	225	267	152	64	86	25 655	13 035	12 618
Maldives	9	5	4	5	3	3	1	0	1	294	151	144
Marshall Islands	2	1	1	2	0	0	0	0	0	54	28	26
Micronesia, Federated States of	3	2	2	2	1	1	1	0	0	111	56	54
Mongolia	88	42	45	46	19	26	19	6	12	2 581	1 287	1 291
Myanmar	2 068	964	1 105	1 296	587	709	458	194	263	47 968	23 759	24 208
Nauru	1	0	0	0	0	0	0	0	0	14	7	7
Nepal	993	443	550	456	194	262	111	44	66	27 091	13 427	13 665
New Caledonia	14	7	7	7	3	4	3	1	2	236	116	118
New Zealand	326	159	166	222	104	119	131	47	84	4 097	2 015	2 082
Niue	0	0	0	0	0	0	0	0	0	2	1	1
Northern Mariana Islands	4	2	2	2	1	1	0	0	0	86	45	42
Palau	1	0	0	1	0	0	0	0	0	21	11	10

Age group (years)	60–69			70–79			80+			All ages		
Country/area	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**	**Both**	**M**	**F**
Papua New Guinea	163	83	80	60	29	31	13	7	7	6 071	3 083	2 988
Philippines	3 178	1 515	1 663	1 471	653	819	404	152	253	84 565	42 588	41 981
Pitcairn Islands*	0	0	0	0	0	0	0	0	0	0	0	0
Republic of Korea	3 855	1 829	2 026	2 048	814	1 234	669	204	465	47 872	23 940	23 931
Samoa	7	4	4	4	2	2	1	0	1	185	96	89
Singapore	296	146	151	171	78	93	63	25	38	4 328	2 178	2 149
Solomon Islands	14	7	7	7	3	3	1	1	1	472	242	228
Sri Lanka	1 067	509	558	581	260	322	215	95	118	19 121	9 449	9 671
Thailand	4 058	1 899	2 158	2 245	970	1 274	821	284	536	63 005	30 736	32 267
Timor-Leste	34	17	17	13	6	7	3	1	1	1 069	543	525
Tokelau	0	0	0	0	0	0	0	0	0	2	1	1
Tonga	5	2	2	3	2	2	0	0	0	100	52	50
Tuvalu	0	0	0	0	0	0	0	0	0	11	6	5
Vanuatu	7	4	3	3	2	2	1	0	0	216	110	107
Viet Nam	3 259	1 570	1 689	2 335	1 087	1 248	857	376	481	85 028	42 507	42 520
Wallis and Futuna	1	0	0	0	0	0	0	0	0	15	8	7
Asia Pacific Region	190 170	94 153	96 024	108 346	50 519	57 827	36 520	14 578	21 936	3 448 404	1 765 400	1 682 995

Note: The sum of population provided in age groups may differ slightly from total population of the country/area provided in other tables due to round-off errors.
* Total Population of Pitcairn Island is 92.

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm
World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm
Demographic tables for the Western Pacific Region 2005-2010. Manila, WHO Regional Office for the Western Pacific, 2005. Available from: http://www.wpro.who.int/publications/Demographic+tables.htm

Table 3.2 Total population density (number of people per square km) in the Asia Pacific Region, 1990–2015

Country/area	1990	1995	2000	2005	2010	2015
American Samoa	237	264	287	322	356	388
Australia	2	2	2	3	3	3
Bangladesh	785	877	968	1 064	1 157	1 251
Bhutan	12	11	12	14	15	16
Brunei Darussalam	45	51	58	65	72	79
Cambodia	54	63	71	77	84	92
China	120	126	132	137	141	145
Cook Islands	75	77	68	59	53	49
Democratic People's Republic of Korea	167	180	190	196	199	203
Fiji	40	42	44	45	47	48
French Polynesia	49	54	59	64	68	72
Guam	244	265	283	307	328	348
Hong Kong (China)	5 191	5 647	6 062	6 422	6 751	7 047
India	262	290	318	345	371	396
Indonesia	96	104	111	119	126	132
Japan	327	332	336	338	338	335
Kiribati	99	106	116	127	137	148
Lao People's Democratic Republic	17	20	22	24	26	28
Macao (China)	14 313	15 832	16 964	18 196	18 845	19 493
Malaysia	55	62	71	78	85	91
Maldives	724	832	916	991	1 082	1 184
Marshall Islands	261	282	288	313	350	384
Micronesia, Federated States of	137	153	153	157	160	165
Mongolia	1	2	2	2	2	2
Myanmar	59	64	68	71	74	77
Nauru	436	475	478	481	488	504
Nepal	130	147	166	184	203	223
New Caledonia	9	10	12	13	14	15
New Zealand	13	14	14	15	16	16
Niue	9	9	7	6	6	5
Northern Mariana Islands	94	124	149	173	191	207
Palau	33	37	42	44	45	46
Papua New Guinea	9	10	12	13	14	16
Philippines	204	229	254	282	310	337
Pitcairn Islands	13	12	12	10	10	10
Republic of Korea	431	452	470	481	489	493
Samoa	57	59	63	65	68	70
Singapore	4 416	5 092	5 882	6 336	6 723	7 040

Country/area	1990	1995	2000	2005	2010	2015
Solomon Islands	11	13	14	16	18	20
Sri Lanka	261	276	285	291	298	304
Thailand	106	112	118	123	127	130
Timor-Leste	50	57	55	72	85	101
Tokelau	134	123	126	117	117	117
Tonga	145	150	151	153	157	160
Tuvalu	363	377	392	402	410	419
Vanuatu	12	14	16	18	20	22
Viet Nam	200	221	238	256	274	291
Wallis and Futuna	69	72	74	75	78	81
Asia Pacific Region	94	103	108	127	131	135
World	39	42	45	48	51	54

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm
World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Table 3.3 Average annual population growth rate (%) in the Asia Pacific Region, 1990–2015

Country/area	1990–1995	1995–2000	2000–2005	2005–2010	2010–2015
Australia	1.37	1.15	1.19	1.01	0.95
Bangladesh	2.22	1.98	1.89	1.67	1.56
Bhutan	-1.53	1.94	2.63	1.43	1.48
Brunei Darussalam	2.76	2.45	2.29	2.05	1.81
Cambodia	3.23	2.29	1.76	1.74	1.78
China	1.10	0.91	0.67	0.58	0.54
Democratic People's Republic of Korea	1.50	1.10	0.58	0.34	0.33
Fiji	1.19	0.86	0.65	0.62	0.46
French Polynesia	1.99	1.80	1.59	1.31	1.21
Guam	1.67	1.28	1.66	1.30	1.18
Hong Kong (China)	1.69	1.42	1.15	1.00	0.86
India	2.08	1.84	1.62	1.46	1.31
Indonesia	1.53	1.40	1.31	1.16	0.98
Japan	0.31	0.25	0.14	-0.02	-0.18
Lao People's Democratic Republic	2.82	2.15	1.62	1.72	1.64
Macao (China)	2.02	1.38	1.40	0.70	0.68
Malaysia	2.58	2.45	1.95	1.69	1.47
Maldives	2.78	1.93	1.57	1.76	1.80
Micronesia, Federated States of	2.15	-0.02	0.55	0.46	0.58
Mongolia	1.51	0.66	0.88	0.96	1.09
Myanmar	1.44	1.24	0.89	0.85	0.76
Nepal	2.51	2.39	2.08	1.97	1.88
New Caledonia	2.42	2.15	1.71	1.54	1.35
New Zealand	1.48	0.96	1.22	0.90	0.79
Papua New Guinea	2.62	2.67	2.41	2.00	1.75
Philippines	2.27	2.11	2.08	1.90	1.67
Republic of Korea	0.97	0.77	0.46	0.33	0.18
Samoa	0.84	1.07	0.71	0.87	0.65
Singapore	2.85	2.88	1.49	1.19	0.92
Solomon Islands	2.86	2.76	2.57	2.33	2.08
Sri Lanka	1.10	0.69	0.43	0.47	0.39
Thailand	1.16	1.06	0.76	0.66	0.50
Timor-Leste	2.77	-0.76	5.31	3.50	3.36
Tonga	0.60	0.14	0.26	0.50	0.35
Vanuatu	2.84	1.94	2.54	2.38	2.18
Viet Nam	2.05	1.51	1.45	1.32	1.20
Asia Pacific Region	1.54	1.34	1.15	1.02	0.93
World	1.54	1.37	1.24	1.17	1.10

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm
World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Table 3.4 Dependency ratios and sex ratios by type in the Asia Pacific Region, 2005					
Country/area	Dependency ratios			Sex ratio	
	Child	Old age	Total	0–4 years	Overall
American Samoa	56	8	64	108	106
Australia	29	19	48	105	99
Bangladesh	57	6	63	105	105
Bhutan	53	7	60	103	111
Brunei Darussalam	44	5	49	111	108
Cambodia	63	5	69	104	95
China	31	11	41	116	107
Cooks Islands	56	8	64	108	106
Democratic People's Republic of Korea	36	13	49	105	97
Fiji	52	7	59	107	103
French Polynesia	41	8	48	109	105
Guam	46	10	56	113	104
Hong Kong (China)	21	16	37	105	92
India	53	8	61	109	108
Indonesia	43	8	51	104	100
Japan	21	30	51	106	96
Kiribati	58	8	67	106	107
Lao People's Democratic Republic	70	6	76	104	99
Macao (China)	21	10	31	113	92
Malaysia	49	7	56	106	103
Maldives	55	6	61	100	105
Marshall Islands	58	8	67	106	107
Micronesia, Federated States of	67	7	74	114	103
Mongolia	43	6	49	104	100
Myanmar	41	8	49	103	98
Nauru	58	8	67	106	107
Nepal	68	6	74	105	98
New Caledonia	41	10	51	100	102
New Zealand	32	18	51	105	97
Niue	56	8	64	108	106
Northern Mariana Islands	58	8	67	100	107
Palau	58	8	67	106	107
Papua New Guinea	71	4	75	107	103
Philippines	60	6	67	105	101
Pitcairn Islands*	50	106	156	100	100
Republic of Korea	26	13	39	110	100
Samoa	75	8	83	108	109
Singapore	27	12	39	108	101
Solomon Islands	72	5	77	109	107
Sri Lanka	35	9	44	104	98

Country/area	Dependency ratios			Sex ratio	
	Child	Old age	Total	0–4 years	Overall
Thailand	31	11	42	105	95
Timor-Leste	86	5	91	104	103
Tokelau	56	8	64	108	106
Tonga	67	11	78	100	104
Tuvalu	56	8	64	108	106
Vanuatu	70	6	76	107	104
Viet Nam	46	9	54	104	100
Wallis and Futuna	56	8	64	108	106
Asia Pacific Region	50	11	61	106	103

Note: The sum of the population provided in age groups may differ slightly from the total population of the country/area provided in other tables due to round-off errors.

* Population of less than 1000

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Demographic tables for the Western Pacific Region 2005-2010. Manila, WHO Regional Office for the Western Pacific, 2005. Available from: http://www.wpro.who.int/publications/Demographic+tables.htm

Table 3.5 Crude birth rate per 1000 population in the Asia Pacific Region, 1990–2015					
Country/area	**1990–1995**	**1995–2000**	**2000–2005**	**2005–2010**	**2010–2015**
American Samoa	...	...	...	...	...
Australia	14.7	13.5	12.7	12.4	12.2
Bangladesh	33.6	29.4	27.8	24.8	23.1
Bhutan	35.7	29.3	22.4	18.5	18.9
Brunei Darussalam	28.2	25.1	23.6	21.5	19.5
Cambodia	41.0	32.0	27.5	26.4	25.9
China	18.2	16.0	13.6	13.1	13.1
Cook Islands	...	...	...	...	...
Democratic People's Republic of Korea	21.1	19.0	15.1	13.2	13.6
Fiji	27.5	25.5	23.1	21.1	19.7
French Polynesia	25.4	21.4	19.3	18.3	17.5
Guam	26.0	23.9	20.7	18.5	17.4
Hong Kong (China)	12.4	10.0	8.1	7.6	7.1
India	30.7	27.7	25.1	23.0	21.0
Indonesia	24.3	22.0	20.7	18.7	16.8
Japan	9.7	9.6	9.0	8.3	7.5
Kiribati	...	...	...	...	...
Lao People's Democratic Republic	41.4	34.5	28.4	26.8	25.1
Macao (China)	16.9	10.9	7.4	7.5	7.9
Malaysia	27.8	24.5	22.7	20.6	19.0
Maldives	36.6	26.6	22.2	23.4	23.3
Marshall Islands	...	...	...	...	...
Micronesia, Federated States of	32.2	31.5	29.7	25.9	23.8
Mongolia	29.1	21.2	19.7	18.4	18.0
Myanmar	25.3	22.1	19.5	18.2	16.6
Nauru	...	...	...	...	...
Nepal	38.1	34.5	30.2	28.1	26.4
New Caledonia	23.8	21.6	18.0	16.4	15.5
New Zealand	17.1	14.9	14.2	13.7	12.9
Niue	...	...	...	...	...
Northern Mariana Islands	...	...	...	...	...
Palau	...	...	...	...	...
Papua New Guinea	36.7	36.9	34.0	29.6	26.7
Philippines	31.7	29.1	28.1	25.8	23.2
Pitcairn Islands	...	...	...	...	...
Republic of Korea	15.9	13.5	10.4	9.3	8.5
Samoa	31.1	33.1	29.4	24.7	21.9
Singapore	17.9	14.0	10.1	8.2	7.9
Solomon Islands	38.7	36.3	33.6	30.5	27.6
Sri Lanka	20.4	18.2	16.3	15.0	14.6
Thailand	18.4	17.0	15.4	14.6	13.6

Country/area	1990–1995	1995–2000	2000–2005	2005–2010	2010–2015
Timor-Leste	43.0	45.7	41.7	42.1	39.9
Tokelau	...	...	...	...	...
Tonga	29.9	26.6	24.3	25.6	23.8
Tuvalu	...	...	...	...	...
Vanuatu	36.5	33.9	31.0	28.8	26.4
Viet Nam	28.2	21.4	20.2	18.8	17.5
Wallis and Futuna	...	...	...	...	...
Asia Pacific Region	23.7	21.3	19.2	17.9	16.9
World	24.7	22.6	21.1	20.3	19.5

Note: ... Data not available.

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Table 3.6 Total fertility rate per woman in the Asia Pacific Region, 1990–2015

Country/area	1990–1995	1995–2000	2000–2005	2005–2010	2010–2015
Australia	1.9	1.8	1.8	1.8	1.8
Bangladesh	4.1	3.5	3.2	2.8	2.6
Bhutan	5.4	4.2	2.9	2.2	2.1
Brunei Darussalam	3.1	2.7	2.5	2.3	2.1
Cambodia	5.6	4.5	3.6	3.2	2.9
China	1.9	1.8	1.7	1.7	1.8
Democratic People's Republic of Korea	2.4	2.1	1.9	1.9	1.9
Fiji	3.4	3.2	3.0	2.8	2.6
French Polynesia	3.1	2.6	2.4	2.3	2.2
Guam	3.1	3.0	2.7	2.5	2.4
Hong Kong (China)	1.3	1.1	0.9	1.0	1.0
India	3.9	3.5	3.1	2.8	2.5
Indonesia	2.9	2.6	2.4	2.2	2.0
Japan	1.5	1.4	1.3	1.3	1.3
Lao People's Democratic Republic	5.9	4.7	3.6	3.2	2.9
Macao (China)	1.6	1.1	0.8	0.9	1.0
Malaysia	3.5	3.1	2.9	2.6	2.4
Maldives	5.6	3.9	2.8	2.6	2.5
Micronesia, Federated States of	4.8	4.5	4.2	3.7	3.3
Mongolia	3.4	2.4	2.1	1.9	1.9
Myanmar	3.1	2.7	2.3	2.1	1.9
Nepal	5.0	4.4	3.7	3.3	3.0
New Caledonia	2.9	2.6	2.2	2.1	2.0
New Zealand	2.1	2.0	2.0	2.0	1.9
Papua New Guinea	4.7	4.6	4.3	3.8	3.4
Philippines	4.1	3.7	3.5	3.2	2.9
Republic of Korea	1.7	1.5	1.2	1.2	1.2
Samoa	4.7	4.7	4.4	3.9	3.5
Singapore	1.8	1.6	1.4	1.3	1.3
Solomon Islands	5.5	4.9	4.4	3.9	3.5
Sri Lanka	2.5	2.2	2.0	1.9	1.9
Thailand	2.0	1.9	1.8	1.9	1.9
Timor-Leste	5.7	7.0	7.0	6.5	6.0
Tonga	4.5	4.0	3.7	3.8	3.4
Vanuatu	4.8	4.6	4.2	3.7	3.3
Viet Nam	3.3	2.5	2.3	2.1	2.0
Asia Pacific Region	3.51	3.12	2.78	2.56	2.38

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Table 3.7 Crude death rate per 1000 population 1990–2015, and age-standardized death rate 2002 in the Asia Pacific Region

Country/area	1990–1995	1995–2000	2000–2005	2005–2010	2010–2015	Age-standardized death rate 2002
Australia	7.0	7.0	6.8	7.1	7.4	4.2
Bangladesh	11.1	9.2	8.2	7.5	7.0	12.7
Bhutan	12.6	10.0	7.8	7.2	7.0	13.1
Brunei Darussalam	3.2	2.9	2.8	2.8	3.0	5.9
Cambodia	11.6	10.4	10.0	9.0	8.0	16.6
China	7.1	6.7	6.6	7.1	7.5	8.4
Cook Islands	...	...	...	...	...	8.2
Democratic People's Republic of Korea	6.0	7.9	9.3	9.9	10.3	11.1
Fiji	6.3	6.2	6.4	6.6	6.9	10.6
French Polynesia	5.0	4.8	4.9	5.2	5.5	...
Guam	4.7	4.7	5.1	5.5	5.7	...
Hong Kong (China)	5.6	5.1	5.3	5.9	6.5	...
India	9.8	9.1	8.7	8.2	7.8	12.9
Indonesia	8.2	7.2	6.6	6.3	6.3	11.0
Japan	7.0	7.6	8.0	9.0	9.8	3.6
Kiribati	...	...	...	...	...	11.0
Lao People's Democratic Republic	11.9	9.5	8.0	7.1	6.4	16.3
Macao (China)	4.5	4.2	4.3	4.7	5.2	...
Malaysia	5.0	4.7	4.5	4.5	4.6	8.3
Maldives	8.9	7.3	6.5	5.7	5.3	12.7
Marshall Islands	...	...	...	...	...	13.3
Micronesia, Federated States of	6.4	6.3	6.3	6.1	5.8	10.6
Mongolia	8.9	7.2	6.9	6.6	6.4	12.4
Myanmar	10.3	9.8	10.2	9.7	9.0	14.3
Nauru	...	...	...	...	...	14.5
Nepal	12.0	9.8	8.7	7.7	7.0	14.1
New Caledonia	5.5	5.5	5.2	5.5	5.9	...
New Zealand	7.6	7.4	7.1	7.1	7.3	4.8
Niue	...	...	...	...	...	8.6
Palau	...	...	...	...	...	9.7
Papua New Guinea	10.6	10.2	9.9	9.6	9.2	14.1
Philippines	6.3	5.5	5.1	4.8	4.7	9.9
Republic of Korea	5.6	5.5	5.4	5.9	6.6	6.5
Samoa	6.9	6.2	5.7	5.4	5.2	10.3
Singapore	4.9	4.8	4.9	5.3	6.1	4.6
Solomon Islands	10.2	8.7	7.9	7.2	6.8	10.9
Sri Lanka	6.5	7.0	7.3	7.2	7.7	9.1
Thailand	7.4	8.1	8.6	8.5	8.9	8.6
Timor-Leste	15.4	12.6	10.2	8.9	7.8	14.9

Country/area	1990–1995	1995–2000	2000–2005	2005–2010	2010–2015	Age-standardized death rate 2002
Tonga	5.9	5.7	5.7	5.7	5.7	8.9
Tuvalu	...	...	...	...	...	14.3
Vanuatu	7.1	6.7	5.7	5.0	4.6	10.3
Viet Nam	6.9	5.7	5.2	5.1	5.0	9.3
Asia Pacific Region	8.2	7.7	7.4	7.4	7.5	...
World	9.3	8.9	8.8	8.6	8.5	...

Note: ... Data not available.

Sources: *World population prospects: the 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

Table 3.8 Percentage of population in urban areas in the Asia Pacific Region, 1990–2015

Country/area	1990	1995	2000	2005	2010	2015
American Samoa	80.9	85.3	88.8	91.3	93.0	94.1
Australia	85.4	86.1	87.2	88.2	89.1	89.9
Bangladesh	19.8	21.5	23.2	25.1	27.3	29.9
Bhutan	7.2	8.3	9.6	11.1	12.8	14.8
Brunei Darussalam	65.8	68.6	71.1	73.5	75.7	77.6
Cambodia	12.6	14.2	16.9	19.7	22.8	26.1
China	27.4	31.4	35.8	40.4	44.9	49.2
Cook Islands	56.9	58.7	65.2	70.4	73.8	76.7
Democratic People's Republic of Korea	58.4	59.1	60.2	61.6	63.4	65.5
Fiji	41.6	45.5	48.3	50.8	53.4	56.1
French Polynesia	55.9	53.5	52.4	51.7	51.6	52.3
Guam	90.8	92.1	93.2	94.0	94.7	95.3
Hong Kong (China)	99.5	100.0	100.0	100.0	100.0	100.0
India	25.5	26.6	27.7	28.7	30.1	32.0
Indonesia	30.6	35.6	42.0	48.1	53.7	58.5
Japan	63.1	64.6	65.2	65.8	66.8	68.2
Kiribati	35.0	36.4	43.0	47.4	51.5	55.4
Lao People's Democratic Republic	15.4	17.2	18.9	20.6	22.6	24.9
Macao (China)	99.8	99.9	100.0	100.0	100.0	100.0
Malaysia	49.8	55.6	61.8	67.3	71.8	75.4
Maldives	25.8	25.6	27.5	29.6	32.1	34.8
Marshall Islands	64.7	65.3	65.8	66.7	67.8	69.3
Micronesia, Federated States of	25.8	25.1	22.3	22.3	22.7	23.6
Mongolia	57.0	56.8	56.6	56.7	57.5	58.8
Myanmar	24.9	26.1	28.0	30.6	33.9	37.4
Nauru	100.0	100.0	100.0	100.0	100.0	100.0
Nepal	8.9	10.9	13.4	15.8	18.2	20.9
New Caledonia	59.6	60.3	61.9	63.7	65.5	67.4
New Zealand	84.7	85.3	85.7	86.2	86.8	87.4
Niue	30.9	31.5	33.7	36.7	39.9	43.2
Northern Mariana Islands	89.8	91.7	93.3	94.5	95.3	95.9
Palau	69.6	71.4	69.6	69.6	70.1	70.9
Papua New Guinea	13.1	13.2	13.2	13.4	14.0	15.0
Philippines	48.8	54.0	58.5	62.7	66.4	69.6
Pitcairn Islands	0.0	0.0	0.0	0.0	0.0	0.0
Republic of Korea	73.8	78.2	79.6	80.8	81.9	83.1
Samoa	21.2	21.5	21.9	22.4	23.4	24.9
Singapore	100.0	100.0	100.0	100.0	100.0	100.0
Solomon Islands	13.7	14.7	15.7	17.0	18.6	20.5
Sri Lanka	17.2	16.4	15.7	15.1	15.1	15.7
Thailand	29.4	30.3	31.1	32.3	34.0	36.2

Country/area	1990	1995	2000	2005	2010	2015
Timor-Leste	20.8	22.7	24.5	26.5	28.7	31.2
Tokelau	0.0	0.0	0.0	0.0	0.0	0.0
Tonga	22.7	22.9	23.2	24.0	25.3	27.4
Tuvalu	40.7	44.0	46.0	48.1	50.4	52.9
Vanuatu	18.7	20.2	21.7	23.5	25.6	28.1
Viet Nam	20.3	22.2	24.3	26.4	28.8	31.6
Wallis and Futuna	0.0	0.0	0.0	0.0	0.0	0.0
Asia Pacific Region	30.1	32.7	35.4	38.2	41.0	43.9
World	43.0	44.8	46.7	48.7	50.8	52.9

Sources: *World population prospects: the 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

World urbanization prospects: the 2005 revision. New York, United Nations Department of Economic and Social Affairs, Population Division, 2005 (medium variant estimates). Available from: http://www.un.org/esa/population/publications/WUP2005/2005wup.htm

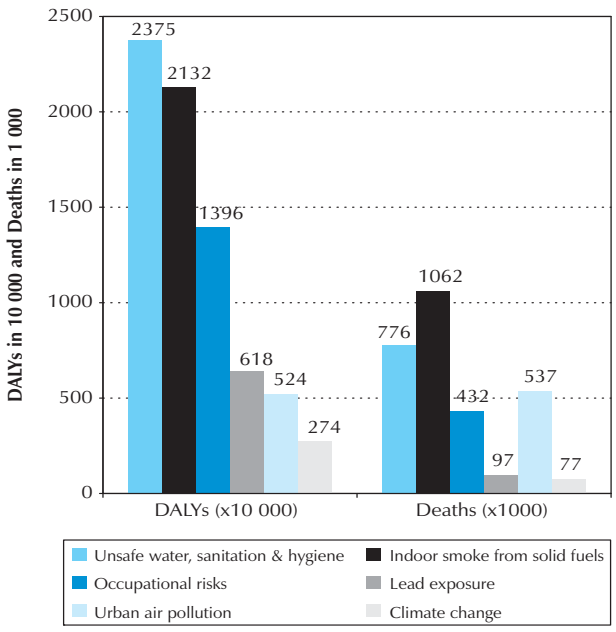
4

Environmental trends

Introduction

According to the World Health Organization's estimates, environmental risks were responsible for 6.6 million deaths in the Asia Pacific Region and 164 million disability-adjusted life years (DALYs) in 2002, accounting for 24% of DALYs lost and 25% of deaths in the Region.[1] Environmental risk factors include unsafe water, sanitation and hygiene, indoor and outdoor air pollution, chemicals, wastes, recreational environment, water resources management, land use, noise, radiation, occupation, climate change, and others.

Fig. 4.1 Attributable mortality and DALYs lost due to selected environmental and occupational risks in the Asia Pacific Region, 2000



Source: *The world health report 2002: Reducing risks, promoting healthy life.* Geneva, World Health Organization, 2002.

Selected major environmental and occupational risks were studied in detail and results indicated that the combined contributions of unsafe water, sanitation and hygiene, indoor smoke from solid fuels, urban air pollution, lead exposure and climate change amounted to about 2.9 million deaths and 73 million DALYs (Figure 4.1). Occupational risks, including factors causing injury, airborne particulates, carcinogens, noise and ergonomic stressors, contributed to 430 000 deaths and 14 million DALYs.[2]

These and other environmental risks to health are discussed in detail in the succeeding sections of the chapter.

4.1 Water supply and sanitation

Approximately 1.8 million people die annually from diarrhoeal diseases, including cholera, and 90% of these are children under five years, mostly in developing countries, according to global estimates.[3] Some 88% of diarrhoeal disease in the world is attributable to unsafe water, sanitation and hygiene.[4]

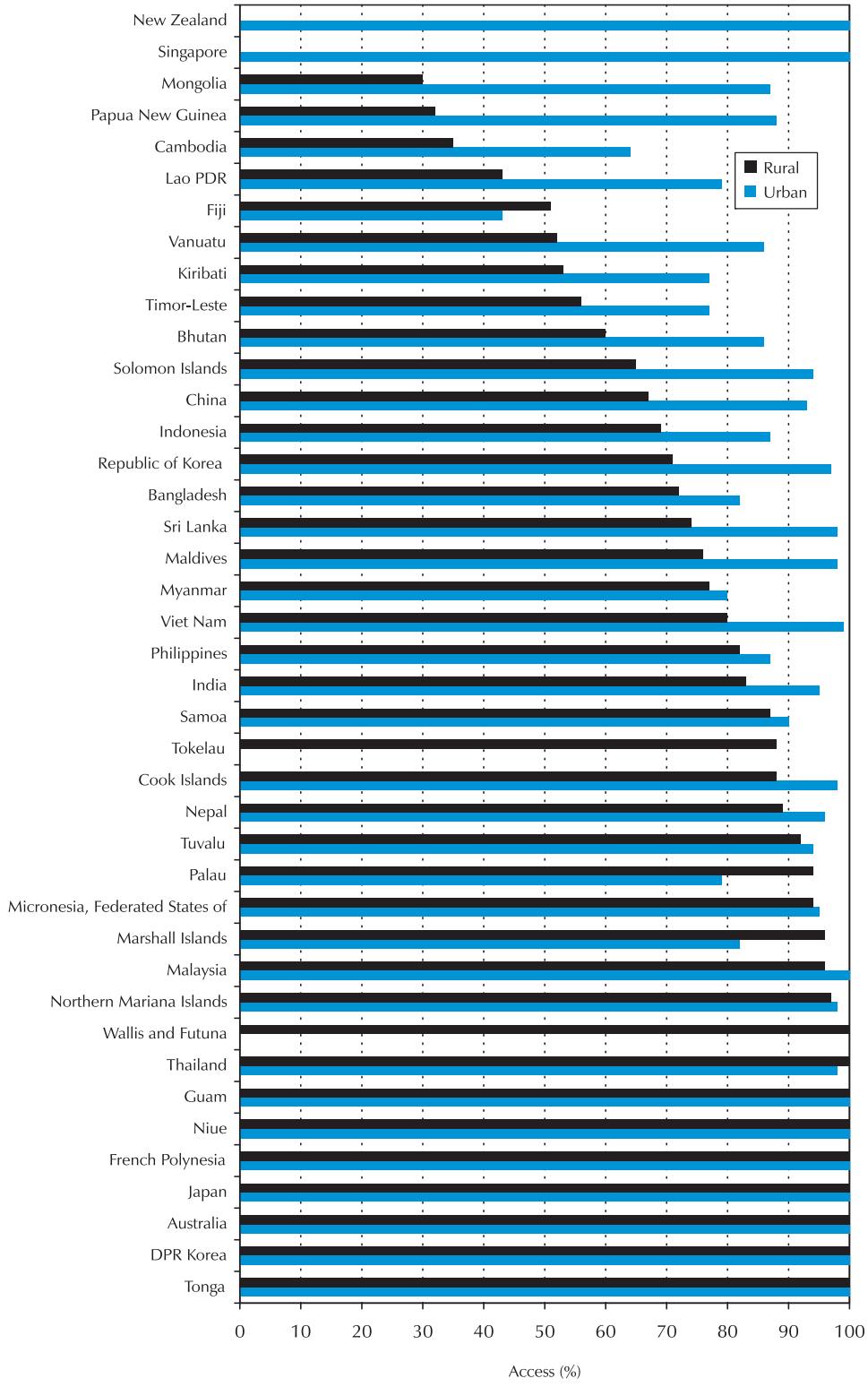
Early interventions by caregivers through home-applied oral rehydration therapy and improved case management of diarrhoeal episodes in children have led to a steady decline of case fatality rates in many countries. However, since the prevalence of pathogens in the immediate human environment and the resulting number of diarrhoeal episodes per year are generally not decreasing, considerable social and economic health costs still remain. Diarrhoea and other infectious diseases such as worm infestation directly affect the nutritional status of children and contribute to stunting and slower developmental and learning performance.[5]

Access to services

Between 1990 and 2004 access to improved sources of drinking water was extended to more than 781 million additional people in the Asia Pacific Region. Despite this enormous effort, approximately 638 million people, about 18.4% of the population of the Region, still lack access to this basic necessity of life.[6] Countries having the lowest level of access are mainly those that suffer the highest rates of under-five mortality: Cambodia, the Lao People's Democratic Republic and Papua New Guinea. In addition, disparities persist among social classes and geographically within countries. Figure 4.2 illustrates disparities in coverage between urban and rural populations in selected countries of the Region. Moreover, it is often assumed that improved sources of water are safe for human consumption, but in reality there is no assurance of safety unless adequate community or operator-based water quality surveillance and control programmes are in place. "Improved" sources of water are defined as house connections, public stand posts, boreholes, protected dug wells, protected springs and rainwater collection systems. Even these sources may suffer from inadequate supply and water quality, especially during the dry season. This may force people to obtain water from less reliable sources, causing additional costs and health risks. Figure 4.3 shows that although access to improved water sources appears to be high in many countries of the Region, in reality few consumers have access through house connections and therefore must carry and store water in the home, a behaviour that risks contamination of the water in transit or in storage and also increases the risk of other vector-borne diseases such as dengue.

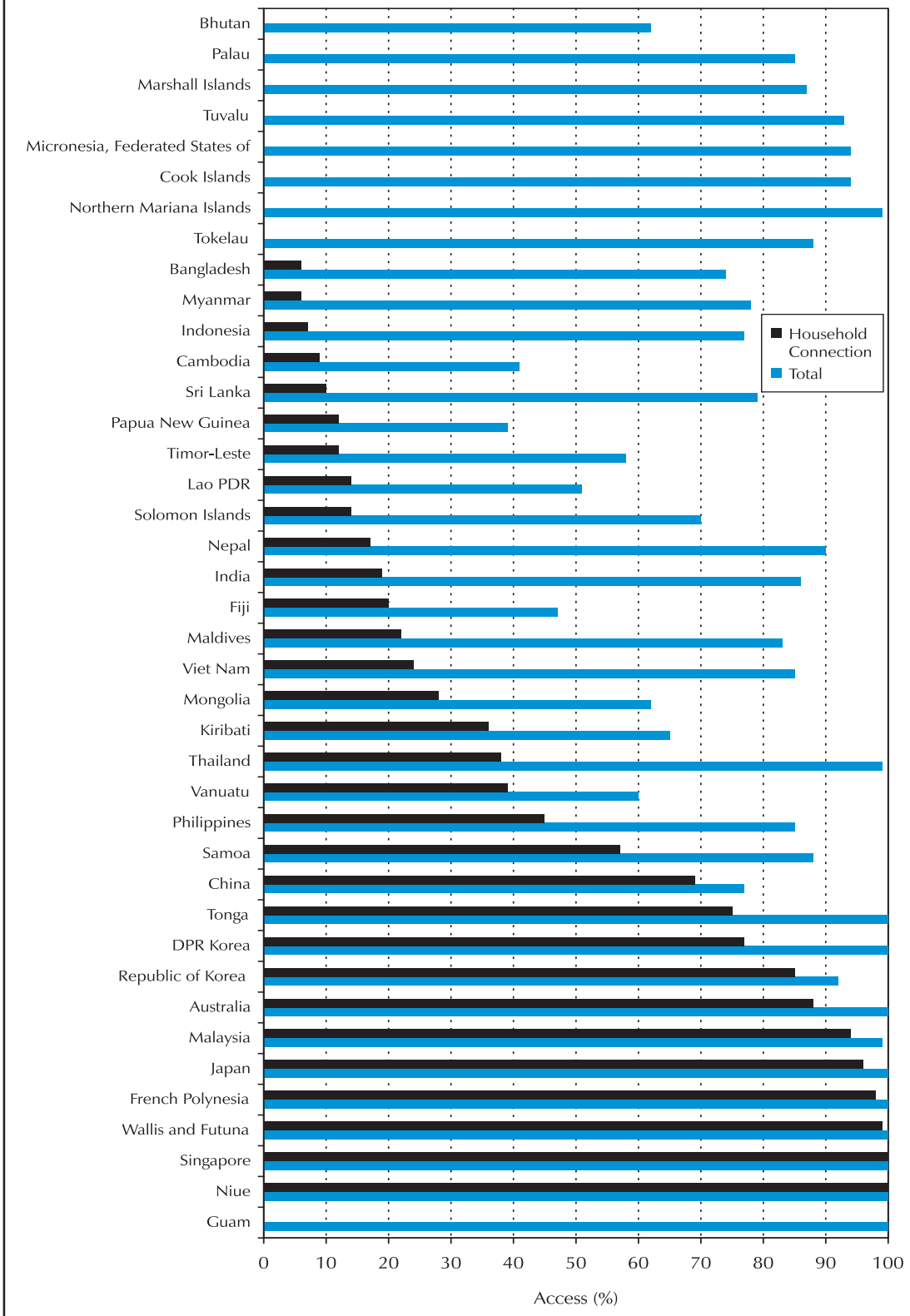
Compared to the 638 million people who lack access to improved water supply in the Asia Pacific Region, nearly 2 billion people lack access to improved sanitation. Between 1990 and 2004, improved sanitation in these countries was extended to about 829 million additional people and coverage increased to 45.4%.[7] Nonetheless, of the 2.6 billion people worldwide[8] without access to improved sanitation, two out of three live in the Asia Pacific Region.[9] Again, the countries having lowest levels of access are mainly those that suffer the highest rates of under-five mortality. The problem is most severe in urban slums and in rural communities. Table 4.1 presents the regional estimates of water and sanitation coverage.

Fig. 4.2 **Percentage of population having access to improved drinking water sources according to place of residence for selected countries of the Asia Pacific Region, 2004**



Source: *Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade*. Geneva, World Health Organization and UNICEF, 2006.

Fig. 4.3 **Percentage of population with access to improved water source and with access through household connection in selected countries of the Asia Pacific Region, 2004**



Source: *Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade.* Geneva, World Health Organization and UNICEF, 2006.

Table 4.1 Regional estimates of water and sanitation coverage, 1990–2004

Region	Year	Population			Improved drinking water coverage (%)						Improved sanitation coverage (%)		
					Total		Urban		Rural				
		Total (thousands)	Urban (%)	Rural (%)	Total	Household connection	Total	Household connection	Total	Household connection	Total	Urban	Rural
Eastern Asia	1990	1 226 156	30	70	71	50	99	82	59	36	24	64	7
	2004	1 388 052	42	58	78	70	93	87	67	57	45	69	28
South Asia	1990	1 175 198	27	73	72	21	90	56	66	9	20	54	8
	2004	1 528 108	30	70	85	20	94	50	81	8	38	63	27
South-eastern Asia	1990	439 884	32	68	76	16	93	42	68	4	49	70	40
	2004	548 525	43	57	82	28	89	50	77	11	67	81	56
Oceania	1990	6 434	23	77	51	21	92	69	39	7	54	80	46
	2004	8 712	25	75	50	21	80	57	40	9	53	81	43

Source: *Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade.* Geneva, World Health Organization and UNICEF, 2006.

The importance of hygiene

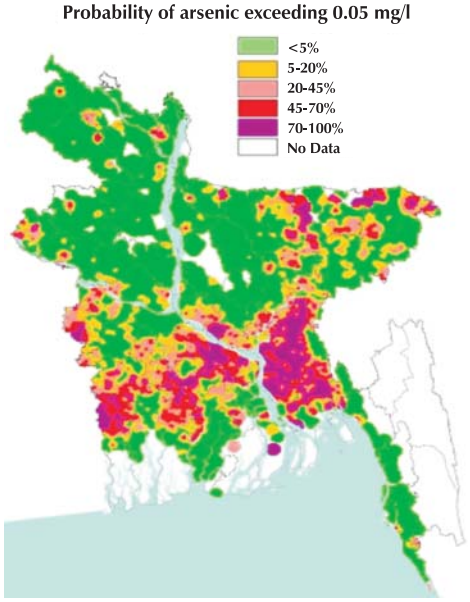
Improvements in hygiene behaviour are essential in order to optimize the health outcomes associated with investments in water supply and sanitation services. The importance of this crucial aspect can be vividly demonstrated by the example of Thailand, which enjoys one of the lowest under-five mortality rates among Asian countries. Despite significant progress in that country, water- and sanitation-related diseases remain major health problems, especially due to helminths and diarrhoea, dysentery, enteric fever (typhoid and paratyphoid fever), and food poisoning. The Department of Health's epidemiological survey (1973–2001) showed that acute diarrhoea and food poisoning in Thailand increased over the period despite significant improvements in water supply and sanitation coverage. This development is mainly attributed to two factors: drinking water quality and hygiene behaviour. Water supply sources at both community and household levels are regularly subject to bacterial contamination, with only about 50% of all supplies meeting Thailand's national drinking water standards.[10] Although little data are available on hygiene practices at the household level, about two thirds of food handlers surveyed by the Department of Health showed unhygienic practices,[11] and this may be indicative of general hygiene practices.

In addition to raising awareness, it is worthwhile to acknowledge that for many households, especially those in urban fringes and rural areas, it will be some time before the water they use is safe from bacterial contamination. To offer the poor better protection, household water treatment systems such as chlorination-based safe water options, solar disinfection systems, ceramic filters and others have been promoted through social marketing in most countries in the Region. These solutions are viewed as a necessary complementary intervention until such time as everyone has access to safe and sustainable supplies of drinking water.

Chemical hazards in drinking water

Exposure to hazardous chemicals in drinking water is a serious issue in several countries in the Asia Pacific Region, especially with respect to naturally occurring arsenic and fluoride in groundwater. In China, for example, although the full magnitude and scale of arsenic exposure is still not fully known, it has been reported that excessive levels of arsenic have been detected in pocket areas of 21 provinces. In Liaoning, Jilin, Ningxia and Qinghai provinces, the population at high risk is reported to be more than 4.5 million people and over 35 000 cases of confirmed arsenicosis have been reported.[12] Over 26 million people in China suffer from dental fluorosis, and over 1 million suffer from skeletal fluorosis due to elevated fluoride in their drinking water.[13] Similarly, of India's 35 states, 20 have been identified as endemic areas for fluorosis, with an estimated 25 million people impacted and another 66 million at risk.[14,15] Arsenic is also found in most of Bangladesh (Figure 4.4), in 20 *terai* (moist land) districts in Nepal[16] and in seven states in India, all forming part of the Gangetic and Brahmaputra flood plains. Arsenic occurrences are suspected in two more states in India situated in these flood plains. Arsenic is also reported from localized sources in other states in northern India. In Myanmar, several townships in the Ayeyarwady delta have elevated arsenic concentrations.[17] It is estimated that well over 30 million people may be potentially exposed. The health consequences could be very serious, with a large number of those exposed developing chronic conditions and cancer.[18]

Fig. 4.4 Arsenic concentration in wells in Bangladesh, 1999–2000



Source: McArthur JM, *et al*. Arsenic in groundwater: testing pollution mechanisms for sedentary aquifiers in Bangladesh. *Water resources research*, 37(1): 109-117. Published in 2001 by the American Geophysical Union. Reproduced by permission of the American Geophysical Union.

Some other countries affected by naturally occurring hazardous chemicals in groundwater include Cambodia, the Lao People's Democratic Republic, Mongolia and Viet Nam. Mining operations, discharges from industry, intensive agriculture, pollution from towns and megacities will often introduce additional chemical compounds into groundwater and surface water bodies. Exposure to some compounds may risk chronic health effects and may be difficult to control with conventional water treatment technologies.

Water resources

Water is a fundamental resource for all socioeconomic development and for maintaining healthy ecosystems. As the population increases and development calls for increased allocations of water for domestic, agricultural and industrial sectors, the pressure on water resources intensifies. Many of the countries in the Asia Pacific Region face water scarcities during part of the year or in high-demand locations. Water use has been growing significantly during the last century, and several areas in the Region are chronically

water-short, for example New Delhi, and several other cities in India and China. UN-Water* estimates that by 2025, 1.8 billion people will live in countries or regions with absolute water scarcity, that is, having insufficient quantities to meet basic human needs, and two thirds of the world population could be under stress conditions.[19] Most countries in the Asia Pacific Region have developed water resources management plans that attempt to address sharing of water resources, coordination and planning, conservation and protection, through policy guidance, assessments and knowledge management, and the promotion of best practices. Much more needs to be done, however, to reduce the health and economic risks associated with water scarcity or the contamination of water resources used for drinking. Civil society and nongovernmental organizations have been at the forefront in the last decade in promoting conservation measures in watershed development and, increasingly, rainwater harvesting. Improvements in collection and storage of rainwater have made rain a resource that is welcomed in urban settings, where municipalities are including mandatory rainwater collection systems in new buildings, and in remote hilly areas, where obtaining spring water requires precarious and time-consuming journeys while rainwater comes nearly free.

Governments will need to ensure the right balance between economic and health purposes through appropriate policies for water resources and for domestic consumption. These policies may take markedly different expressions in various countries. For example, in Nepal the Rural Water Supply and Sanitation Sector Strategy (2004) is consistent with the Poverty Reduction Support Programme, which states that the "provision of water supply and sanitation services will be demand-driven and community managed, and service standards [are] to correspond with affordability and willingness to pay. The Government ... [will] subsidize the basic service level, 15 minutes' round-trip to fetch water at 45 litres per head … users to pay for incremental costs of better service".

Contribution of unsafe water, sanitation and hygiene to disease burden

Concern arises over what is not known about morbidity and mortality due to diarrhoea in some countries. Where diarrhoea is not a reportable illness, the burden of disease attributable to unsafe water, sanitation and hygiene cannot yet be accurately estimated, impeding regional estimates as well. Global estimates of disease burden due to diarrhoea may underestimate the importance of this illness in some countries and therefore within the Asia Pacific Region. In those countries in which diarrhoea is a reportable illness, it is one of the leading causes of morbidity and mortality. In order to be able to estimate the burden of disease attributable to unsafe water, sanitation and hygiene in the Asia Pacific Region as a whole, special studies are needed to generate information on morbidity and mortality due to diarrhoea.

Innovative and effective actions and outstanding achievements

Several countries of the Asia Pacific Region enjoy universal or near-universal access to improved sources of drinking water. Access is estimated at 100% in countries and areas such as Australia, French Polynesia, Guam, Japan, and Singapore, and drinking water quality control is well developed in these countries and areas. Other countries have made dramatic progress in recent decades, with countries such as Cook Islands, Malaysia, the Commonwealth of the Northern Mariana Islands, the Republic of Korea, Thailand and others exceeding 85% access to improved sources of drinking water.[20]

* UN-Water is the interagency mechanism coordinating the United Nations action aimed at implementation of the agenda defined by the Millennium Declaration and the World Summit on Sustainable Development in all aspects related to fresh water. (http://www.un.org/waterforlifedecade).

Myanmar increased its sanitation coverage dramatically, rising from 24% in 1990 to 77% in 2004, by establishing annual sanitation weeks and developing community-based action.[21] In 2003, the Government of Bangladesh set a target of universal access to sanitation by 2010. Access has increased in that country from 20% in 1990 to 39% in 2004.[22] Social mobilization ensured a steady growth in latrine coverage in the 1990s, but this levelled off when this support was discontinued in 1998. In October 2003, before the Government promoted the Total Sanitation Campaign, a national survey reported that 33% of the population used a sanitary latrine. Since then the Bangladesh Sanitation Secretariat claims that the campaign lifted coverage to 59% by mid-2005.[23]

Box 4.1: The community-based surveillance system for arsenic in West Bengal, India

This consists of a network of 20 block-level laboratories, equipped with spectrophotometers and managed by locally recruited chemists. The laboratories are run by nongovernmental organizations (NGOs), under the oversight of the Public Health Engineering Department. The laboratory network also includes two state referral laboratories using Hydride Generation – Atomic Absorption Spectrophotometer (HG-AAS). It should be noted that the NGOs selected to run the laboratories were already established in the area, operating rural sanitary marts to market sanitation to the local population.

The decision to use the more costly spectrophotometers rather than cheaper but less accurate field test kits was based on several factors. At the time the decision was made, field-testing had not provided results reliable enough to decide whether to declare a water source as safe or unsafe, based on a 50 μg/L arsenic detection limit. Furthermore, the presence of an established network of NGOs and the availability of trained chemists made the use of spectrophotometers a viable proposition. It became clear that the problem of arsenic contamination was widespread rather than isolated, and the blanket testing of public supplies would lead to longer-term monitoring and eventually would include the testing of private water supplies. This would only be affordable if owners pay the US$ 1.80 for testing, for which they would expect an accurate result. This fee covers the cost of the chemicals used and staff salaries, and includes a small margin for the NGOs.

Screening of all public handpumps in 75 arsenic affected blocks of West Bengal has been completed, with an overall accuracy of 80% or more (as verified by the referral laboratories). The NGOs involved are now stimulating demand for private testing, based on their experience in marketing sanitation. The United Nations Children's Fund (UNICEF) is also supporting the upgrading of the 20 laboratories to enable the testing of other parameters, including total dissolved solids, nitrate, iron and faecal coliforms, thus providing households, communities and local government with a complete testing facility. Currently, household filters are promoted statewide, through interpersonal communication, using the NGOs that gained experience through the sanitary mart outreach.

The South Asian Conference on Sanitation (SACOSAN), held in 2003 in Dhaka, Bangladesh, resulted in an earnest commitment to take up the issue of sanitation in all participating countries. Several countries such as Bangladesh, India and Nepal made a commitment to achieve "total sanitation" well before 2015. SACOSAN II, held in Islamabad, Pakistan, noted impressive progress, and offered stories of community participation and commitment to make sanitation work for the health of all. If the countries that have joined SACOSAN stay the course, all will achieve the Millennium Development

Goals (MDGs) with respect to sanitation. This political and sectoral commitment has proven critical to the success of such efforts, as has the community-level partnerships and collaboration among local government, health and water agencies, and nongovernmental organizations.

The success of the SACOSAN process in generating awareness and political commitment to address sanitation challenges has stimulated a similar process in East Asia. The first East Asia Ministerial Conference on Sanitation and Hygiene was held in Beppu, Japan, in 2007 with support from the World Bank Water and Sanitation Programme, UNICEF, WHO and other international partners. This development is expected to boost political commitment and support for improving access to sanitation in many countries of the Region. National sanitation plans have been prepared in many East Asian countries through a process of national dialogue and these are being implemented through collaboration among various stakeholders. A research and learning project on sanitation in Indonesia and the Philippines is also being implemented by the World Bank Water and Sanitation Programme, with funding from the Swedish International Development Cooperation Agency, and lessons learnt will be disseminated widely for the benefit of other countries in the Asia Pacific Region.

WHO is applying new tools, guidelines and methodologies to accelerate effective management of the sector in Bangladesh, Bhutan, China, the Lao People's Democratic Republic, Myanmar, the Philippines and Viet Nam. National sector assessments and sector dialogues are being supported in several countries to stimulate and support country progress towards achieving MDGs for water and sanitation. Drinking water quality is also being strengthened in participating countries, through community-based approaches in rural communities and the demonstration of risk-management approaches in urban systems. Low-cost technologies and behaviour change interventions are being demonstrated in specific settings, such as schools, hospitals, marketplaces and other venues. Project experiences and lessons learnt will be documented and disseminated Region-wide. Similar action is ongoing among Pacific island countries and areas with the support of the Pacific Islands Applied Geoscience Commission (SOPAC), WHO and the governments of Australia and New Zealand.

Impetus was given to household water treatment and safe storage as an effective low-cost strategy for improving water quality, through the Third Annual Meeting of the International Network to Promote Household Water Treatment and Safe Storage, 2005. With support from the Government of Japan, WHO is supporting research on household water treatment technologies for arsenic mitigation in Cambodia, Myanmar and Viet Nam; and a pilot study recently concluded in the Philippines stimulated the development of government policy to support the scaling up of household water treatment strategies nationally. UN-HABITAT is supporting capacity-building activities in this line of work in countries along the Mekong Delta. Population Services International, the Cooperative for Assistance and Relief Everywhere (CARE) and several other nongovernmental organizations are developing social marketing approaches to promote household water treatment in India, Indonesia, Myanmar, Nepal, the Philippines and Viet Nam. Ceramic water purifiers have been widely used for household water treatment in Cambodia through the efforts of nongovernmental organizations such as International Development Enterprises and Resources for Development International-Cambodia, and quality control measures are now being developed there with support from UNICEF and the World Bank Water and Sanitation Programme.

4.2 Air quality

Due to rapid urbanization and industrialization, overall outdoor air quality, particularly in urban areas, has deteriorated over the last 40 years. While many developed countries have improved air quality in recent years, it remains a major problem in most developing countries. WHO estimates that over 500 000 deaths annually are attributable to urban air pollution in the Asia Pacific Region, with about 97% occurring in developing countries.[24]

Indoor air pollution is an even greater problem in the Region, due to the use of solid fuels such as wood, charcoal, dung, agriculture residues and coal. An estimated one million deaths are attributed to indoor smoke from the use of solid fuels, all of which occur in developing countries. The use of solid fuels is common in rural and poor urban areas, and indoor smoke from burning solid fuels is particularly severe in areas of higher latitude and altitude where windows and doors are sealed to conserve warmth in winter. Since solid fuels are often used indoors for domestic cooking and heating, women and children are most affected. The proportion of population using solid fuels is one of the indicators of the environmental sustainability goal in the MDGs and, therefore, the level of indoor air pollution from this source is indirectly monitored through the MDG process.

Costs to society arising from urban air pollution include damage to human health, buildings and vegetation; lowered visibility; and heightened greenhouse gas emissions. Of these, increased premature mortality and morbidity are generally considered to be the most serious consequences of air pollution. Damage to human health is an appropriate primary indicator of the seriousness of air pollution. Sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), particulate matter (PM) and lead constitute key or "classical" air pollutants. Health-based ambient air quality standards generally are set first for classical pollutants, after which they are measured to establish the magnitude of the air pollution problem.

Box 4.2: Key air pollutants and their health effects

Lead: This metal retards the intellectual development of children and adversely affects their behaviour. At high levels, lead increases the incidence of miscarriages in women, impairs renal function and increases blood pressure. More lead is absorbed by children when the dietary intake of calcium or iron is low and when the stomach is empty. Young and poor malnourished children are particularly susceptible to lead poisoning.

Particulate matter (PM): The most significant health effects of air pollution in Asia are associated with exposure to airborne particulate matter which causes premature death from heart and lung diseases, chronic bronchitis, and asthma and other forms of respiratory illness. The impact of PM increases with decreasing particle size, with studies increasingly focusing on particles smaller than 2.5 microns (μm) and even 0.1 μm (called ultrafines).

Ozone: Responsible for photochemical smog, ozone is associated with lung function decrements, asthma attacks and other forms of respiratory illness, as well as premature death. Ozone is not emitted directly, but is formed in the atmosphere through the photochemical reaction of oxides of nitrogen and reactive hydrocarbons.

Oxides of sulfur (SO_x): These cause changes in lung function of people with asthma and exacerbates respiratory symptoms in sensitive individuals. SO_x also contributes to acid rain and to the formation of small particles through atmospheric reactions, called secondary particles, increasing the PM load.

Oxides of nitrogen (NO_x): Affects lung function in people with asthma, contributes to acid rain and secondary particulate formation, and is a precursor of ground-level ozone.

Carbon monoxide (CO): This gas inhibits the capacity of blood to carry oxygen to organs and tissues. People with chronic heart disease may experience chest pain when CO levels are high. At very high levels, CO impairs vision, manual dexterity and learning ability, and can be fatal.

Table 4.2 WHO air quality guidelines, 2005

Air pollutant	Guideline value ($\mu g/m^3$)	Averaging time
Particulate matter		
$PM_{2.5}$	10	1 year
	25	24 hours
PM_{10}	20	1 year
	50	24 hours
Ozone (O_3)	100	8 hour
Nitrogen dioxide (NO_2)	40	1 year
	200	1 hour
Sulfur dioxide (SO_2)	20	24 hour
	500	10 minutes

Source: *Air quality guidelines. Global update 2005. Particulate matter, ozone, nitrogen dioxide and sulfur dioxide.* Copenhagen, World Health Organization Regional Office for Europe, 2006.

Health-based air quality guidelines are provided by WHO for the classical and other air pollutants. WHO recently issued new guideline values for some classical air pollutants (Table 4.2).

Sources of air pollution

Table 4.3 presents examples of different sources and types of ambient and indoor air pollution. Ambient air pollutants are generated from a variety of stationary, mobile and natural sources. Stationary sources are found in different parts of the Region. In rural areas, agricultural production, mining and quarrying generate particulate matter that is dispersed over wide areas. Added to this are industrial points (large single-source contributions such as a power generation plants), area sources (e.g. many small- and medium-sized enterprises) and community sources. Industries associated with manufacturing of chemicals are major sources of nitrogen oxides, while the incineration of municipal wastes and sewage sludge contribute to PM. Mobile sources of air pollutants are generated by gasoline- and diesel-powered vehicles. PM is predominantly generated from diesel exhaust, while lead is generated from leaded petrol. The sources and constituents of ambient air pollution differ by locality. Accurate apportionment of ambient air pollutants from different sources is not readily available for most areas of the Region. However, in general, motor vehicle emissions contribute the largest proportion of air pollution in urban areas, while agricultural and industrial point sources are responsible for much of the air pollution in rural areas. A recent survey in Metro Manila in the Philippines shows that road traffic contributes 50%–85% of particulate matter pollution at various sampling locations in the metropolitan area.[25]

The major sources of indoor air pollution in the Asia Pacific Region, as elsewhere in the world, include the combustion of biomass fuels and coal, tobacco smoking, furnishings, and construction materials. There are, however, marked variations in the importance of these different sources, which relate closely to the levels of socioeconomic development in the Region. In more developed countries, such as Australia, Japan, New Zealand, the Republic of Korea and Singapore, relatively clean sources of household energy predominate, but improvements in energy efficiency have led to homes being relatively airtight, reducing ventilation and raising indoor pollutant levels. In such circumstances, even minor sources of pollution from gas cookers, new furnishings, damp conditions or naturally

Table 4.3 Sources and types of air pollution

Sources of air pollution	
Stationary sources	Rural area sources: agricultural production, mining and quarrying. Industrial point and area sources: manufacturing of chemicals, non-metallic mineral products, basic metal industries, power generation. Community sources: heating of homes and buildings, municipal waste sewerage sludge incinerators, fireplaces, cooking facilities, laundry services and cleaning plants.
Mobile sources	Gasoline- and diesel-powered vehicles, motorcycles, aircraft, dust from vehicle traffic.
Indoor sources	Tobacco smoking, biological sources (e.g. pollen, mites, moulds, insects and pet allergens), combustion emissions, emissions from indoor materials (e.g. volatile organic compounds, lead, radon, asbestos and various synthetic chemicals).
Natural sources	Eroded areas, volcanoes, certain plants that release pollen, sources of bacteria, spores and viruses, and forest fires.

Source: *WHO air quality guidelines for Europe*. Copenhagen, WHO Regional Office for Europe, 2000.

occurring radon gas can lead to significant exposure and recognized health effects. In developing countries such as Bangladesh, Cambodia, China, India, Indonesia, the Lao People's Democratic Republic, Myanmar, Nepal, Papua New Guinea and Solomon Islands, the most significant issue for indoor air quality is exposure to pollutants released during the combustion of solid fuels, including biomass, such as wood, dung and crop residues, or coal, used for cooking and heating. A majority of these households are located in poor rural communities and burn these fuels in traditional inefficient

Table 4.4 Proportion of population using solid fuels in the Asia Pacific Region

Country	Percentage of population using solid fuels	Country	Percentage of population using solid fuels
Australia	<5	Nepal	80
Bangladesh	88	New Zealand	<5
Cambodia	>95	Papua New Guinea	90
China	80	Philippines	47
Fiji	40	Republic of Korea	<5
India	74	Samoa	70
Indonesia	72	Singapore	<5
Japan	<5	Solomon Islands	95
Lao People's Democratic Republic	>95	Thailand	72
Malaysia	<5	Tonga	56
Mongolia	51	Vanuatu	79
Myanmar	95	Viet Nam	70

Source: *Fuel for life: household energy and health*. Geneva, World Health Organization, 2006. Available from: http://www.who.int/indoorair/publications/fuelforlife/en/index.html

devices such as earthen or metal stoves, often in kitchens that are poorly ventilated, resulting in very high exposure levels.[26] Table 4.4 presents the proportion of the population using solid fuels in those countries in the Region where data are available.

Capacity of countries for abating air pollution

Countries of the Asia Pacific Region have and are taking steps to abate air pollution. However, this response is determined in part by socioeconomic development. In many countries, there is a firm policy on air pollution and this policy serves as the basis for air quality monitoring and surveillance. However, countries vary in their capacity to respond to the need for abatement of air pollution. In general, larger countries, such as China and India, have instituted policies on air pollution and have strengthened the infrastructure for ambient air quality monitoring. Smaller countries, such as Bhutan and the Maldives and those in the Pacific, are still in the process of developing policies.

Many countries in the Region have established ambient air quality standards, and associated disease surveillance systems have been gradually strengthened in recent years. Australia, China, Japan, Malaysia, New Zealand, the Republic of Korea, Singapore and Thailand have both ambient air quality monitoring and disease surveillance systems to allow for the national assessment of the health impacts of air pollution. Most developing countries in the Region where national air quality standards have been developed use WHO air quality guidelines and those of more industrialized countries as a basis for developing their national standards. However, these countries have limited disease surveillance systems.

Indoor air pollutants have not been as extensively monitored as outdoor air pollutants, even in developed countries, and the evidence base for the health effects of indoor air pollution needs to be further strengthened. Most developed countries in the Region, however, have the infrastructure required to support a definitive indoor air quality management strategy. In contrast, the problem of indoor air pollution from solid fuel use in developing countries is set against a backdrop of vulnerable populations, competing risks from additional environmental health risks, inadequate technical resources for the generation of additional scientific evidence, limited feasibility for technological interventions, relative inexperience in implementing air quality management programmes, and limited local capacity for environmental management. These factors, together with the sheer size of the population at risk, demand an approach to the formulation and application of air quality management that differs markedly from that followed by developed countries.[27]

Air quality in the Region

The poor ambient air quality in the Region reflects weak policies and poor infrastructure in many countries. In general, the SO_2 level has been reduced in many urban areas of Asia over recent years. While NO_2 and PM_{10} levels have been reduced somewhat, the levels still remain high in many cities. Figure 4.5a to 4.5d show recent annual mean ambient air quality levels in a number of Asian cities. In most cities, except Hanoi, the SO_2 level is lower than the WHO guideline value, while the level of NO_2 exceeds the WHO guideline value in several of the cities shown in the figure. Particulate matter is high in most cities of developing countries. The levels of PM_{10} exceed the new WHO guideline value in most cities where it is monitored.

Fig. 4.5a Annual mean total suspended particulate (TSP) levels in Asian cities, 2000–2003

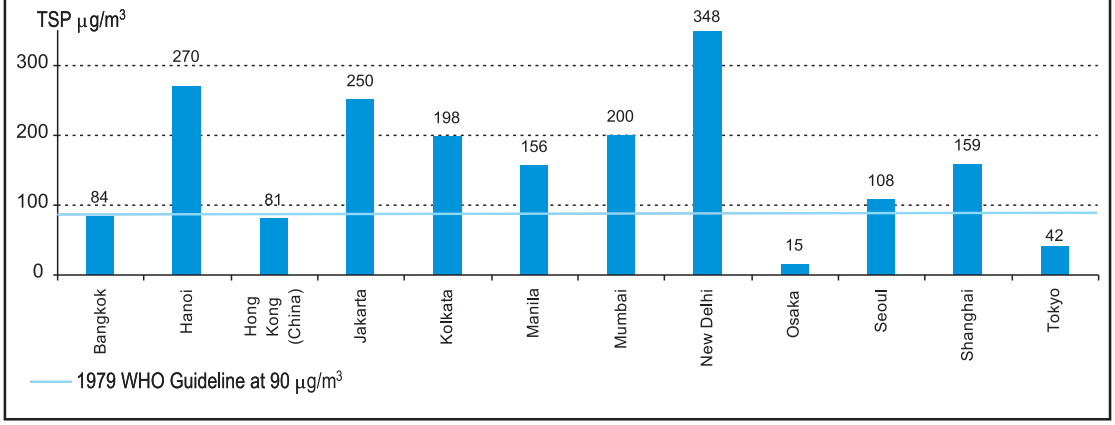


Fig. 4.5b Annual mean particulate matter (PM_{10}) levels in Asian cities, 2000–2003

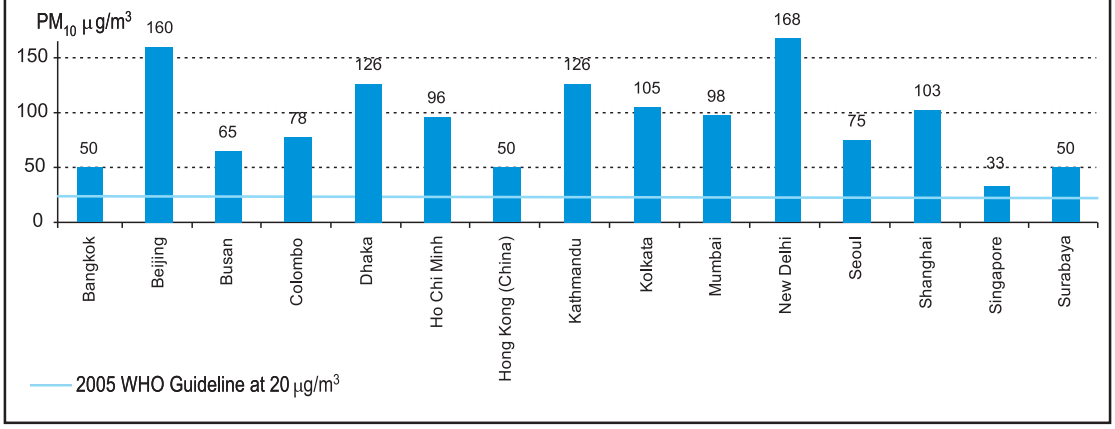


Fig. 4.5c Annual mean sulfur dioxide (SO_2) levels in Asian cities, 2000–2003

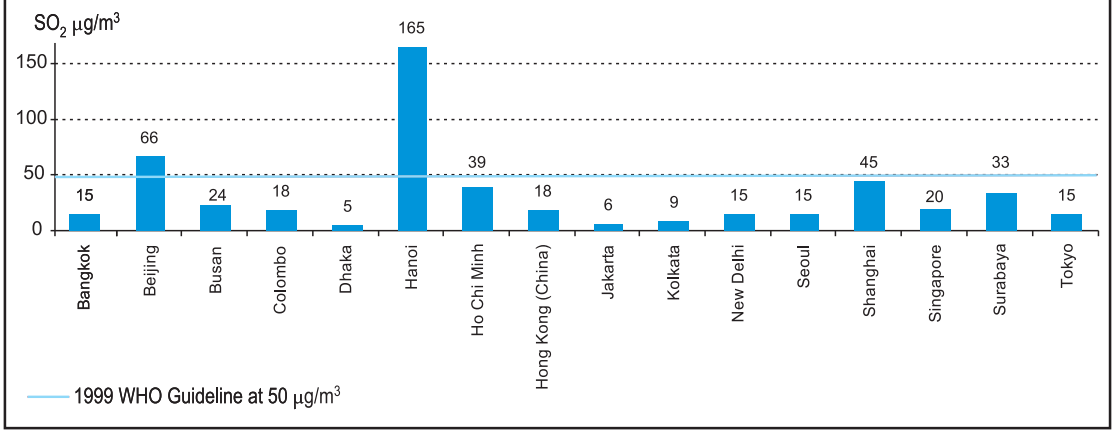
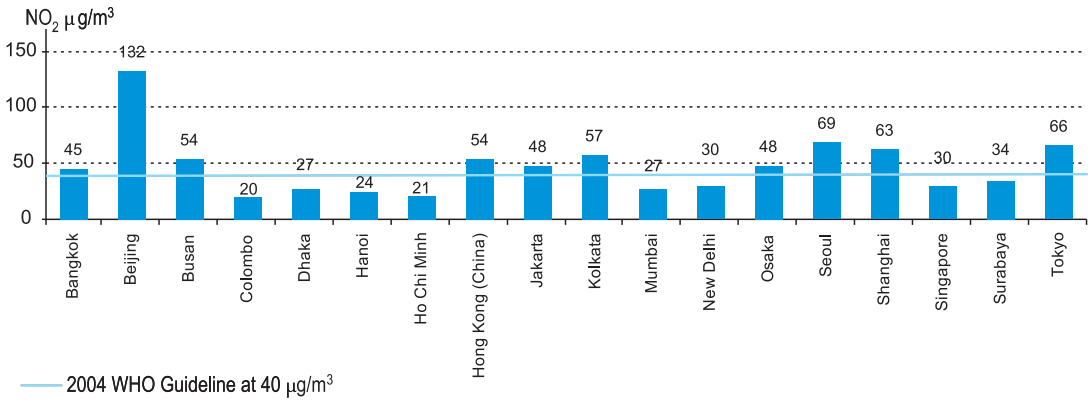


Fig. 4.5d Annual mean nitrogen dioxide (NO_2) levels in Asian cities, 2000–2003



Source: *Huizenga C., et al.* Benchmarking urban air quality management in Asian cities. *Presentation at the 13th World Clean Air and Environmental Protection Congress and Exhibition, 22-27 August 2004.*

Box 4.3: Air quality in Nepal

Air quality is continuing to deteriorate in the large urban areas of Nepal, mainly due to the rising number of vehicles and industries. The total number of vehicles increased from 75 159 in 1990 to 220 000 in 1998, out of which two-wheelers accounted for 51% of total. The State of the Environment Nepal 2001 report shows that respiratory diseases increased from 10.9% of the total outpatients' visits (5 167 378) in 1996 to 11.6% of the total outpatients' visits (7 115 981) in 1998. Acute respiratory infection accounted for more than 30% of total deaths in children under five years of age. A significant portion of the population, in both rural and urban areas, is affected by bronchitis caused by domestic smoke. The problem appears to be severe in large urban areas like Biratnagar, Birgunj, Kathmandu and Pokhara. Many urban inhabitants of mountain regions are more vulnerable to respiratory diseases because they are not only exposed to high levels of ambient air pollution, but also to poor air quality from wood burning inside the ill-ventilated houses.

Disease burden of air pollution

The number of studies carried out on the health impacts of air pollution is still limited in the Asia Pacific Region, but has significantly increased in the past 10 years. A recent literature review identified 138 original epidemiological studies on the health effects of outdoor air pollution in Asia (i.e. in China, India, Indonesia, Japan, Malaysia, the Republic of Korea, Singapore and Thailand) that were published between 1980 and 2003. The summary results in Asia are similar to those reported previously by North American and European multi-city studies of correlation between PM_{10} and SO_2 and mortality.[28] The multi-city studies showed that with an increase of 10 microgram of PM_{10} per m^3 of air the mortality increased by 0.5%.

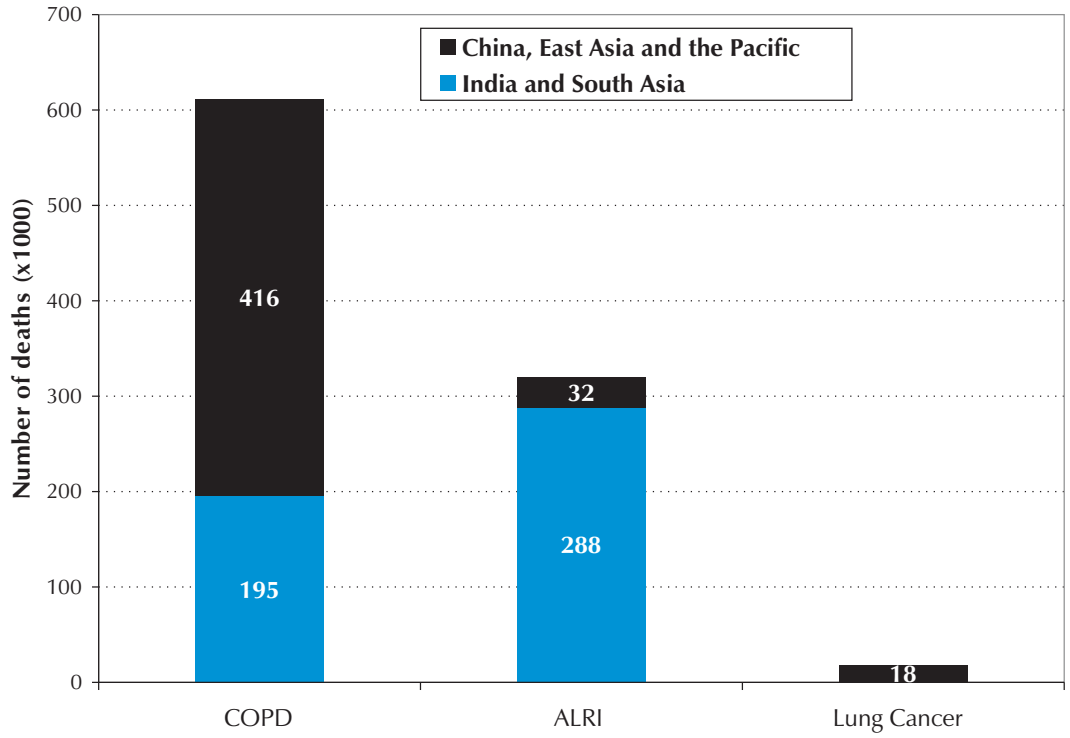
The analysis of the health benefits associated with air pollution reduction has made great progress over the past 10 to 15 years. Health impact estimates for air pollution are generally obtained from epidemiological studies that are designed to determine relationships—referred to as concentration-response functions—between air pollution and health effects in human populations.

Consistent findings across a wide array of cities, including those in developing countries with diverse populations and a variety of particle characteristics, strongly indicate that health gains indeed do result from PM pollution reductions. Emerging scientific evidence points to increasing damage with decreasing particle diameter. Particles larger than about 10 μm are deposited almost exclusively in the nose and throat, whereas particles smaller than 1 μm are able to reach the lower regions of the lungs. The intermediate size range gets deposited in between these two extremes of the respiratory tract. A statistically significant association has been found between adverse health effects and ambient PM_{10} concentrations, and recent studies using $PM_{2.5}$ data have shown an even stronger association between health outcomes and particles in this size range.

Recent WHO estimates of respiratory disease mortality attributable to indoor air pollution based on the proportion of population using solid fuels are shown in Figure 4.6. Indoor air pollution is associated with under-five child mortality from pneumonia and acute lower respiratory infection, and the magnitude is significant in India and other South Asian countries. Chronic obstructive pulmonary disease caused by exposure to indoor smoke from burning solid fuels is a major cause of mortality in adults in China and East Asian countries, and also a problem in India and South Asia. Coal use in China is estimated to cause 15 000 deaths annually.

In the Asia Pacific Region indoor smoke from solid fuels contributed to about 1.1 million deaths and the loss of 21 million DALYs in 2000, with almost all of them occurring in developing countries. Indoor smoke from solid fuels is a significant health risk in the Asia Pacific Region.

Fig. 4.6 Estimated mortality from acute lower respiratory infection (ALRI), chronic obstructive pulmonary disease (COPD) and lung cancer attributable to indoor smoke from solid fuels in Asia Pacific Region



Source: *Fuel for life: household energy and health*. Geneva, World Health Organization, 2006. Available from: http://www.who.int/indoorair/publications/fuelforlife/en/index.html

Intervention measures for abating air pollution in the Region

Many national governments have responded by establishing comprehensive policies encompassing the setting of ambient air quality and emission standards, developing monitoring systems, and regulating and reducing emissions from industrial sources, power generation facilities, domestic sources and motor vehicles.

Industrial and power generation plants are often required to provide air pollutant removal equipment or change to better quality fuels to control emissions. Sometimes, polluting plants are forced to relocate outside cities. Domestic sources are controlled by switching from solid fuels (e.g. wood, coal and charcoal) to gaseous fuels (e.g. liquefied petroleum gas or natural gas). All these steps can be seen in New Delhi, India, where the Supreme Court through a series of orders between 1997 and 1999 ordered all polluting industries to be relocated outside city limits. The Supreme Court in its order of July 1998 had also directed all public transport vehicles to switch to compressed natural gas (CNG), which produces fewer air pollutants (Box 4.4).

Box 4.4: Reducing vehicle emissions in India

The Supreme Court intervened to address air quality in New Delhi by ordering the relocation of polluting industries outside the city and by mandating a series of fuel, lubricant and vehicle-technology measures targeting vehicular emissions, including conversion of the entire city bus fleet, three-wheelers and taxis to run on CNG by the end of March 2001. A number of parallel steps have been taken in the past several years, resulting in air that is visibly cleaner. Steps directed at vehicular pollution control included a ban on the sale and purchase of loose lubricant for use in two-stroke engine vehicles and the requirement that the lubricant be premixed with gasoline to ensure correct proportion. Other steps include progressively lowering sulfur and benzene in gasoline and sulfur in diesel, the elimination of lead in gasoline in 1998, and the mandating of Bharat Stage II emission standards (equivalent to Euro II) for passenger vehicles (in 2000) and heavier vehicles (in 2001). Bharat Stage III (equivalent to Euro III) were enforced in 2005. In 2001, diesel sulfur content was reduced to 0.05% in all outlets. A total of 3538 hazardous industries were closed.

During 2001–2002, all buses, all three-wheelers and a sizeable section of the city's taxi fleet moved to CNG. As on July 2007, Delhi has 154 CNG stations and over 128 000 CNG vehicles (11 535 buses, 70 159 three-wheelers, 5368 RTVs, 5686 taxis and 35 229 private cars). Piped natural gas is provided to 75 000 households, and as many as 119 commercial consumers (18 large and 101 small commercial establishments) as of 2004.

Recent data nevertheless show that because of 105% increase in the total personal vehicle registration in the last 10 years—diesel cars during the same period have increased by 425%—air quality gains from the introduction of CNG may be lost, according to India's Pollution Control Board.

As part of the second-generation reforms, the Delhi government has begun to implement public transportation projects including metro rail and bus rapid transit systems to reduce the number of cars and reduce vehicular emissions.

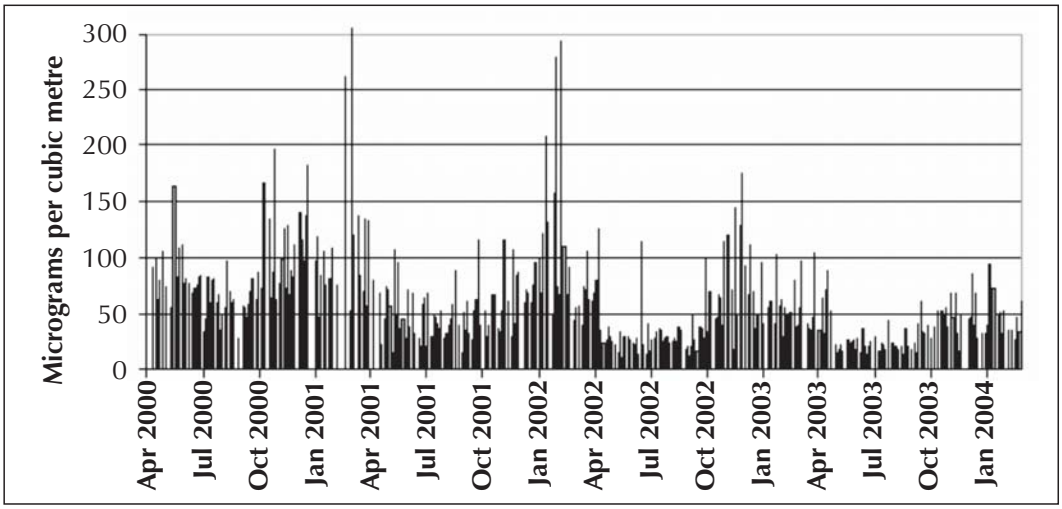
At a national level, in terms of priority, the Government has targeted 11 polluted cities for early introduction of improved emissions standards conforming to the Auto Fuel Policy roadmap. These include Agra, Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kanpur, Kolkata, Mumbai, Pune and Surat. Bharat Stage III emission standards have been enforced in all these cities since 2005. The rest of the country is still following Bharat Stage II emission norms. India also has had inspection centres since 1991 carrying out mandatory regular vehicle inspections in an effort to improve vehicle maintenance and enforce emission standards.

The Auto Fuel Policy proposed in August 2002 was intended to formulate a comprehensive and integrated approach; it proposes a roadmap to 2010, including specific standards for emissions and fuel quality, a recommendation for a single body entrusted with the task of enforcing these standards, and the rationalization of fuel taxes and tax incentives. The Auto Fuel Policy that was finally approved by the Government of India in 2003 endorsed the proposal for the emission standards roadmap but did not accept the proposals for a unified body for enforcing standards and on tax policy.

In addition, the Supreme Court is supervising implementation of air pollution control plans in eight cities in India. Along similar lines, the Union Ministry of Environment and Forests has initiated city-based action planning in a large number of cities.

Figure 4.7 shows the 24-hour average $PM_{2.5}$ data for Farm Gate in Dhaka, Bangladesh, which is identified as an urban traffic "hot spot". The major contributors are likely to be vehicular emissions. The ban on two-stroke three-wheelers that went into effect on 1 January 2003 resulted in a considerable drop in $PM_{2.5}$ concentrations at Farm Gate between 2002 and 2003.

Fig. 4.7 $PM_{2.5}$ 24-hour average data at Farm Gate, Dhaka, Bangladesh, April 2000–March 2004



Source: Bangladesh Atomic Energy Commission

Some other countries have attempted to reduce vehicular emission pollution by reducing traffic volume; promoting non-motorized transport and public transport systems, particularly rail-based systems; and switching to vehicles with more efficient engines and cleaner fuels. The successful move to rail-based systems in Bangkok, Beijing, Kuala Lumpur, Metro Manila, New Delhi and Shanghai has shown promise in helping reduce vehicular pollution in these megacities. Some cities including Ahmedabad, Delhi and Jakarta have begun to implement bus-based rapid transit systems as part of the overall traffic restraint and pollution control strategy.

The use of unleaded gasoline is gaining popularity in the Asia Pacific Region where the use of leaded gasoline has now been banned in most countries. It has been shown that replacing leaded with unleaded gasoline significantly reduces the level of lead in the body, particularly in children. Recent studies in the Philippines[29] showed that the blood lead level in children had substantially dropped since 2000, when the Clean Air Act mandated a ban on leaded gasoline. In Metro Manila, 90.3% of children studied in 2000 had a blood lead level higher than 10 μg/dl, and the percentage dropped to 34.6% in 2003. Similar blood lead levels in children were found in the metropolitan areas of the Philippines' second- and third-largest cities, Cebu and Davao, and in Olongapo, north of Manila, as well as in Bangkok, Thailand.

Box 4.5: Electric vehicles for Kathmandhu

The Kathmandu Electric Vehicle Alliance (KEVA) has been formed by the government, nongovernmental organizations and private partners to improve the air quality of Kathmandu, the capital of Nepal. KEVA is supported by USAID/Nepal under Asia and Near East Bureau's Clean Air Initiative and the Alliance Partners.

KEVA brings new ideas, new partners, new technologies and new resources to support the adoption and expansion of electric vehicle use in Kathmandu. KEVA is working with the Kathmandu metropolitan and national governments, donors and other groups to identify and eliminate constraints to the expansion of the electric-based mass transit and to promote the spread of electric vehicle operational systems and technologies.

The programme targets reduction in air pollution through expansion of electric vehicle (EV) use in Kathmandu by encouraging expansion of electric tempos and trolleys, improving Kathmandu metropolitan government policies and technical skills, as well as identifying and designing new ways to expand electricity-based transportation.

The public awareness and advocacy component of KEVA's approach ensures the sustainability of electric vehicles by increasing public awareness and public support for EVs. More information is available at www.keva.org.np.

The health significance of indoor smoke from solid fuels has been known to scientists, but systematic efforts to assess and reduce health risks associated with it have only recently begun. Ultimately, switching from solid fuels to higher-quality liquid or gaseous fuels, or even better, to clean renewable energy alternatives, such as solar and wind power, should be strongly promoted and supported. However, if this is not possible, the use of stoves with improved combustion efficiency and with a chimney or hood for good ventilation of flue gas should be a priority intervention.

Air pollution challenges

Air pollution generated in one country or city can affect other locales, such as dust or sandstorms in North-East Asia, haze induced by man-made fires in Borneo and Sumatra in South-East Asia, or brown clouds in South Asia and South-East Asia. The health impact of these trans-boundary air pollution events has not been fully studied. However, high correlations between haze and health effects have been observed in Kuching, Sarawak, Malaysia, in September 1997. Due to its trans-boundary nature, it has been estimated that the annual occurrence of haze puts an estimated 20 million people at risk for respiratory disease. The most vulnerable countries are those in the immediate vicinity, namely Indonesia, Malaysia, Singapore and Thailand, as shown by satellite imagery. More distant countries, such as Maldives, can also experience transient air pollution due to the effects of haze. In addition to health, air traffic and shipping are also at risk for accidents due to haze. Given the magnitude of the problem, a regional solution is needed whereby early warning systems can alert neighbouring countries of the impending danger and alert source countries of the immediate need to reduce pollution at its source. The Association of Southeast Asian Nations Haze Technical Task Force is addressing the issue.

In many countries in the Asia Pacific Region, especially developing nations, there is a need to improve human resources and institutional capacity to undertake health impact assessments of priority air quality problems. There is an urgent requirement for a database on the health effects of air

pollution for policy-makers to effectively manage health effects from air pollution. In countries where data exist, such as Australia, Japan, New Zealand, the Republic of Korea, Singapore and Thailand, considerable progress has been made in improving air quality.

The health sector cannot act alone. Evidence-based data collection and programme implementation can only succeed through intersectoral collaboration with the energy, transportation, industrial and agricultural sectors. Most countries in the Region still need to establish such multi-stakeholder mechanisms, and existing mechanisms need further strengthening.

In addition, cooperation is needed among countries in addressing common air pollution problems of indoor smoke from solid fuels, transport-related air pollution, control of open burning and trans-boundary air pollution. Increased opportunities for key stakeholders to share successful experiences such as air quality legislation, introduction of bus/rail systems in megacities, and the use of smokeless cooking devices in rural areas should be pursued, and although some mechanisms do already exist, transboundary cooperation in air quality management needs to be enhanced.

Partners in air quality management

Due to the huge population of the Asia Pacific Region, the abatement of air pollution poses significant challenges. Partnership is critical in this respect and there are already some excellent networks in the Region. However, the transfer of technology and tools from more advanced countries to less advanced countries is not yet fully developed.

An example of a successful partnership is the multi-stakeholder Clean Air Initiative for Asian Cities. The Public Health and Air Pollution in Asia project, covering 20 Asian cities and supported by the Health Effects Institute and the automobile industry, has undertaken a number of air pollution health impact studies. The results of these studies will provide policy-makers with valuable information to take action on reducing air pollution. In order to facilitate the exchange of information and experiences among policy-makers and practitioners of air quality management, a regional network has been formed. The Clean Air Initiative for Asian Cities provides timely information on air quality management and involves local and national governments, research institutions, and international partner agencies. More information is available at www.cleanairnet.org/caiasia/.

Another significant initiative is the promotion of smokeless cooking devices, also known as smokeless *chulas,* in South-East Asian countries. One body promoting this technology is the Agency for Non-Conventional Energy and Rural Technology, established by the Government of Kerala, India.

Urban transport policies favouring the environment and the health and safety of city inhabitants through reduced traffic noise, better road safety, introduction of vehicle-free days, and the promotion of physical activity such as cycling and walking can significantly improve urban air quality. To address these and other environmental issues associated with urban transport, the United Nations Centre for Regional Development has recently established a regional forum on environmentally sustainable transport in Asia.

4.3 Chemicals and wastes

Issues at stake

The Asia Pacific Region has many rapidly industrializing countries where an increasing number and volume of chemicals are used in mining, forestry, fishery, manufacturing, energy and construction industries, as well as in shops, offices and households. Several economies are agriculture-based, and

the improper management of agrochemicals, particularly pesticides, is a major health hazard. In 2000, an estimated 135 000 deaths in the Asia Pacific Region were due to poisoning by chemicals, pharmaceuticals, and animal and plant toxins, constituting 43% of global poisoning deaths. Poisoning was responsible for 3.7 million DALYs lost in the Region, 45% of the world total, making it an important constituent of the total burden of disease and mortality– with chemicals responsible for a large proportion of these poisonings.[30]

There are over 100 000 chemicals in existence, a third of which are used in industry, agriculture and households. While most benefit economic development, their inadequate management sometimes results in costly damage to human health and ecosystems. Unsafe exposure to toxic chemicals can cause disease, disability and death; and may occur at different stages of production, storage, transport (including import and export), use and disposal.

Countries in the Region handle vast volumes of chemicals. For example, in the late 1990s, Indonesia annually imported 18 million tonnes of petroleum derivates, manufactured 58 million tonnes and exported 52 million tonnes. The country also imported about 4500 tonnes of pesticides, formulated 52 000 tonnes and exported 170 000 tonnes. Imported industrial chemicals amounted to 5.5 million tonnes, with another 195 000 tonnes formulated. Consumer chemicals amounted to 12 million tonnes imported, 620 000 tonnes manufactured and 6 million tonnes exported.[31]

Legislative and regulatory control of chemicals may include importation, registration and inventory, risk assessment and notification, labelling and information, packaging, restrictions on use, tracking systems, treatment and disposal of waste chemicals, and occupational health and safety requirements for production, use, storage, transport and disposal. In addition to occupational health and safety, provisions are needed for preparedness and response plans during emergencies involving toxic and hazardous chemicals. Many developing countries in the Region lack adequate legislative and institutional infrastructure and the capacity to manage chemicals effectively.

The potential of multiple health hazards from chemicals calls for urgent action to improve their management. Children working in cottage industries such as bangle or fireworks production are often exposed to toxic and hazardous chemicals from an early age. Chronic exposure is linked to damage to the nervous and immune systems and to ill effects on reproductive function and development.

Management of solid and hazardous waste

Accelerating economic activity in the Region creates ever increasing amounts of industrial and municipal solid wastes. The average amount of household solid waste generated in a city is about 0.7 to 1.0 kg/person/day.[32] As costs rise for waste collection and disposal sites dwindle, the quantity of uncollected or improperly disposed solid waste is increasing. Municipal solid waste management is a particular problem in the cities of developing countries, where financial and human resources are insufficient to provide reliable collection services and adequate disposal operations. Solid waste left uncollected in streets and open spaces means dumping, burning and picking of waste is still common. Industrial solid waste, some of which is considered hazardous, is also brought to open dumpsites without prior treatment.

The amount of solid waste generated from health-care facilities ranges from 0.3 kg/bed/day in smaller provincial hospitals to 1.0–1.5 kg/bed/day in large general hospitals. Of that amount, 80%–85% is non-hazardous and can be dealt with as general municipal solid waste, with only 15%–20% requiring special handling.[33] Hazardous components of health-care waste include infectious, pharmaceutical, radioactive and chemical material, and sharps. When health-care wastes are not

segregated, as is the case in most health facilities in the Region, all waste should be considered hazardous. Such practices led the United Nations Basel Convention on the Transboundary Movement of Hazardous Wastes to officially classify health-care waste as the second-most dangerous after nuclear wastes.

Unsafe management of hazardous health-care waste poses risks to workers, patients, waste handlers and the general public. Improperly disposed contaminated transfusion tubing, used syringes and other medical equipment often end up in the hands of waste-pickers who sell them to scrap dealers and, in the process, are also exposed to potential infection.

Unsafe injection practices and needle reuse in the Region are estimated to cause 377 000 deaths and 7.4 million DALYs lost each year (see Box 4.6).[34] Between 6.5 million and 13 million hepatitis B infections, 2 million to 3.9 million hepatitis C infections and 17 000 to 35 000 HIV infections are associated with unsafe injection practices by health-care workers, as about half of all injections in the Region are unsafe.[35] In the informal sector, this risk is also high, with up to 3% of the urban workforce in some countries involved in waste-picking, many of them children.[36]

Box 4.6: Sharp wastes are the most hazardous

A study by the Indian Clinical Epidemiology Network and the All India Institute of Medical Sciences found that 63% of syringes used across India are unsafe. Of 600 million injections annually, approximately 370 million are unsafe and 35% come with the risk of transmitting viruses like HIV. According to the study, 68.7% of injections in government facilities and 59.9% in private clinics and hospitals were unsafe. The state of West Bengal has one of the most dismal records in this regard.

This study reveals a widespread unhygienic culture in both public and private health facilities. "Infections from syringes are common not because of mechanical defects but because of improper usage. Once used, a syringe has to be discarded and the needle broken. But nursing staff often reuse syringes despite the rules. There is also no guarantee that a fresh packet of syringes hasn't made a previous trip to a health facility," says a senior medical officer.

Source: *Assessment of injection practices in India. An IndiaCLEN Program Evaluation Network (IPEN) study*. IndiaCLEN. 2005. Available from: http://www.ipen.org.in/images/stories/exec.%20summary.pdf

National programmes and policies

Engaging in global action

Many countries in the Asia Pacific Region have, or are in the process of becoming, parties to several international treaties in pursuit of the sound management of chemicals. These include the Basel Convention on the Transboundary Movement of Hazardous Wastes; the Vienna Convention for the Protection of the Ozone Layer; the Montreal Protocol on Substances that Deplete the Ozone Layer; the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; the Stockholm Convention on Persistent Organic Pollutants; and, the Globally Harmonized System of Classification and Labelling of Chemicals. Political commitment by governments is key to the development of chemical safety in the Region.

Table 4.5 Partcipation of countries in main global environmental agreements on chemical safety, as of 21 December 2007

Country	Signature/Ratification**			
	Stockholm (2004)	**Rotterdam (2004)**	**Basel (1992)**	**Montreal (1989)**
Australia	2004	2004	1992	1989
Bangladesh	2007	...	1993	1990
Bhutan	...	...	2002	2004
Brunei Darussalam	2002 *	...	2002	1993
Cambodia	2006	...	2001	2001
China	2004	2005	1991	1991
Cook Islands	2004	2004	2004	2003
Democratic People's Republic of Korea	2002	2004	...	1995
Fiji	2001	...	...	1989
India	2006	2005	1992	1992
Indonesia	2001 *	1998 *	1993	1992
Japan	2002	2004	1993	1988
Kiribati	2004	...	2000	1993
Lao People's Democratic Republic	2006	...	...	1998
Malaysia	2002 *	2002	1993	1989
Maldives	2006	2006	1992	1989
Marshall Islands	2003	2003	2003	1993
Micronesia, Federated States of	2005	...	1995	1995
Mongolia	2004	2001	1997	1996
Myanmar	2004	...	...	1993
Nauru	2002	...	2001	2001
Nepal	2007	2007	1996	1994
New Zealand	2004	2003	1994	1988
Niue	2005	...	...	2003
Palau	2002 *	...	...	2001
Papua New Guinea	2003	...	1995	1992
Philippines	2004	2006	1993	1991
Republic of Korea	2007	2003	1994	1992
Samoa	2002	2002	2002	1992
Singapore	2005	2005	1996	1989
Solomon Islands	2004	...	...	1993
Sri Lanka	2005	2006	1992	1989
Thailand	2005	2002	...	1989
Timor-Leste	...	...	...	...
Tonga	2002 *	...	...	1998
Tuvalu	2004	...	...	1993
Vanuatu	2005	...	...	1994
Viet Nam	2002	2007	1995	1994

... Data not available

* Signature only, no ratification

** Year of entry into force in brackets

*Source*s: Status of ratifications of the Stockholm Convention on Persistent Organic Pollutants (22 May 2001). Available from: http://www.pops.int/reports/StatusOfRatifications.aspx

Ratifications of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (10 September 1998). Available from: http://www.pic.int/home.php?type=t&id=63&sid=17

List of ratifications/acceptances/approvals of the amendment to the Basel Convention. Available from: http://www.basel.int/ratif/convention.htm

Status of ratification and evolution of the Montreal Protocol (United Nations Environment Programme – Ozone Secretariat). Available from: http://ozone.unep.org/Ratification_status/

An international mechanism to develop and promote strategies and partnerships for the management of chemicals among national governments, intergovernmental and nongovernmental organizations, and the Intergovernmental Forum on Chemical Safety (IFCS) was established soon after the United Nations Conference on Environment and Development in 1992. Most countries in the Asia Pacific Region have become members of IFCS, and the health sector is the national focal point in Japan, the Lao People's Democratic Republic, the Federated States of Micronesia, Myanmar, the Philippines, Sri Lanka, Thailand and Tonga. Thailand served as President of IFCS, and the Philippines as Vice-President for Asia and the Pacific, between 2003 and 2006.

The most recent international initiative on chemical safety is the development of a Strategic Approach to International Chemicals Management (SAICM) to provide an overarching policy framework to guide efforts for achieving the goal of sound management of chemicals in all countries. As endorsed by the World Summit on Sustainable Development in 2002, the objective of implementing SAICM is to "renew the commitment, as advanced in Agenda 21, to sound management of chemicals throughout their life cycle and of hazardous wastes for sustainable development as well as for the protection of human health and the environment, inter alia, aiming to achieve, by 2020, that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment". The International Conference on Chemicals Management held in Dubai in 2006 adopted the SAICM and countries have begun implementing it.

National policies on the management of chemicals

The legislation and multisectoral mechanisms to control the production, use, import/export, storage, transport and disposal of chemicals are in place in more industrialized and rapidly industrializing countries, including Australia, Indonesia, Japan, Malaysia, New Zealand, the Philippines, the Republic of Korea, Singapore and Thailand. China and India are rapidly improving their legislative control of chemicals. National profiles on chemicals management have been prepared in Bangladesh, China, India, Indonesia, Mongolia, Sri Lanka and Thailand.

However, the institutional capacity, human resources and facilities to undertake toxicological assessment, monitoring and control of human exposure to toxic chemicals is still limited in many developing countries. Also lacking is the provision of adequate information and the means to prevent and manage chemical emergencies.

Establishing and strengthening poison centres

In the Region, 15 countries now have 27 poison information and management centres with more being planned (Table 4.6). These centres provide information on the toxicity, handling and treatment of poisons in both individual and mass casualty incidents.

Policies and practices in waste management

Most countries have legislation on waste management. However, adequate legislation with effective management systems for solid and hazardous waste are in place only in more industrialized countries such as Australia, Japan, Malaysia, New Zealand, the Republic of Korea and Singapore. In countries such as China, India, Indonesia, Thailand and Viet Nam, solid waste management systems are rapidly improving.

Table 4.6 Poison centres established in the Asia Pacific Region

Country	Number	Locations
Australia	5	Brisbane, Canberra, Melbourne, Perth, Sydney
Cambodia	1	Phnom Penh
China	2	Beijing, Hong Kong
India	4	Ahmedabad, Cochin, Chennai, New Delhi
Indonesia	3	Bandung, Jakarta, Surabaya
Japan	2	Osaka, Tsukuba
Malaysia	1	Penang
Mongolia	1	Ulaanbaatar
Nepal	1	Kathmandu
New Zealand	1	Dunedin
Philippines	1	Manila
Singapore	1	Singapore
Sri Lanka	1	Colombo
Thailand	1	Bangkok
Viet Nam	2	Hadong, Hanoi

Sources: *World directory of poison centres (Yellow Tox)*. WHO International Programme on Chemical Safety (IPCS). Available from: http://www.who.int/ipcs/poisons/centre/directory/en/.
Poison centres in the Western Pacific Region. Available from: http://www.wpro.who.int/NR/rdonlyres/718858C0-339E-48D8-A24E-583AFE73B21C/0/List

Effective regulations and guidelines for health-care waste management exist in Australia, China, Fiji, India, Indonesia, Japan, the Lao People's Democratic Republic, Malaysia, Mongolia, New Zealand, Palau, Papua New Guinea, the Republic of Korea, Samoa, Singapore, Thailand and Viet Nam. However, only the more industrialized countries such as Australia, Japan, Malaysia, Singapore, New Zealand and the Republic of Korea have implemented adequate management of health-care waste.

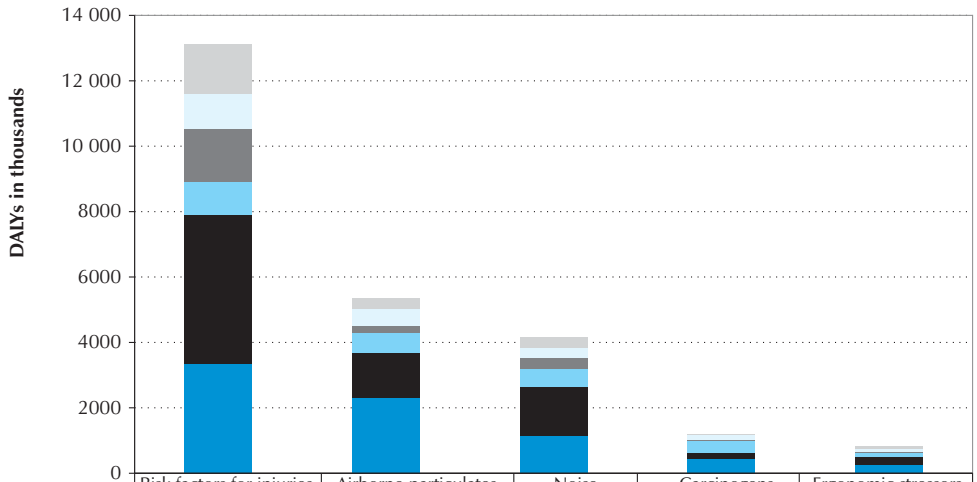
4.4 Occupational health

Occupational hazards cause or contribute to the premature deaths of millions of people worldwide and result in the ill-health or disablement of hundreds of millions more each year. Globally, occupational risks have been classed as the tenth leading cause of morbidity and mortality. The burden of disease from selected occupational risk factors amounts to 1.5% of the global burden in terms of DALYs lost. Almost 24 million DALYs lost and 699 000 deaths are attributable to these risk factors. Work-related injuries cause nearly 310 000 deaths each year, and nearly 146 000 deaths are attributable to work-related carcinogens.[37,38]

The disease burden due to occupational risks remains largely uncharacterized in the Asia Pacific Region, which has an active workforce of about 1.6 billion people.[39] However, the gravity of occupational health problems is highlighted from time to time by disasters and accidents such as the Bhopal chemical spill in India, the Kader toy factory fire in Thailand, the Tokai village nuclear incident in Japan, and frequent coal mine explosions in China.[40]

According to *The world health report 2002,* which addressed selected occupational risk factors in the Asia Pacific Region for 2000, an estimated 189 000 deaths annually were attributable to injury-related risk factors, 72 000 deaths to work exposure to carcinogens, and 171 000 deaths to airborne particulates. These risk factors, plus noise and ergonomics stressors, attributed about 16 million DALYs lost in 2000, which was about two thirds of the world total (Figure 4.8).

Fig. 4.8 Attributable DALYs by occupational risk factor in WHO Regions, 2000



	Risk factors for injuries	Airborne particulates	Noise	Carcinogens	Ergonomic stressors
Africa Region	1558	353	345	37	82
Americas Region	1050	502	309	130	80
Eastern Mediterranean Region	1632	228	311	40	53
European Region	1000	606	534	339	97
South-East Asia Region	4553	1359	1506	201	234
Western Pacific Region	3335	2305	1148	435	270

Source: Ezzati M, *et al.* Selected major risk factors and global and regional burden of disease. *The Lancet.* 2002. Available at http://image.thelancet.com/extras/02art9066web.pdf

Most countries in the Asia Pacific Region are experiencing rapid economic development, a process that potentially amplifies the pre-existing traditional risks and introduces new occupational risks. In particular, workers are exposed to a wide range of occupational hazards and risks including chemical, physical and biological hazards, as well as inadequate ergonomics practices and high psychosocial stress. Thus, occupational health is a major concern.

Prevailing trends

The trends in occupational health are discussed in terms of: (1) the characteristics of the workforce in different sectors and the prevalence of work safety practices; (2) existing policy frameworks and procedures; and (3) existing institutional infrastructure for administering occupational health.

Main sectors involved

Employment by economic sectors in selected countries of the Region presents a varied picture and an unequal distribution (Figure 4.9). For the sake of convenience, the economic sectors were regrouped into three broad categories comprising agriculture, industry and services based on the United Nations Classification System.[41]

Agriculture, which includes forestry and fishing, is the major sector providing employment to workers in developing countries. In Bangladesh, China, Indonesia, the Philippines, Sri Lanka, Thailand and Viet Nam more than one third of the workforce is employed in this economic sector. In developed countries, the percentage of the workers in this sector is small: less than 1% in Brunei Darussalam and Singapore, and 7% in New Zealand.

Those employed in the industrial sector—comprising mining and quarrying, construction, repair and demolition, and commerce and manufacturing—generally make up between 10% and 30% of the Region's workforce. While the percentage is relatively high in Japan (27%), Malaysia (30%) and the Republic of Korea (27%), it is relatively low in Bangladesh (13%) and the Philippines (15%).

The service sector consists of community, social and personal activities, electricity, gas and water supply, transport, storage and communication, wholesale and retail trade, financing, insurance, real estate and business services community, social and personal services, and services not adequately described. It employs the largest percentage of the workforce. This is over 70% in some high-income countries such as Australia (76%), Brunei Darussalam (79%), New Zealand (71%) and Singapore (76%).

Occupational disease and injuries

Overall there is a lack of information on the prevalence of occupational diseases and injuries. The International Labour Organization (ILO) estimates that the number of fatalities caused by work-related diseases and occupational accidents in the Asia Pacific Region in 2002 was slightly over 1 million with 310 000 fatalities in India and 460 000 fatalities in China.[42]

In terms of types of disease or injury that caused fatalities, cancers, circulatory system diseases, accidents and violence are the most common causes (Figure 4.10). However, the situation varies significantly between countries.

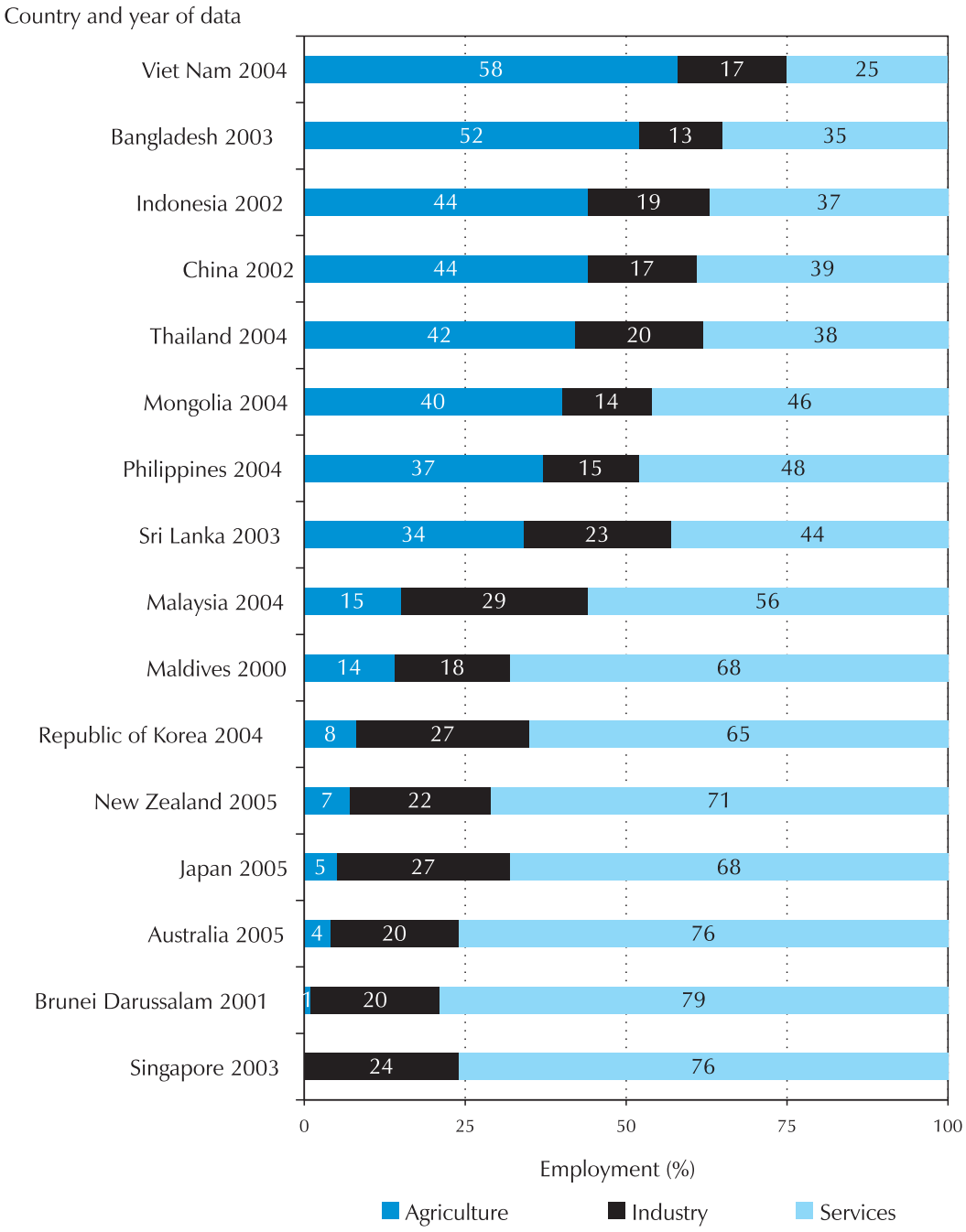
Traditional occupational hazards and risks are still prevalent in Bangladesh, India and Sri Lanka, particularly among agriculture workers, who are also afflicted by communicable diseases. Work-related dust disorders, such as silicosis, are major occupational illnesses in countries such as India and Viet Nam. The prevalence of silicosis in open-cast mines and in cottage industries is particularly significant, as is hearing loss related to physical exposure, such as noise and vibrations. Also important in many countries, including Bangladesh, India and Nepal, are conditions of malnutrition and anaemia, injuries, musculoskeletal disorders, tuberculosis and other respiratory disorders, occupational dermatitis, reproductive disorders, and poisonings.

Countries in rapid transition such as China and Thailand have reduced mortality from traditional hazards but injuries and diseases due to new technologies and industrialization, such as those resulting from exposures to asbestos and carcinogens, are likely to rise.

Policy for occupational health

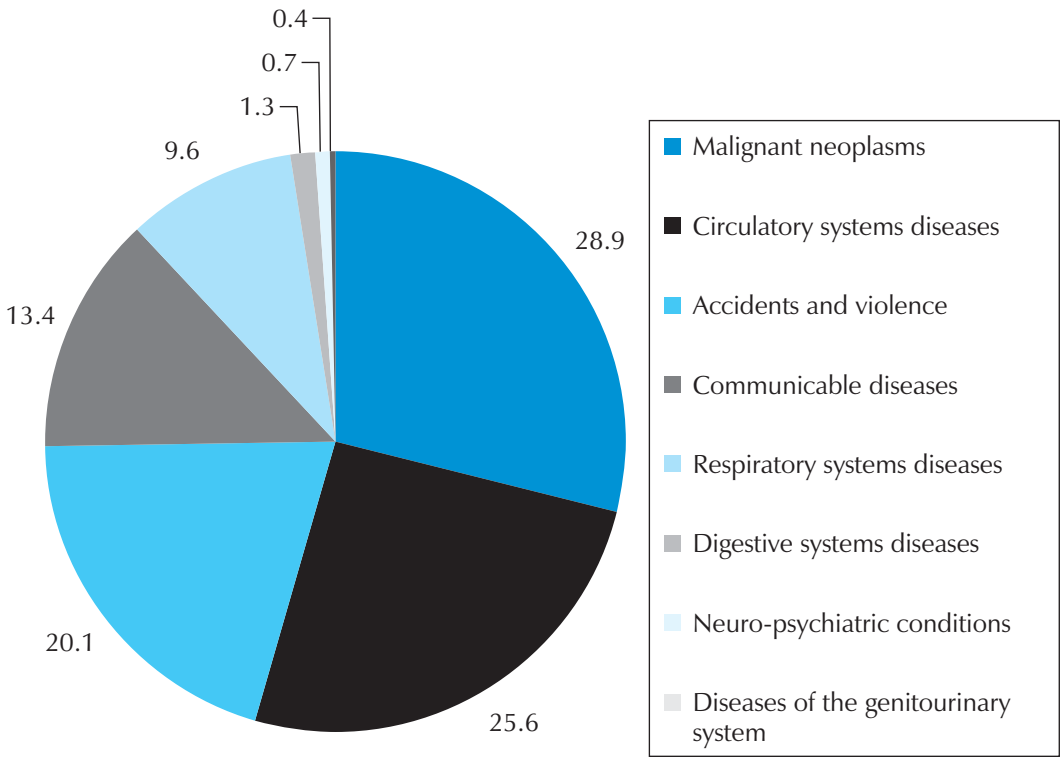
The policy environment of occupational health and safety differs from country to country. Countries can be broadly grouped into three categories: those with well developed and integrated polices covering all sectors; those with fragmented policies addressing only limited sectors; and those with very rudimentary policies.

Fig. 4.9 Percentage distribution of employment by economic sectors in selected countries of the Asia Pacific Region



Source: Data available from International Labour Organization Bureau of Statistics (LABORSTA) (http://laborsta.ilo.org/). The most recent data after 2000 from selected countries are used, categorized into the three major economic sectors, as described in the text.

Fig. 4.10 Percentage distribution of work-related fatalities by cause in the Asia Pacific Region



Source: *Global estimates of fatalities caused by work-related diseases and occupational accidents, 2002*. Geneva, International Labour Organization, 2002. http://www.ilo.org/public/english/protection/safework/accidis/globest_2002/dis_world.htm

An integrated policy on occupational health that addresses the needs of all economic sectors is exemplified by countries such as Australia, Japan, New Zealand, the Republic of Korea and Singapore. Policies in these countries include comprehensive coverage of large segments of working populations in most economic sectors. Ministries of health, labour, social security and others are involved in occupational health and safety. The role of each ministry is clearly defined and there is good intersectoral collaboration. The reporting of occupational injuries and diseases is mandatory, and the victims of occupational illness have an opportunity to receive compensation. The policies of these countries can be used as a blueprint for others seeking to improve occupational health.

Most countries in the Region have policies addressing some aspects of occupational health in selected economic sectors. Countries such as China, Indonesia, Malaysia, the Philippines, Thailand and Viet Nam have policies with a relatively comprehensive coverage of the workforce through rules created under legislative acts. Malaysia enacted its comprehensive Occupational Safety and Health Act in 1994. The Labour Code of the Philippines with the Occupational Safety and Health Standards and Thailand's Labour Protection Act provide comprehensive coverage of workers and workplaces. Indonesia has a number of laws related to workplace diseases, covering health-care workers, occupational health services and care, diagnosis and reporting of occupational diseases, personal protection equipment, threshold limit values for chemical and airborne contaminants, and occupational

safety. Viet Nam also has the Labour Code, the Laws on People's Health Protection and other legislation providing occupational health and safety protection, including compensation, for most workers. These countries have legal provisions for the health protection of workers in most economic sectors.

Countries such as Bangladesh, India, Mongolia and Sri Lanka have policies centred on ensuring occupational safety and health in manufacturing and mining sectors and on the docks. For example, victims of occupational illness and injury from the docks have avenues for compensation. There are no exclusive laws on occupational health and safety, but elements of occupational health and safety are incorporated in these. However, policies exclude most of the workforce employed in agriculture or other unorganized sectors. These countries have some way to go towards establishing a firm policy for the protection of workers in different sectors of the economy. Taking note of the hazards and the presence of a large workforce, India has recently introduced laws to protect health and safety of construction workers.

Other countries in the Asia Pacific Region, such as Bhutan, Brunei Darussalam, Maldives, Myanmar and Nepal, need to provide basic occupational health and safety protection to the majority of workers. In Brunei Darussalam, national legislation addressing compensation for work-related injuries and workplace safety can be found in the Workmen's Compensation Act and certain provisions of the Labour Act. In Nepal, the Labour, Trade Union and Industrial Enterprises Acts have been enacted. Bhutan has enacted the Occupational Health and Safety Rules 2006, which covers all sectors of the economy except agriculture. For miners there are separate legal provisions, but there is no indication of the extent of occupational health and safety measures provided for in these Acts.

Countries with integrated policy and comprehensive coverage on occupational health have surveillance systems for monitoring health and safety. Thus, comparatively better statistics are available on occupational injuries in Australia, Japan, Malaysia and New Zealand, which show over 75% of the estimated fatal injuries being reported.[43] However, in most of the remaining countries in the Region, occupational health surveillance is yet to be properly implemented. The reporting of occupational illness and injuries, at least in the manufacturing sector, is mandatory in many countries.

Institutional infrastructure and administration of occupational health services

As a direct consequence of fragmentary policy, various ministries and affiliated divisions or departments are responsible for the administration of occupational health services. As a result, there is no uniform administrative mechanism in the Region. The principal ministries involved are labour, health and social welfare, environment, trade and industry, home affairs, manpower, agriculture, and forestry. Labour and health ministries are generally involved in all countries. Despite agriculture being a prime employer, the agriculture ministry is involved in the administration of occupational health only in China, Indonesia, Malaysia, Nepal, the Philippines, Sri Lanka, Thailand and Viet Nam. In a few countries such as India, Indonesia and Thailand, the industry and environment ministries are also involved.

The overall responsibility for health and safety at work rests with the ministries of labour and health in most countries of the Region. In many countries, responsibility is divided, in the sense that the ministry of labour is involved in formulating legal instruments and in enforcing them while the ministry of health is involved in education and training and providing health care to workers. Ministries of health and labour often have affiliated institutions which carry out environmental monitoring of the workplace, perform biological monitoring, and provide laboratory facilities for diagnosis and confirmation of occupational diseases. In some countries of the Region such as India, a special division of the labour ministry called the factory division is responsible for occupational health and safety administration.

This, however, may restrict the occupational health and safety administration in workplaces other than factories. Tourism, human resources and forestry are the other ministries involved in some countries, which is perhaps due to the economic significance of these industries.

The delivery of occupational health and safety functions also varies. In some countries such as Thailand, both public and private hospitals are involved in the delivery of occupational health and safety services. Most Asian countries have the delivery of occupational health services performed at the local levels. The policy decisions and the setting of standards with regard to occupational health and safety, however, generally take place at the national level. Regional centres, often consisting of specialized institutions, link up the national and workplace occupational health services. Tertiary care hospitals, hospitals attached to medical schools, and other specialized hospitals offer national-level services in occupational health. Medical centres, dispensaries and medical facilities in factories provide occupational health and safety services at the workplace level. Occupational health and safety services at the enterprise level are also available, usually in large enterprises. However, in small enterprises occupational health and safety services are not provided in most instances.

Innovative approaches in occupational health in the Region

Countries of the Asia Pacific Region have undertaken a number of innovative approaches to effectively reduce and manage occupational hazards and risks through the formulation or adaptation of special initiatives and by active networking.

In an effort to reduce hazards in the agricultural sector, the ILO has introduced the Work Improvement in Neighbourhood Development (WIND) programme. The WIND training programme provides practical knowledge for the management of tools and fertilizers, and the storage of pesticide. This programme was first developed in 1995 in Cantho province, Viet Nam, in collaboration with the Institute for Science of Labour, Kawasaki, Japan, and subsequently applied in the Philippines and Thailand. Cantho Province, Viet Nam, has continued to develop the methodology and has established a sustainable mechanism for delivering WIND training to many villages through the rural health centre network. Work Improvement in Small Enterprises (WISE) is another ILO programme, designed to promote practical, voluntary action to improve working conditions by owners and managers of small and medium enterprises. Both these programmes are widely used in Thailand and Viet Nam for risk management. Healthy Workplaces, a programme that integrates health protection and health promotion in workplaces, has been introduced by the World Health Organization and implemented in several countries in the Region. Over 200 Healthy Workplaces initiatives have been undertaken in Malaysia, Mongolia, the Philippines, Singapore and Viet Nam.

A common portal has been developed by the World Health Organization's Collaborating Centres in Australia and Japan to enhance networking in order to share resources and experiences in occupational health. The portal can serve as a gateway offering a broad array of web-based occupational health resources. The hosting of a dedicated portal with good Internet connectivity enables the sharing and dissemination of occupational health information, as well as cross-linking various national web pages. This will provide another excellent opportunity to facilitate networking.

Challenges and needs in occupational health

Occupational health is a considerable concern in the Asia Pacific Region. Current priorities and constraints for the strengthening of occupational health vary between countries. Developing national policies on occupational health is, therefore, a priority in countries such as Bhutan, Brunei Darussalam

and Maldives. In countries such as India, Indonesia, Thailand and Viet Nam where policies already exist, the priority is intersectoral coordination for bringing clarity to all stakeholders regarding obligations, responsibility and authority that will strengthen occupational health programmes. As earlier indicated, there are at least three governmental ministries which carry out worker activities: the ministries of health, labour and social security. With very few exceptions, occupational health programmes do not include unified criteria for programming and evaluation, social participation, and coordination. This results in overlapping activities, concentration of activities in certain labour groups and conflicts due to competition for the utilization of resources. Intersectoral coordination is essential to overcome these problems and turn them into opportunities for intervention.

The main challenges and constraints for improving occupational health programmes in all countries of the Asia Pacific Region include strengthening monitoring and surveillance of occupational diseases and injuries, as well as developing critical human resources. The magnitude of occupational diseases and injuries requires policy-makers to not only monitor the performance of occupational health programmes but also develop and implement strategic interventions.

However, the current situation in most countries of the Region is of a virtual absence of reporting of occupational diseases and injuries. The lack of reporting highlights the fact that the provision of legislation alone may not be sufficient. Infrastructure for reporting must be strengthened and the capacity for undertaking reporting must be enhanced through human resources development. Another common problem associated with reporting is that it can lead to reprisal, loss of employment and economic hardship. Health promotion strategies must reassure both the employee and the employer that reprisals do not occur. The employer has to be convinced that healthy workplaces lead to increased productivity.

There is a need to develop occupational health and safety services for the informal and agriculture sectors on a priority basis. Agriculture activities are prone to high risks of injury and illness due to the use of a variety of equipment, machinery and agro-chemicals, especially hazardous and acutely toxic pesticides. Agricultural projects have increased the exposure of workers and local communities to hazardous pesticide use. Traditionally, the thrust of occupational health and safety efforts in most countries of the Region has been directed towards the manufacturing sector. Recent reports of high morbidity and mortality from asthma and chronic obstructive pulmonary disease attributed to workplace exposure to airborne dust calls for immediate action. In recent years most developing and rapidly industrializing countries in the Region have shown a rise in the use of asbestos. This necessitates concerted efforts for advocacy for adoption of the WHO Policy of Elimination of Asbestos-related Diseases by countries in the Region. Some countries have acted to control this problem.

The informal sector, including garment factories in export processing zones, create conditions that lead to poor occupational health services. Developing comprehensive occupational health programmes are thus a priority for countries in the Region.

4.5 Climate change and human health

Scope

In 2007 the Intergovernmental Panel on Climate Change (IPCC) concluded that most of the rise in global warming observed since the mid-20th century is very likely due to increasing greenhouse gases generated by human activities. The panel also reported that greenhouse gas emissions increased by 70% between 1970 and 2004, and projected that global mean temperature will rise by between 1.1 °C and 6.4 °C by the end of the 21st century, depending partly on how successful we are in slowing greenhouse gas emissions. This projected rate of increase is without precedent during the last 10 000 years.[44,45]

Global temperature increases trigger faster melting of glaciers and other ice as well as thermal expansion of the oceans, eventually raising sea levels. This may inundate the Asia Pacific Region's large low-lying coastal zones and small islands. Due to shifting weather patterns in different locations (low and high atmospheric pressure and the formation of clouds, winds and moisture) temperature increases are not uniform across the globe.[46] In general, temperature increases are greater in cold climatic subregions such as North and Central Asia and the Tibetan Plateau (Table 4.7).

Changes in precipitation vary between subregions, but drier areas such as Northern Australia and Central Asia are expected to receive less precipitation in the future (Table 4.8). Compared to the pre-global warming period, temperature and precipitation changes are rapid, creating unstable weather and climate patterns. Extreme weather events such as heat waves, droughts, storms, typhoons and floods are occurring more often in different parts of the world. The increasing frequency of summer heat waves in temperate zones (Europe in 2003, Asia in 2004) and typhoons and floods throughout the world are signs of changing weather and climate patterns.

Table 4.7 Projected increase in surface air temperature (°C) for three time periods, compared to 1990, for subregions of the Asia Pacific Region

Subregions	30-year periods from 2010 to 2099		
	2010–2039	2040–2069	2070–2099
	Lower to upper estimates	Lower to upper estimates	Lower to upper estimates
North Asia	1.69 to 2.94	3.13 to 6.65	4.00 to 10.45
Central Asia	1.52 to 1.89	2.58 to 4.42	3.42 to 7.50
Tibetan Plateau	1.49 to 2.05	2.74 to 4.44	3.73 to 7.62
East Asia	1.24 to 1.82	2.24 to 4.18	3.00 to 6.95
South Asia	0.54 to 1.18	0.88 to 3.16	1.56 to 5.44
South-East Asia	0.72 to 0.92	1.30 to 2.32	1.87 to 3.92
Indian Ocean	0.51 to 0.98	0.84 to 2.10	1.05 to 3.77
Northern Pacific	0.49 to 1.13	0.81 to 2.48	1.00 to 4.17
Southern Pacific	0.45 to 0.82	0.80 to 1.79	0.99 to 3.11
Australia	0.10 to 1.50	0.30 to 4.00	0.40 to 8.00
New Zealand	0.10 to 1.40	—	0.20 to 4.00

Source: Intergovernmental panel on Climate Change (IPCC). Fourth Assessment Report: Working Group II Report "Impacts, Adaptation and Vulnerability", Chapter 10 – Asia, Chapter 11 – Australia and New Zealand, and Chapter 16 – Small Islands. Available from http://www.ipcc.ch/ipccreports/ar4-wg2.htm

In addition to the direct impact of natural disasters on health and safety, changing weather patterns have the potential to change the distribution of vector-borne diseases such as malaria and dengue fever and introduce them to areas where they were previously unknown. More frequent floods and droughts could increase the occurrence of infectious waterborne diseases. Rising atmospheric temperatures also boost the formation of photochemical smog. Dramatic changes in temperature and rainfall affect food production, nutrition and food security. Taking only a few well-established links to health into account, climate change already causes an estimated 77 000 deaths and leads to the loss of 2.7 million DALYs annually in the Asia Pacific Region.[47]

Table 4.8 Projected change in precipitation (%) for three time periods, compared to 1990, for subregions of the Asia Pacific Region

Subregions	30-year periods from 2010 to 2099		
	2010–2039	2040–2069	2070–2099
	Lower to upper estimates	Lower to upper estimates	Lower to upper estimates
North Asia	+4 to +16	+8 to +35	+10 to +59
Central Asia	-5 to +5	-7 to +8	-13 to +10
Tibetan Plateau	+4 to +14	+5 to +21	+7 to +31
East Asia	0 to +6	+2 to +13	+4 to +21
South Asia	-3 to +8	0 to +26	-16 to +31
South-East Asia	-2 to +1	-1 to +4	+1 to +12
Indian Ocean	-5.4 to +6	-6.9 to +12.4	-9.8 to +14.7
Northern Pacific	-6.3 to +9.1	-19.2 to +21.3	-2.7 to +25.8
Southern Pacific	-3.9 to +3.4	-8.2 to +6.7	-14 to +14.6
Australia	-15 to +10	-40 to +27	-80 to +54
New Zealand	-19 to +15	—	-32 to +40

Source: Intergovernmental panel on Climate Change (IPCC) Fourth Assessment Report: Working Group II Report "Impacts, Adaptation and Vulnerability", Chapter 10 – Asia, Chapter 11 – Australia and New Zealand, and Chapter 16 – Small Islands. Available from: http://www.ipcc.ch/ipccreports/ar4-wg2.htm

Robust findings on regional climate change for mean and extreme precipitation and drought[48] indicate the direction of simulated precipitation change:

- very likely annual mean increase in the Tibetan plateau and winter decrease in southwestern Australia;
- likely annual mean increase in the Northern Pacific, the northern Indian Ocean, the Southern Pacific (slight, mainly equatorial regions), and the west of New Zealand's South Island;
- likely annual mean decrease in eastern French Polynesia and winter and spring decrease in southern Australia;
- likely summer mean increase in North Asia, East Asia, South Asia and most of South-East Asia, and likely winter increase in East Asia;
- likely increase in extremes of daily precipitation in South Asia, East Asia, Australia and New Zealand;
- likely increase in risk of drought in Australia and eastern New Zealand.

Box 4.7: Vulnerability of mountain regions

As indicated in Table 4.7, temperature increases are greater over land at high altitudes and latitudes. Physical changes are already taking place in mountainous regions. Perhaps the most obvious is the retreat of glaciers, in many cases leaving large lakes in their wake. No lake existed at the Lower Barun Glacier in Nepal in 1967, but by 1996 one had grown to considerable size.

These physical changes bring health risks. Vector-borne diseases may invade warmer habitats at higher altitudes. Variable precipitation is likely to bring more floods and landslides. A risk that is unique to mountainous regions, and which can cause many deaths, is glacial lake outburst floods: a flash flood caused by the bursting of natural dams consisting of moraine ridges. In addition, populations in many mountainous and neighbouring lowland regions rely on water from predictable, seasonal glacial melt. The retreat of glaciers heightens the threat of water insecurity and the incidence of diarrhoeal diseases and reduces agricultural production.

Urgency to reduce the generation of greenhouse gases

The most fundamental intervention that could impact climate change would be to reduce the generation of greenhouse gases, particularly carbon dioxide (CO_2). The Kyoto Protocol, an international agreement under the United Nations Framework Convention on Climate Change (UNFCC), aims to reduce CO_2 emissions. It took effect in May 2005. Table 4.9 lists the countries in the Region that have ratified or signed the agreement and intend to achieve targets set by the protocol. For example, the Japanese Government initiated a no-tie, no-jacket programme (cool biz, or cool business) in government offices that allowed air conditioning temperatures to be raised without discomfort, thereby reducing power and CO_2 generation at fossil fuel power plants.

Despite mitigation efforts, global warming is expected to continue. Since a complete reversal in global warming is not considered possible in the near future, there is a need to adapt to the consequences of global warming. Measures by the health sector could include working closely with meteorological organizations and services to establish early detection and preparedness for potential outbreaks of disease and strengthening public health surveillance, monitoring and response systems. An awareness programme for the general public and policy-makers needs to be developed along with the provision of health advice. The first efforts in this direction are being made in a new project on piloting approaches to protect health in changing climates. In partnership with the United Nations Development Programme and with funding from the Global Environmental Facility, this initiative is being implemented in seven vulnerable countries, three of which are in the Asia Pacific Region. The project supports targeted interventions in these countries, strengthens institutional capacity to address health risks, involves an increasingly informed and engaged health sector in adapting to climate change, and extracts lessons that are applicable to other countries.

Table 4.9 Countries and areas that have ratified or signed the United Nations Framework Convention on Climate Change and the Kyoto Protocol, as of 16 January 2008

Country	UNFCCC	Kyoto Protocol
Australia	1992	2007
Bangladesh	1994	2001
Bhutan	1995	2002
Brunei Darussalam	2007	No
Cambodia	1995	2002
China	1993	2002
Cook Islands	1993	2001
Democratic People's Republic of Korea	1994	2005
Fiji	1993	1998
India	1993	2002
Indonesia	1994	2004
Japan	1993	2002
Kiribati	1995	2000
Lao People's Democratic Republic	1995	2003
Malaysia	1994	2002
Maldives	1992	1998
Marshall Islands	1992	2003
Micronesia, Federated States of	1993	1999
Mongolia	1993	1999
Myanmar	1994	2003
Nauru	1993	2001
Nepal	1994	2005
New Zealand	1993	2002
Niue	1996	1999
Palau	1999	1999
Papua New Guinea	1993	2002
Philippines	1994	2003
Republic of Korea	1993	2002
Samoa	1994	2000
Singapore	1997	2006
Solomon Islands	1994	2003
Sri Lanka	1993	2002
Thailand	1994	2002
Timor-Leste	2006	No
Tonga	1998	No
Tuvalu	1993	1998
Vanuatu	1993	2001
Viet Nam	1994	2002

Source: United Nations Framework Convention on Climate Change. Available from: http://unfccc.int/parties_and_observers/parties/items/2352.php

Box 4.8: Bhutan's response

The Royal Government of Bhutan considers it imperative that the country prepares itself for disaster mitigation in relation to climate and human health. As a result, the following five priority areas have been identified for action:

1. Strengthen the response capacity of the health sector by preparing for medical emergency response.
2. Strengthen public health systems with the aim of controlling vector-borne and waterborne diseases.
3. Set up an early warning subsystem by coordinating disease surveillance and climate monitoring activities.
4. Reduce the risks of vector-borne and waterborne diseases by engaging and empowering local communities to implement integrated pest and vector management and to safeguard drinking water sources.
5. Obtain stakeholder engagement by advocating and creating awareness, particularly at the local community level.

These measures will be considered by the Ministry of Health, which is in the process of drafting the 10th Five-Year Plan, to be implemented from 2008 to 2013.

Source: von Hildebrand A., Dorji G. *Climate change – a threat to global health security: case study of Bhutan.* New Delhi. WHO Regional office for South-East Asia. *Regional health forum*, Volume 11, Number 1 – 2007

National assessments of vulnerability and adaptation, including the implications of climate change to the health sector, have been completed by most countries that ratified the United Nations Framework Convention on Climate Change through the preparation of national communication reports. More specific assessment of the actual and potential impact of climate change on health has been done in some countries, including Australia, Japan and New Zealand. A risk assessment study conducted for Oceania, including Australia, New Zealand and Pacific island countries and areas, in 2002 indicates that extreme temperatures currently contribute to the deaths of some 1100 people annually over age 65 in ten Australian and two New Zealand cities. Yearly flood-related deaths and injuries may increase by up to 240%, with malaria- and dengue-affected areas likely expanding southwards. The number of people exposed to flooding due to sea level rise in Australia and New Zealand is predicted to approximately double in the next 50 years.[49]

4.6 Food contamination and safety

Public health significance of food contamination and foodborne illnesses

Everyone has a right to adequate, suitable and safe food to meet their nutritional needs. Despite this right, a different reality exists, both in the Asia Pacific Region and globally. In fact, foodborne illnesses are all too frequent in the Asia Pacific Region. However, the ubiquitous nature of the problem, coupled with the complexities of dealing with multiple stakeholders in the food-to-table chain, has

made it difficult for most countries in the Asia Pacific Region to devote proper attention to this major public health problem. Despite encouraging progress at the country level and some significant advances in enacting laws, regulations and enforcement mechanisms, much still needs to be done.

The importance of safe food, whether domestically produced, imported or exported, and its impact on both public health and economic efficiency and competitiveness, are understood by governments in the Asia Pacific Region. However, the danger of food contamination and food-related disease outbreaks is particularly acute in the Region because of the proximity in which animals and people live and the way in which food is produced and distributed. Countries in the Region face a challenge of improving the efficiency and effectiveness of their food control systems in a time of rapid urbanization, increasing opportunities in food trade and the growing intensification of livestock production, all of which increase the potential for food safety risks.

Foodborne illnesses arise from the ingestion of food contaminated with bacteria, protozoa, helminths, viruses, bacterial toxins, fungal toxins, chemicals–including heavy metals, pesticides, marine toxins and chemicals derived from processing–adulterants and dioxins. Physical hazards such as glass, metal and other substances present additional challenges. Foodborne illnesses give rise to a diverse range of symptoms, many of which may be reported in general terms such as gastrointestinal illness, diarrhoea, diseases of the digestive system, cancer, bacterial food poisoning or fish poisoning. Some symptoms are reported according to the causative agents, such as hepatitis A or salmonellosis. Many more are likely to remain unreported.

Even in the most industrialized countries of the world, 20%–30% of the population may be affected by foodborne illness in any one year.[50] In the Asia Pacific Region, however, surveillance is not comprehensive enough to provide an estimate of the true burden of foodborne illness. Still, it is likely that the situation is at least as serious as elsewhere in the world. On this basis, a conservative estimate would suggest that more than 300 million[51] people are affected by foodborne illness each year in the Asia Pacific Region.

Approximately one million cases of diarrhoeal diseases are reported annually in both the Philippines and Viet Nam. In Cambodia in 2004, diarrhoeal diseases were the second most prevalent cause of morbidity, with 383 118 reported cases.[52] In 2000, diarrhoeal diseases were the fifth most frequent cause of morbidity and the third greatest cause of mortality in the Lao People's Democratic Republic.[53] In 2002, India reported over 450 000 deaths due to diarrhoea and over nine million cases of diarrhoeal diseases.[54,55]

In New Zealand, campylobacteriosis, an infection that normally attacks the digestive system, is increasingly being reported. In July 2006, the New Zealand Food Safety Authority expressed its concern at the incidence of campylobacteriosis with more than 12 000 cases being reported annually.[56] In Hong Kong (China), *Vibrio parahaemolyticus* infections, *Staphylococcus aureus* intoxications and salmonellosis are among the most frequently reported foodborne diseases. *Vibrio parahaemolyticus* is also the leading cause of food poisoning in Japan, and is usually associated with the consumption of raw or undercooked fish and shellfish. In 2000, the sixth leading cause of morbidity in Japan was attributed to food poisoning of bacterial origin at a rate of 25.47 per 100 000 population, equating to 32 417 cases.[57]

In addition to this baseline burden of disease, the Region has not been immune from food safety emergencies, large outbreaks and contamination scares, which have been highly publicized in national, regional and global media. Outbreaks of foodborne illness can, in a short time, affect large numbers of individuals and can frequently target the most vulnerable sub-populations, such as schoolchildren and older persons. In 2004, the international media reported the deaths of at least 50 infants in China

due to consumption of unsafe infant formula. In addition, it was reported that this also brought about severe malnutrition of roughly 200 additional infants, many of whom suffered permanent brain damage.[58] In 2006, a string of similar infant formula scandals[59] re-emerged there. These incidents and reports of harmful substances and contamination in some exported food products prompted China to establish in August 2007 a State Council Leading Group on Product Quality and Food Safety to address these concerns and to enhance a farm-to-table approach to food safety. More recently, following the detection of pesticide residues beyond permissible limits in aerated soft drinks, the Government of India addressed the need to harmonize national laws in tune with international standards.

In relation to food contamination several countries in the Region have attempted to collect some data to better direct their food control efforts. In a 2002 survey,[60] 44% of street foods in Hanoi, Viet Nam, were found to contain unapproved colouring agents that were potentially toxic and/or carcinogenic. Based on a preliminary survey of restaurants undertaken in 2002, WHO in Bangladesh found that out of 517 samples of salad, lentils, beef, mutton, rice and eggs, 57% were contaminated with *E. coli*, with salads showing the highest (84%). Contamination after food preparation is also likely. *S. aureus* was high in salads (67%), and was also found in one in every three dishes of rice, lentils or chicken.

In India, several surveys of pesticide residues in food commodities have been conducted in recent years, under the responsibility of the Ministry of Health. Some of the results are presented in Table 4.10.

Table 4.10 Pesticide residues in food, India (1979-2000)

Year	Sponsor	Samples	Comments
1979 –1984	FAO	1 645	DDT and BHC traces found in the majority of samples.
1986 – 1987	WHO	648	Generalized pesticide contamination, albeit "below tolerance limits ".
	WHO	1 132	Pesticide contamination found in almost all samples but "below tolerance limits".
1996	WHO	636	Some results were beyond the permitted levels.
2000	WHO	708	117 cereals, 91 pulses, 131 spices, 15 meat products, 50 milk products, 119 vegetables and fruits, 62 tea/coffee, 49 oil/fats, 30 oil seeds, 34 baby food, 10 dry food samples. Most samples contaminated by organochlorine pesticides, however, "all the articles under investigation were found far below the tolerance limit as prescribed in Rule 65 of PFA Rules".

FAO = Food and Agriculture Organization of the United Nations
PFA = Prevention of Food Adulteration Rules

Source: Comments and recommendations on the report of the WHO Country Project, Survey of Pesticide Residues in Food Commodities (IND-FOS-001- Quality of Essential Foods) 2000-2001. WHO Regional Office for South-East Asia. 2002

Economic and social consequences

The economic and social consequences of food contamination can also be significant. An estimate of medical costs and productivity losses for China, for example, is between US$ 4.7 billion to US$ 14 billion annually.[61] Even for countries with much lower populations, the economic and social consequences of food contamination can be significant. A study in Australia found that 5.4 million cases of foodborne illness occur there annually. The associated cost was approximately US$ 2.3 billion per annum[62] in a country with only 20 million people. In New Zealand, campylobacteriosis alone is estimated to cost roughly US$ 48 million annually, 70% of the total economic cost of infectious intestinal disease in that country.[63]

In addition, a poor food safety record can adversely affect tourism. The outbreak of severe acute respiratory syndrome (SARS) showed how devastating an adverse public health event can be for both domestic and international tourism, with lost revenues in the range of billions of dollars. A large-scale outbreak of foodborne illness could also have an important impact. Similarly, even in the absence of mutations of avian influenza to allow human-to-human or food-based transmission, tourism and trade may be threatened by perceptions that Asian food safety structures are ill equipped to respond to this emerging disease.

Current status of national food control programmes

Despite the extent of foodborne illnesses, many countries in the Asia Pacific Region do not yet have a clearly articulated and coherent national policy on food safety. The reluctance to establish documented policies and plans of action relevant to all participants in food safety is an indication of the lack of awareness among consumers and the failure of the private and public sector alike to recognize the true extent of the health, social and economic consequences of foodborne illnesses.

There is a need for a strong political commitment in support of the development of effective food control programmes. This commitment has to be part of a national strategy founded in the sharing of responsibilities among food safety authorities, the entire food industry (including farmers, growers, food processors, food retailers, food service operators and caterers) and consumers, with effective national and subnational coordination.

A second limitation of many food safety programmes in the Asia Pacific Region is the low level of coordination and cooperation among the different government departments involved in developing and enforcing legislation. There are often considerable overlaps, with different government departments claiming the same jurisdiction in relation to food safety. As a consequence, laws are sometimes developed and used as leverage for one department and a barrier to another department. This has resulted in some countries having an excessively complex and sometimes inconsistent web of laws, regulations and standards addressing food control. Despite such overlapping laws, these countries also often have critical areas of the food chain unprotected by legislation.

Inconsistencies in requirements are another problem linked to uncoordinated food control systems. This confuses food producers, as well as the various provincial and municipal enforcement agencies. Many standards have been drawn up without adequate consultation with key stakeholders and with an insufficiently sound scientific basis.

Varying standards of enforcement, education and training among different provincial and local authorities is another key limitation across the Asia Pacific Region. Generally, there are insufficient numbers of inspectors to implement national programmes effectively. Inspectors are often insufficiently trained, and the system of monitoring the effectiveness of inspections is limited. Rampant harassment and corruption in many countries still presents a major hurdle.

National capacity to analyse food also varies across the Region, with many governments unable to isolate or identify common foodborne pathogens and chemical hazards from food. Quality assurance in analytical procedures is also often overlooked, although it is an essential element of contaminant monitoring and foodborne illness surveillance.

Contaminant monitoring programmes are undertaken in a minority of countries and usually cover only a limited range of contaminants. The most regularly collected data relate to contamination with pesticides, heavy metals and mycotoxins. Several countries, however, provide data on these to WHO's Global Environment Monitoring System – Food Contamination Monitoring and Assessment Programme(GEMS/Food).

In some countries, the law requires that foodborne illnesses be reported to the appropriate government agencies. But surveillance systems often are inadequately developed. In other countries there are no requirements in place that foodborne illnesses must be reported. Only very few countries have an active foodborne illness surveillance system capable of tracking and reporting the incidence of, and factors contributing to, foodborne illnesses.

If a food safety programme is to be effective, it must actively promote the participation of both industry and consumers. However, political and economic systems do not always encourage such partnerships. It is only in very few countries in the Asia Pacific Region, mostly developed countries, in which both industry and consumers are invited to participate fully. In addition, not enough governments have training programmes for industry personnel aimed at introducing modern food safety concepts based upon Hazard Analysis and Critical Control Points (HACCP) principles.† The usefulness of a systematic approach such as HACCP needs further promotion as it can enable businesses and health authorities to prioritize improvements based upon risk.

WHO, following a series of technical meetings in the Asia Pacific Region, helped develop regional strategic plans for food safety. Action on these plans has been limited. In addition, WHO has recommended that all countries in the Region should develop broadly based, participative risk communication strategies to promote better knowledge, attitudes and practices related to food safety issues.

Enhancing food control in the Asia Pacific Region

Food control management

An integral element of an effective food control programme is effective management that achieves farm-to-table protection of the food supply. The state government in New South Wales, Australia, established the New South Wales Food Authority in April 2004. The Food Authority was formed by merging SafeFood New South Wales with the food regulatory activities of New South Wales Health. As Australia's first completely integrated or "through-chain" food regulation agency, the New South Wales Food Authority is responsible for food safety across the entire food industry, from primary production to point of sale. This could provide a model for a farm-to-table approach to food safety for other states in Australia and for other countries of the Region.

In New Zealand prior to 2002, food safety was administered, as it still is in many countries, by the Ministry of Health, the Ministry of Agriculture and Forestry, and local authorities. The Government created a single agency at the national level, the New Zealand Food Safety Authority, to achieve a consistent approach to regulation and management and to share resources. Also of note in New Zealand is the establishment of a Minister for Food Safety in the Government.

† HACCP is a systematic preventive approach to food safety that addresses physical, chemical and biological hazards as a means of prevention, rather than a finished-product inspection. The system is used at all stages of food production and preparation.

Japan has taken a different approach, with an emphasis on separating risk assessment and risk management. To achieve this, Japan established a Food Safety Commission as an organization that undertakes risk assessment. The commission is independent from risk management organizations such as the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Health, Labour and Welfare. The Commission's three main tasks are to: conduct risk assessment on food in a scientific, independent and fair manner, and make recommendations to relevant ministries based on the results of risk assessments; implement risk communication among stakeholders such as consumers and food-related business operators; and respond to foodborne accidents and emergencies.

In the area of food legislation, the Indian government passed the Food Safety and Standards Bill in 2006 which consolidates eight laws governing the food sector and establishes the Food Safety and Standards Authority (FSSA) to regulate the sector, bringing food manufacturing, sale and safety under a single umbrella. It has provisions for setting up Food Appellate Tribunals at the central and state levels, and a number of scientific panels and committees. Everyone in the food sector is required to get a licence or a registration which would be issued by local authorities. FSSA will be aided by several scientific panels and a central advisory committee to lay down standards for food safety. These standards will include specifications for ingredients, contaminants, pesticide residue, biological hazards and labels. Every distributor is required to be able to identify any food article to its manufacturer, and every seller to its distributor.

Food safety policies and plans; food laws, regulations and standards

Countries in the Asia Pacific Region need to develop food safety policies and plans of action. Some countries, such as Bangladesh and Mongolia, have developed integrated nutrition, food security and food safety plans of action. Others, including Bhutan, the Lao People's Democratic Republic, Maldives and Samoa, have drafted food safety policies.

Another component of national food control programmes is the development of effective and enforceable laws, regulations and standards. The basic food law is the foundation of a food control programme. China, Cook Islands, the Federated States of Micronesia, Fiji, Kiribati, the Lao People's Democratic Republic, the Marshall Islands and Nauru are taking action to strengthen their food safety legislation. The Association of South-East Asian Nations, as a regional body, also provides through its ASEAN Expert Group on Food Safety a model for cooperative action to harmonize food regulation in order to facilitate trade in safe food.

The Codex Alimentarius Commission coordinates the establishment of international guidance on food standards. Codex, which is the international reference for food safety under the Sanitary and Phytosanitary Agreement, has adopted the Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius. Codex is also developing working principles on risk analysis intended for application by governments. Risk analysis comprises risk assessment, management and communication.

Integrated monitoring and surveillance to better guide food safety and public debate on food safety

Surveillance provides valuable information in estimating the burden of foodborne diseases and in the rapid detection and response to outbreaks. To be effective, it has to be integrated with food monitoring data along the entire food chain from farm to table, thus improving the ability to link pathogens in food to disease in humans. Surveillance assists in the assessment of the burden of foodborne diseases,

identification of public health priorities, setting of policies, evaluating programme performance, and the prevention, detection and control of outbreaks, and in the process stimulates research. It may also identify emerging food safety issues.

National surveys on the quality of foods with high consumer affinity, such as ice-cream and sweets, and edible oils, carried out by the Institute of Public Health in Bangladesh were successful in supporting the public debate on food safety. The debate, engendered by a consortium of consumer groups, the Bangladesh Standards and Testing Institute, WHO and FAO resulted in the creation of mobile food tribunals. These tribunals allow immediate action, such as raiding, inspecting and fining, upon complaint.

The building of analytical capacity is, therefore, essential to food control programmes. Food studies have been conducted in a number of countries including Bangladesh, Bhutan, Cambodia, Fiji, India, Indonesia, Kiribati, the Lao People's Democratic Republic, Solomon Islands and Viet Nam. In addition, collaborating centres in the Asia Pacific Region continue to conduct studies and make the data available to the WHO (GEMS/Food) programme.

Food safety education

Food safety education also remains a priority area for attention in the Asia Pacific Region. The concepts contained in WHO's Five Keys to Safer Food are simple, if applied, could greatly enhance the safety of food. The concepts have been introduced to ministries of education and have been incorporated into a number of educational materials to be used by teachers in Pacific and in South-East Asia, and are also being introduced in some areas of China. The Five Keys to Safer Food are also being integrated into broader public health education programmes in schools.

Food safety in emergencies

Following natural disasters, such as the 2004 earthquake and tsunami in South-East Asia, food in the affected areas may become contaminated and consequently be at risk for outbreaks of foodborne disease including diarrhoea, dysentery, cholera, hepatitis A and typhoid fever. Poor sanitation, including lack of safe water and toilet facilities and lack of suitable conditions to prepare food, have led to mass outbreaks of foodborne disease. As people suffering from the direct effects of the disaster may already be at risk through malnutrition, exposure, shock and other traumas, it becomes all the more essential that the food they consume is safe. This is particularly important for foods for infants, pregnant women and the elderly, who are most susceptible to foodborne disease. Under most conditions, the threats posed by contaminated water and food are interrelated and cannot be separated. Therefore, water should be treated as contaminated, and should be boiled or otherwise made safe before it is consumed or used as an ingredient in food.

Avian influenza and food safety

The unprecedented widespread outbreaks of avian influenza in many countries in the Region, and the demonstrated capacity of the avian influenza A(H5N1) strain to directly infect humans and cause death, have significantly increased the risk of the emergence of a human influenza pandemic. However, the virus has yet to develop an efficient means of human-to-human transmission. Thus, there is still the opportunity to take action that reduces the risk of the virus establishing the attributes and prevalence necessary for a pandemic. With this in mind, there is an urgent need to address the root cause of the situation: the way in which humans interact with and handle the production, distribution, processing and marketing of animals for food.

There is a need for enhanced regulatory control to:

(1) be implemented along the length of the food production and marketing chain, as well as in rural communities; and

(2) operate in an environment without effective or limited bio-security, as this is the case in many of the current operations producing animals for food in Asia, where animals are frequently raised "free range" and are commonly slaughtered in the home or at a live animal market.

Such regulations must address better biosecurity on farms; the transportation of animals to the market; improved hygiene and sanitation; segregation of different species; and slaughter conditions, as appropriate to the particular developing country or urban and rural situations. In addition to regulatory control it is also imperative that all community members in Asia better understand the risks to human health that are associated with the ways in which humans live with and handle animals. Together, national and local authorities, health workers, agriculture and veterinary health authorities, farmers, market associations, and community activists need to identify and implement risk management and risk communication strategies and actions that protect human health and can be undertaken at national and local levels.

4.7 Other environmental issues

Environmental health risks to children

Children are particularly vulnerable to environmental hazards because they consume more food, air and water than adults in proportion to their weight. Their immune, reproductive, digestive and central nervous systems are still developing and they spend their time closer to the ground where dust and chemicals accumulate. Exposure to environmental risks at early stages of development can lead to irreversible long-term, often lifelong, mental and physical damage.

Priority environmental risks that must be tackled, particularly in developing countries, include unsafe water, lack of hygiene, poor sanitation, indoor air pollution, vector-borne diseases, chemical exposure and unintentional injuries. These risk factors cause the bulk of environmentally related diseases, disability and deaths among children and undermine their development.

The global initiative on Healthy Environments for Children launched at the World Summit on Sustainable Development in Johannesburg, South Africa, in 2002, brought together governments and nongovernmental and international organizations to form the Healthy Environments for Children Alliance in order to galvanize worldwide action on some of the major environmentally related risks to children's health. The alliance intends to be inclusive, participatory and action-oriented, bringing change to settings where children live, learn and play by providing knowledge, increasing coordination, enhancing political will and mobilizing resources.

In the Asia Pacific Region a number of initiatives have been undertaken, including advocacy work, such as the development of education materials at national levels (e.g. a guide for teachers on health effects of environmental factors, or a game for schoolchildren) and the networking of stakeholders to generate political will and coordinate intersectoral action on children's environmental health. Research projects were also initiated to study both exposure sources and health outcomes of priority environmental risks to children's health. In Mongolia and Nepal, indoor air pollution in winter was studied while settings approaches were applied to water, sanitation and unintentional injury issues in villages in

Samoa. Schoolchildren were trained to assess water quality in the highly polluted waters of the Ganges river in Kanpur, India, and presented their findings to local politicians. Indian schoolchildren collaboratively developed a CD-ROM-based educational game on environmental health (Box 4.9).

Box 4.9: CD-ROM-based educational game on environmental health

The objective of the game is to increase environmental awareness. The information package on various environmental issues is presented in an enjoyable and challenging manner that follows the "play way" principle of learning. The game intends to help children understand various environmental problems and also introduce possible solutions. The CD-ROM is available at http://www.searo.who.int/en/Section23/Section1671_7505.htm

Emergencies and environmental health risks

The December 2004 tsunami and earthquake affected 82 health facilities in Sri Lanka and 180 in Indonesia.[64] The management of medical wastes became an urgent issue. There were isolated reports of industrial and agricultural chemical leakage, as well as a spill of radioactive material from a destroyed cement factory in Banda Aceh province in Indonesia. Sri Lanka reported that of the hundreds of environmental samples analysed no toxic substance exceeded WHO recommendations, but investigations continue.

A huge environmental challenge arose from accumulated pharmaceutical wastes from post-tsunami donations in Banda Aceh, the earthquake stricken Yogyakarta area of Indonesia, and other tsunami-struck countries such as Sri Lanka where several hundred, if not thousands, of tonnes of outdated drugs were stored in poor conditions. The introduction of these substandard drug stocks for sale to an unwary public, environmental pollution from leakage into soil and groundwater, and the release of potentially toxic gases into the atmosphere from poorly monitored incineration, create grave public health risks (Box 4.10).

Box 4.10: Post-tsunami donations of outdated pharmaceuticals in Banda Aceh province, Indonesia

After the tsunami of 26 December 2004, international aid was rapidly mobilized from around the world. It included shipments of large quantities of pharmaceuticals for immediate and medium-term health-care needs.

As is common in emergency situations, there was little opportunity to coordinate needs with appropriate supplies. With poor local infrastructure, some pharmaceuticals were sent directly to hospitals and clinics or a central storage depot while some were mixed with other goods and had to be later separated and redirected.

By early 2006, outdated or obsolete pharmaceuticals had accumulated in estimated quantities of between several hundred to 6000 tonnes, and volumes have continued to increase as aid containers cleared customs.

Source: *Sound management of hazardous wastes from health care and from agriculture.* Report of the Joint WHO and FAO Regional Workshop, Jakarta, Indonesia, 26-29 June 2006. New Delhi, WHO Regional Office for South-East Asia.

The experience related in Box 4.10 is not unique. A WHO-supported survey was carried out in May 2006 by Pharmaciens Sans Frontieres and the provincial health authorities DEPKES/DINKES/FDA Indonesia. Pharmaciens Sans Frontieres found that out of more than 4000 tonnes of drugs

received for a population of two million, 60% were not on the national list of essential drugs, 70% were labelled in foreign languages and 25% had *inadequate expiry dates*. Some drugs arrived in excessive amounts, meeting the needs of the entire Indonesian population for 10 years. Over 30 tonnes of drugs were stored in unsecured places, courtyards or open sheds, with 84% of surveyed facilities inappropriate for storing perishable goods.[65]

Another survey was conducted on Nias Island, Indonesia, which was struck by an earthquake in March 2004 and a tsunami in 2005. Of an estimated 500 tonnes of donated drugs, 200 tonnes were found to be useless and 150 tonnes were segregated, recollected and stored in temporary shelters before being incinerated at a cement factory at a disposal cost of US$ 1000 per tonne.[66]

Of the 160 tonnes of post-tsunami donated pharmaceuticals found to be inadequate in Sri Lanka, 100 tonnes have already been destroyed.[67]

Radiation

Radiation is a natural part of the environment, with radioactive sources in the soil, water and air contributing to our exposure to ionizing radiation. Man-made sources include mining, power generation, nuclear medicine, consumer products, and military and industrial applications. Environmental radioactive pollution has resulted from nuclear weapons testing, nuclear waste disposal and accidents at nuclear power plants, as well as from transportation, storage, loss and misuse of radioactive sources. The benefits of nuclear applications in medicine, industry and science are well established and it is crucial that such benefits far outweigh known risks through safe usage, transportation and storage.

Nuclear weapons testing has been carried out in the Asia Pacific Region, including China and India. Accidents at nuclear power plants pose a potential threat to human health and safety. Four countries in the Region have 103 operational nuclear power reactors (Table 4.11).

Table 4.11 Nuclear power reactors in operation and under construction in Asia Pacific Region, as of January 2008

Country	No. of units in operation	No. of units under construction
China	11	5
India	17	6
Japan	55	1
Republic of Korea	20	3

Source: International Atomic Energy Agency Power Reactor Information System. Available from: http://www.iaea.org/programmes/a2

A global network of 12 international agencies respond to major radiation accidents through the implementation of the Joint Radiation Emergency Management Plan, coordinated by the International Atomic Energy Agency (IAEA). WHO participates in this initiative, and provides assistance in medical response as well as preparedness for accidental exposures to ionizing radiation through another global network, the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN). Coordinated at WHO headquarters in Geneva, REMPAN involves the participation of WHO regional offices and 35 worldwide radiation health institutions. In the Region, there are eight such institutions in China, India, Japan and the Republic of Korea (Table 4.12).

Table 4.12 REMPAN collaborating centres and liaison institutes in the Region

Country	No.	REMPAN collaborating centre (CC) and liaison institute (LI)
China	2	Chinese Centre for Medical Response to Radiation Emergency, Beijing (LI)
		Beijing Institute of Radiation Medicine (LI)
India	1	Bhabha Atomic Research Centre (LI)
Japan	3	Radiation Effects Research Foundation – Hiroshima Atomic Research Institute (CC)
		Nagasaki University (CC)
		Research Centre for Radiation Emergency Medicine, National Institute of Radiological Sciences, Chiba (LI)
Republic of Korea	2	National Radiation Emergency Medical Centre, Korea Institute of Radiological and Medical Sciences, Seoul (LI)
		Radiation Health Research Institute, Korea Hydro and Nuclear Power, Seoul (LI)

Source: WHO/REMPAN collaborating centres and liaison institutes. Geneva, World Health Organization. Available from: http://www.who.int/ionizing_radiation/a_e/rempan/en/index.html

Electromagnetic fields

Electromagnetic fields (EMF) represent one of the most widespread and fastest-growing concerns among various radiation sources. Almost everyone is now exposed to varying degrees of EMF, and levels will continue to rise as technology advances. Radio, television, radar and cellular telephone antennas, and microwave ovens are among the most common radio frequency fields. Scientific evidence does not indicate any adverse health effects under normal exposure conditions and many study results are inconclusive. In response to growing public health concern over possible health effects from exposure to an increasing number and diversity of EMF sources, WHO launched a global EMF project in 1996 involving national authorities from around the world. From the Asia Pacific Region Australia, China, Japan, Malaysia, New Zealand, the Philippines, the Republic of Korea, Singapore and Thailand participated in the project. Several countries in the Region have also developed regulations, standards and guidelines for the protection of the public from exposures to EMF. These include Australia, China, Japan, New Zealand, the Philippines, the Republic of Korea and Singapore.

Ultraviolet radiation

Ultraviolet (UV) radiation is part of the electromagnetic spectrum emitted by the sun. Whereas UVC rays (wavelengths of 100–280 nm) are absorbed by atmospheric ozone, most radiation in the UVA range (315–400 nm) and about 10% of UVB rays (280–315 nm) reach the earth's surface. Both UVA and UVB are of major importance to human health. Small amounts of UV are essential for the production of vitamin D, yet overexposure can result in acute and chronic health effects on the skin, eye and immune system. The number of deaths due to UV radiation-related diseases (i.e. malignant melanoma and skin carcinoma) in the Asia Pacific Region was estimated to be around 17 000 in 2000, while the burden of disease attributable to UV radiation exposure in the Region was an estimated 520 000 DALYs lost.[68]

In order to minimize the health impact of UV radiation exposure, WHO in collaboration with the United Nations Environment Programme, the World Meteorological Organization, the International Agency for Research on Cancer and the International Commission on Non-Ionizing Radiation Protection implemented a global programme called INTERSUN. The Australian Radiation Protection and Nuclear Safety Agency and the Cancer Council, Victoria, participate in INTERSUN, which aims to provide information, practical advice and sound scientific predictions on the health impact and environmental effects of UV exposure. Countries are encouraged to take action to reduce UV-induced health risks and offer guidance to national authorities and other agencies about effective sun awareness programmes. An easy-to-use UV Index was developed along with information on simple protection measures against excess UV exposure such as covering of the hands and legs, wearing of sunglasses, use of sunscreen and avoiding the midday sun.

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Section B

The Regional Health Situation

5

Mortality

Introduction

The mortality level in a population is an important indicator of its health and well-being. Summary measures of mortality conditions like life expectancy at birth or infant mortality rate have long been used as measures of socioeconomic development, or as indices of the quality of life. Mortality data by age and sex, as well as mortality trends over time provide key insights into the health status of populations and are important inputs in the planning and implementation of preventive measures. Cause-of-death statistics are used in evaluating programme effectiveness, deciding health priorities, and for health policy and programme development.

This chapter presents levels and trends in infant, child, adult and maternal mortality in the Asia Pacific Region's countries and areas. Causes of deaths for various age groups are likewise presented. The last section presents comparative data on two summary measures of mortality: life expectancy at birth and health-adjusted life expectancy (HALE).

While the worldwide trend towards increasing life expectancy and declining mortality has also been observed in the Region, there are still very large disparities in the health and mortality levels among countries. Moreover, countries are in different stages of development in the collection, measurement and utilization of mortality statistics, with a very wide variability in the quality and timeliness of mortality data being generated. These situations pose a major challenge in making evidence-based decisions, such as the prioritization of health interventions and allocation of resources based on mortality indicators.

The 48 Member countries and areas in the Region have been classified according to mortality strata, based on the classification used in *The world health report 2004*. While the original classification scheme consists of five strata according to levels of child and adult mortality, countries and areas in the Region belong to only three strata: Stratum A (very low child and adult mortality); Stratum B (low child

and adult mortality); and Stratum D (high child and adult mortality). A little over half (52.1%) of the countries and areas in the Region belong to mortality stratum B while only five qualified to be part of Stratum A. These are shown in Table 5.1. The countries and areas categorized as residual in the table are those which were not included in the original list.

Table 5.1 List of countries in the Region in different mortality strata

A.	**Very low child and very low adult mortality countries:** Australia, Brunei Darussalam, Japan, New Zealand, Singapore
B.	**Low child and low adult mortality countries:** Cambodia, China, Cook Islands, Federated States of Micronesia, Fiji, Indonesia, Kiribati, Lao People's Democratic Republic, Malaysia, the Marshall Islands, Mongolia, Nauru, Niue, Palau, Papua New Guinea, the Philippines, the Republic of Korea, Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam
C.	**Low child and high adult mortality countries:** None
D.	**High child and high adult mortality countries:** Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, Nepal, Timor-Leste
E.	**High child and very high adult mortality countries:** None
Residual: American Samoa, French Polynesia, Guam, New Caledonia, the Commonwealth of the Northern Mariana Islands, the Pitcairn Islands, Tokelau, Wallis and Futuna. Hong Kong (China) and Macao (China) not listed.	

Source: *The world health report 2004: changing history.* Geneva, World Health Organization, 2004: 157.

5.1 Perinatal and neonatal mortality: tracing the invisible

Mortality in young children is customarily measured by perinatal, neonatal, infant and under-five mortality rates. These have significance in terms of typical causes of death but they do not define non-overlapping periods of life.

The perinatal period is from 28 weeks of gestation to one week of life and the neonatal period is from birth to four weeks of life. The infancy period includes neonatal and postneonatal periods, and the under-five period includes the infancy period and the age range that is generally stated as 1–4 years of age.

Due partly to the emphasis on child mortality by *Health for All by 2000* and now the Millennium Development Goals (MDGs), mortality levels during various phases of childhood are now much more precisely known than adult mortality levels. However, the magnitude of mortality in children, particularly during perinatal and neonatal periods, is still not fully known for many developing countries, and even less known is the mortality profile. Aetiologically more important is the initial period—the neonatal, late gestational (28 weeks or more) and early neonatal period (up to seven days of life). This period escaped attention until recently when global efforts were initiated to trace these "invisible" deaths.

Stillbirths

Data on stillbirths are generally unreliable. The official estimate of stillbirth rate for India for the year 2000 is 8 per 1000 total births but the WHO estimate is 39 (Annex Table 5.1), a difference that could cast doubt on both estimates.[1] The estimated 3.3 to 4 million stillbirths that occur globally each year represents a ratio of 1 stillbirth for every 33 live births globally.[2] In about 25% of stillbirths in less developed countries, death occurs shortly before birth and most arise from complications of delivery.[3]

Intrapartum care may save some stillbirths, but some of these weak newborns may additionally contribute to neonatal deaths. Thus both should be tracked together in terms of perinatal mortality.

Perinatal mortality

The neonatal period extends from the time of birth to 28 days. The first week of life is called early neonatal, and 8 to 28 days the late neonatal, period. Early neonatal deaths plus stillbirths comprise perinatal mortality.

More than one in five deaths under five years of age occurs during the first week of life.[4] Some 25% to 45% of all neonatal deaths occur in the first 24 hours.[5]

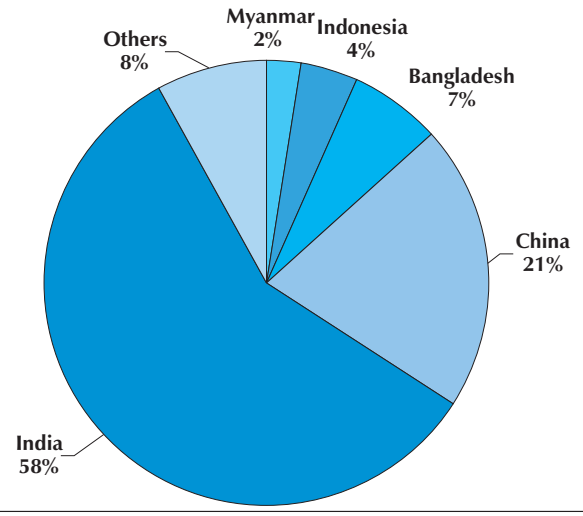
A significant component of perinatal mortality is intrapartum deaths—babies dying during labour. Systematic global or regional estimates are not available, but a meta-review estimated 1.02 million intrapartum stillbirths and 0.90 million intrapartum neonatal deaths annually worldwide.[6] Causes of such deaths are not fully ascribed but birth asphyxia is recognized as a major cause. Intrapartum causes are difficult to distinguish from prematurity.

The 2000 estimate for perinatal mortality in the Region is 3.3 million, about half the world's total, and India's contribution is more than half of the regional total (Figure 5.1). Other major contributors are China, Bangladesh and Indonesia.[7]

Early neonatal health is inextricably mixed with maternal health, discussed separately in this report (Chapter 9). Care during the period of labour and the first week following birth is critical to save lives. But many births occur at home with no formal contact with the health-care system, so there is a need to take intrapartum care to the doorstep of the needy.

Some potent interventions are readily available for reducing perinatal mortality. Maternal nutrition and control of anaemia has cross-cutting implications that extend from childhood to adulthood. Another very cost-effective intervention is immunization of antenatal women

Fig. 5.1 Percentage of total perinatal deaths according to country, 2000



Total perinatal deaths in the Region during the year 2000: 3.3 million

Source: Calculations based on rates in Annex Table 5.2

against tetanus. Increased spacing between births can also help. In Indonesia, perinatal mortality rate is 50 per 1000 total births when the birth interval is less than 15 months, versus only 14 for a birth interval of 15–26 months.

Providing professional care at childbirth (see Chapter 9) can help reduce intrapartum stillbirths, intrapartum-related neonatal deaths and maternal deaths. Attending 67 million births annually (including stillbirths) in this Region is a challenge to national health systems. Most of these interventions do not require high technology, just life-saving knowledge translated into simple steps that can be followed by a skilled attendant.

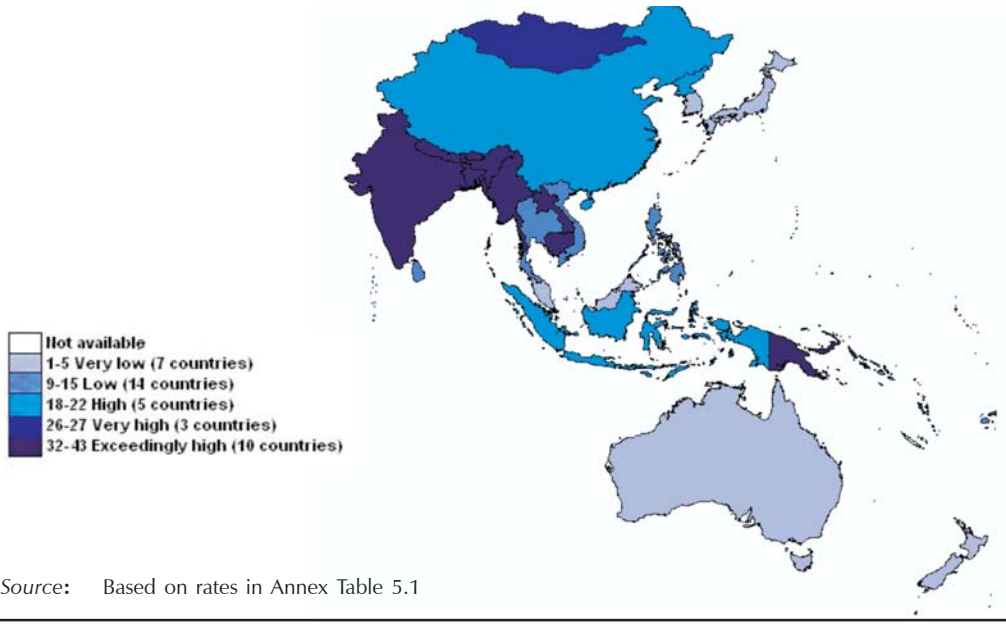
Neonatal mortality

Nearly four million neonatal deaths occur worldwide every year, nearly all in developing countries, representing 38% of all deaths below age five.[9] Nearly 2 million neonatal deaths occur in the Asia Pacific Region countries of Bangladesh, Cambodia, China, India, Indonesia and Myanmar. The ratio of early to late neonatal deaths is more than 3:1.

Estimates of neonatal mortality rate for the year 2000 for countries of the Region are given in Annex Table 5.1. The rate is intolerably high in countries such as India, reaching 43 per 1000 live births.

Variation across countries in the Region is very large. All such inequalities are unjust but this huge differential highlights the extent to which the rate can be brought down with sufficient effort. The data pattern for neonatal mortality across countries suggests five natural classes for the 48 countries and areas in the Region (Figure 5.2). Bangladesh, Bhutan, Cambodia, India, the Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Papua New Guinea and Timor-Leste have extremely high neonatal mortality rates. China, the Democratic People's Republic of Korea, Indonesia, Tuvalu and Vanuatu have high rates. Australia, Brunei Darussalam, Japan, the Republic of Korea, Malaysia, New Zealand and Singapore are among countries with relatively very low neonatal mortality rates. Appropriate strategies for reducing the rate will depend on the current rate.

Fig. 5.2 Neonatal mortality rates in the Asia Pacific Region, 2000



Source: Based on rates in Annex Table 5.1

Between 1980 and 2000, global child mortality after the first month of life fell by a third but neonatal mortality rate fell only by about a quarter.[10] WHO's South-East Asia and Western Pacific Regions achieved 21% and 39% reduction respectively. The largest reduction has been in Japan, Malaysia and the Republic of Korea where the neonatal mortality rate was already less than 5%. In Indonesia this rate fell by 50%, in Bangladesh by 40%, but in India by only 11%.[11]

Neonatal deaths often go undocumented, which in turn leads to inaction. Preventing deaths in newborns has not been a focus of maternal and child health programmes. Four million neonatal deaths worldwide are double that of HIV/AIDS deaths at all ages combined, but they have largely been ignored until recently.

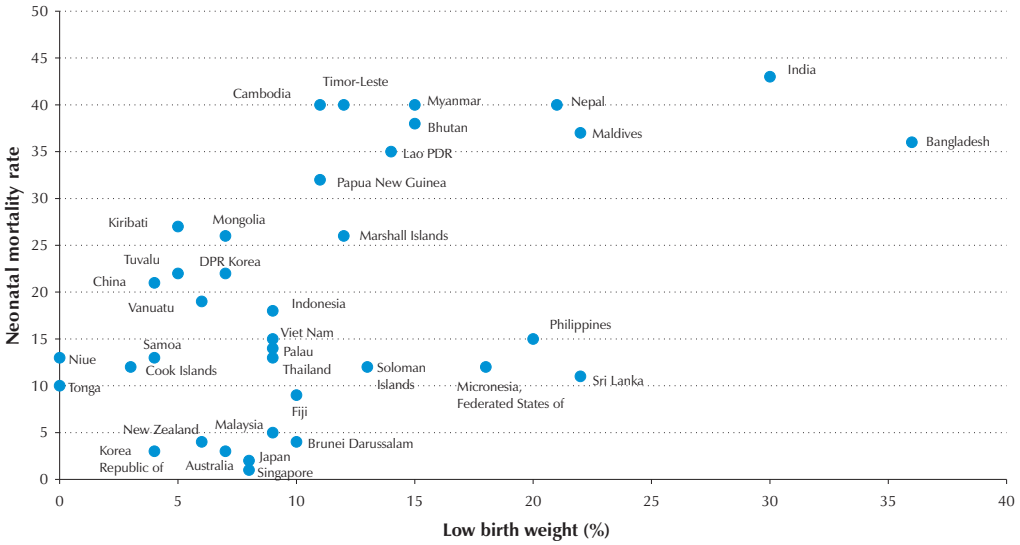
Causes of neonatal deaths

Death of a newborn is distressing for the mother and the family and sometimes leads to a replacement attempt that causes further harm to the woman's body. Causes of neonatal deaths have not been fully investigated and the recording of causes is generally inaccurate. This occurs primarily due to lack of understanding of the exact causes of death in this earliest phase of life. For example, Australia reported "certain conditions originating in the perinatal period" as the dominant cause of neonatal deaths.[12]

The main direct causes of neonatal deaths globally are pre-term births, severe infections, asphyxia and neonatal tetanus.[13] Calculations indicate that this is also true for the Asia Pacific Region, but the percentages are somewhat different.[14] In low neonatal mortality rate countries, the dominant cause is pre-term births; whereas in high neonatal mortality rate countries severe infections, including diarrhoea, are equally common causes. Most of these are preventable by simple measures, such as proper antenatal and natal care.

Low birth weight is an underlying cause of many neonatal deaths. A relationship between the percentage of low birth weight and neonatal mortality rate is evident in Figure 5.3. In general, there is a direct relationship between low birth weight and neonatal mortality, with countries having a high percentage of children with low birth weight also having high neonatal mortality rates.

Fig. 5.3 Relationship between percentage of low birth weight and neonatal mortality rate in countries of the Asia Pacific Region, 2000



Source for neonatal mortality rate: *The world health report 2005: making every mother and child count*. Geneva, World Health Organization, 2006.

Source for percentage with low birth weight: State of the world's children 2006: excluded and invisible. New York, United Nations Children's Fund, 2005.

Pre-term deliveries are common and carry their own risks. Causes of pre-term deliveries are not fully known. Antepartum haemorrhage and pregnancy induced hypertension can trigger pre-term births. Reasons such as multiple births and abnormality of placenta and foetal membranes are rarely amenable to intervention, as are work stress and pregnancy in adolescence. Ascending infection from vagina to the cervix and foetal membranes can be controlled when detected during antenatal check-ups. Maternal nutrition depletion is also discussed as a possible cause that can be easily tackled with existing knowledge.

Strategies to bolster efforts to control neonatal deaths, if not commonplace, are nonetheless easy to identify. Controlling infections and improving nutrition during the antenatal period is most important, followed by intrapartum care by a skilled worker. Birth spacing also allows the mother to recuperate.

5.2 Infant mortality: saving the young

Substantial augmentation of efforts is required on sustainable basis to minimize the avoidable tragedy of infant deaths. The world's average is 54 per 1000 live births and the average for 37 countries in the Asia Pacific Region is 45 per 1000 live births (median is 27).[15] Country rates for the years 2000 and 2004 are given in Annex Table 5.3. At least 10 countries (information is not available for some) out of 48 have infant mortality rates of 50 per 1000 live births or more (Table 5.2). These countries require a special scale-up in efforts to control this menace. Advocacy, communication and social mobilization can provide substantial help.

With infant mortality rates ranging from 3 per 1000 live births in Japan to 97 in Cambodia, a ratio of 1:32, the inequalities are enormous. Infant mortality rate is more sensitive to public health efforts and the high variation is an indication of the variation in these efforts.

Table 5.2 Classification of countries by infant mortality rate (IMR), 2004

IMR (per 1000 live births)	Countries	Number of countries
≥50	Bangladesh, Bhutan, Cambodia, India, the Lao People's Democratic Republic, the Marshall Islands, Myanmar, Nepal, Papua New Guinea, Timor-Leste	10
30-49	The Democratic People's Republic of Korea, Indonesia, Kiribati, Maldives, Mongolia, Solomon Islands, Tuvalu, Vanuatu	8
10-29	China, Cook Islands, Fiji, Malaysia, the Federated States of Micronesia, Nauru, Palau, the Philippines, Samoa, Sri Lanka, Thailand, Tonga, Viet Nam	13
≤9	Australia, Brunei Darussalam, Japan, the Republic of Korea, New Zealand, Singapore	6
No information	American Samoa, French Polynesia, Guam, Hong Kong (China), Macao (China), the Commonwealth of the Northern Mariana Islands, New Caledonia, Niue, the Pitcairn Islands, Tokelau, Wallis and Futuna	11

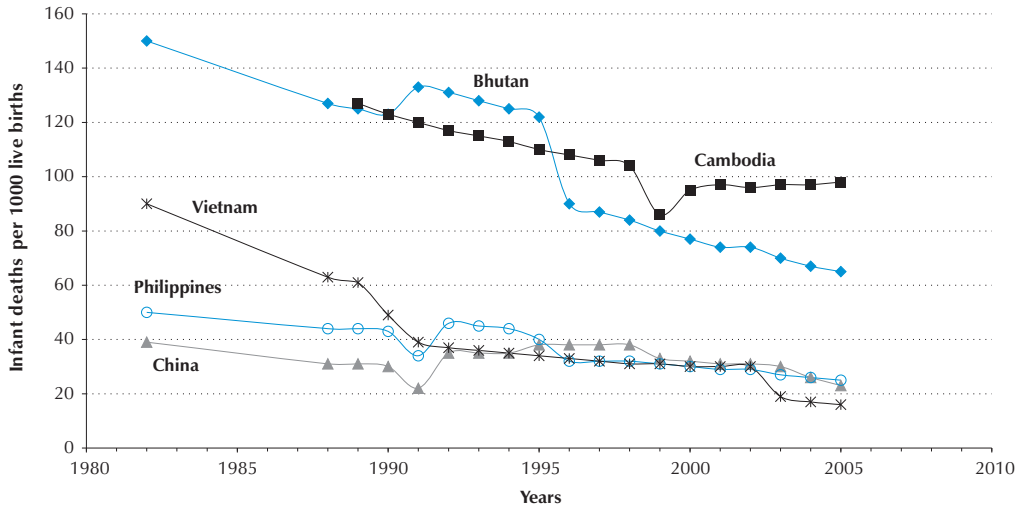
Sources: *State of the world's children 2002: leadership.* New York, United Nations Children's Fund, 2001.
State of the world's children 2006: excluded and invisible. New York, United Nations Children's Fund, 2005.
The world health report 2006: working together for health. Geneva, World Health Organization, 2006

Trends in infant mortality rate

Infant mortality is declining around the world and in the Asia Pacific Region. Infant mortality rates (IMR) from 1982 to 2005 in various countries of the Region are shown in Annex Table 5.4. The figures for IMR across years and among countries may not be directly comparable with respect to data sources and methods of estimation, therefore, care should be taken in comparing and interpreting the values presented.

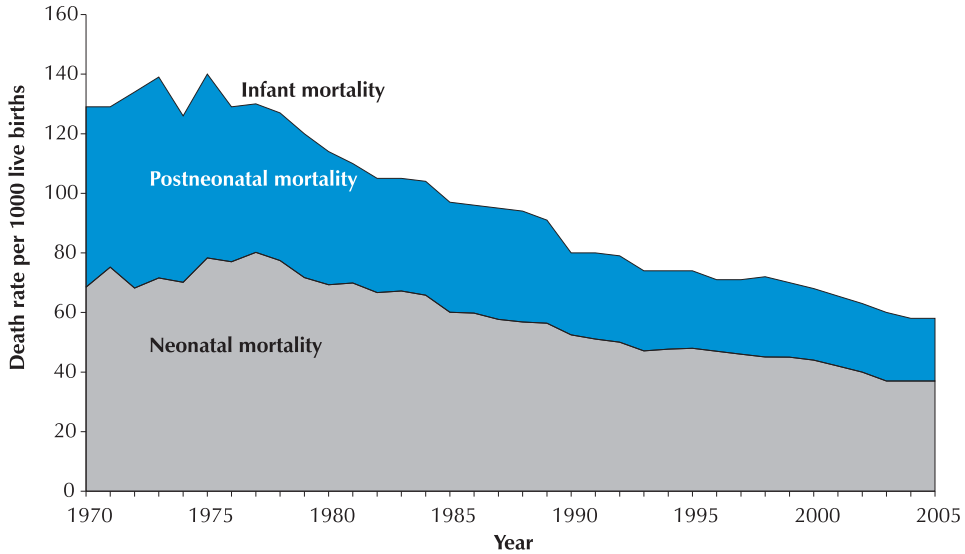
Based on the data presented in Annex Table 5.4, some countries have shown tremendous improvement in their IMR while others have been mediocre (Figure 5.4). Bangladesh, Bhutan, India, Indonesia, Malaysia, Maldives, Nepal, the Philippines, Sri Lanka and Thailand have reduced IMR by 50% or more during the 23 years between 1982 and 2005. Viet Nam and the Republic of Korea

Fig. 5.4 Infant mortality rate in selected countries, 1982–2003



Source: *State of the world's children (1985, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997.1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006)*. New York, United Nations Children's Fund

Fig. 5.5 Neonatal, post-neonatal and infant mortality rates in India, 1970–2002



Source: Sample Registration System. *Statistical report 1972 to 2002*. New Delhi, Registrar-General, 2003.

experienced a reduction of more than three fourths from 90 and 30 per 1000 live births in 1982 to 16 and 5 per 1000 live births in 2005, respectively. Countries with low levels—Australia, Japan, New Zealand and Singapore—have also reduced IMR by 50% or so during this period.

Post-neonatal deaths

The 11-month post-neonatal period accounts for 38% of infant mortality in the Region. Factors such as the health of mothers, intrapartum care, birth weight and gestation period continue to be important determinants of deaths in the post-neonatal period. The main causes of post-neonatal deaths in developing countries are diarrhoea and pneumonia. Oral rehydration therapy is a cheap and effective way to tackle diarrhoea. For pneumonia, early detection and medical care are valid options for reducing the risk of death but prevention by improved nutrition and increased breastfeeding remains the strategy of choice, although a vaccine is also available.

5.3 Under-five mortality: Millennium Development Goal 4

The proportion of children surviving to age five is considered a sensitive indicator of the development and well-being of a population. Survival to this age does not depend only on nutrition and health services but also on attitude, culture, education and income levels.

In 1950–1955, almost a quarter (224 per 1000) of all children born worldwide did not reach their fifth birthday. This declined to 80 per 1000 in the year 2003.[16] Target 5, under Millennium Development Goal (MDG) 4, calls for reducing by two thirds, between 1990 and 2015, the under-five mortality rate.

The under-five mortality rates for the Region are given in Annex Table 5.3. These are estimates based on previous trends, adjustments and models. The uncertainty intervals for these estimates are also given, and confirm that countries with higher mortality have less reliable information.

Gender and geographical disparities

The median under-five mortality rate in 2004 for female children in this Region was 32 per 1000 live births, but 40.5 per 1000 live births for male children. This is a 21% difference between the sexes, and one of the few indicators where females score better than males. However, countries such as China, India, Nepal, the Republic of Korea and Tuvalu defy this pattern with under-five mortality rates for female children being higher. The listing of countries according to patterns of sex differentials in under-five mortality rates is shown in Table 5.3.

Besides gender differentials, inequalities across countries are perturbing. Among countries of this Region, Australia, Japan, New Zealand, the Republic of Korea, and Singapore have under-five mortality rates of ≤ 7 per 1000 live births, but Cambodia and Myanmar have 105 or more. The 2004 under-five mortality rates for all countries and areas in this Region are presented in Annex Table 5.3.

Trends and progress towards Millennium Development Goal 4

Target 5 of MDG Goal 4 stipulates an under-five mortality rate in 2015 of one third the level of that in 1990. What are the prospects for achieving this target? Remarkably, mortality has been reduced by nearly half during the second half of the 20th century. But most of this reduction pertains to the period after the first four weeks of life with very little reduction in the neonatal period. A substantial reduction in neonatal deaths is needed to meet Target 5.

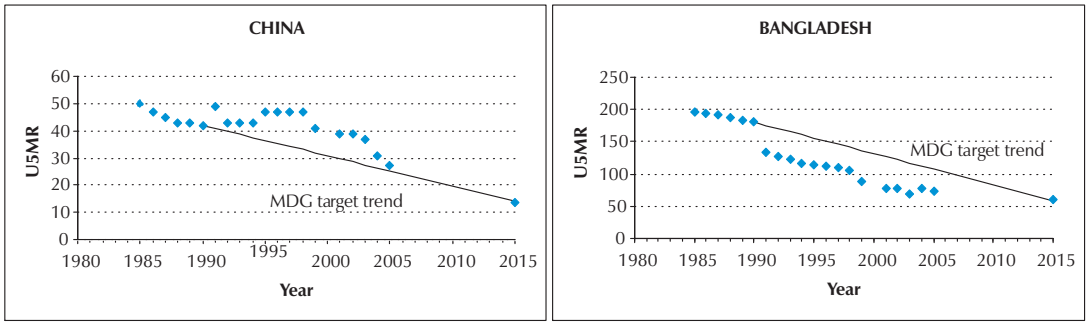
Table 5.3 Countries with negative, positive and almost no gender differential in under-five mortality rate, 2004

Under-five mortality rate in females higher (≥2 per 1000 live births) than males (5 countries)	Under-five mortality rate in females nearly equal to males (<2 and >–2 per 1000 live births) (7 countries)	Under-five mortality rate in females lower (≤–2 per 1000 live births) than males (26 countries)
China, India, the Republic of Korea, Nepal, Tuvalu	Australia, Bhutan, Japan, New Zealand, Palau, Singapore, Vanuatu	Bangladesh, Brunei Darussalam, Cambodia, Cook Islands, Fiji, Indonesia, Kiribati, the Democratic People's Republic of Korea, the Lao People's Democratic Republic, Malaysia, Maldives, the Marshall Islands, the Federated States of Micronesia, Mongolia, Myanmar, Nauru, Niue, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tonga, Viet Nam

Source: Annex Table 5.3

Future projections (Figure 5.6) show that if the present trend continues, Bangladesh may exceed Target 5 but China may lag behind it. Projections assume that no additional efforts are made and the previous trend will continue till 2015, but in many countries extra efforts and resources will be needed to achieve reductions in child mortality levels. The chance of reaching the MDG target for under-five mortality seems remote for many countries unless extra efforts are made. This assumes that intensive efforts can produce at most a 10% additional rate of decline per year over what has been achieved so far.

Fig. 5.6 Present trend in under-five mortality rate in China and Bangladesh, and the trend required to reach Target 5 of Millennium Development Goal 4



Sources: United Nations Children's Fund. Information by country (China 1990, China 2005 and Bangladesh 2005). Available from: http://www.unicef.org/infobycountry/index.html

State of the world's children (1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 001, 2003, 2004, 2006). New York, United Nations Children's Fund.

Box 5.1: Health inequalities are injurious to health

Health organizations have long been concerned about enormous inequalities that exist across countries and across segments of populations at the subnational level. *The world health report 1995* was subtitled Bridging the Gap and *The world health report 1999* produced several health indicators for the poor and non-poor in 46 developing countries. Despite such all-pervasive efforts, there is little evidence that the gap is closing and the inverse care law—good care is less accessible to the more needy—continues to prevail. Improvements are wide-ranging but developed countries are racing ahead leaving developing countries behind by ever bigger margins. Between 1970 and 2000, under-five mortality rates declined by more than 70% in high-income countries compared with a reduction of 40% in low-income countries.[17] At subnational levels, no country for which trend data are available managed to reduce inequalities while reducing child mortality.[18] The examples of China and Sri Lanka demonstrate that income is not the sole criteria for health disparities but it is the most commonly studied parameter in this context. The difference is indeed vast between the rates in the top and the bottom income quintile population in some countries as seen in the table below.

Comparison of under-five mortality rates by poorest and richest quintiles in selected countries

Country	Year	Under-five mortality rate		Ratio
		Poorest quintile	Richest quintile	
Bangladesh	2004	121.1	72.0	1.7
Cambodia	2000	154.8	63.6	2.4
India	1999	141.3	45.5	3.1
Indonesia	2003	77.0	22.0	3.5
Nepal	2001	129.9	67.7	1.9
Philippines	2003	66.0	21.0	3.1
Viet Nam	2002	66.2	28.6	2.3

Source: WHO Statistical Information System (WHOSIS). Available from: http://www.who.int/whosis/database/core/core_select_process.cfm?countries=all&indicators=child_mort

Inequity reflects the moral or ethical dimensions of inequality and this underscores the normative nature of disparities, whereas inequality is merely a quantitative expression of the heterogeneity, some of which may be beyond human control. Inequities arise from differential access to health requirements, such as nutrition, hygiene and medical care.

Are inequities detrimental to the interests of society? Any disparity is fundamentally unfair, but people in poor health may have to consistently live in fear, anxiety and insecurity. Inequalities work to the disadvantage of the worse-off. Those deprived are swept up in a vicious cycle of undernutrition, infection, disability and low wages. Inequalities are injurious to health. Efforts exerted by countries to address the MDGs are often hampered through ineffectiveness in dealing with inequities. Societies with fewer inequities perhaps make faster progress. Improvements in average levels of health not accompanied by lowered inequities are insufficient to generate human capital and accumulate sustainable development.[19] Thus, in the long run, health inequity affects all, not just the deprived.

Real progress will depend on achievements made by the poorest people in the highest mortality countries. The WHO Commission on Macroeconomics and Health concluded that the greatest achievements can be made by focusing on the health of the poor and on the least developed countries. Equity must be a priority in health policy and mechanisms to ensure accountability. Equity must also be used to assess the success of various health programmes.

Previous trends suggest that mortality rates for the post-neonatal period and between ages 1–4 have limited scope of improvement. The focus now should be on early and late neonatal mortality that have defied improvement so far. One in three under-five deaths in the Region occurs during the first week of life. Knowledge, tools and resources are available to prevent these deaths.

5.4 Adult mortality

Undoubtedly, child mortality is the weakest link in the chain that determines the health trajectory of a nation but significant mortality during the long adult phase of life raises new and significant issues; and because of transition and ageing, interest in adult health is growing. The most productive phase of life is between the ages of 20 to 59 and a death during this period has profound economic and social ramifications for families.

Different methods are used in different countries to measure adult mortality. The example of China, which uses two parallel systems of mortality reporting, is presented in Box 5.2. Complete vital registration does not exist in many developing countries and accurate knowledge of the level of adult mortality is not available. Where vital registration is unreliable, surveys in which causes are assessed by verbal autopsy are sometimes used. Yet 17 of the 48 countries in the Region do not have recent data on cause of death.[20] Efforts are on to evaluate the completeness of registration systems, to investigate the quality of cause-of-death coding, and to develop and validate a standardized verbal autopsy reporting form.

Box 5.2: Mortality data system in China

China has two parallel systems that report mortality levels and causes: the Ministry of Health's Vital Registration (MOH-VR), and the Disease Surveillance Points (DSP) system. The vital registration system currently covers 41 urban and 85 rural centres, accounting for nearly 8% of the population. The reporting has significant bias because the quality is better in urban than rural areas, and also better in eastern than western regions.

The Disease Surveillance Points system is based on a nationally representative sample of 145 urban and rural sites, covering a total of 1% of the population. In both systems, certification of cause of institutional deaths in urban areas is done by the attending hospital, and in rural areas a verbal autopsy method is used to identify the cause of death. In the DSP system, completeness is periodically assessed and correction applied for under-reporting.

The two systems provide varying results. Age-standardized death rates differ. Protein and energy malnutrition and meningitis are among the leading causes of childhood mortality according to DSP, but appear in the list of 10 leading causes in the MOH-VR. There are differences in the proportion of deaths among older person for ischaemic heart disease. Such variations cause uncertainty over the true pattern of causes of death in China, and suggest the need to invest in improving data quality, perhaps by investigating how one system can complement the other in providing a complete and valid picture.

Sources: Rao C, *et al*. Evaluating national cause-of-death statistics: principles and application to the case of China. *Bulletin of the World Health Organization*, 2005, 83: 618-625.

Yang G, *et al*. Mortality registration and surveillance in China: history, current situation and challenges. *Population health metrics*, 2005, 3: 3.

Usable information available from 16 developing countries confirms a steady downward trend in adult mortality for both males and females. The probability of death in males between 15 and 59 years was 0.268 before 1970, but dropped to 0.196 in the 1990s, a decline of nearly 1% per annum. In females there was an average decline of nearly 2% per annum. [21]

There are also wide disparities in adult mortality, with the female probability of dying between ages 15 to 60 in 2004 ranging from 45 per 1000 females in Japan to 303 per 1000 in Nauru. Among males, the probability of dying between ages 15 to 60 for the same year ranged from 86 per 1000 males in Australia, to 448 per 1000 males in Nauru. Female adult mortality is lower than male mortality in all Asia Pacific Region countries except for Bangladesh and Tonga. The female advantage varies substantially. The female probability of adult death is less than half of the male probability in the Republic of Korea and Japan, but it is nearly equal in Nepal. These are shown in Annex Table 5.6.

Maternal mortality: Levels, trends and the Millennium Development Goal target

The enormous loss of life due to pregnancy and childbirth in developing countries is an avoidable tragedy. Every year nearly 600 000 women—more than one woman every minute—die globally from complications related to pregnancy and childbirth.[22] In realization of the importance of reducing maternal mortality, the Millennium Development Goals set a target (MDG Goal 5, Target 6) of reducing it by 2015 to three fourths of the 1990 level.

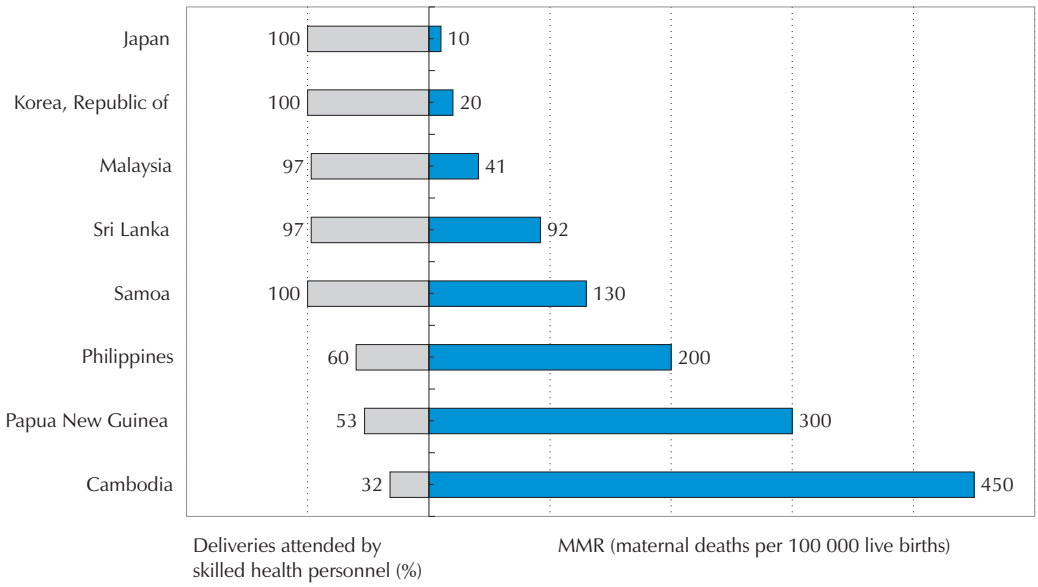
Death of a woman is called maternal when it is related to or aggravated by pregnancy or its management, and not caused by accidental or incidental conditions. For uniformity, deaths occurring during pregnancy or within 42 days of delivery are counted. Maternal mortality ratio (MMR) is measured per 100 000 live births.

Despite a clear definition of MMR, the measure actually used varies from country to country. A large number of such deaths go unreported, as many women do not access any health-care facility. Misclassification of events is common, with discrepancies between what is classified as a maternal death among all deaths to pregnant women being the biggest problem.

Annex Table 5.7 provides estimates of MMR for the Region's countries. Globally, more than half a million maternal deaths occurred in the year 2000, with an average ratio of nearly 400 per 100 000 live births.[23] Deaths in the Region are nearly 200 000 and the MMR is exceptionally high in Nepal (740), Timor-Leste (660), the Lao People's Democratic Republic (650), India (540) and Cambodia (450). As for most other indicators, inequalities are large and uncertainties for the estimates are especially large for this indicator in view of the complexities already mentioned.

Maternal mortality has declined considerably but progress is too slow to achieve the MDG target of 75% reduction by the year 2015. The MDG target seems unachievable by countries where rates are high. However, most medical causes of maternal mortality can be prevented by professional care during pregnancy and at the time of delivery. Malaysia and Sri Lanka have halved MMRs every 7 to 10 years with modest investments.[24] Besides improving maternal nutrition, provision of skilled birth attendants for home deliveries in the deprived segments is the key. Sri Lanka developed an institutional structure for deliveries and provided easy access that yielded results. There is an inverse relationship between MMR and the deliveries attended by skilled workers (Figure 5.7).

Fig. 5.7 Relationship between maternal mortality ratio and antenatal care coverage for selected countries, 2000



Source: *The world health report 2005: making every mother and child count*. Geneva, World Health Organization, 2005.

For maternal mortality ratio, Samoa: Estimates developed by WHO, UNICEF and UNFPA.

5.5 Leading causes

Death at any age is upsetting to individuals, families and society, and puts pressure on the health-care system to perform better. Be it in infancy or in old age, death is a byproduct of a large number of long- and short-term factors. Malnutrition and adverse lifestyle are basic problems that may have roots in ignorance rather than poverty. A lack of proper water supply and sanitation acts as a catalyst. Deficiencies in health services such as in immunization, maternal and child health services, and medical care, add to the risks.

Among the mortality indicators, cause-of-death statistics is one of the most highly problematic, especially for developing countries. Its collection, collation and analysis involve complex processes which are prone to errors at different levels. One of the major causes of this problem is the very low percentage of deaths which are medically attended in many developing countries, resulting in a high percentage of ill-defined causes of deaths. Large variations in procedures for death registration, within and across countries, lead to non-comparability of data being reported. The lack of training on procedures for death certification and the use of International Classification of Diseases results in a high degree of misclassification of causes of death.

Undernutrition and child mortality

Much effort has been directed at averting mortality in the post-neonatal period and in the 1–4 age group. These efforts were indeed successful and the mortality in these periods of life declined. The strategies included control and treatment of infection and improvement in child nutrition.

Low birth weight in developing countries occurs primarily because of poor maternal health and nutrition. Low birth weight is the single most important marker of adverse perinatal and neonatal outcome. Low birth weight data for the Region is in Figure 9.16, chapter 9.

More than half of all deaths in young children are attributable to undernutrition.[25] The deaths may apparently be due to diarrhoea, but the underlying cause in 61% of diarrhoeal deaths globally is undernutrition[26]: deaths attributed to other diseases also have their root in undernutrition. As the overall mortality level rises, the relative contribution of undernutrition to child deaths increases.

Leading causes of adult deaths

Computations of the death rates from the top 10 causes in the Region were done in the Global Burden of Disease 2002 project. The results for the whole Region and for each of the three mortality strata (very low mortality, low mortality and high mortality) are presented in Annex Tables 5.8, 5.9, 5.10 and 5.11 respectively. The results presented in these tables for the age group 15–59 are summarized in Table 5.4. In very low, and low mortality countries, the top cause is malignant neoplasms. This is true for both males and females. However, there is a difference between the sexes in the high mortality countries, with infectious and parasitic diseases being the top causes of death among males. Among females, it is cardiovascular diseases and infectious and parasitic diseases.

Table 5.4 Top two highest age-cause specific death rate (deaths per million population) in the age group 15–59 years, according to sex and mortality stratum of countries, 2002

Sex	Mortality stratum			All strata
	A. Very low mortality*	B. Low mortality*	D. High mortality*	
Male	Malignant neoplasms (70.4) Cardiovascular diseases (51.2)	Malignant neoplasms (78.0) Unintentional injuries (67.4)	Infectious and parasitic diseases (169.9) Cardiovascular diseases (120.7)	Infectious and parasitic diseases (94.0) Cardiovascular diseases (86.4)
Female	Malignant neoplasms (54.1) Cardiovascular diseases (18.9)	Malignant neoplasms (53.8) Cardiovascular diseases (46.6)	Cardiovascular diseases (87.2) Infectious and parasitic diseases (87.0)	Cardiovascular diseases (60.1) Malignant neoplasms (49.8)

* Both child and adult mortality

Note: There is no C stratum countries in this Region

Source: Calculations based on *Global burden of disease*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhosubregionmortality2002.xls

Situations in individual countries can be very different. For example, in Myanmar the topmost cause for all ages is malaria, which was responsible for 7.7% of the deaths in 2004. This is nearly twice the share of the next cause, which is other diseases of the respiratory system (3.9%).[27] In Japan, the profile is completely different. In 2005, the top causes were malignant neoplasms, heart disease and cerebrovascular disease. Deaths from malignant neoplasms are more common in males, while deaths from heart and cerebrovascular diseases are almost equal among females and males. Deaths from suicides are more common in males than females.[28]

Although most interventions to control child and maternal mortality would be applicable to many developing countries, adult mortality reduction is not nearly as universal. The strategies against adult mortality have to be country-specific.

The epidemiological transition replaces communicable diseases with noncommunicable diseases, and early deaths by late deaths. There can be no controversy regarding postponing all deaths as much as possible, but there are questions regarding the causes of death and its implications.[29] Among noncommunicable diseases, sudden death by acute myocardial infarction, stroke or injury has different implications than slow death by cancer, diabetes or respiratory disease. The former entails short suffering to the individual and possibly to the family, and less burden on the health care establishment, but gives no opportunity for the individual and the family to spend time together and prepare to face the inevitable. Death after protracted illness has reverse implications.

Risk factors and mortality

Risk is inherently uncertain and thus difficult to evaluate. Concepts such as attributable risk are used to delineate the role of risk factors in causation of adverse conditions, realizing that a factor rarely works in isolation and requires the presence of others to trigger the onset.

Malnutrition, lifestyle and environment can be hypothesized as the main underlying risk factors causing much of premature mortality. More than a quarter of deaths globally can be ascribed to nutrition-related risks such as high blood pressure, high cholesterol, obesity, and low fruit and vegetable intake.[30] Tobacco use and being underweight are the other major risks.

In the Asia Pacific Region the highest percentage of deaths among males is attributable to tobacco. This is true for all three strata of countries based on mortality levels. Undernutrition is a major risk factor in high mortality level (Stratum D) countries. A surprisingly high percentage of deaths in high mortality countries are due to conditions such as high blood pressure and high cholesterol, even surpassing undernutrition. These are shown in Annex Table 5.12. These results are based on a series of assumptions and thus extreme caution should be exercised in interpreting these findings. They should be continuously challenged, evaluated and replaced by facts, as they become available. Focus must remain on preventive and promotive measures that can be applied to the population, rather than to individuals.

Reducing risk and risk factors requires social changes that are difficult to communicate and even more difficult to present in a convincing manner to large populations. Mass media can influence risk perception through an anecdotal approach. They can help reduce the gap between the experts and the public. Awareness against HIV/AIDS in some countries is an example of the significance of the media in controlling a disease. Similar efforts must be initiated to spread the message about major risk factors.

5.6 Life expectancy and health-adjusted life expectancy: the health gap

Life expectancy at birth for a population cohort can be understood as the average number of years that a child born in the year is expected to live when exposed to the prevailing risks of death at various ages. It reflects and summarizes the current age-specific death rates that in turn depend on the mortality profile. Life expectancy at birth is considered as a comprehensive measure of mortality, and is often used as a measure of health development.

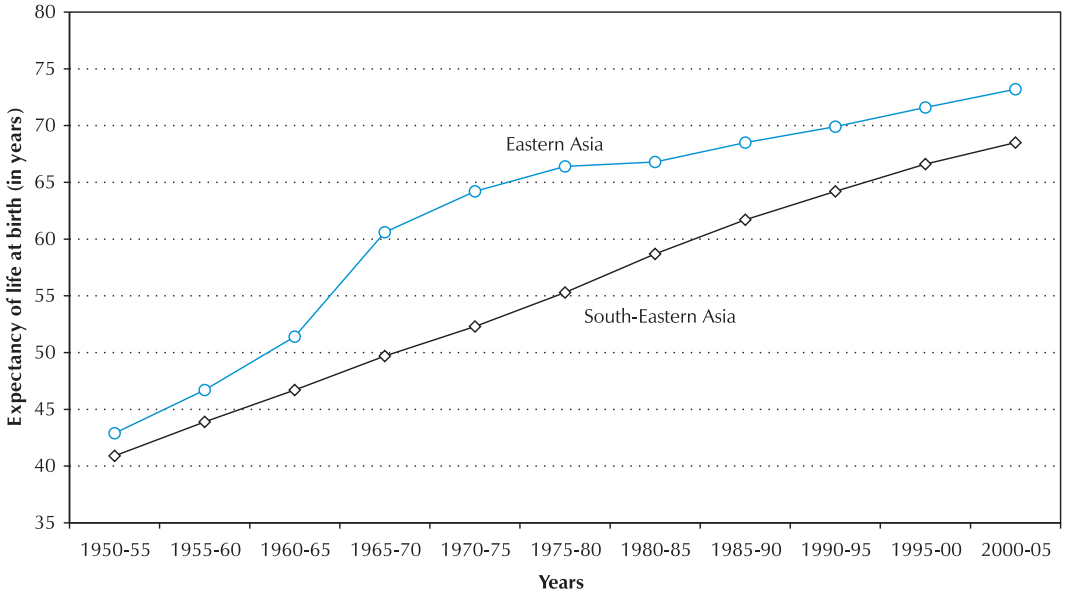
The life expectancy at birth obtained from standard life tables for the Region is shown in Annex Table 5.13. Since these are based on estimation and not on accurate registration of deaths, there is a margin of uncertainty. The median life expectancy at birth for the Region is 68 years. Substantial inequalities exist across nations. Japanese live on average 28 years longer than Cambodians—82 years versus 54 years. These inequalities are not explained by economic development alone. Sri Lanka has low per capita income but has life expectancy at birth close to that of developed countries, while China with half the per capita income of Thailand has better life expectancy.[31] As is the pattern nearly everywhere, females tend to live longer than males in almost all countries in the Region, modally by seven years. In Cambodia, Myanmar, Nauru, the Philippines and Sri Lanka, life expectancy at birth for females is seven years more than males, and in Mongolia it is eight years. These are not highly developed countries. In Australia and New Zealand the difference is only five years.

Trends in life expectancy

At the global level, intercountry differences in life expectancy at birth slightly decreased till 1985–1990 but increased thereafter because average life expectancy fell in some countries in sub-Saharan Africa and the former Soviet Union.

Differentials across regions in life expectancy at birth 50 years ago were not large (Figure 5.8) but improvements over this period have been uneven. Countries of Eastern Asia experienced sharp increases in the 1960s but the subsequent improvement was slow. In South-East Asian countries, the rise was steady. Increase in life expectancy in Cambodia was sharp in the 1980s following the end of hostilities but has slowed recently (Figure 5.9). In the Lao People's Democratic Republic, the rise is perceptibly high in recent years.

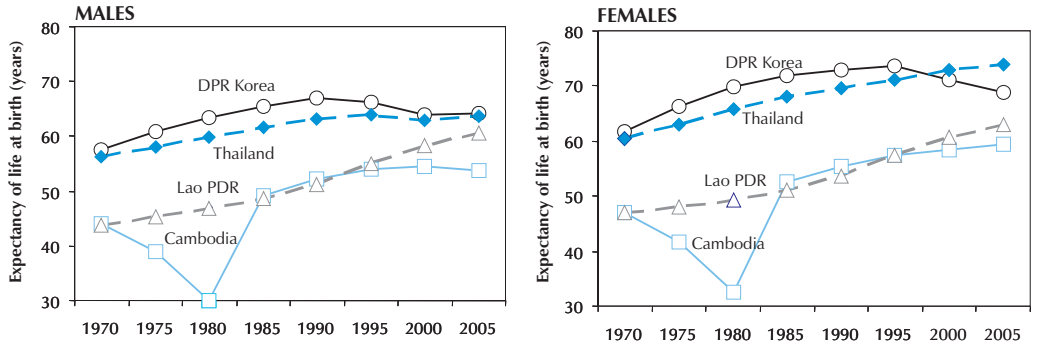
Fig. 5.8 Trend in life expectancy at birth in Asia



Source: *World population prospects: 2005 revision*. United Nations Department of Economic and Social Affairs, Population Division. Available from: http://esa.un.org/unpp

World population prospects: 2006 revision. United Nations Department of Economic and Social Affairs, Population Division. Available from: http://esa.un.org/unpp

Fig. 5.9 **Trend in male and female life expectancy at birth in Thailand, the Democratic People's Republic of Korea, Cambodia and the Lao People's Democratic Republic**



Source: Nations Statistics Division. Available from: http://unstats.un.org/unsd/cdb/cdb_simple_data_extract.asp

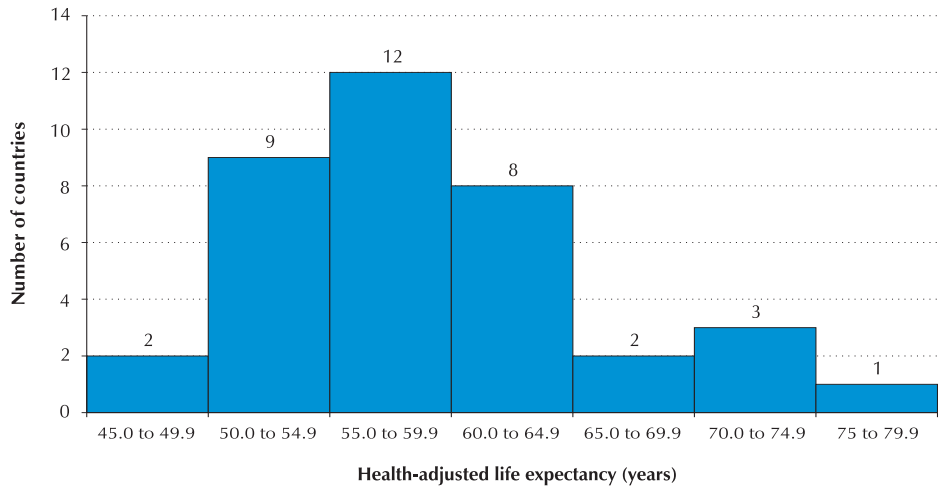
Gains in life expectancy at birth between 1995 and 2004 have not been uniform (Annex Table 5.14). Bhutan gained 11 years but Malaysia only one year. Cambodian females gained 25 years between 1978 and 2004 and males in Maldives gained 10 years. Countries with high life expectancy have not gained much except for Singaporeans, who gained nine years for females and eight years for males between 1978 and 2004.

Health-adjusted life expectancy

Health-adjusted life expectancy (HALE) at birth, also called healthy life expectancy, is the equivalent number of years in full health that a newborn can expect to live (time spent in poor health is adjusted for equivalent years in full health).

Annex Table 5.15 contains estimates of HALE for countries of the Region for the year 2002. Annex Table 5.16 has values for three preceding years. Health-adjusted life expectancy at birth in countries of the Region ranges from 47 to 75 years with a median of 60 years. Only four countries in the Region have HALEs exceeding 70 years, and two countries have less than 50 years (Figure 5.10).

Fig. 5.10 **Frequency distribution of countries in the Region for health-adjusted life expectancy at birth, 2002**



Source: *The world health report 2004: changing history*. Geneva, World Health Organization, 2004.

The difference between life expectancy at birth and HALE at birth is the expected number of years of full health lost due to disease, injuries and other disabilities. This difference is a measure of the health gap. The loss can also be expressed as percentage of life expectancy at birth (Annex Table 5.15). In most countries, nearly 10%–15% of life years are lost due to temporary or permanent disabilities. This figure is higher in females than in males.

AIDS, diabetes and injuries are conditions that affect the young. Their impact on life expectancy at birth needs to be closely monitored in the future. However, caution is required in countries with high childhood mortality, as the statistical effect of such conditions is attenuated because these conditions do not have as much opportunity to show their impact.

Both life expectancy and HALE are comprehensive measures of health and longevity. They can be increased by reducing mortality at all ages, particularly child mortality, since it affects life expectancy significantly.

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Annex tables

A note on the annex tables

The data provided in many Annex tables have been taken from WHO or United Nations Children's Fund reports as identified for each table or column. For quality of these data, please refer to the concerned report where detailed explanations of the sources and their reliability are given. These reports explain that the data have been collected from a wide variety of sources (some are based on models), and their reliability can vary. Inconsistencies in some of the rates are evident. Whereas these inconsistencies over time are understandable for countries with a small population, a sudden jump or drop for countries with a big population need further investigation for authenticity of such erratic trends. Some of this could be due to periodic revision of the estimates. In the Democratic People's Republic of Korea, this could be caused by natural disasters.

In some cases the rates provided in these Annex tables may differ from national figures which can be based on alternate rigorous methods of estimation.

Table 5.1 Stillbirths and live births, and stillbirth, perinatal mortality, postneonatal mortality and infant mortality rates for Asia Pacific Region countries and areas, 2000

	Country/area	Annual no. of live births in thousands	Annual no. of still-births in thousands[a]	Still birth rate per 1000 total births	Perinatal mortality rate per 1000 total births[a]	Neonatal mortality rate per 1000 live births			Post-neonatal mortality rate per 1000 live births[a]	Infant mortality rate per 1000 live births
						Early	Late[a]	Total		
1	American Samoa	...	...	...	...	...	...	6	2	8
2	Australia	246	1	3	6	3	0	3	3	6
3	Bangladesh	4 226	104	24	50	27	9	36	18	54
4	Bhutan	73	2	22 [b]	40	18	20	38	39	77
5	Brunei Darussalam	8	0	6	9	3	1	4	2	6
6	Cambodia	461	18	37 [b]	67	31	9	40	55	95
7	China	19 428	376	19 [b]	35	16 [b]	5	21	11	32
8	Cook Islands	...	...	11 [b]	...	9 [b]	3	12 [b]	8	20
9	DPR Korea	388	8	20 [b]	37	17 [b]	5	22 [b]	1	23
10	Fiji	20	0	9	16	7	2	9	9	18
11	French Polynesia	...	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...	...	...	...	...
14	India	25 780	1 046	39 [b]	71	33	10	43	26	69
15	Indonesia	4 564	79	17 [b]	31	14	4	18	17	35
16	Japan	1 196	6	5	6	1	1	2	2	4
17	Kiribati	...	...	24 [b]	...	20 [b]	7	27 [b]	25	52
18	Lao PDR	195	6	32 [b]	57	26 [b]	9	35 [b]	55	90
19	Macao (China)	...	...	...	...	...	...	...	...	...
20	Malaysia	549	2	3	7	4	1	5	3	8
21	Maldives	11	0	25	54	30	7	37	22	59
22	Marshall Islands	...	...	24 [b]	...	20 [b]	6	26 [b]	29	55
23	Micronesia, Federated States of	3	0	11 [b]	20	9 [b]	3	12 [b]	8	20
24	Mongolia	58	1	25 [b]	45	21	5	26	36	62
25	Myanmar	1 194	45	36 [b]	65	30 [b]	10	40	38	78
26	Nauru	...	...	13 [b]	...	11 [b]	3	14 [b]	11	25
27	Nepal	805	19	23	51	29	11	40	32	72
28	New Caledonia	...	...	...	...	...	...	...	...	...
29	New Zealand	54	0	3	6	3	1	4	2	6
30	Niue	...	...	12 [b]	...	10 [b]	3	13 [b]	...	...
31	Northern Mariana Islands	...	...	...	...	...	...	...	...	...
32	Palau	...	...	13 [b]		10 [b]	4	14 [b]	10	24
33	Papua New Guinea	180	5	28 [b]	51	24	8	32	47	79
34	Philippines	2 029	23	11	23	12	3	15	15	30
35	Pitcairn Islands	...	...	...	...	...	...	...	...	...
36	Republic of Korea	597	1	2	4	2	1	3	2	5
37	Samoa	5	0	12 [b]	22	10 [b]	3	13 [b]	8	21
38	Singapore	47	0	3	4	1	0	1	3	4
39	Solomon Islands	15	0	11 [b]	20	9 [b]	3	12 [b]	9	21
40	Sri Lanka	310	3	11 [b]	20	9	2	11	6	17

Country/area		Annual no. of live births in thousands	Annual no. of still-births in thousands[a]	Still birth rate per 1000 total births	Perinatal mortality rate per 1000 total births[a]	Neonatal mortality rate per 1000 live births			Post-neonatal mortality rate per 1000 live births[a]	Infant mortality rate per 1000 live births
						Early	Late[a]	Total		
41	Thailand	1 082	12	11 [b]	20	9	4	13	12	25
42	Timor-Leste	19	1	36 [b]	65	30 [b]	10	40 [b]	...	...
43	Tokelau	...	...	...	...	...	...	...	...	...
44	Tonga	3	0	10 [b]	18	8 [b]	2	10 [b]	7	17
45	Tuvalu	...	0	20 [b]		16 [b]	6	22 [b]	16	38
46	Vanuatu	6	0	17 [b]	31	14 [b]	5	19 [b]	16	35
47	Viet Nam	1 593	39	24	37	13	2	15	15	30
48	Wallis and Futuna	...	...	...	...	...	...	...	...	...

[a] Calculated

[b] Estimates derived from regression and similar estimation methods

... *Data not available*

Sources:The world health report 2005: making every mother and child count. Geneva, World Health Organization, 2005.

State of the world's children 2002: leadership. New York, United Nations Children's Fund, 2002.

Table 5.2 Number of child deaths at various stages (rounded to nearest thousand) Asia Pacific Region countries and areas, 2000

Country/area		Annual no. of still births ('000)	Perinatal deaths ('000)	Neonatal deaths '000			Post neonatal deaths ('000)	Infants deaths ('000)	1-4 yr deaths ('000)	Under five deaths ('000)
				Early	Late	Total				
1	American Samoa	...	...	...	...	...	...	...	...	...
2	Australia	1	1	1	0 †	1	1	1	0 †	1
3	Bangladesh	104	218	114	38	152	76	228	118	347
4	Bhutan	2	3	1	1	3	3	6	2	7
5	Brunei Darussalam	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
6	Cambodia	18	32	14	4	18	25	44	18	62
7	China	376	687	311	97	408	214	622	155	777
8	Cook Islands	...	...	...	...	...	...	...	...	...
9	DPR Korea	8	15	7	2	9	0 †	9	3	12
10	Fiji	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
11	French Polynesia	...	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...	...	...	...	...
14	India	1 046	1 897	851	258	1 109	670	1 779	696	2 475
15	Indonesia	79	143	64	18	82	78	160	59	219
16	Japan	6	7	1	1	2	2	5	0 †	5
17	Kiribati	...	...	...	...	...	...	...	...	...
18	Lao PDR	6	12	5	2	7	11	18	3	20
19	Macao (China)	...	...	...	...	...	...	...	...	...
20	Malaysia	2	4	2	1	3	2	4	1	5
21	Maldives	0 †	1	0 †	0 †	0 †	0 †	1	0 †	1
22	Marshall Islands	...	...	...	...	...	...	...	...	...
23	Micronesia, Federated States of	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
24	Mongolia	1	3	1	0 †	2	2	4	1	5
25	Myanmar	45	80	36	12	48	45	93	38	131
26	Nauru	...	...	...	...	...	...	...	...	...
27	Nepal	19	42	23	9	32	26	58	23	81
28	New Caledonia	...	...	...	...	...	...	...	...	...
29	New Zealand	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
30	Niue	...	...	...	...	...	...	...	...	...
31	Northern Mariana Islands	...	...	...	...	...	...	...	...	...
32	Palau	...	...	...	...	...	...	...	...	...
33	Papua New Guinea	5	10	4	1	6	8	14	6	20
34	Philippines	23	47	24	6	30	30	61	20	81
35	Pitcairn Islands	...	...	...	...	...	...	...	...	...
36	Republic of Korea	1	2	1	1	2	1	3	0 †	3
37	Samoa	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
38	Singapore	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
39	Solomon Islands	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
40	Sri Lanka	3	6	3	1	3	2	5	1	6
41	Thailand	12	22	10	4	14	13	27	4	31

Country/area		Annual no. of still births ('000)	Perinatal deaths ('000)	Neonatal deaths '000			Post neonatal deaths ('000)	Infants deaths ('000)	1-4 yr deaths ('000)	Under five deaths ('000)
				Early	Late	Total				
42	Timor-Leste	1	1	1	0 †	1	0 †	0 †	0 †	0 †
43	Tokelau	…	…	…	…	…	…	…	…	…
44	Tonga	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
45	Tuvalu	…	…	…	…	…	…	…	…	…
46	Vanuatu	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †	0 †
47	Viet Nam	39	60	21	3	24	24	48	14	62
48	Wallis and Futuna	…	…	…	…	…	…	…	…	…
	TOTAL*	1 797	3 292	1 495	459	1 955	1 233	3 189	1 163	4 351

… *Data not available*

* Excluding countries/areas with small populations for whom comparable information is not available

† Less than 500

Source: Calculated from Annex Table 5.1

Table 5.3 Infant mortality, ages 1–4 and under-five mortality rates in Asia Pacific Region countries and areas, 2000 and 2004

		Infant mortality rate	One-to-four year mortality rate*	Under-five mortality rate	Infant mortality rate	Under-five mortality rate			
	Country/area	2000	2000	2000	2004	Male 2004	Female 2004	Both 2004	Uncertainty interval
1	American Samoa	...	...	...	...	...	...	...	...
2	Australia	6	0	6	5	6	5	5	5 - 6
3	Bangladesh	54	28	82	56	81	73	77	70 - 84
4	Bhutan	77	23	100	67	80	80	80	64 - 96
5	Brunei Darussalam	6	1	7	8	10	8	9	7 - 10
6	Cambodia	95	40	135	97	154	127	141	127 - 155
7	China	32	8	40	26	27	36	31	29 - 33
8	Cook Islands	20	0	24	18	24	17	21	19 - 22
9	DPR Korea	23	7	30	42	56	54	55	30 - 81
10	Fiji	18	4	22	16	21	19	20	18 - 22
11	French Polynesia	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...	...	...	...
14	India	69	27	96	62	81	89	85	77 - 94
15	Indonesia	35	13	48	30	41	36	38	35 - 42
16	Japan	4	0	4	3	4	3	4	4 - 4
17	Kiribati	52	18	70	49	66	64	65	55 - 75
18	Lao PDR	90	15	105	65	88	78	83	69 - 98
19	Macao (China)	...	...	...	...	...	...	...	...
20	Malaysia	8	1	9	10	14	11	12	11 - 14
21	Maldives	59	21	80	35	47	44	46	31 - 58
22	Marshall Islands	55	13	68	52	66	52	59	43 - 74
23	Micronesia, Federated States of	20	4	24	19	26	19	23	16 - 30
24	Mongolia	62	16	78	41	60	45	52	42 - 64
25	Myanmar	78	32	110	76	116	93	105	72 - 138
26	Nauru	25	0	30	25	35	24	30	24 - 36
27	Nepal	72	28	100	59	74	79	76	68 - 84
28	New Caledonia	...	...	...	...	...	...	...	...
29	New Zealand	6	0	6	5	7	6	6	5 - 7
30	Niue	...	...	...	...	50	20	36	36 - 36
31	Northern Mariana Islands	...	...	...	...	...	...	...	...
32	Palau	24	5	29	22	27	28	27	20 - 35
33	Papua New Guinea	79	33	112	68	98	87	93	75 - 110
34	Philippines	30	10	40	26	40	28	34	29 - 39
35	Pitcairn Islands	...	...	...	...	...	...	...	...
36	Republic of Korea	5	0	5	5	5	7	6	5 - 6
37	Samoa	21	5	26	25	42	17	30	24 - 36
38	Singapore	4	0	4	3	4	3	3	3 - 4
39	Solomon Islands	21	4	25	34	60	52	56	48 - 64

		Infant mortality rate	One-to-four year mortality rate*	Under-five mortality rate	Infant mortality rate	Under-five mortality rate			
	Country/area	2000	2000	2000	2004	Male 2004	Female 2004	Both 2004	Uncertainty interval
40	Sri Lanka	17	2	19	12	16	12	14	12 - 16
41	Thailand	25	4	29	18	23	20	21	18 - 24
42	Timor-Leste	...	...	...	64	91	69	80	69 - 92
43	Tokelau	...	...	...	...	...	...	...	...
44	Tonga	17	4	21	20	32	17	25	20 - 29
45	Tuvalu	38	0	53	36	50	52	51	37 - 64
46	Vanuatu	35	9	44	32	40	40	40	29 - 51
47	Viet Nam	30	9	39	17	24	22	23	20 - 26
48	Wallis and Futuna	...	...	...	...	...	...	...	...

* Calculated

... Data not available

Sources: *State of the world's children 2002: leadership*. New York, United Nations Children's Fund, 2001.

State of the world's children 2006: excluded and invisible. New York, United Nations Children's Fund, 2005.

The world health report 2006: working together for health. Geneva, World Health Organization, 2006.

Table 5.4 Infant mortality rate for Asia Pacific Region countries and areas, 1982-2005

	Country/area	1982	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1	American Samoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Australia	10	9	8	8	8	7	7	7	7	6	5	5	5	6	6	6	6	5	5
3	Bangladesh	130	118	116	114	101	97	94	91	85	83	81	79	58	54	51	51	46	56	54
4	Bhutan	150	127	125	123	133	131	128	125	122	90	87	84	80	77	74	74	70	67	65
5	Brunei Darussalam	13	12	...	9	9	...	8	8	...	9	8	8	8	6	6	6	5	8	8
6	Cambodia	...	...	127	123	120	117	115	113	110	108	106	104	86	95	97	96	97	97	98
7	China	39	31	31	30	22	35	35	35	38	38	38	38	33	32	31	31	30	26	23
8	Cook Islands	...	...	...	15	15[x]	...	26	26	...	26	26	26	26	20	19	19	18	18	17
9	DPR Korea	32	24	27	26	25	25	24	23	23	23	23	23	23	23	42	42	42	42	42
10	Fiji	29	27	26	26	25	...	23	22	...	20	20	19	18	18	18	17	16	16	16
11	French Polynesia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Hong Kong (China)	12	8	7	7	7	6	6	5	5	...	...	...	...	...	...	...	...	...	...
14	India	120	98	96	94	84	83	81	79	76	73	71	69	70	69	67	67	63	62	56
15	Indonesia	90	84	73	71	61	71	71	71	50	47	45	40	38	35	33	33	31	30	28
16	Japan	7	5	4	5	5	4	5	4	4	4	4	4	4	4	3	3	3	3	3
17	Kiribati	...	...	...	58	56		59	58		56	55	54	53	52	51	51	49	49	48
18	Lao PDR	...	109	106	104	101	98	96	94	91	102	99	96	93	90	87	87	82	65	62
19	Macao (China)	...	62[x]	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	Malaysia	29	24	23	22	15	14	13	12	11	11	10	9	8	8	8	8	7	10	10
21	Maldives	80	67[x]	...	61	58	...	56	56	...	54	53	62	60	59	58	58	55	35	33
22	Marshall Islands	23*	...	...	23	23[x]	...	63	63	...	63	63	63	63	55	54	54	53	52	51
23	Micronesia, Federated States of	23*	...	...	23	26	...	24	23	...	21	20	20	20	20	20	20	19	19	34
24	Mongolia	50	44	66	64	62	61	59	...	57	55	105	105	61	62	61	58	56	41	39

	Country/area	1982	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
25	Myanmar	100	69	67	65	85	83	81	79	105	105	81	80	79	78	77	77	76	76	75
26	Nauru	...	...	...	...	...	...	...	...	...	25	25	25	25	25	25	25	25	25	25
27	Nepal	150	127	125	123	102	90	90	84	81	82	75	72	75	72	66	66	61	59	56
28	New Caledonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	New Zealand	12	10	10	10	8	8	7	7	7	7	7	5	6	6	6	6	5	5	5
30	Niue	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31	Northern Mariana Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32	Palau	...	...	23	23	23[x]	...	25	25	...	25	28	28	28	24	24	24	23	22	10
33	Papua New Guinea	100	57	58	56	55	54	67	67	67	79	79	79	79	79	70	70	69	68	55
34	Philippines	50	44	44	43	34	46	45	44	40	32	32	32	31	30	29	29	27	26	25
35	Pitcairn Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
36	Republic of Korea	30	24	24	23	9	8	8	8	8	6	6	5	5	5	5	5	5	5	5
37	Samoa	35	...	...	46	46	...	44	44	...	42	41	22	21	21	20	20	19	25	24
38	Singapore	11	9	8	8	8	6	5	5	5	4	4	4	4	4	3	3	3	3	3
39	Solomon Islands	...	44*	...	30	28	...	27	26	...	24	23	22	22	21	20	20	19	34	24
40	Sri Lanka	39	32	27	26	16	15	15	15	15	17	17	17	17	17	17	17	13	12	12
41	Thailand	50	38	27	26	28	27	27	27	27	31	31	30	26	25	24	24	23	18	18
42	Timor-Leste	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	89	87	64	52
43	Tokelau	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
44	Tonga	...	...	...	22	22	···	21	20	...	19	19	19	18	17	17	16	15	20	20
45	Tuvalu	...	...	...	...	34[x]	...	40	40	...	40	40	40	40	38	38	38	37	36	31
46	Vanuatu	...	101[x]	...	69	68	...	64	45	...	41	39	38	37	35	34	34	31	32	31
47	Viet Nam	90	63	61	49	39	37	36	35	34	33	32	31	31	30	30	30	19	17	16
48	Wallis and Futuna	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

* Rate for the year one year before the year mentioned in the column heading

[x] Indicates data that refer to years or periods other than those specified in the column heading, differ from the standard definition, or refer to only part of a country

... Data not available

Source: *State of the world's children* (1985, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007). New York, United Nations Children's Fund.

Table 5.5 Under-five mortality rate by sex and for total population for selected Asia Pacific Region countries and areas, 1995-2004

		Both				Male							Female						
	Country/area	1995	1996	1997	2003	1998	1999	2000	2001	2002	2003	2004	1998	1999	2000	2001	2002	2003	2004
1	American Samoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Australia	8	8	8	6	8	7	7	7	6	6	6	6	5	5	5	5	5	5
3	Bangladesh	148	144	...	69	106	113	91	82	71	68	81	116	116	93	84	73	70	73
4	Bhutan	149	145	...	85	98	113	93	90	93	85	80	94	114	92	90	92	85	80
5	Brunei Darussalam	14	13	12	6	11	12	12	14	14	6	10	11	9	7	14	12	5	8
6	Cambodia	142	137	...	140	141	138	136	130	149	153	154	127	129	120	114	124	127	127
7	China	44	43	40	37	43	35	38	34	31	32	27	54	40	44	40	41	43	36
8	Cook Islands	...	...	...	21	...	29	23	23	21	24	24	...	24	20	18	19	19	17
9	DPR Korea	27	26	25	55	27	100	54	54	56	56	56	25	99	52	52	54	54	54
10	Fiji	24	23	23	20	28	25	27	27	30	21	21	18	19	21	24	27	19	19
11	French Polynesia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	India	102	99	90	87	82	97	90	89	87	85	81	97	104	99	88	95	90	89
15	Indonesia	65	63	59	41	69	63	51	50	45	45	41	56	53	49	40	36	37	36
16	Japan	6	6	6	4	6	5	5	5	4	4	4	5	5	4	4	4	4	3
17	Kiribati	...	...	...	66	...	62	93	82	80	73	66	...	58	74	66	69	59	64
18	Lao PDR	148	143	...	91	154	143	152	153	146	96	88	146	126	131	137	131	85	78
19	Macao (China)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	Malaysia	23	22	21	7	16	15	15	13	10	8	14	13	13	12	11	8	7	11
21	Maldives	71	68	65	72	53	90	62	42	38	67	47	80	86	66	48	43	77	44
22	Marshall Islands	...	...	...	61	...	60	48	48	46	68	66	...	51	39	37	36	53	52
23	Micronesia, Federated States of	...	...	...	23	...	44	61	65	63	25	26	...	31	48	52	51	20	19
24	Mongolia	69	68	69	68	72	123	92	79	75	72	60	75	104	75	63	66	64	45
25	Myanmar	99	95	90	106	121	142	111	121	118	117	116	104	126	97	106	94	93	93
26	Nauru	...	...	...	30	...	19	16	18	18	35	35	...	15	11	13	12	24	24
27	Nepal	126	122	...	82	110	119	101	100	81	80	74	124	107	116	115	87	85	79

		Both				Male							Female						
	Country/area	1995	1996	1997	2003	1998	1999	2000	2001	2002	2003	2004	1998	1999	2000	2001	2002	2003	2004
28	New Caledonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	New Zealand	10	10	8	6	9	9	7	7	7	7	7	8	7	6	6	6	6	6
30	Niue	...	...	...	33	...	33	31	33	38	43	50	...	30	28	26	24	22	20
31	Northern Mariana Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32	Palau	...	...	...	28	...	23	26	24	24	29	27	...	16	22	22	22	26	28
33	Papua New Guinea	84	82	...	93	79	129	118	100	98	96	98	88	106	109	93	92	90	87
34	Philippines	48	45	...	36	49	48	11	46	39	39	40	38	41	37	33	33	33	28
35	Pitcairn Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
36	Republic of Korea	13	13	...	5	13	12	10	8	8	5	5	13	10	9	8	7	5	7
37	Samoa	74	71	68	24	25	28	37	24	27	27	42	29	25	30	19	21	21	17
38	Singapore	10	9	...	3	6	4	5	4	4	3	4	6	3	4	4	3	3	3
39	Solomon Islands	30	29	...	22	32	49	37	71	86	24	60	22	47	27	62	75	21	52
40	Sri Lanka	20	19	18	15	22	25	21	22	20	17	16	20	19	17	18	16	13	12
41	Thailand	43	43	36	26	37	40	35	38	32	29	23	33	27	32	31	26	24	20
42	Timor-Leste	...	...	...	125	...	...	...	...	142	141	91	...	...	...	...	108	107	69
43	Tokelau	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
44	Tonga	...	...	...	19	...	29	29	36	23	24	32	...	23	19	23	15	15	17
45	Tuvalu	...	...	...	51	...	45	43	58	72	57	50	...	32	40	52	56	44	52
46	Vanuatu	51	48	...	38	54	64	57	56	40	38	40	42	57	45	54	40	38	40
47	Viet Nam	59	56	...	23	54	39	38	44	41	26	24	57	31	30	35	33	20	22
48	Wallis and Futuna	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...

... Data not available

Source: The world health report (1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2005, 2006). Geneva, World Health Organization.

Table 5.6 Probability of dying between 15 and 60 years (per 1000 population) by sex, and corresponding uncertainly intervals, and female to male ratio in Asia Pacific Region countries and areas, 2004

	Country/area	Males		Females		Female : male ratio
		2004	Uncertainty	2004	Uncertainty	
1	American Samoa	...	...	...	...	...
2	Australia	86	83-88	50	48-52	0.58
3	Bangladesh	251	223-282	258	233-283	1.03
4	Bhutan	255	114-418	196	92-365	0.77
5	Brunei Darussalam	107	89-125	81	70-93	0.76
6	Cambodia	430	293-580	276	154-466	0.64
7	China	158	148-167	99	90-108	0.63
8	Cook Islands	158	141-178	104	95-114	0.66
9	DPR Korea	231	87-402	168	68-341	0.73
10	Fiji	270	244-297	169	151-187	0.63
11	French Polynesia	...	...	...	...	...
12	Guam	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...
14	India	275	259-293	202	186-220	0.73
15	Indonesia	239	222-256	200	186-216	0.84
16	Japan	92	92-93	45	45-46	0.49
17	Kiribati	297	265-330	175	152-205	0.59
18	Lao PDR	331	275-386	300	267-335	0.91
19	Macao (China)	...	...	...	...	...
20	Malaysia	200	182-220	109	98-120	0.55
21	Maldives	186	159-215	140	126-156	0.75
22	Marshall Islands	327	297-356	275	250-295	0.84
23	Micronesia, Federated States of	202	177-228	169	146-191	0.84
24	Mongolia	303	277-330	185	163-210	0.61
25	Myanmar	334	174-510	219	110-399	0.66
26	Nauru	448	283-596	303	184-417	0.68
27	Nepal	297	274-320	285	264-306	0.96
28	New Caledonia	...	...	...	...	...
29	New Zealand	95	92-98	62	59-65	0.65
30	Niue	178	139-222	138	107-178	0.78
31	Northern Mariana Islands	...	...	...	...	...
32	Palau	224	213-234	206	186-228	0.92
33	Papua New Guinea	322	293-352	265	240-293	0.82
34	Philippines	269	257-281	149	137-159	0.55
35	Pitcairn Islands	...	...	...	...	...
36	Republic of Korea	151	146-156	55	54-58	0.36
37	Samoa	235	218-252	203	187-219	0.86
38	Singapore	92	80-106	51	48-56	0.55
39	Solomon Islands	193	125-265	143	83-207	0.74
40	Sri Lanka	232	183-278	119	104-133	0.51
41	Thailand	265	243-287	154	135-174	0.58
42	Timor-Leste	267	123-430	184	84-357	0.69
43	Tokelau	...	...	...	...	...
44	Tonga	140	135-144	194	187-201	1.39
45	Tuvalu	325	237-433	277	213-387	0.85
46	Vanuatu	212	144-280	170	115-227	0.80
47	Viet Nam	197	182-212	122	111-134	0.62
48	Wallis and Futuna	...	...	...	...	...

... Data not available

Source: *The world health report 2006: working together for health*. Geneva, World Health Organization, 2006: Annex Table 5.1.

Table 5.7 Different estimates of the maternal mortality ratio in Asia Pacific Region countries and areas, 1990, 1995, 2000 and 2005

	Source →	UNESCAP[1]	Annex Table F of WHO/UNICEF[2]		WHO / UNICEF / UNFPA[3]		WHO / UNICEF / UNFPA / World Bank[4]	
	Country/area	1990	1995	Uncertainty interval	2000	Uncertainty interval	2005	Uncertainty interval
1	American Samoa	...	...	...	...	...	...	...
2	Australia	9	6	4 - 8	8	5 - 10	4	4 - 9
3	Bangladesh	850	600	200 - 1500	380	320 - 450	570	380 - 760
4	Bhutan	1 600	500	180 - 1100	420	110 - 780	440	160 - 970
5	Brunei Darussalam	60*	22	7 - 65	37	22 - 53	13	3 - 47
6	Cambodia	900	590	200 - 1400	450	260 - 620	540	370 - 720
7	China	95	60	31 - 120	56	28 - 110	45	30 - 60
8	Cook Islands	...	...	...	...	...	...	...
9	DPR Korea	70	35	11 - 110	67	17 - 130	370	110 - 1200
10	Fiji	90*	20	6 - 60	75	19 - 140	210	55 - 720
11	French Polynesia	...	20	10 - 40	...	...	...	...
12	Guam	...	12	6 - 24	...	...	...	...
13	Hong Kong (China)	7	...	...	...	...	...	...
14	India	570	440	330 - 540	540	430 - 650	450	300 - 600
15	Indonesia	650	470	370 - 580	230	58 - 440	420	240 - 600
16	Japan	18	12	8 - 16	10	7 - 13	6	6 - 12
17	Kiribati	...	...	...	...	...	...	...
18	Lao PDR	650	650	530 - 790	650	160 - 1200	660	190 - 1600
19	Macao (China)	...	20	10 - 40	...	...	...	...
20	Malaysia	80	39	29 - 50	41	20 - 81	62	41 - 82
21	Maldives	...	390	230 - 610	110	28 - 220	120	42 - 260
22	Marshall Islands	...	...	...	...	...	...	...
23	Micronesia, Federated States of	...	...	...	...	...	...	...
24	Mongolia	65	65	19 - 190	110	75 - 150	46	46 - 93
25	Myanmar	580	170	55 - 470	360	91 - 660	380	260 - 510

	Source →	UNESCAP[1]	Annex Table F of WHO/UNICEF[2]		WHO / UNICEF / UNFPA[3]		WHO / UNICEF / UNFPA / World Bank[4]	
	Country/area	1990	1995	Uncertainty interval	2000	Uncertainty interval	2005	Uncertainty interval
26	Nauru	...	...	...	...	...	...	...
27	Nepal	1 500	830	580 - 1100	740	440 - 1100	830	290 - 1900
28	New Caledonia	...	10	5 - 20	...	...	...	...
29	New Zealand	25	15	15 - 30	7	5 - 10	9	9 - 18
30	Niue	...	...	...	...	..	...	...
31	Northern Mariana Islands	...	...	...	...	...	...	...
32	Palau	...	...	...	...	...	...	...
33	Papua New Guinea	930	390	130 - 1000	300	77 - 570	470	130 - 1300
34	Philippines	280	240	170 - 310	200	120 - 280	230	60 - 700
35	Pitcairn Islands	...	...	...	...	...	...	...
36	Republic of Korea	130	20	18 - 22	20	10 - 40	14	14 - 27
37	Samoa	35*	15	8 - 30	130	...	...	...
38	Singapore	10	9	6 - 12	30	20 - 41	14	14 - 27
39	Solomon Islands	...	60	17 - 180	130	33 - 240	220	65 - 580
40	Sri Lanka	140	60	31 - 120	92	46 - 180	58	39 - 77
41	Thailand	200	44	41 - 47	44	22 - 88	110	70 - 140
42	Timor-Leste	...	...	...	660	170 - 1200	380	150 - 700
43	Tokelau	...	...	...	...	...	...	...
44	Tonga	...	...	...	...	...	...	...
45	Tuvalu	...	...	...	...	...	...	...
46	Vanuatu	280*	32	16 - 65	130	...	...	...
47	Viet Nam	160	95	32 - 280	130	32 - 240	150	40 - 510
48	Wallis and Futuna	...	...	...	...	...	...	...

* Data refer to most recent year available during the period specified in the column heading

... Data not available

Source: [1] *Statistics on women in Asia and the Pacific 1999*: Table 2.03. Bangkok, United Nations Economic and Social Commission for Asia and the Pacific. Available from: http://www.unescap.org/esid/GAD/Statistics/Women%20Statistics%201999/index.asp

[2] Maternal mortality in 1995. Estimates developed by WHO, UNICEF

[3] Maternal mortality in 2000. Estimates developed by WHO, UNICEF, UNFPA

[4] Maternal mortality in 2005. Estimates developed by WHO, UNICEF, UNFPA and The World Bank

Table 5.8 Age and sex, and cause-specific death rates (per million population) in the Asia Pacific Region, 2002

Age group →		0-4	5-14	15-29	30-44	45-59	60-69	70-79	80+	Total
Cause	**Total (M+F)**	**Males**								
All causes	**8 039**	**12 554**	**982**	**1 967**	**3 515**	**10 093**	**28 941**	**65 407**	**146 049**	**8 346**
Cardiovascular diseases	2 338	126	41	135	424	2 931	11 147	27 547	62 886	2 307
Infectious and parasitic diseases	1 126	4 061	244	430	1 149	1 558	2 230	3 803	6 691	1 283
Malignant neoplasms	1 051	65	42	96	333	2 049	6 671	11 557	17 372	1 178
Respiratory diseases	751	77	16	27	72	724	3 005	9 544	25 846	722
Respiratory infections	596	2 019	167	93	98	219	1 462	3 799	12 254	561
Unintentional injuries	577	382	308	648	700	921	1 147	1 878	4 103	690
Perinatal conditions	411	4 591	0	0	0	0	0	0	0	433
Digestive diseases	297	224	33	65	167	627	1 177	2 101	4 524	318
Intentional injuries	238	16	25	343	362	394	501	679	1 206	285
Diabetes mellitus	137	4	2	10	26	201	652	1 343	2 782	126
Age group →		**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**	**Total**
Cause		**Females**								
All causes		**13 706**	**1 100**	**1 596**	**2 362**	**6 699**	**20 212**	**51 453**	**130 825**	**7 719**
Cardiovascular diseases		134	48	139	303	1 915	8 396	23 873	60 856	2 370
Infectious and parasitic diseases		4 467	331	309	486	739	1 285	2 335	4 157	963
Malignant neoplasms		78	38	77	330	1 533	3 857	6 926	12 699	919
Respiratory diseases		82	16	29	76	595	2 118	7 653	24 666	780
Respiratory infections		2 719	202	74	48	141	1 156	3 094	10 894	633
Unintentional injuries		509	254	346	346	511	747	1 426	3 231	459
Perinatal conditions		4 231	0	0	0	0	0	0	0	389
Digestive diseases		369	65	82	103	338	708	1 560	3 892	275
Intentional injuries		14	23	217	220	276	307	471	609	189
Diabetes mellitus		9	3	7	20	185	744	1 455	2 100	149

Source: *Deaths by age, sex and cause for the year 2002*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhoregionmortality2002.xls

Table 5.9 Age and sex and cause-specific death rates (per million population) in very low mortality (Stratum A) countries of the Region, 2002

Age group →		0-4	5-14	15-29	30-44	45-59	60-69	70-79	80+	Total
Cause	**Total (M+F)**	**M a l e s**								
All causes	**7 375**	**949**	**133**	**630**	**1 231**	**4 807**	**13 444**	**34 420**	**107 586**	**8 100**
Cardiovascular diseases	2 425	53	9	55	260	1 192	3 384	9 859	38 188	2 356
Malignant neoplasms	2 300	25	24	49	207	1 810	6 232	14 081	26 278	2 781
Respiratory infections	628	56	6	7	17	91	479	2 446	16 203	663
Respiratory diseases	380	38	4	8	18	81	470	2 208	8 859	456
Unintentional injuries	312	138	52	238	197	312	554	1 141	3 360	397
Digestive diseases	287	16	2	6	62	324	656	1 113	3 295	318
Intentional injuries	230	15	7	199	346	582	516	379	543	338
Genitourinary diseases	180	4	1	1	8	45	164	636	3 360	160
Neuropsychiatric conditions	152	52	9	34	42	78	174	555	1 962	144
Infectious and parasitic diseases	150	60	4	7	27	102	276	732	1 893	162
Age group →		**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**	**Total**
Cause		**F e m a l e s**								
All causes		**817**	**101**	**269**	**640**	**2 305**	**5 928**	**16 652**	**74 052**	**6 678**
Cardiovascular diseases		52	8	23	94	430	1 436	5 515	33 350	2 491
Malignant neoplasms		29	19	42	260	1 259	2 840	5 881	13 044	1 838
Respiratory infections		47	5	5	10	36	167	930	9 260	594
Respiratory diseases		28	3	4	13	47	200	776	3 885	307
Unintentional injuries		104	30	65	53	99	207	556	2 058	230
Digestive diseases		16	2	4	21	72	210	651	2 987	256
Intentional injuries		11	6	84	116	152	182	200	281	125
Genitourinary diseases		6	0	1	5	24	95	426	2 782	199
Neuropsychiatric conditions		29	8	13	20	42	113	353	1 887	159
Infectious and parasitic diseases		42	3	5	10	38	161	469	1 283	139

Source: *Deaths by cause, sex and mortality stratum in WHO regions, estimates for 2002*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhosubregionmortality2002.xls

Table 5.10 Age sex and cause-specific death rates (per million population) in low mortality (Stratum B) countries of the Region, 2002

Age group →		0-4	5-14	15-29	30-44	45-59	60-69	70-79	80+	Total
Cause	**Total (M+F)**	**Males**								
All causes	**6 980**	**7 592**	**626**	**1 623**	**2 709**	**8 508**	**26 675**	**64 120**	**157 135**	**7 306**
Cardiovascular diseases	2 176	76	21	104	339	2 188	9 355	26 103	67 937	2 107
Malignant neoplasms	1 198	68	46	104	399	2 560	7 536	12 929	16 625	1 396
Respiratory diseases	916	73	7	18	44	433	3 017	12 200	39 838	840
Infectious and parasitic diseases	624	2 139	91	247	591	899	1 823	3 255	5 832	761
Unintentional injuries	499	480	304	643	621	813	1 039	1 477	3 277	650
Respiratory infections	283	584	63	48	65	167	611	1 652	7 782	241
Digestive diseases	281	340	15	48	161	574	1 174	2 131	4 719	321
Intentional injuries	238	14	23	302	320	370	586	746	1 212	276
Perinatal conditions*	231	2 834	0	0	0	0	0	0	0	233
Diabetes mellitus	132	1	1	5	21	149	586	1 220	2 320	109
Age group →		**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**	**Total**
Cause		**Females**								
All causes		**8 399**	**535**	**848**	**1 753**	**5 469**	**17 430**	**49 876**	**149 409**	**6 641**
Cardiovascular diseases		64	22	73	230	1 520	6 555	22 214	69 606	2 247
Malignant neoplasms		80	39	63	359	1 639	4 040	7 672	11 744	992
Respiratory diseases		64	7	15	46	346	2 358	10 050	38 489	994
Infectious and parasitic diseases		2 006	94	143	262	449	894	1 607	2 899	481
Unintentional injuries		513	203	181	270	384	511	1 011	2 864	341
Respiratory infections		1 451	74	32	30	80	408	1 420	8 674	326
Digestive diseases		402	18	28	69	247	685	1 598	4 351	240
Intentional injuries		7	18	166	236	293	380	580	785	198
Perinatal conditions*		2 904	0	0	0	0	0	0	0	229
Diabetes mellitus		2	1	5	21	167	740	1 585	2 323	155

Source: *Deaths by cause, sex and mortality stratum in WHO regions, estimates for 2002*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhosubregionmortality2002.xls

Table 5.11 Age sex and cause-specific death rates (per million population) in high mortality (Stratum D) countries of the Region, 2002

Age group →	Total	0-4	5-14	15-29	30-44	45-59	60-69	70-79	80+	Total
Cause	**Total (M+F)**	**M a l e s**								
All causes	**9 644**	**18 171**	**1 439**	**2 541**	**5 182**	**14 097**	**37 587**	**80 078**	**148 428**	**9 859**
Cardiovascular diseases	2 561	181	65	184	591	4 649	16 686	37 279	67 926	2 587
Infectious and parasitic diseases	1 967	6 210	433	710	2 247	3 063	3 543	6 061	10 794	2 157
Respiratory infections	1 043	3 572	295	159	165	340	3 310	8 444	17 671	1 006
Unintentional injuries	721	296	326	690	899	1 247	1 515	2 935	5 916	779
Perinatal conditions	719	6 597	0	0	0	0	0	0	0	767
Malignant neoplasms	690	63	37	90	234	1 171	5 207	7 934	13 730	683
Respiratory diseases	558	83	26	41	128	1 390	3 717	7 345	11 449	586
Digestive diseases	321	118	55	93	189	788	1 334	2 432	4 872	315
Intentional injuries	240	18	29	412	437	396	342	669	1 560	292
Neuropsychiatric conditions	165	81	28	45	122	181	177	3 010	6 109	175
Age group →		**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**	**Total**
Cause		**F e m a l e s**								
All causes		**19 619**	**1 794**	**2 739**	**3 690**	**9 907**	**29 223**	**70 355**	**139 734**	**9 417**
Cardiovascular diseases		207	79	240	463	2 962	13 633	35 530	65 782	2 534
Infectious and parasitic diseases		7 128	618	564	956	1 420	2 293	4 661	9 863	1 766
Respiratory infections		4 110	359	137	85	276	2 745	7 482	17 736	1 082
Unintentional injuries		527	324	596	521	832	1 315	2 665	5 210	659
Perinatal conditions		5 756	0	0	0	0	0	0	0	669
Malignant neoplasms		78	39	99	286	1 403	3 835	5 876	14 655	699
Respiratory diseases		103	28	51	139	1 167	2 261	5 866	11 151	528
Digestive diseases		355	123	162	176	561	894	1 891	3 642	328
Intentional injuries		21	29	300	205	271	217	370	495	185
Neuropsychiatric conditions		72	37	31	42	129	149	2 638	5 005	155

Source: *Deaths by cause, sex and mortality stratum in WHO regions, estimates for 2002*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhosubregionmortality2002.xls

Table 5.12 Percentage of deaths attributable to various risk factors in different mortality strata of Asia Pacific Region countries and the world, 2000

	Stratum A		Stratum B		Stratum D		Asia Pacific Region		World	
Risk factor	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Total Population ('000)	75 796	78 558	932 228	894 524	639 087	602 719	1 647 111	1 575 801	3 045 295	2 999 722
Total Mortality ('000)	616	519	6 717	5 966	6 358	5 764	13 691	12 249	29 232	26 629
Childhood and maternal undernutrition	**Per cent deaths attributable to risk factor**									
Underweight	0.0		2.0	2.1	9.0	10.7	5.2	6.0	6.5	6.9
Iron deficiency	0.0	0.0	0.7	1.0	2.2	3.2	1.4	2.0	1.3	1.7
Vitamin A deficiency	0.0	0.0	0.3	0.4	1.1	1.8	0.6	1.0	1.1	1.7
Zinc deficiency	0.0	0.0	0.2	0.2	21.0	24.0	1.0	1.2	1.4	1.5
Other nutritional risk and physical inactivity										
High blood pressure	13.8	14.6	12.6	15.0	10.5	9.0	11.7	12.2	11.9	13.7
High cholestrol	6.3	7.5	4.4	5.1	7.7	8.8	6.0	6.9	7.2	8.6
High BMI	3.4	3.9	3.1	4.1	0.7	1.9	2.0	3.0	4.0	5.3
Less fruit and vegetable intake	4.2	3.7	4.8	4.7	5.9	5.4	5.3	5.0	5.0	4.8
Physical inactivity	3.7	3.7	2.5	2.8	3.4	3.2	3.0	3.0	3.3	3.6
Sexual and reproductive health risks										
Unsafe sex	0.0	0.6	0.7	1.0	3.6	3.1	2.0	2.0	4.7	5.7
Lack of contraception	...	0.0	...	0.2	...	1.0	...	0.5	...	0.6
Addictive substances										
Tobacco	20.8	9.4	12.5	2.5	12.3	2.3	12.8	2.7	13.3	3.8
Alcohol	3.1	5.4	7.7	1.3	2.3	0.4	5.0	1.0	5.6	0.6
Illicit drugs	0.3	0.2	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.2

	Stratum A		Stratum B		Stratum D		Asia Pacific Region		World	
Risk Factor	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Environmental risks										
Unsafe water, sanitation and hygiene	0.0	0.0	1.0	0.9	5.1	5.7	2.9	3.1	3.1	3.1
Urban outdoor air pollution	1.6	1.5	2.9	3.3	1.1	1.0	2.0	2.1	1.4	1.5
Indoor smoke from solid fuels	0.0	0.0	2.3	6.5	3.4	5.3	2.7	5.6	2.3	3.6
Lead	0.0	0.0	0.4	0.2	0.6	0.3	0.5	0.3	0.5	0.3
Global climate change	0.0	0.0	0.0	0.0	0.6	0.7	0.3	0.3	0.3	0.3
Occupational risks										
Risk factors for injuries	0.3	0.0	1.4	0.1	1.2	0.1	1.3	0.1	1.0	0.1
Carcinogens	0.6	0.2	0.5	0.2	0.2	0.0	0.4	0.1	0.3	0.1
Airborne particulates	0.6	0.2	1.8	1.0	0.8	0.3	1.3	0.6	0.9	0.3
Ergonomic stressors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Noise	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other selected risks to health										
Unsafe health-care injection	0.0	0.0	2.3	1.1	1.4	1.1	1.8	1.1	1.1	0.7
Childhood sexual abuse	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.1	0.2

... *Data not available*

The table shows the estimated mortality for each risk factor considered individually. These risk action part through other risks and act jointly with other risks.

Consequently, the mortality due to groups of risk factors will usually be less than the sum of individual risks.

Source: Ezzati M, *et al* and the Comparative Risk Assessment Collaborating Group. *Selected risk factors and global and regional burden of disease. The lancet,* 2002, 360: 1347-1360

Table 5.13 Life expectancy at birth (in years) with uncertainty interval by sex in Asia Pacific Region countries and areas, 2004

	Country/area	Male	Female	Both sexes	Uncertainty interval
1.	American Samoa	…	…	…	…
2.	Australia	78	83	81	81 - 81
3.	Bangladesh	62	63	62	61 - 64
4.	Bhutan	62	65	63	56 - 69
5.	Brunei Darussalam	76	78	77	76 - 78
6.	Cambodia	51	58	54	47 - 60
7.	China	70	74	72	71 - 73
8.	Cook Islands	70	75	72	71 - 73
9.	DPR Korea	65	68	66	58 - 74
10.	Fiji	66	71	69	67 - 70
11.	French Polynesia	…	…	…	…
12.	Guam	…	…	…	…
13.	Hong Kong (China)	…	…	…	…
14.	India	61	63	62	62 - 63
15.	Indonesia	65	68	67	66 - 68
16.	Japan	79	86	82	82 - 82
17.	Kiribati	63	67	65	64 - 66
18.	Lao PDR	58	60	59	57 - 62
19.	Macao (China)	…	…	…	…
20.	Malaysia	69	74	72	71 - 72
21.	Maldives	66	68	67	66 - 68
22.	Marshall Islands	60	64	62	60 - 64
23.	Micronesia, Federated States of	68	71	70	68 - 72
24.	Mongolia	61	69	65	64 - 66
25.	Myanmar	56	63	59	51 - 66
26.	Nauru	58	65	61	56 - 67

	Country/area	Male	Female	Both sexes	Uncertainty interval
27.	Nepal	61	61	61	60 - 62
28.	New Caledonia	…	…	…	…
29.	New Zealand	77	82	80	79 - 80
30.	Niue	68	74	71	68 - 73
31.	Northern Mariana Islands	…	…	…	…
32.	Palau	67	70	68	67 - 69
33.	Papua New Guinea	58	61	60	58 - 62
34.	Philippines	65	72	68	68 - 69
35.	Pitcairn Islands	…	…	…	…
36.	Republic of Korea	73	80	77	77 - 76
37.	Samoa	66	70	68	67 - 69
38.	Singapore	77	82	80	79 - 80
39.	Solomon Islands	66	70	68	64 - 72
40.	Sri Lanka	68	75	71	70 - 73
41.	Thailand	67	73	70	70 - 71
42.	Timor-Leste	61	66	63	56 - 69
43.	Tokelau	…	…	…	…
44.	Tonga	71	70	71	70 - 71
45.	Tuvalu	61	62	61	58 - 64
46.	Vanuatu	63	69	68	65 - 72
47.	Viet Nam	68	74	71	70 - 72
48.	Wallis and Futuna	…	…	…	…

.... Data not availbale

Source: *Deaths by cause, sex and mortality stratum in WHO regions, estimates for 2002*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/gbdwhosubregionmortality2002.xls

Table 5.14 Life expectancy at birth (in years) by sex in Asia Pacific Region countries and areas, selected years 1995-2004

		Both sexes						Male								Female							
	Country/area	1995	1996	1997	2002	2003	2004	1978	1998	1999	2000	2001	2002	2003	2004	1978	1998	1999	2000	2001	2002	2003	2004
1	American Samoa	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
2	Australia	78	78	78	80	81	81	70	75	77	77	77	78	78	78	77	81	82	82	83	83	83	83
3	Bangladesh	57	57	…	63	63	62	47	58	58	60	62	63	63	62	46	58	58	61	62	63	63	63
4	Bhutan	52	52	…	61	63	63	45	60	60	60	61	60	61	62	47	62	61	63	63	62	64	65
5	Brunei Darussalam	75	75	76	76	77	77	68	73	75	73	73	75	75	76	71	78	80	79	76	77	79	78
6	Cambodia	53	53	…	55	54	54	30	51	52	53	53	52	50	51	33	55	55	59	59	57	57	58
7	China	69	69	70	71	71	72	64	68	68	69	70	70	70	70	66	72	71	73	73	73	73	74
8	Cook Islands	…	…	…	72	71	72	…	…	69	69	70	69	68	70	…	…	73	72	74	74	74	75
9	DPR Korea	72	72	72	66	66	66	62	69	58	62	64	64	65	65	69	75	61	57	68	67	68	68
10	Fiji	72	72	73	67	68	69	66	71	64	67	68	65	66	66	69	75	69	71	72	70	71	71
11	French Polynesia	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
12	Guam	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
13	Hong Kong (China)	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
14	India	62	62	62	61	62	62	53	62	60	60	60	60	60	61	52	63	61	63	62	62	63	63
15	Indonesia	64	64	65	66	67	67	52	63	67	63	64	65	65	65	54	67	69	67	67	68	68	68
16	Japan	80	80	80	82	82	82	73	77	78	78	78	78	78	79	78	83	84	82	85	85	85	86
17	Kiribati	…	…	…	64	65	65	…	…	61	60	62	62	62	63	…	…	66	65	66	67	67	67
18	Lao PDR	52	53	…	55	59	59	42	52	54	52	54	54	58	58	45	55	57	56	56	56	60	60
19	Macao (China)	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
20	Malaysia	71	72	72	72	72	72	64	70	68	68	69	70	70	69	67	74	70	74	74	75	75	74
21	Maldives	63	64	65	66	65	67	56	66	63	62	64	67	66	66	53	63	63	61	64	66	64	68
22	Marshall Islands	…	…	…	63	61	62	…	…	64	63	61	61	60	60	…	…	67	68	64	65	63	64
23	Micronesia, Federated States of	…	…	…	67	70	70	…	…	66	64	65	65	68	68	…	…	70	68	68	68	71	71
24	Mongolia	65	65	66	63	65	65	55	64	59	61	61	60	62	61	58	67	65	67	68	66	69	69
25	Myanmar	59	59	60	59	59	59	50	59	58	56	55	56	56	56	53	62	59	61	60	62	63	63

		Both sexes						Male								Female							
	Country/area	1995	1996	1997	2002	2003	2004	1978	1998	1999	2000	2001	2002	2003	2004	1978	1998	1999	2000	2001	2002	2003	2004
26	Nauru	...	...	...	63	61	61	...	...	56	59	59	60	58	58	...	...	63	67	66	67	65	65
27	Nepal	55	56	...	60	61	61	47	58	57	59	59	60	60	61	45	57	58	58	58	60	61	61
28	New Caledonia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	New Zealand	76	76	77	79	79	80	69	74	74	76	76	77	77	77	76	80	79	81	81	81	82	82
30	Niue	...	...	...	70	71	71	...	...	68	70	68	68	68	68	...	...	71	73	74	73	74	74
31	Northern Mariana Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32	Palau	...	...	...	69	68	68	...	...	65	52	67	66	66	67	...	...	70	69	71	71	70	70
33	Papua New Guinea	57	57	...	60	60	60	50	57	53	55	58	58	59	58	50	59	57	58	61	62	62	61
34	Philippines	67	68	...	68	68	68	58	67	64	62	64	65	65	65	61	70	69	71	72	72	71	72
35	Pitcairn Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...
36	Republic of Korea	72	72	...	76	76	77	61	69	69	71	71	72	73	73	68	76	76	78	79	79	80	80
37	Samoa	69	69	69	68	68	68	61	69	65	57	67	67	67	66	64	74	71	73	70	70	70	70
38	Singapore	75	76	...	80	80	80	69	75	75	75	77	77	78	77	73	79	81	80	81	82	82	82
39	Solomon Islands	71	71	...	65	70	68	63	70	62	67	65	64	69	66	67	74	64	71	68	67	73	70
40	Sri Lanka	72	73	73	70	71	71	65	71	66	68	67	67	68	68	69	75	73	75	74	74	75	75
41	Thailand	69	68	69	69	70	70	59	66	66	66	66	66	67	67	63	72	70	72	72	73	73	73
42	Timor-Leste	...	...	...	58	58	63	...	...	...	...	...	55	55	61	...	...	...	...	...	61	61	66
43	Tokelau	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
44	Tonga	...	...	...	71	71	71	...	...	68	67	68	70	71	71	...	...	73	73	71	71	71	70
45	Tuvalu	...	...	...	61	61	61	...	...	64	64	62	60	61	61	...	...	66	68	65	61	62	62
46	Vanuatu	66	67	...	68	68	68	55	66	59	61	65	66	67	63	59	70	63	68	67	69	69	69
47	Viet Nam	66	67	...	70	71	71	54	65	65	67	67	67	68	68	58	70	69	71	72	72	74	74
48	Wallis and Futuna	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

... Data not available

Source: *The world health report (1996, 1997, 1998, 1999, 2001, 2002, 2003, 2005, 2006)*. Geneva, World Health Organization.

Table 5.15 Health-adjusted life expectancy at birth (in years) with uncertainty intervals, healthy years lost, and percentage of life expectancy at birth (LEB) in Asia Pacific Region countries and areas, 2002

	Country/area	Both sexes	Health-adjusted life expectancy (HALE)				Healthy years lost		% of LEB (Healthy years lost / LEB) x 100	
			Male		Female		$(LEB_{2002}) - (HALE_{2002})$			
			HALE	Uncertainty interval	HALE	Uncertainty interval	M	F	M	F
1	American Samoa	...	...	...	...	...	...	...	...	...
2	Australia	72.6	70.9	70.2 - 71.4	74.3	73.7 - 75.1	7.0	8.7	9.0	10.4
3	Bangladesh	54.3	55.3	54.0 - 56.7	53.3	52.2 - 54.7	7.3	9.3	11.7	14.8
4	Bhutan	52.9	52.9	46.3 - 58.8	52.9	45.5 - 57.5	7.3	9.5	12.1	15.2
5	Brunei Darussalam	65.3	65.1	63.8 - 66.4	65.5	64.7 - 66.6	9.7	11.9	13.0	15.4
6	Cambodia	47.5	45.6	39.5 - 49.9	49.5	42.5 - 54.0	6.3	7.6	12.1	13.3
7	China	64.1	63.1	62.2 - 63.9	65.2	64.3 - 66.2	6.5	7.6	9.3	10.4
8	Cook Islands	61.6	60.6	58.9 - 61.2	62.7	61.7 - 63.8	8.6	11.5	12.5	15.5
9	DPR Korea	58.8	58.0	50.9 - 64.2	59.7	51.6 - 65.7	6.4	7.4	10.0	11.0
10	Fiji	58.8	56.9	56.4 - 58.6	60.6	60.1 - 62.4	7.7	9.7	12.0	13.8
11	French Polynesia	...	...	...	...	...	...	...	...	...
12	Guam	...	...	...	...	...	...	...	...	...
13	Hong Kong (China)	...	...	...	...	...	...	...	...	...
14	India	53.5	53.3	52.5 - 54.1	53.6	52.7 - 54.6	6.8	8.4	11.3	13.6
15	Indonesia	58.1	57.4	56.6 - 58.4	58.9	58.1 - 59.9	7.5	9.1	11.5	13.4
16	Japan	75.0	72.3	71.5 - 73.1	77.7	76.9 - 78.1	6.1	7.5	7.8	8.8
17	Kiribati	54.0	52.3	51.1 - 53.4	55.6	54.7 - 57.0	9.5	11.0	15.4	16.5
18	Lao PDR	47.0	47.1	44.8 - 49.6	47.0	44.7 - 49.5	7.0	9.2	12.9	16.4
19	Macao (China)	...	...	...	...	...	...	...	...	...
20	Malaysia	63.2	61.6	60.8 - 62.5	64.8	64.1 - 65.6	8.0	10.0	11.4	13.3
21	Maldives	57.8	59.0	58.1 - 60.5	56.6	55.7 - 57.7	7.5	9.0	11.3	13.8
22	Marshall Islands	54.8	53.9	52.3 - 55.7	55.7	54.4 - 57.3	7.2	8.9	11.7	13.8
23	Micronesia, Federated States of	57.7	57.0	55.2 - 59.0	58.4	56.6 - 60.4	7.9	9.6	12.2	14.2
24	Mongolia	55.6	53.3	52.4 - 54.4	58.0	57.1 - 58.9	6.8	8.0	11.3	12.1
25	Myanmar	51.7	49.9	43.2 - 55.9	53.5	45.5 - 58.8	6.3	8.4	11.2	13.5
26	Nauru	55.1	52.7	49.6 - 56.2	57.5	55.0 - 60.5	6.9	9.0	11.6	13.5
27	Nepal	51.8	52.5	51.3 - 53.6	51.1	50.2 - 52.3	7.4	9.1	12.4	15.1

	Country/area	Health-adjusted life expectancy (HALE)					Healthy years lost (LEB_{2002}) – ($HALE_{2002}$)		% of LEB (Healthy years lost / LEB) x 100	
		Both sexes	Male		Female					
			HALE	Uncertainty interval	HALE	Uncertainty interval	M	F	M	F
28	New Caledonia	…	…	…	…	…	…	…	…	…
29	New Zealand	70.8	69.5	68.8 - 70.2	72.2	71.5 - 73.0	7.2	9.0	9.3	11.1
30	Niue	60.4	58.9	55.7 - 61.4	62.0	59.9 - 64.3	8.6	11.3	12.8	15.5
31	Northern Mariana Islands	…	…	…	…	…	…	…	…	…
32	Palau	59.6	58.7	57.9 - 59.7	60.5	59.6 - 61.7	7.7	10.4	11.5	14.7
33	Papua New Guinea	51.9	51.4	49.7 - 53.6	52.4	50.9 - 54.4	7.0	9.1	12.0	14.8
34	Philippines	59.3	57.1	56.2 - 58.1	61.5	60.6 - 62.6	8.0	10.2	12.4	14.3
35	Pitcairn Islands	…	…	…	…	…	…	…	…	…
36	Republic of Korea	67.8	64.8	64.1 - 65.6	70.8	70.1 - 71.6	6.9	8.6	9.7	10.8
37	Samoa	59.7	59.2	58.1 - 60.3	60.3	59.3 - 61.6	7.6	9.4	11.3	13.5
38	Singapore	70.1	68.8	67.7 - 70.0	71.3	70.6 - 72.1	8.6	10.4	11.1	12.7
39	Solomon Islands	56.2	55.4	53.4 - 57.6	57.1	55.7 - 58.8	8.3	10.3	13.0	15.3
40	Sri Lanka	61.6	59.2	57.3 - 61.0	64.0	63.0 - 65.1	8.0	10.3	11.8	13.9
41	Thailand	60.1	57.7	56.5 - 58.9	62.4	61.5 - 63.5	8.4	10.2	12.7	14.1
42	Timor-Leste	49.8	47.9	40.8 - 53.6	51.8	43.5 - 56.9	6.9	8.7	12.7	14.4
43	Tokelau	…	…	…	…	…	…	…	…	…
44	Tonga	61.8	61.9	61 .0 - 62.7	61.8	61.0 - 62.7	8.2	9.6	11.7	13.5
45	Tuvalu	53.0	53.0	51.3 - 54.7	53.1	51.1 - 54.9	7.0	8.3	11.7	13.6
46	Vanuatu	58.9	58.5	56.9 - 60.3	59.4	57.9 - 61.2	8.0	9.8	12.0	14.1
47	Viet Nam	61.3	59.8	58.7 - 60.9	62.9	62.0 - 64.2	7.4	9.3	11.0	12.9
48	Wallis and Futuna	…	…	…	…	…	…	…	…	…

… Data not available

LEB values are derived from Annex Table 5.14

Source: *The world health report 2004: changing history*. Geneva, World Health Organization, 2004

Table 5.16 Health-adjusted life expectancy by sex in Asia Pacific Region countries and areas, 2000-2002

	Country/area	Both			Male			Female		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
1	American Samoa	…	…	…	…	…	…	…	…	…
2	Australia	71.5	71.6	72.6	69.6	70.1	70.9	73.3	73.2	74.3
3	Bangladesh	49.3	52.1	54.3	50.6	51.7	55.3	47.9	52.6	53.3
4	Bhutan	49.2	51.4	52.9	50.1	50.0	52.9	48.2	52.9	52.9
5	Brunei Darussalam	64.9	62.0	65.3	63.8	60.4	65.1	65.9	63.7	65.5
6	Cambodia	47.1	46.4	47.5	45.6	43.0	45.6	48.7	49.9	49.5
7	China	62.1	63.2	64.1	60.9	62.0	63.1	63.3	64.3	65.2
8	Cook Islands	60.7	60.5	61.6	60.4	58.3	60.6	61.1	62.6	62.7
9	DPR Korea	55.4	…	58.8	…	…	58.0	…	…	59.7
10	Fiji	59.6	58.8	58.8	58.7	56.8	56.9	60.5	60.8	60.6
11	French Polynesia	…	…	…	…	…	…	…	…	…
12	Guam	…	…	…	…	…	…	…	…	…
13	Hong Kong (China)	…	…	…	…	…	…	…	…	…
14	India	52.0	51.4	53.5	52.2	51.5	53.3	51.7	51.3	53.6
15	Indonesia	57.4	56.7	58.1	56.5	56.1	57.4	58.4	57.2	58.9
16	Japan	73.8	73.6	75.0	71.2	71.4	72.3	76.3	75.8	77.7
17	Kiribati	53.6	53.2	54.0	52.8	51.1	52.3	54.4	55.4	55.6
18	Lao PDR	44.7	44.2	47.0	43.7	42.4	47.1	45.7	46.0	47.0
19	Macao (China)	…	…	…	…	…	…	…	…	…
20	Malaysia	61.6	60.4	63.2	59.7	57.6	61.6	63.4	63.2	64.8
21	Maldives	52.4	51.9	57.8	54.2	49.6	59.0	50.6	54.3	56.6
22	Marshall Islands	56.1	52.6	54.8	54.8	50.4	53.9	57.4	54.7	55.7
23	Micronesia, Federated States of	56.6	55.8	57.7	55.8	54.0	57.0	57.5	57.5	58.4
24	Mongolia	52.4	53.9	55.6	50.3	49.9	53.3	54.5	58.0	58.0
25	Myanmar	49.1	48.9	51.7	47.7	46.5	49.9	50.5	51.4	53.5
26	Nauru	52.9	52.7	55.1	50.4	48.8	52.7	55.4	56.6	57.5
27	Nepal	45.8	48.9	51.8	47.5	48.7	52.5	44.2	49.1	51.1

	Country/area	Both			Male			Female		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
28	New Caledonia	…	…	…	…	…	…	…	…	…
29	New Zealand	70.8	70.3	70.8	69.5	69.1	69.5	72.1	71.5	72.2
30	Niue	61.1	59.1	60.4	60.8	56.4	58.9	61.4	61.9	62.0
31	Northern Mariana Islands	…	…	…	…	…	…	…	…	…
32	Palau	57.7	57.7	59.6	56.5	55.5	58.7	58.9	59.9	60.5
33	Papua New Guinea	46.8	49.8	51.9	46.6	47.9	51.4	47.1	51.8	52.4
34	Philippines	59.0	55.5	59.3	57.0	51.1	57.1	60.9	59.8	61.5
35	Pitcairn Islands	…	…	…	…	…	…	…	…	…
36	Republic of Korea	66.0	67.4	67.8	63.2	64.5	64.8	68.8	70.3	70.8
37	Samoa	59.9	57.7	59.7	58.2	56.0	59.2	61.6	59.5	60.3
38	Singapore	67.8	68.7	70.1	66.8	67.9	63.0	68.9	69.5	69.4
39	Solomon Islands	59.0	54.8	56.2	58.0	52.6	55.4	60.1	56.9	57.1
40	Sri Lanka	61.1	58.9	61.6	58.6	55.2	59.2	63.6	62.6	64.0
41	Thailand	59.7	58.6	60.1	57.7	56.4	57.7	61.8	60.8	62.4
42	Timor-Leste	…	…	…	…	…	…	…	…	51.8
43	Tokelau	…	…	…	…	…	…	…	…	…
44	Tonga	60.7	58.8	61.8	59.3	57.1	61.9	62.0	60.4	61.8
45	Tuvalu	57.0	53.9	53.0	56.4	52.0	53.0	57.6	55.7	53.1
46	Vanuatu	56.7	54.9	58.9	56.0	53.4	58.5	57.4	56.3	59.4
47	Viet Nam	58.9	58.6	61.3	58.2	55.9	59.8	59.7	61.4	62.9
48	Wallis and Futuna	…	…	…	…	…	…	…	…	…

... Data not available

Source: *The world health report (2001, 2002, 2004).* Geneva, World Health Organization.

6

Burden of disease

Introduction

The global burden of disease (GBD) is a comprehensive assessment of mortality and disability from specific diseases, injuries and risk factors. A scientific, evidence-based approach to health issues that objectively quantifies the burden of disease, disability-adjusted life years (DALYs) is a comprehensive measurement of health gaps which combines premature mortality in populations along with the extent and severity of morbidity.

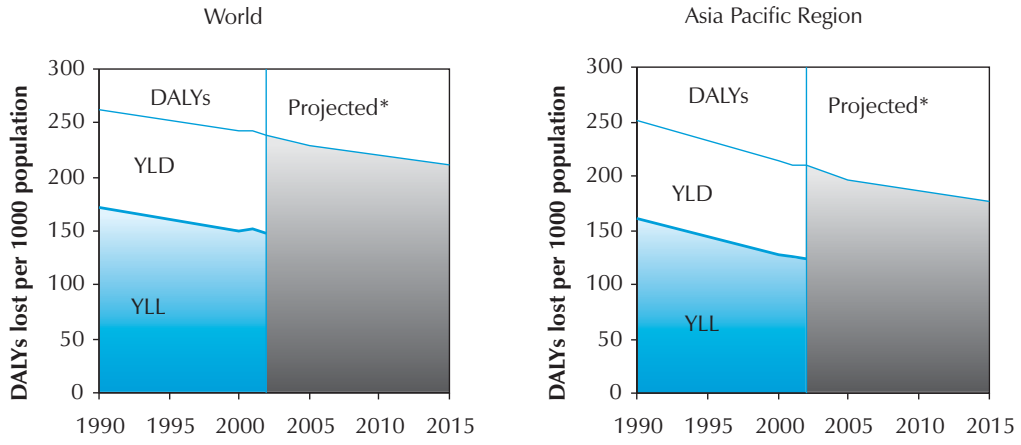
Disability-adjusted life years for a disease is years of life lost (YLL) due to premature death, plus years lost to disability (YLD), thus DALYs represent both mortality and morbidity. One DALY is one lost year of "healthy" life, and the burden of disease is a measurement of the gap between current health status and an ideal situation, in which everyone lives to old age free of disease and disability.[1]

Measurement of DALYs considers mortality with age at death, incidence of various types of adverse health conditions with age at onset, prevalence of morbidities with severity, duration and sequelae, and remission rates. These have been obtained for over 130 causes. The use of DALYs is a large step towards standardization and comparability of the burden of disease.

Any death earlier than the highest expectation of life is considered premature, and contributes to YLL. Similarly, the period of various disabilities during the entire life is equated to the loss of years of healthy life. In addition, years lost from the most productive and active periods of life are valued more than loss during childhood or old age, and future years lost are discounted for equivalence to the current year. A practical guide for carrying out such studies is available in WHO's *National burden of disease manual*.[2]

If everyone were to live in full health throughout their maximum potential lifespan, the loss of DALYs would be zero. In 2002, the world average of all DALYs was 239 per 1000 population, of which 148 (62%) are YLL due to premature mortality, and the remaining 91 (38%) are YLD. The decline in global DALYs since 1990 has been less than 1% per annum, even when adjusted for population growth (Figure 6.1).

Figure 6.1 Trend in years of life lost, years lost to disability and disability-adjusted life years lost per 1000 population



* 2005 and 2015 projections are available only for DALYs and disaggregated YLLs and YLDs are not available

Sources: For 1990 data: Murray CJL, Lopez AD, eds. *Global burden of disease, vol I*. Cambridge, Harvard School of Public Health, 1996.
For 2002 data: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html
For 2005 and 2015 data: *Projections of mortality and burden of disease to 2030*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodprojections2030/en/index.html

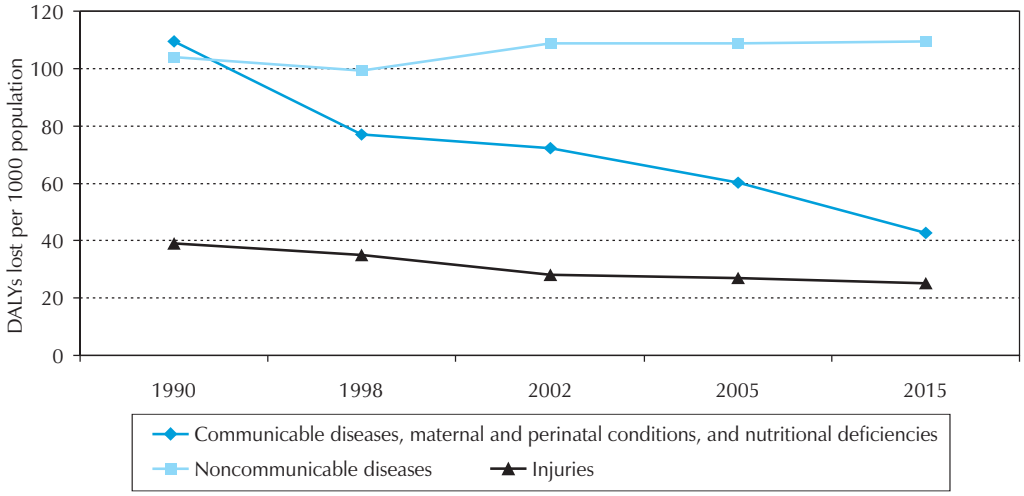
According to classification of condition, in 1990, DALYs were slightly higher for communicable, maternal and perinatal conditions, and nutritional deficiencies, compared to noncommunicable conditions. Since then, there has been a slight decrease, which is projected to continue until 2015, while DALYs for noncommunicable diseases continue to rise (Figure 6.2).

Globally, the share of DALYs lost to noncommunicable diseases has increased from 40.9% in 1990 to 46.8% in 2002 and is projected to rise at nearly the same rate until 2015. The share of nutritional deficiencies for this measure of health gap has dropped from 3.7% to 2.3% for the same period, and is projected to decline faster in the next decade (Table 6.1).

Disability-adjusted life years lost in the Asia Pacific Region

Compared to the developed countries of Europe, under-five mortality and morbidity is very high in the Asia Pacific Region, but the gap is projected to narrow by 2015 (Figure 6.3). The contribution of under-five mortality and morbidity in the Region to total DALYs was 37% in 1990, but had dropped to 27% by 2002. Since the total of all age groups is 100%, the contribution of those aged 60 and above has correspondingly increased. All DALYs lost indicate poor health, but the increased share among older ages implies that some causes of mortality and morbidity have shifted from younger to older age groups, at least for countries with well-developed economies.

Figure 6.2 Trends in disability-adjusted life years lost (per 1000 population) due to the major group of conditions in the Asia Pacific Region, 1990–2015



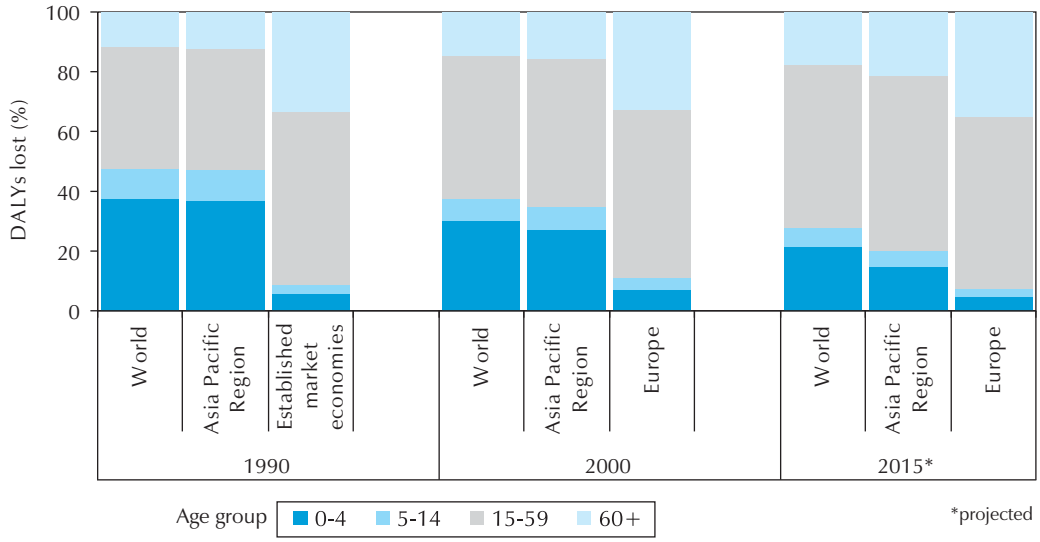
Sources: 1990: Murray CJL, Lopez AD, eds. *Global burden of disease, vol I*. Cambridge, Harvard School of Public Health, 1996. Annex Tables 9c, 9d and 9e.

1998: *The world health report 1999: making a difference*. Geneva, World Health Organization, 1999. Annex Table 3.

2002: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

2005 and 2015: *Projections of mortality and burden of disease to 2030*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodprojections2030/en/index.html

Figure 6.3 Comparative trend of disability-adjusted life years lost by age group worldwide, in the Asia Pacific Region and Europe



Sources: For 1990 data: Murray CJL, Lopez AD, eds. *Global burden of disease, vol I*. Cambridge, Harvard School of Public Health, 1996.

For 2000 data: *Global burden of disease (GBD) 2000*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2000v3/en/index.html

For 2015 data: *Projections of mortality and burden of disease to 2030*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodprojections2030/en/index.html

Table 6.1 Disability-adjusted life years lost worldwide by major groups of causes, 1990–2015

Year →	1990		1998		2002		Projected 2005		Projected 2015	
Population (thousands) →	5 267 000		5 884 576		6 224 985		6 441 919		7 103 297	
Cause ↓	Per 1000 pop.	%	Per 1000 pop.	%	Per 1000 pop.	%	Per 1000 pop.	%	Per 1000 pop.	%
Total DALYs lost	**261.9**	**100**	**234.9**	**100**	**239.4**	**100**	**228.3**	**100**	**210.2**	**100.0**
I. Communicable, maternal, perinatal and nutritional conditions	**115.0**	**43.9**	**96.1**	**40.9**	**98.0**	**41.0**	**88.8**	**38.6**	**75.0**	**34.6**
A Infectious and parasitic diseases	60.0	22.9	55.1	23.4	56.3	23.5	50.5	22.2	45.2	21.5
B Respiratory infections	22.2	8.5	14.5	6.2	15.2	6.3	13.5	5.9	9.5	4.5
C Maternal conditions	5.7	2.2	5.5	2.3	5.4	2.3	4.6	2.0	3.1	1.5
D Perinatal conditions	17.5	6.7	13.7	5.8	15.6	6.5	14.4	6.3	11.4	5.4
E Nutritional deficiencies	9.7	3.7	7.4	3.2	5.5	2.3	4.9	2.1	3.4	1.6
II Noncommunicable diseases	**107.2**	**40.9**	**100.8**	**42.9**	**112.1**	**46.8**	**111.7**	**49.0**	**110.2**	**52.5**
A Malignant neoplasms	13.4	5.1	13.7	5.8	12.1	5.1	12.3	5.4	12.7	6.0
B Other neoplasms	...	...	0.7	0.3	0.3	0.1	0.3	0.1	0.3	0.1
C Diabetes mellitus	2.1	0.8	2.0	0.8	2.6	1.1	2.8	1.2	3.7	1.7
D Endocrine disorders	1.2	0.4	1.0	0.4	1.3	0.5	1.2	0.5	1.0	0.5
E Neuropsychiatric conditions	27.5	10.5	27.1	11.5	31	13	30.8	13.5	30.0	14.3
F Sense organ diseases	2.0	0.8	2.1	0.9	11.1	4.7	11.4	5.0	12.1	5.8
G Cardiovascular diseases	25.3	9.7	24.3	10.3	23.8	9.9	23.8	10.4	22.6	10.7
H Respiratory diseases	11.5	4.4	10.5	4.5	8.9	3.7	9.0	4.0	9.4	4.5
I Digestive diseases	9.0	3.4	7.0	3.0	7.5	3.1	7.1	3.1	6.0	2.9

Year →	1990		1998		2002		Projected 2005		Projected 2015	
Population (thousands) →	5 267 000		5 884 576		6 224 985		6 441 919		7 103 297	
Cause ↓	Per 1000 pop.	%	Per 1000 pop.	%	Per 1000 pop.	%	Per 1000 pop.	% cent	Per 1000 pop.	%
J Genitourinary diseases	2.9	1.1	2.6	1.1	2.4	1	2.4	1.0	2.3	1.1
K Skin diseases	0.0	0.0	0.3	0.1	0.6	0.3	0.6	0.3	0.6	0.3
L Musculoskeletal diseases	3.6	1.4	3.6	1.6	4.8	2	4.9	2.1	4.9	2.3
M Congenital anomalies	6.3	2.4	4.8	2.0	4.4	1.8	4.1	1.8	3.3	1.6
N Oral conditions	1.4	0.5	1.4	0.6	1.2	0.5	1.2	0.5	1.2	0.6
III. Injuries	**39.6**	**15.1**	**37.7**	**16.0**	**29.2**	**12.2**	**28.8**	**12.6**	**27.4**	**13.0**
A Unintentional injuries	28.9	11.0	26.5	11.3	21.4	8.9	20.8	9.1	19.5	9.3
B Intentional injuries	10.7	4.1	11.1	4.7	7.9	3.3	7.8	3.4	7.9	3.7

... Data not availbale

Sources: For 1990 data: Murray CJL, Lopez AD, eds. *Global burden of disease, vol I*. Cambridge, Harvard School of Public Health, 1996.

For 1998 data: *The world health report 1999: making a difference*. Geneva, World Health Organization, 1999.

For 2002 data: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

For 2005 and 2015 data: *Projections of mortality and burden of disease to 2030*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodprojections2030/en/index.html

In 2002, the contribution of the Asia Pacific Region to total DALYs lost worldwide was 46%. Both morbidity and mortality are declining more rapidly in the Region than elsewhere, but DALYs for noncommunicable diseases are higher than communicable diseases, a trend reversed for the rest of the world (Table 6.2).

Table 6.2 Worldwide premature death and disability by conditions compared to the Asia Pacific Region, 2002

Cause	World			Asia Pacific		
	YLL	YLD	DALYs	YLL	YLD	DALYs
All causes	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
I. Communicable, maternal, perinatal and nutritional conditions	**53.63**	**20.36**	**40.96**	**45.48**	**19.01**	**34.56**
A. Infectious and parasitic diseases	32.23	9.34	23.51	22.26	7.79	16.29
B. Respiratory infections	9.59	1.08	6.35	9.47	1.13	6.03
C. Maternal conditions	1.63	3.27	2.26	1.39	3.14	2.11
D. Perinatal conditions	8.91	2.67	6.53	11.20	2.82	7.74
E. Nutritional deficiencies	1.27	4.00	2.31	1.16	4.12	2.38
II. Noncommunicable diseases	**33.33**	**68.77**	**46.83**	**39.36**	**70.14**	**52.06**
A. Malignant neoplasms	7.76	0.69	5.07	9.19	0.44	5.58
B. Other neoplasms	0.19	0.00	0.12	0.16	0.00	0.10
C. Diabetes mellitus	0.93	1.34	1.09	1.04	1.35	1.17
D. Endocrine disorders	0.41	0.73	0.53	0.44	0.28	0.37
E. Neuropsychiatric conditions	1.43	31.72	12.97	1.24	31.48	13.72
F. Sense organ diseases	0.00	12.22	4.66	0.01	14.30	5.91
G. Cardiovascular diseases	13.66	3.91	9.94	15.59	4.23	10.90
H. Respiratory diseases	3.07	4.73	3.7	4.45	4.59	4.51
I. Digestive diseases	2.90	3.47	3.12	3.71	3.25	3.52
J. Genitourinary diseases	1.00	1.06	1.02	1.24	0.98	1.13
K. Skin diseases	0.08	0.54	0.25	0.06	0.53	0.25
L. Musculoskeletal diseases	0.12	5.11	2.02	0.13	5.49	2.34
M. Congenital anomalies	1.76	1.96	1.84	2.11	1.98	2.05
N. Oral conditions	0.00	1.29	0.49	0.00	1.25	0.52
III. Injuries	**13.04**	**10.86**	**12.21**	**15.16**	**10.85**	**13.38**
A. Unintentional injuries	8.89	9.00	8.93	10.76	9.73	10.33
B. Intentional injuries	4.15	1.86	3.28	4.40	1.13	3.05

Source: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

Note that in Table 6.2, the major contributors to YLD are diseases with a low case-fatality rate and a chronic course; for example, neuropsychiatric conditions (31% of YLD) and sense organ diseases (14% of YLD). These conditions are gradually being noticed because of the considerable burden of the disease brought about by their chronicity and, therefore, higher cost of treatment, impact on social

relationships and loss of economic opportunities for those afflicted. Despite recent advances in neuroscience, much remains to be understood about these conditions, and greater attention and resources are needed to address the burden they create.

In 1990, average DALYs lost in the Region was 253 per 1000 population, but dropped 17% to 209 per 1000 by 2002 (Table 6.3), with communicable, maternal, perinatal and nutritional conditions steadily declining. Among specific conditions in this group, the greatest decline was in nutritional deficiencies, and the smallest in perinatal conditions.

Table 6.4 presents the country-specific DALYs (percentage and per 1000 population) of the major groups of conditions. For communicable, maternal, perinatal and nutritional conditions, low-resource countries such as Cambodia, the Lao People's Democratic Republic and Timor-Leste have the highest percentage of DALYs. By contrast, high-resource countries such as Australia, Japan, New Zealand and Singapore have the highest percentage of DALYs due to noncommunicable diseases. China has the highest for injuries (15%), while Mongolia, Sri Lanka, India, Thailand, Indonesia, Viet Nam and Bangladesh closely follow each other. Of all conditions, the Lao People's Democratic Republic has the highest DALYs per 1000 (403.1), followed by Cambodia (384.5) and Nepal (303.5).

The hidden burden of disease

Although DALYs were developed to measure disease burden, a hidden burden exists for each morbidity condition, and some of this hidden burden is currently unquantifiable.

Costs borne by families is one example of a hidden disease burden, particularly in countries lacking specialized health services. The economic cost to industry through higher health coverage of employees is another that is yet to be studied in detail.

A group of conditions with an obvious yet hidden burden are neuropsychiatric conditions, because the burden has not been quantified in DALYs. These disorders are responsible for 13% of DALYs worldwide and 14% in the Asia Pacific Region. In the midst of this increasing burden, recognition of mental disorders as a major health problem remains low, or nonexistent, in many national health programmes.

Evidence suggests that the poor and marginalized in developing countries are at greater risk and females are most greatly affected by mental disorders. Between 10% to 30% of women in developing countries suffer from depression during pregnancy and childbirth. This impacts child care and health. The negative health implications for children of depressed mothers can be substantial and they may suffer serious somatic effects as well.[3,4]

Although the precise mechanisms involving the interaction of social and biological factors that lead to mental disorders are unclear, there is ample evidence to banish the scepticism in developing countries that little can be done for many mental disorders, particularly depression. Primary prevention through education and economic empowerment, and secondary prevention by training medical-care providers to recognize and treat common mental diseases, should be explored.

Suicide, although classified under the category of injuries is related to this, and is now a leading cause of death among young women of reproductive age in China and India. Complications arising from unsuccessful suicide attempts, from wrist drop to wrist slashing, or injuries from ingesting corrosive materials, leave not only physical but also psychological scars.

Table 6.3 Trend in disability-adjusted life years lost per 1000 population in the Asia Pacific Region

Cause ↓	1990	1998	2002	2005+	2015+
Population (thousands)→	**2 667 000.0**	**3 136 209.0**	**3 308 368.9**	**3 419 785.4**	**3 705 468.0**
Total DALYs lost (per 1000 pop.) →	**252.6**	**211.0**	**209.0**	**196.3**	**177.2**
I. Communicable, maternal, perinatal and nutritional conditions	**109.5**	**76.9**	**72.2**	**60.3**	**42.8**
A. Infectious and parasitic diseases	50.7	36.9	34.0	28.4	23.0
B. Respiratory infections	19.6	13.9	12.6	10.1	5.6
C. Maternal conditions	8.1	4.7	4.4	3.5	1.8
D. Perinatal conditions	17.7	13.0	16.2	14.2	9.9
E. Nutritional deficiencies	11.1	8.3	5.0	4.2	2.6
II. Noncommunicable diseases	**104.0**	**99.1**	**108.8**	**108.9**	**109.4**
A. Malignant neoplasms	12.8	13.9	11.7	12.1	13.3
B. Other neoplasms	0.0	0.5	0.2	0.2	0.2
C. Diabetes mellitus	1.7	1.5	2.4	2.6	3.2
D. Endocrine disorders	0.4	0.4	0.8	0.7	0.6
E. Neuropsychiatric conditions	25.8	25.7	28.7	28.5	28.0
F. Sense organ diseases	2.5	2.6	12.3	12.6	13.5
G. Cardiovascular diseases	24.1	23.1	22.8	22.8	22.4
H. Respiratory diseases	13.0	12.9	9.4	9.8	10.8
I. Digestive diseases	9.3	7.0	7.4	6.8	5.6
J. Genitourinary diseases	2.4	2.1	2.4	2.3	2.2
K. Skin diseases	0.0	0.2	0.5	0.5	0.5
L. Musculoskeletal diseases	2.6	2.9	4.9	4.9	5.1
M. Congenital anomalies	7.0	5.0	4.3	3.8	3.0
N. Oral conditions	1.3	1.3	1.1	1.1	1.2
III. Injuries	**39.1**	**35.1**	**28.0**	**27.1**	**25.0**
A. Unintentional injuries	32.3	17.3	21.6	20.8	19.0
B. Intentional injuries	6.8	6.5	6.4	6.3	6.1

+ Projected

Sources: 1990: Murray CJL, Lopez AD, eds. *Global burden of disease, vol I*. Cambridge, Harvard School of Public Health, 1996. Annex Tables 9c, 9d and 9e

1998: *The world health report 1999: making a difference*. Geneva, World Health Organization, 1999. Annex Table 3

2002: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

2005 and 2015: *Projections of mortality and burden of disease to 2030*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodprojections2030/en/index.html

Table 6.4 Disability-adjusted life years by major disease conditions in selected Asia Pacific Region countries, 2002

	Country and area	DALYs lost (%)			DALYs lost per 1000 population			
		Group I conditions*	Noncommu-nicable diseases	Injuries	Group I conditions*	Noncommu-nicable diseases	Injuries	All causes
1	Australia	5.1	85.1	9.8	5.6	93.8	10.8	110.2
2	Bangladesh	47.1	40.7	12.2	121.1	104.6	31.4	257.1
3	Bhutan	51.7	36.8	11.5	152.1	108.2	33.8	294.1
4	Brunei Darussalam	15.6	73.3	11.1	20.0	94.3	14.3	128.6
5	Cambodia	62.4	30.8	6.8	239.8	118.5	26.3	384.5
6	China	18.5	66.4	15.0	28.5	102.2	23.1	153.8
7	Cook Islands	33.3	66.7	0.0	55.6	111.1	0.0	166.7
8	DPR Korea	33.4	57.8	8.8	71.2	123.2	18.7	213.0
9	Fiji	26.4	66.3	7.4	51.7	130.0	14.4	196.1
10	India	45.3	41.4	13.3	129.6	118.2	37.9	285.8
11	Indonesia	31.0	56.0	13.1	66.2	119.6	27.9	213.6
12	Japan	5.6	84.3	10.1	5.9	87.9	10.5	104.3
13	Kiribati	33.3	62.5	4.2	92.0	172.4	11.5	275.9
14	Lao People's Democratic Republic	60.4	27.9	11.7	243.4	112.5	47.2	403.1
15	Malaysia	19.9	69.6	10.5	29.0	101.8	15.4	146.3
16	Maldives	41.7	48.3	8.3	80.9	93.9	16.2	190.9
17	Marshall Islands	23.1	61.5	7.7	57.7	153.8	19.2	230.8
18	Micronesia, Federated States of	31.8	59.1	9.1	64.8	120.4	18.5	203.7
19	Mongolia	29.3	57.1	13.8	66.4	129.3	31.3	227.0
20	Myanmar	49.8	38.9	11.3	148.0	115.8	33.6	297.3
21	Nauru	33.3	66.7	0.0	76.9	153.8	0.0	230.8
22	Nepal	51.9	36.8	11.3	157.5	111.6	34.4	303.5
23	New Zealand	4.9	85.4	9.7	5.7	100.4	11.4	117.5
24	Palau	25.0	50.0	0.0	50.0	100.0	0.0	150.0
25	Papua New Guinea	54.0	35.9	10.1	155.4	103.5	29.0	287.9
26	Philippines	33.0	57.6	9.4	63.0	109.9	17.9	190.8
27	Republic of Korea	11.0	76.1	0.3	14.8	102.3	0.4	117.5
28	Samoa	27.6	65.5	6.9	45.5	108.0	11.4	164.8
29	Singapore	10.4	83.5	6.1	11.0	88.2	6.5	105.7
30	Solomon Islands	40.4	54.1	6.4	95.0	127.4	15.1	237.6
31	Sri Lanka	15.3	71.3	13.4	28.4	131.9	24.7	185.1
32	Thailand	29.8	56.9	13.3	61.1	116.7	27.2	205.1
33	Timor-Leste	63.4	25.5	11.1	131.3	52.8	23.0	207.0
34	Tonga	25.0	68.8	6.3	38.8	106.8	9.7	155.3
35	Tuvalu	33.3	66.7	0.0	100.0	200.0	0.0	300.0
36	Vanuatu	31.6	60.5	7.9	58.0	111.1	14.5	183.6
37	Viet Nam	32.2	54.9	12.9	53.6	91.4	21.4	166.4

* Communicable diseases, maternal and perinatal conditions, and nutritional deficiencies

Source: Data calculated from: *Death and DALY estimates for 2002 by cause for WHO Member States*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/statistics/bodgbddeathdalyestimates.xls

Other psychosocial effects include anxiety and depression over impending death; fear of disability; chronic pain, and loss of ability to perform activities related to daily living, for example, those resulting from chronic diseases such as stroke, diabetes or cancer. For communicable diseases, mental illnesses and many other chronic illnesses that are stigmatized, shame and guilt are common. The SARS epidemic generated feelings of extreme vulnerability, uncertainty and threat to life during its initial outbreak phase. Over time, when the infection was being brought under control, depression and avoidance were evident among hospital workers in Taiwan.[5] Beyond the impact on individual health there was also an impact on families, occupations and on the national economy, all this attributed to hidden burdens of the epidemic.

Morbidity

Morbidity is the occurrence of ill-health and the effects of disease on a population. It is measured in various ways, often by the probability that a randomly selected individual in a population, at some time and place, will become seriously ill. Incidence and prevalence are both measures of morbidity, as is disability. Various chronic diseases bring about physical, sensory and cognitive impairments.

Morbidity data is difficult to collate across countries because of varying sources and dates, different approaches to diagnostic nomenclature, and the use of vague and nonspecific diagnoses. Available sources range from hospital reports, community surveys, routine surveillance and monitoring, and research. There are also varying health information system capabilities across countries, with some reflecting obviously poor data collection methods and others with more systematic health information systems.

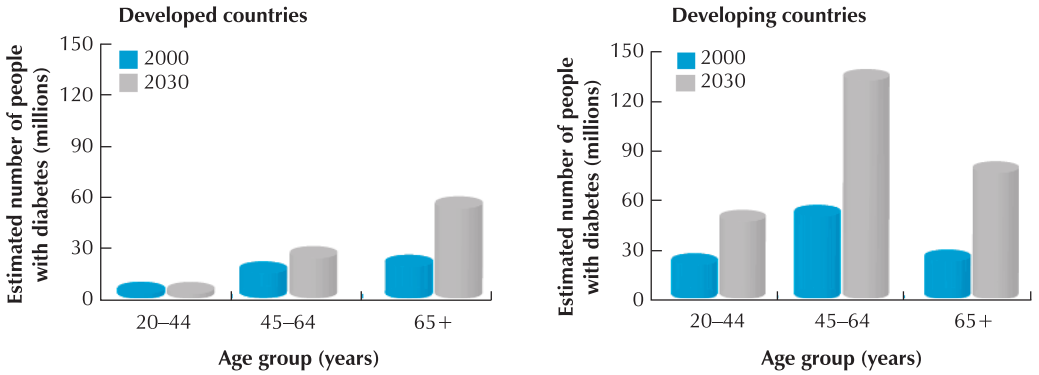
Recent available data generated by these varied sources from countries in the Asia Pacific Region include respiratory tract infections, childbirth-related conditions, diarrhoea, viral infections (including influenza), various skin diseases, other respiratory conditions, and injuries and accidents (including poisoning) as leading causes of morbidity.[6,7] Other causes of morbidity include various disorders of the cardiovascular system, parasitic infections, neoplasms and diabetes. Tuberculosis remains a major health challenge in some countries such as Cambodia, Indonesia, Nepal, the Philippines and Timor-Leste.[8,9] Malaria is the leading cause of morbidity in the Lao People's Democratic Republic, Myanmar, Solomon Islands and Vanuatu,[10] and in Indonesia it is anaemia.

Although available data gleaned from different sources show predominantly infectious diseases as leading causes of morbidity, particularly among the young, there is a growing concern over the increasing incidence of noncommunicable disease conditions such as cardiovascular disease and diabetes. Neuropsychiatric disorders, particularly depression, continue to be a public health challenge. Epidemiological transition is believed to partly play a role in the changing morbidity landscape.

The concept of epidemiologic transition is related to demographic transition (ageing populations) and nutrition transition, both part of a more broadly defined health transition. As life expectancy increases with demographic transition, cardiovascular disease is increasing rapidly in some developing countries. In India, cardiovascular disease cases were estimated to be 38 million in 2005, and may rise to 64 million by 2015. This is partly due to a growing and ageing population as well as an increasing prevalence of lifestyle-related risk factors.[11] The current estimate of more than 180 million people worldwide with diabetes is likely to more than double by 2030.[12] Since the 1980s, Japanese disease patterns have shifted to lifestyle-related diseases such as cancer, heart disease, cerebrovascular disease and diabetes.[13]

Figure 6.4 shows the estimated number of people with diabetes in both developed and developing countries. The rate of increase in diabetes cases appears to be higher in developing countries in comparison with developed countries.

Figure 6.4 Estimated number of people with diabetes in developed and developing countries, 2000 and 2030



Source: *Diabetes facts and figures*. Geneva, World Health Organization. Available from: http://www.who.int/diabetes/facts/en/index.html.

Neuropsychiatric disorders, on the other hand, have gained much attention. Although the prevalence of neuropsychiatric disorders varies widely, from 4.3% in Shanghai, China, to 26.4% in the United States of America, serious disorders are associated with substantial disability. [14] Four of the ten leading causes of YLD are due to neuropsychiatric disorders, such as depression, alcohol-use disorders, schizophrenia and bipolar disorder.[15]

In general, the epidemiologic transition is from a high occurrence of communicable diseases to noncommunicable diseases. Some countries, such as the Philippines, defy this expected pattern, with most of the leading causes of morbidity still being communicable diseases like diarrhoea, bronchitis, pneumonia, influenza, tuberculosis, malaria, chicken pox and measles. The situation is similar in Samoa, where there is persistent high morbidity due to communicable diseases, although obesity, diabetes and cardiovascular diseases are becoming more prevalent. Pregnancy-related disorders in Thailand are now overshadowed by intestinal diseases.

It is also important to note that morbidity from emerging and re-emerging infectious diseases has threatened public health safety. Among these are HIV/AIDS, SARS, avian flu, and tuberculosis, which has been difficult to control because of growing resistance to conventional therapies.

Maternal morbidity

Improving maternal health is one of the eight Millennium Development Goals. Conditions related to childbirth (pregnancy, delivery and obstetric complications) are among the five leading causes of morbidity. Maternal health also impacts child health, with depression following childbirth associated with poor child growth in developing countries. An association between psychological morbidity during pregnancy and low birth weight (<2.5 kg) was established in a cohort study in India. In this study, it was concluded that maternal psychological morbidity has an adverse impact on fetal growth.[16]

In a systematic review done to identify the main causes of maternal mortality and morbidity, the maternal conditions most frequently reported in studies were hypertensive disorders in pregnancy, stillbirth, pre-term delivery, induced abortion and haemorrhage. [17]

A useful indicator for measuring maternal morbidity is YLD. Table 6.7 shows the YLD due to maternal conditions in different countries, classified according to mortality strata. Overall, YLD for maternal conditions in Stratum D (high child and high adult mortality) countries is 10 times that of Stratum A (very low child and very low adult mortality) countries. Improving maternal health, particularly delivery, in many developing countries remains a challenge, despite the realization that maternal health is at the core of efforts to reduce poverty and inequality.

Table 6.7 Years lost due to disability for maternal conditions in females aged 15–44 in the Region (by mortality strata), 2002

Cause	Years lost due to disability			
	Stratum A	Stratum B	Stratum D	Region
Maternal haemorrhage	0.00	0.02	0.50	0.20
Maternal sepsis	0.48	2.26	4.48	3.02
Hypertensive disorders	0.00	0.00	0.00	0.00
Obstructed labour	0.05	0.53	2.59	1.28
Abortion	0.00	0.17	2.70	1.12
Others	1.53	4.12	8.94	5.83
Total maternal conditions	2.06	7.10	19.21	11.45

Note: There is no stratum C country in this Region

A. Very low child and very low adult mortality countries: Australia, Brunei Darussalam, Japan, New Zealand, Singapore

B. Low child and low adult mortality countries: Cambodia, China, Cook Islands, Fiji, Indonesia, Kiribati, the Republic of Korea, the Lao People's Democratic Republic, Malaysia, the Marshall Islands, the Federated States of Micronesia, Mongolia, Nauru, Niue, Palau, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam

C. Low child and high adult mortality countries: None

D. High child and high adult mortality countries: Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Timor-Leste, the Democratic People's Republic of Korea

E. High child and very high adult mortality countries: None

Source: Calculations based on: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

One of only a few available indicators for measuring maternal health at the population level is the percentage of women who have anaemia. Low birth weight and child and maternal mortality are possible outcomes of anaemia in pregnant women. The other direct adverse sequelae of iron deficiency anaemia are reduced work productivity among affected women and the possibility of mental retardation in affected children.[18]

Often asymptomatic, anaemia goes unnoticed and is widely prevalent among pregnant women. While it is practically absent (2% or less) in Guam, Hong Kong (China), Palau and Tokelau, it is disturbingly high (50% or more) in Cambodia, French Polynesia, India and the Federated States of Micronesia. At 44%, it is also a concern in the Philippines (Table 6.8). A maternal micronutrient

Table 6.8 Percentage of pregnant women with anaemia in selected Asia Pacific Region countries and areas		
Country/area	**Percentage**	**Year**
French Polynesia	66.6	2002
Cambodia	57.1	2005
Micronesia, Federated States of	51.0	2000
India	49.7	1998-99
Philippines	43.9	2003
American Samoa	32.0	2002
New Zealand	27.0	1998
Fiji	17.8	1998
Mongolia	12.1	2006
Marshall Islands	8.0	1999
Vanuatu	7.0	2003
Australia	6.2	2005
Northern Mariana Islands	4.6	2000
Hong Kong (China)	1.8	2006
Guam	1.2	2001
Palau	1.2	1998
Tokelau	0.0	1999

Sources: *Country health information profiles 2007*. Manila, WHO Regional Office for the Western Pacific, 2007. For India: *National Family Health Survey (NFHS-2) 1998-89*. Mumbai, International Institute for Population Sciences.

supplementation trial in rural Nepal found low serum iron concentrations in 40% of pregnant women and anaemia in 33%.[19]

Short height, age over 35, high parity, closely-spaced births and poor obstetric history are risk factors for poor pregnancy outcomes. Medical risk factors for adverse pregnancy outcomes are toxaemia and pre-eclampsia. [20] Although height, age and parity are useful indicators for identifying high-risk pregnancies, these are not modifiable. Augmenting maternal nutrition and hygiene are viable strategies for prevention of obstetric complications.

A very important component of maternal health is proper nutrition, as this determines fetal nutrition. Nutritional deficiencies in antenatal women can cause structural and functional changes *in utero* that may permanently increase susceptibility of the child to chronic diseases.[21] The role of micronutrients is important and a critical need in developing countries is meeting the requirements of calories and iron. This is not only limited to pregnant or women of child-bearing age. Considering the wide benefits of maternal nutrition, innovative approaches are needed. A more extensive discussion of maternal health is found in Chapter 9.

Undernutrition in children

The leading causes of morbidity, such as respiratory tract infections and diarrhoea, mostly affect children. Such morbidity arises from a large number of interrelated factors. Maternal condition has previously been cited as associated with child health. Child nutrition is another interrelated factor.

Undernutrition is an important cause of morbidity. Although overweight is gaining importance in developing countries, international commitments must continue undeterred to alleviate the major problem of undernutrition. Undernutrition compromises the body's defence from infections, and protein and energy malnutrition in children inhibits growth, increases risk of morbidity, affects development, and reduces subsequent school performance and labour productivity.[22] Severe undernutrition during infancy may contribute to lasting intellectual deficits.[23] Improved nutrition is not merely a public health imperative but a social responsibility. Table 6.9 shows the malnutrition situation in some selected countries in the Region. Undernutrition among children aged five and under, for both weight for age and weight for height, is high in Bangladesh. According to gender, the percentage of undernutrition is higher among males. Undernutrition is more prevalent in rural than urban areas.

Aside from undernutrition, the other nutrition-related problems, particularly among children, are iodine deficiency anaemia, vitamin A deficiency and obesity.

Table 6.9 Percentage of children (0 to 5 years) underweight for age and height in selected Asia Pacific Region countries

Country	Year	Weight for age (<-2SD)				Weight for height (<-2SD)			
		Male	Female	Urban	Rural	Male	Female	Urban	Rural
Bangladesh	2004	42.8	42.7	37.7	43.9	15.7	13.5	13.9	14.8
China	2002	7.2	6.4	3.1	8.0	3.3	2.7	2.4	3.2
Cambodia	2006	29.8	27.1	27.7	28.5	8.3	8.3	9.2	8.2
Indonesia	2004	20.7	18.7	16.9	21.9	15.3	13.5	13.1	15.4
DPR Korea	2002	19.2	16.2	16.8	18.5	9.3	8.1	8.7	8.8
Maldives	2001	25.5	26.0	…	…	14.3	12.2	…	…
Mongolia	2004	5.3	4.2	3.0	5.8	0.6	0.7	1.4	0.2
Myanmar	2003	31.1	28.2	24.7	31	11.5	9.8	9.3	11
Nepal	2006	37.7	39.8	23.2	40.9	13.0	12.4	7.5	13.4
Singapore	2000	3.6	2.9	…	…	3.8	3.3	…	…
Sri Lanka†	2000	22.0	23.8	…	…	16.5	14.3	…	…
Timor-Leste	2002	43.0	38.1	33.2	42.9	15.9	11.4	11.1	14.5
Viet Nam	2000	26.6	26.7	16.2	29.1	7.1	5.1	7.2	5.9

† Age 3 months to 5 years

… *Data not available*

Source: *WHO global database on child growth and malnutrition.* Geneva, World Health Organization. Available from: http://www.who.int/nutgrowthdb/database/countries/en/index.html/p-child.pdf

While poverty is frequently a contributing factor to undernutrition, the lack of proper nutritional knowledge complicates the problem. People may not know which available food resource is most nutritious. A basic problem is the deficiency of protein and energy, and this is compounded by deficiencies in micronutrients. A prudent low-cost diet which is wholesome with adequate calorie and micronutrient requirements can be determined. Development of proper food and eating habits is also essential, but such prescriptions must be specific to local conditions, such as what foods are available and are culturally acceptable.

Injuries

Injuries and accidents, including poisoning, are leading causes of mortality (discussed in Chapter 5) as well as morbidity.

Although injury is the fifth leading cause of death in both urban and rural China, nonfatal injuries are far greater: estimated to be at least 50 million annually, leaving 2.25 million suffering disability of

Table 6.10 Years lost due to disability from unintentional and intentional injuries (by mortality strata), 2002

Type of injury	Years lost due to disability			
	Stratum A	Stratum B	Stratum D	Region
Unintentional injuries	**2.67**	**6.01**	**12.51**	**8.39**
Road traffic accidents	0.43	1.36	1.83	1.50
Poisonings	0.03	0.02	0.02	0.02
Falls	0.79	1.64	2.60	1.97
Fire	0.05	0.17	1.18	0.56
Drownings	0.01	0.01	0.01	0.01
Other unintentional injuries	1.37	2.80	6.87	4.33
Intentional injuries	**0.34**	**0.82**	**1.26**	**0.97**
Self-inflicted injuries	0.25	0.23	0.59	0.37
Violence	0.08	0.45	0.54	0.47
War	0.01	0.13	0.12	0.12
Other intentional injuries	0.00	0.01	0.01	0.01

A. Very low child and very low adult mortality countries: Australia, Brunei Darussalam, Japan, New Zealand, Singapore
B. Low child and low adult mortality countries: Cambodia, China, Cook Islands, Fiji, Indonesia, Kiribati, the Republic of Korea, the Lao People's Democratic Republic, Malaysia, the Marshall Islands, the Federated States of Micronesia, Mongolia, Nauru, Niue, Palau, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam
C. Low child and high adult mortality countries: None
D. High child and high adult mortality countries: Bangladesh, Bhutan, India, the Democratic People's Republic of Korea, Maldives, Myanmar, Nepal, Timor-Leste
E. High child and very high adult mortality countries: None

Source: Calculations based on: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

varying degrees.[24] In India, there has been a steep rise in trauma deaths in rural areas over the previous two decades, with five injured for every trauma death.[25]

When measuring the burden of injuries in YLL and YLD, the type of injury plays a large role. Unintentional injuries account for 13.2 YLL and 8.4 YLD per 1000 population. Figures are higher in high child and adult mortality countries (Stratum D) compared to other country categories. Among the identified types of unintentional injuries, falls contribute the most to the YLD. For intentional injuries, self-inflicted injuries are a close second to violence in terms of YLD (Table 6.10). Self-inflicted injuries are related to mental health issues, often called unsuccessful suicide attempts. Aside from the economic cost of self-inflicted injuries from direct health services, there is an unquantifiable psychosocial impact on the individual and the family, not to mention disability arising from sustained injuries in some cases.

Managing morbidity

Theoretically, mortality can only be delayed while morbidity can be eliminated. Sickness is assumed to be an integral part of life but it can be prevented with appropriate measures, treated with effective therapies, and complications prevented.

In less-resourced regions, major contributors to loss of healthy life are childhood and maternal underweight, unsafe sex, unsafe water, sanitation and hygiene, indoor smoke from solid fuels, and various micronutrient deficiencies.[26] High blood pressure, high cholesterol and tobacco are the major risk factors in low mortality countries, while unsafe sex is also a major risk factor in high mortality countries. Except for tobacco use, differences between males and females are minor.

The role of community awareness in health improvement does not always attract the appreciation it deserves. HIV/AIDS has affected large sections of the population in many countries because of lack of awareness about how it is spread and its consequences. Communicable diseases can become epidemics because of ignorance of the benefits of hygiene, clean water sources and immunizations. With increasing longevity, lifestyle diseases and their prevention are getting more attention. Health awareness should figure prominently in policy-making at every level.

Poor nourishment in childhood adversely affects health in adult life through a set of interlocking processes. Much of childhood undernutrition arises from nutritionally deprived mothers. Just as immunization programmes reduce inequality in childhood mortality, maternal nutrition can reduce inequalities in other aspects of health.

Clean water is absolutely essential for healthy living but its importance is not fully realized. Fresh water resources are scarce and uneven, and threatened by all types of contamination. Unsafe water, sanitation and hygiene are major contributors to high morbidity in high mortality countries (segment D) but that does not sufficiently capture the misery inflicted on the deprived segments of society.

Awareness, nutrition, vaccines and safe water are simple strategies but they present stiff implementation challenges, and it has been difficult to bring effective interventions to the needy. Accelerated efforts may produce results if the capability of health systems to carry out interventions is enhanced and other sectors become involved. Building national ownership and the capacity to implement programmes are crucial for this purpose.

Countries must develop criteria to identify priorities and allocate resources accordingly. Large investments poured into diagnostic and curative services meet the market needs generated by the well-off in developing countries but may not be cost-effective in the long run. Various public health strategies (e.g. awareness, nutrition, vaccines and safe water) also compete for resources, raising the relevance of the prioritization issue. For maximum health gains, thorough analysis of the costs and benefits of various interventions should be carried out, based on the best evidence, with morbidity and mortality assessment guiding resource allocation and evidence-based policy.

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7

Priority communicable diseases

Introduction

Although the Asia Pacific Region is undergoing a major economic transition, much morbidity and mortality is still due to infections that are considered to be diseases of poverty. Large high-risk populations and high population densities contribute to their spread, abetted by urbanization, deforestation, climate change, increased trade, international air travel, civil turmoil and disasters. Infectious diseases have a major impact on the public health and economic development of the 3.4 billion people in the Region.[1] Many infections such as tuberculosis, helminths and diarrhoea are associated with poor sanitation, contaminated food, inadequate personal hygiene and lack of basic health services, conditions common in rural and agricultural areas of many countries. As a result of high-risk behaviours, some infections are present in pockets of very high prevalence, often among marginalized population groups.

The emergence of new diseases such as the severe acute respiratory syndrome (SARS), and the appearance of drug-resistant tuberculosis and malaria, counterfeit drugs, and insecticide-resistant vectors prove that the struggle against communicable disease will continue. This chapter provides detailed information about the most prevalent and serious infectious diseases in the Region and the resulting medical and social problems they cause, as well as the successful steps now being taken to combat them. Technical and organizational improvements have brought better diagnosis and treatment. Campaigns can effectively target the focus of infection, as with deworming in schools, immunization, and identification of animal and other vector reservoirs and hosts. Programmatic strategies include securing political commitment and resources, creating a stratified approach based on endemicity and transmission, mobilizing communities, and improving monitoring and evaluation. In several countries, the private sector has been brought into the effort to combat infectious diseases such as tuberculosis, and global cooperation and partnerships with national programmes have contributed to the success of disease control efforts, such as with lymphatic filariasis.

Communicable diseases can rapidly become a global problem and pose threats to national stability, and may require enormous human and economic resources to combat. It costs very little to protect an individual because of the cost-effectiveness and simplicity of many control measures, but most developing countries require external financial support for mass control programmes. Control strategies for many communicable diseases have key elements in common, including early diagnosis and case management, vector surveillance, and effective disease surveillance. Integrating and operationalizing these elements is a key primary health-care function, but many primary health-care systems are hampered by insufficient resources and organizational problems. Resources are still the main obstacle to scaling up control programmes, especially the more costly ones requiring a mass supply of medicines. The Global Fund to Fight AIDS, Tuberculosis and Malaria and other partnerships have made significant funding available for these programmes.

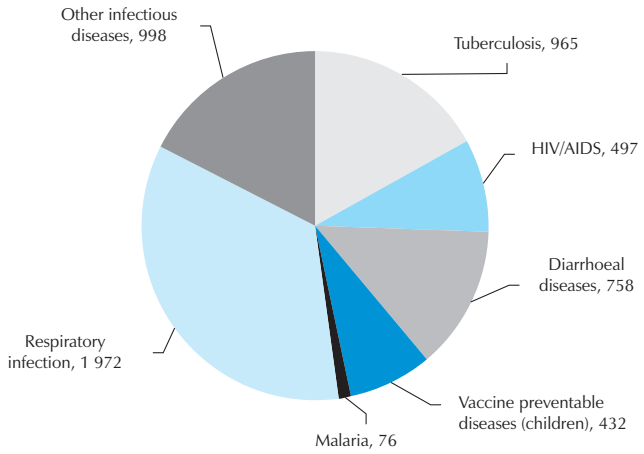
The challenges associated with emerging infectious diseases highlights the need for effective implementation of the International Health Regulations (2005), which provides a public health response to the international spread of disease. A common framework for strengthening national core capacities for the effective prevention and control of public health threats in the Region is now being used to plan capacity and implement sustainable, evidence-based measures to help countries cope with epidemics and emerging diseases.

7.1 Emerging infectious diseases: avian influenza, SARS and other diseases

In the 1960s it was commonly believed that the battle against infectious diseases had been won, but the emergence of new diseases such as the SARS reminds us that the struggle between microbes and mankind is far from over. Infectious diseases account for 26% of annual deaths worldwide and, according to *The world health report 2004* (WHO), 29.9% of 1.49 billion disability-adjusted life years (DALYs) lost every year.[2] These estimates do not include morbidity and mortality that occur as a consequence of past infections, including various cancers, liver diseases, acute rheumatic fever, gastric ulcers, and possibly cardiovascular diseases and diabetes mellitus. The greatest impact of infectious diseases is felt in the developing countries of Africa, the Eastern Mediterranean and the Asia Pacific Region. The potential for an infectious disease to develop into a widespread outbreak, with significant consequences in many developing countries, is ever present. With over half the world's population, the Asia Pacific Region has the highest burden of infectious diseases, which have a major impact on the public health and economic development of 3.4 billion people. Infectious diseases account for 21.4% of 26.6 million deaths in the Region with most deaths caused by respiratory infections (34.6%), tuberculosis (16.9%), acute diarrhoeal diseases (13.3%), HIV/AIDS (8.7%), vaccine-preventable childhood diseases (7.6%), and malaria (1.3%). Other infectious diseases account for the remaining 17.5% of deaths. Infectious diseases cause 22.3% of 691 million DALYs in the Asia Pacific Region. The number of deaths and corresponding DALYs due to infectious diseases are shown in Figures 7.1 and 7.2.

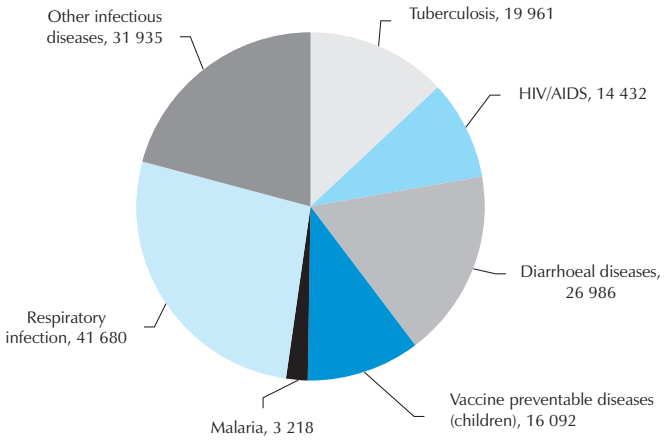
In the last three decades, over 30 new infectious agents have been detected, of which 75% have originated in animals. New pathogens, particularly viruses, remain unpredictable and continue to emerge and spread across countries. The advent of SARS and avian influenza underscores the importance of emerging diseases and their impact on health, economic and social development. The Asia Pacific Region is the epicentre for such emerging diseases. Dengue fever, Japanese encephalitis, leptospirosis,

Fig. 7.1 Number of deaths (thousands) due to infectious diseases in the Asia Pacific Region, 2002



Source: *The world health report 2004*. Geneva, World Health Organization, 2004.

Fig. 7.2 Number of DALYs (thousands) lost due to infectious diseases in the Asia Pacific



Source: *The world health report 2004*. Geneva, World Health Organization, 2004.

Nipah virus, drug-resistant malaria and cholera are some of the diseases that have caused epidemics within the Region.

Several factors contribute to the emergence or re-emergence of infectious diseases. A worldwide increase in poverty and rapid urbanization are forcing millions of people to live in overcrowded and unhygienic conditions where lack of clean water and adequate sanitation provide breeding grounds for infectious diseases. High-density populations raise the risk of respiratory infections and those transmitted through contact with pathogens in food and water. In addition, almost one third of children today are undernourished and half the world's people lack regular access to essential drugs. Human

encroachment on tropical forests and rapid deforestation has brought people with little or no immunity into close proximity with insects that carry malaria and yellow fever and other infectious diseases. Wars, civil turmoil and natural disasters are causing the migration and mass movement of millions of refugees or displaced persons from one country to another. This, coupled with increased international air travel, trade, commerce and tourism, provides fertile breeding grounds for infectious diseases. Deadly as well as commonplace disease-producing organisms are now being transported rapidly from one continent to another. The deliberate release of microbes to cause intentional harm adds a grim dimension to the growing problem.

Other changes, such as the globalization of the food trade, create new opportunities for infections to flourish, including the shipment of livestock; food production, storage and marketing; and altered eating habits. Changes in human behaviour and lifestyles expose certain age groups to higher risk from infectious diseases—for example, the clustering of young children in day-care centres, and the growing numbers of older person in nursing homes.

Due to the presence of most of these factors, many countries in the Asia Pacific Region are especially vulnerable to emerging diseases, making the Region the centre of many epidemics. Examples of important pathogens which emerged recently in the Asia Pacific Region include *Nipah* virus, SARS coronavirus and avian influenza virus A (H5N1).

The outbreaks of emerging infectious diseases like SARS and avian influenza, as well as the resurgence of known epidemic threats such as meningococcal diseases, cholera, typhoid fever and Japanese encephalitis, throughout the Region continue to threaten national, regional and international health security. Over the past years, the Region has experienced unprecedented multicountry outbreaks of newly emerging diseases, including SARS in 2003 and highly pathogenic avian influenza in poultry and humans since 2003. These emerging and re-emerging disease outbreaks not only have a profound impact on public health but also affect the economies and social stability of countries in the Region.

Avian influenza A (H5N1)

Influenza pandemics have occurred regularly throughout human history. Of the three occurring in the 20th century, the so-called Spanish flu pandemic of 1918 was the deadliest, with an estimated 20 to 40 million deaths. These pandemics were all caused by viral strains of influenza A related to avian influenza viruses, the reason the current outbreak of avian influenza A (H5N1) is believed to represent a high threat level.

The first documented occurrence of H5N1 infection in humans occurred in Hong Kong (China) in 1997 with 18 cases, six of which were fatal.[3] The cases coincided with outbreaks of highly pathogenic avian influenza A (H5N1) infection in poultry on farms and in livestock markets. Within three days, Hong Kong (China) culled its entire poultry population of 1.5 million birds in an effort to avert a pandemic threat by removing further human exposure. This strategy was subsequently vindicated by evidence that the virus had begun to mutate in a dangerous way.

From December 2003 to November 2007, the regional outbreak of avian influenza A (H5N1) has resulted in the destruction of more than 150 million poultry and infection of at least 272 people in Cambodia, China, Indonesia, the Lao People's Democratic Republic, Thailand and Viet Nam, with 179 deaths (Table 7.1). The majority of human infections have occurred sporadically, but clusters have been seen in most of these countries. Human infections are largely related to contact with infected

Table 7.1 Confirmed cases of human (A) H5N1 in the Asia Pacific Region, December 2003 to 12 November 2007

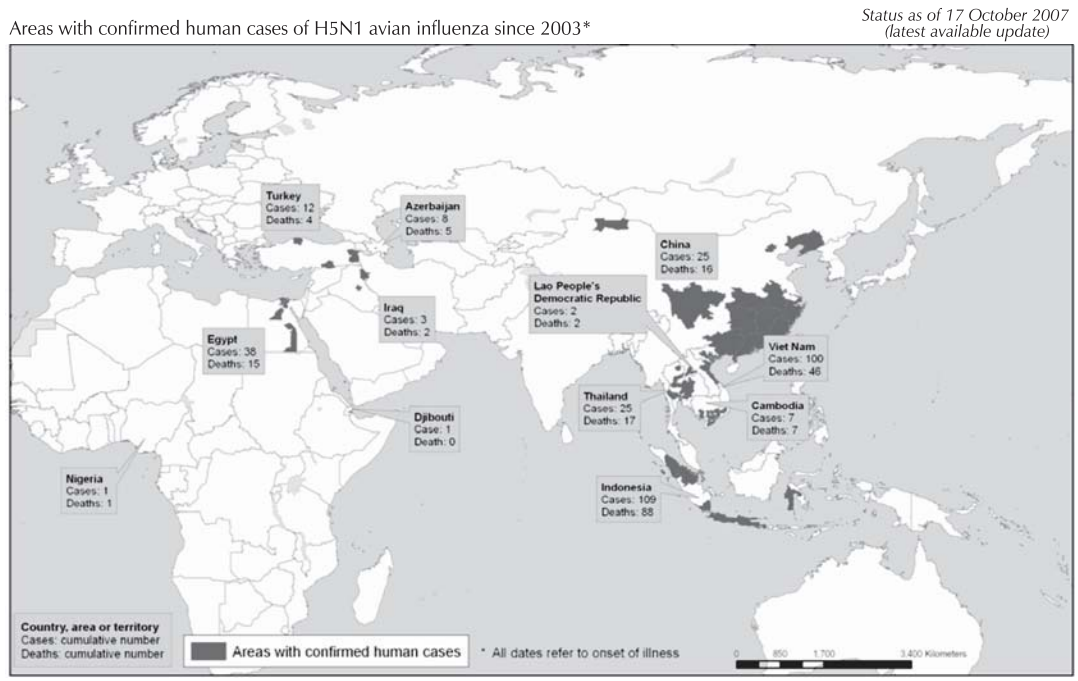
Country	2003		2004		2005		2006		2007		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Cambodia	0	0	0	0	4	4	2	2	1	1	7	7
China	1	1	0	0	8	5	13	8	3	2	25	16
Indonesia	0	0	0	0	20	13	55	45	38	33	113	91
Lao People's Democratic Republic	0	0	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	3	3	0	0	25	17
Viet Nam	3	3	29	20	61	19	0	0	7	4	100	46
Total	4	4	46	32	98	43	73	58	51	42	272	179

Source: *Cumulative number of confirmed human cases of avian influenza A (H5N1) reported to WHO*. Geneva, World Health Organization. Available from: http://www.who.int/csr/disease/avian_influenza/country/cases_table_2008_05_28/en/index.html

poultry, but isolated instances of inefficient person-to-person transmission cannot be completely excluded. The disease has spread among poultry and wild birds to a number of countries in Europe, Africa and West Asia. In early 2006 Turkey reported its first human A (H5N1) cases. However, it is clear that the epicentre of the outbreak remains in the Asia Pacific Region where the disease appears to have become endemic in poultry.

Affected countries have responded vigorously to the emergence of human A (H5N1), but as long as outbreaks in poultry persist the threat of human infections and a possible influenza pandemic remains. Such an influenza pandemic would leave no country unaffected, but the precise impact is difficult to predict. Even a mild pandemic is expected to cause widespread absenteeism from workplaces and significantly increase demand on health services. A severe pandemic is likely to cause large-scale socioeconomic disruption, but advance planning can reduce this and help maintain essential services. In recent years, WHO and its Member States have worked to promote prevention efforts and develop pandemic preparedness plans.

Fig. 7.3 Distribution of human avian influenza cases by country from January 2003 to 17 October 2007



World Health Organization

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO / Map Production: Public Health Mapping and GIS Communicable Diseases (CDS) World Health Organization

Responding to the avian influenza outbreak has been challenging and has required a vigorous response from both WHO and its Member States. A situation analysis is instructive and can be summarized as follows.

- Since December 2003 poultry outbreaks have occurred in 13 countries in the Asia Pacific Region: Bangladesh, Cambodia, China, India, Indonesia, Japan, the Republic of Korea, the Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Thailand and Viet Nam. Some countries experiencing outbreaks have succeeded in controlling the disease but in others this has proved impossible. As a result, the virus is now entrenched over a large geographical area. The total number of human cases reported continues to rise in the

Asia Pacific Region. Cambodia and Indonesia reported their first human cases in 2005, and the Lao People's Democratic Republic in 2007.[4]

- The natural reservoir for the majority of avian influenza viruses, including A (H5N1), is in migratory waterfowl, which normally do not exhibit any signs of illness. In addition, there is now good evidence that domestic duck species can also be infected (and excrete significant amounts of virus) without exhibiting any outward signs. Taken together, these create a situation where a considerable potential reservoir of infection exists in domestic and wild bird populations, making both surveillance and disease control problematic.
- The virus responsible for the outbreak has not only proved to be resilient but also extremely versatile in its ability to infect a wide range of animal species, including pigs, cats and tigers, as well as domestic poultry and wild birds.
- The majority of human infections have occurred in people living in ordinary domestic settings who keep poultry in so-called backyard farms. Widespread poultry outbreaks in backyard farms create considerable logistical problems for detection and control by animal health authorities with limited resources. The preponderance of human infections in these settings also makes it difficult to define risk groups as anything less than virtually the entire population of some countries. The relationship between animal and human infections highlights the need for intersectoral collaboration at all levels between human health, agriculture, animal health and food safety sectors.
- Avian influenza has had a significant economic impact on the Asia Pacific Region and much of this impact has been felt by small-scale farmers who rely on poultry as their sole or major source of income. An important issue has been that of providing compensation for farmers for poultry that have been culled. In some instances the provision of inadequate compensation has proved to be an important disincentive in reporting outbreaks, resulting in problems with disease control.
- The affected countries, together with the international community, have actively responded to the outbreaks since 2003. The control of diseases such as avian influenza requires high-level government commitment, international collaboration and a strong public health infrastructure. However, in some countries public health has not traditionally been given a high priority and, therefore, infrastructure for surveillance and response activities need to be greatly enhanced. At a technical level, reliable laboratory diagnosis for this new disease has proved difficult and support from external technical partners has played a vital role. Despite this, a greater emphasis needs to be placed on capacity-building within affected countries. In addition to infrastructure and human resources enhancement, there is an urgent need to bring public health into the national political and decision-making arena.
- The rapid sharing of data and other information enables the development of evidence-based control strategies in affected countries, assists preparedness in vulnerable ones and is crucial in assessing pandemic risk. Barriers to rapid sharing of such data (and the conduct of formal research) need to be identified and overcome.
- Considerable efforts are currently being made at a global level towards the production of influenza A (H5N1) vaccines to protect individuals during a possible pandemic. However, significant pandemic influenza vaccine production may not occur until at least six months after the start of a pandemic. It is necessary for viral specimens to be sent to external reference laboratories for a number of reasons, including confirmation of diagnostic testing and genetic analysis as well as for the development of vaccines.

- Several antiviral drugs are available for the prevention and treatment of seasonal influenza. Although none of the antiviral drugs have been shown to prevent avian influenza, studies conducted through the WHO Global Influenza Surveillance Network have shown that the antiviral drug oseltamivir may be the most useful for treatment. However, it is expensive and currently in great demand. In addition, its manufacturing process is complex and lengthy. The use of alternative antiviral drugs should be considered where appropriate.

In the early stages of the emergence of a potential pandemic, it may be possible in some situations, to stop or delay the virus spread by implementing a rapid response and containment strategy. The rapid containment of pandemic influenza requires extraordinary measures, including quarantine, social distancing (such as closing of schools) and mass administration of antiviral drugs.

Severe acute respiratory syndrome (SARS)

SARS was the first newly emerging and readily transmissible disease of the 21st century. In late February 2003, an atypical pneumonia outbreak of unknown cause with a total number of 305 cases (including five deaths) in Guangdong province of China was reported by health authorities. The outbreak was caused by a new, emerging disease later named SARS. Retrospective investigation indicated that the initial SARS case might have occurred in mid-November 2002 in Guangdong.

By March 2003, SARS had spread to other countries and areas rapidly due to international travel. According to final data compiled by WHO, 8096 probable SARS cases occurred in 29 countries and areas with 774 fatalities.[5] Although the outbreak affected individuals in many countries, the greatest impact by far was felt in the Asia Pacific Region which had more than 95% of cases.[6]

The epidemic began attracting international attention in February 2003, when an American businessman travelling from Hong Kong (China) became afflicted with fever and respiratory symptoms after arriving in Hanoi.[7] Several of the medical staff who treated him soon developed the same disease, despite basic hospital procedures. The severity of the symptoms and the infection of hospital staff alarmed global health authorities. Fearful of another emergent global epidemic, WHO issued a global alert on 12 March 2003, followed by a health alert from the United States Centers for Disease Control and Prevention.[8]

On 15 March 2003 WHO issued an emergency travel advisory and provided a case definition and a name for the new disease, severe acute respiratory syndrome (SARS).[9,10] SARS is a respiratory disease in humans caused by the SARS coronavirus. Initial symptoms are flu-like and may include fever, malaise, myalgia, lethargy, gastrointestinal symptoms, cough, sore throat and other non-specific symptoms. A symptom that appears to be common to all patients is a fever above 38 °C. Shortness of breath may occur later. Symptoms usually appear 2–10 days following exposure, but a period of up to 13 days has been reported. In most cases symptoms appear within 2–3 days.[11]

The principal mode of transmission at the SARS outbreak sites is exposure to infected respiratory droplets during close person-to-person contact. Droplet spread occurs when droplets from the cough or sneeze of an infected person are propelled a short distance through the air and deposited on the mucous membranes of the mouth, nose or eyes of persons who are nearby. The virus can also spread when a person touches a surface or object contaminated with infectious droplets and then touches the mouth, nose or eyes. The SARS virus could also spread more broadly through other means not yet known.[12]

WHO, affected countries and other partners instituted general infectious disease control measures such as quarantine, isolation and strict hygiene measures in hospitals. Thousands were put under voluntary or supervised quarantine in Canada, China, including Hong Kong (China), Singapore, Taiwan (China) and the United States of America. In Beijing, Hong Kong (China), Singapore, and Toronto, Canada, schools were closed for a number of days to contain the spread of SARS.[13,14,15]

Medical officers, epidemiologists and other specialists were deployed to assist with on-site investigations around the world. On 27 March 2003, WHO recommended the screening of airline passengers for symptoms of SARS. Finally, on 5 July 2003, WHO declared that the last chain of transmission of the global SARS epidemic had been broken and that the outbreak could be declared over.

However, since the 2002–2003 outbreak, four cases of SARS have been reported in Guangzhou, Guangdong province, in China from December 2003 to January 2004.[16] In addition, SARS cases acquired in a laboratory setting have been reported in Beijing, Singapore and Taipei (China). The incident in Beijing was also associated with transmission beyond the index case, with three "generations" of infection resulting in a further nine cases.[17] These cases have raised the profile of laboratory biosafety as a regional issue that should be addressed.

The source of SARS is believed to be in animals endemic to southern China. Although the definitive natural hosts remain uncertain, much research has suggested that a number of animals, including bats, may be implicated.

SARS caused considerable economic impact in many countries in the Asia Pacific Region and around the world. Losses based largely on cancelled travel and decreased investment in service industries in the Asia Pacific Region range from US$ 30 billion to US$ 140 billion.[18] The extent of economic impact from outbreaks largely depends on how swiftly governments implement effective public health policies.

Nipah virus

Another important infectious disease in the Asia Pacific Region is *Nipah* virus, capable of causing illness and death in domestic animals and humans. *Nipah* virus is naturally harboured by certain species of fruit bats which are distributed across an area encompassing northern, eastern and south-eastern areas of Australia, Bangladesh, India, Indonesia, Malaysia, the Philippines, Thailand, some of the Pacific islands and Madagascar in Africa.[19] The bats are not susceptible to infection and do not themselves become ill. *Nipah* virus was discovered in 1999 and is named after the location where it was first detected in Malaysia. *Nipah* virus is closely related to the *Hendra* virus, named after the town where it first appeared in Australia in 1994. Both *Nipah* and *Hendra* are members of the virus family *Paramyxoviridae* and are grouped together in the genus *Henipa* virus.[20]

A major outbreak of *Nipah* virus in pigs and humans in Malaysia from September 1998 to April 1999 resulted in 265 infected persons, 105 of whom died, and the eventual destruction of about 1.1 million pigs.[21] Of those people infected, 93% had exposure to pigs. The disease in pigs was highly contagious and symptoms included acute fever, respiratory problems and neurological signs in infected pigs. An associated outbreak in March 1999 among abattoir workers in Singapore who handled pigs imported from outbreak areas in Malaysia led to 11 cases, with one death. Between December 2003 and April 2004, 56 people in Bangladesh became infected with *Nipah* virus in two outbreaks, with 44 fatalities (78.5% mortality rate).[22]

The mode of transmission from animal to animal, and from animal to human, is uncertain, but appears to require close contact with contaminated tissue or body fluids from infected animals. *Nipah* virus was detected in pigs during the Malaysian outbreak, but other sources such as dogs and cats could not be ruled out. The role of species of animals other than pigs in transmitting infection to humans has not yet been determined, although the disease predominantly affects the nervous system. The typical course of the illness begins with onset of fever followed by headache, dizziness and varying degrees of diminishing consciousness. Patients suffering from a reduced level of consciousness experienced prominent signs of brain-stem dysfunction. Some patients experienced respiratory illness during the early part of their infections.

No drug therapies have yet been proven to be effective in treating *Nipah* virus infection. Treatment relies on providing intensive, supportive care. There is some evidence that early treatment with the antiviral drug ribavirin can reduce both the duration of feverish illness and the severity of disease. However, the efficacy of this treatment in curing the disease or improving survival is still uncertain.

It is widely understood that there is risk of transmission of *Nipah* virus from sick animals such as pigs to humans, but transmission from person to person has not yet been documented even in the context of a large outbreak. Therefore, the risk of transmission of *Nipah* virus to health-care workers is thought to be low. However, transmission without percutaneous exposure (through a break in the skin barrier) is theoretically possible as respiratory secretions contain the virus. This is why it has been categorized as a biohazardous agent that should be managed in a high-level biosecurity laboratory. It is therefore recommended that close contact with body fluids and infected tissues be avoided if *Nipah* infection is suspected.[23]

Meningococcal diseases

Meningococcal disease is a severe bacterial infection of the bloodstream or meninges (a thin lining covering the brain and spinal cord). Symptoms are high fever, headache, vomiting, stiff neck and a rash, which may appear 2–10 days after exposure but usually within 3–5 days. Among people who develop meningococcal meningitis, 5%–10% die in spite of treatment with antibiotics.[24] Of those who live, permanent brain damage, hearing loss, kidney failure, loss of arms or legs, or chronic nervous system problems can occur. The meningococcus bacterium is spread by direct, close contact with nose or throat discharges of an infected person, thus it has potential to cause epidemics.

In the Philippines, meningococcal diseases have been reported since 2000. In September 2004, the Cordillera Administrative Region in the country's main island of Luzon experienced an unusual outbreak of serogroup A meningococcal disease with a high case fatality rate. Between 1 October 2004 and 28 January 2005 a total of 98 cases of meningococcal disease and 32 deaths were reported, 11 laboratory confirmed for *N. meningitides*.[25]

Hand, foot and mouth disease

Hand, foot and mouth disease (HFMD) is a common, acute viral illness in infants and children usually characterized by fever, sores in the mouth, and a rash with blisters. It occurs mainly in children under the age of 10, but may occur in adults too. Individual cases and outbreaks of HFMD occur more frequently in summer and early autumn.

Caused by Coxsackievirus A16 infection, HFMD is a mild disease and nearly all patients recover without medical treatment in 7 to 10 days. On the other hand, another cause of HFMD, enterovirus 71 or EV71, has the potential to cause viral meningitis and, rarely, more serious conditions such as encephalitis or a poliomyelitis-like paralysis. EV71 encephalitis may be fatal. Cases of fatal encephalitis occurred during outbreaks of HFMD in Sarawak, Malaysia, in 1997 and in Taiwan (China) in 1998.[26]

Chikungunya

Chikungunya fever is caused by alphavirus and spreads through the bite of the infected *Aedes aegypti* mosquito. The disease resembles dengue fever, and is characterized by severe, sometimes persistent, joint pain (arthritis) as well as fever and rash. Although widespread occurrence of the disease causes substantial morbidity and economic loss, it is generally not fatal. Major epidemics appear and disappear cyclically, usually with an inter-epidemic period of 7–8 years and sometimes as long as 20 years. After a long period of absence, outbreaks of chikungunya fever appeared in Indonesia in 1982 and 1999, and in Africa and other parts of Asia between 1960 and 1982. Virus strains had also been isolated in Bangkok, Thailand, in the 1960s, in various parts of India and in Sri Lanka in 1969, and in Viet Nam and Myanmar in 1975.[27]

After an interval of a few years, chikungunya fever has been reported from several countries including India and various Indian Ocean islands including the Comoros, Mauritius, Réunion and Seychelles. The most recent outbreaks were reported in more than 150 districts in India in 2006. As of October 2006, more than 1.25 million cases have been reported in India, with 752 245 cases from Karnataka state and 258 998 from Maharashtra state. In some areas attack rates reached as high as 45%.[28]

Other emerging infectious diseases

In August 2005 the Ministry of Health of China reported 215 cases of human disease associated with an outbreak of *Streptococcus suis* in pigs in Sichuan province with 39 fatalities.[29] Symptoms reported by local clinicians included high fever, malaise, nausea and vomiting, followed by meningitis, subcutaneous haemorrhage, toxic shock, and coma in severe cases. The incubation period was short and disease progression rapid.

Japanese encephalitis is a disease spread to humans by infected mosquitoes in temperate regions of Bangladesh, China, India, Japan, Nepal and the Republic of Korea. It is one of a group of mosquito-borne virus diseases that can affect the central nervous system and cause severe complications and even death. The disease is the leading cause of viral encephalitis in Asia with cases between 30 000 and 50 000 reported annually and case-fatality rates ranging from 0.3% to 60%.[30] An outbreak in India, which started in July 2005, resulted in a total of 4255 suspected cases reported from the state of Uttar Pradesh with 914 deaths (a case fatality rate of 22%). Of this total, 280 cases and 68 deaths were from the adjoining state of Bihar. A total of 1802 suspected Japanese encephalitis cases were reported, with 283 fatalities,[31] in these two states till 21 September 2005.

Other new infectious agents that have emerged in recent years in the Asia Pacific Region include *Barmah Forest* virus, *Hendra* virus and *Chandipura* virus.

One feature common to many of these diseases (including avian influenza and SARS) is the increased risk of acquiring them from individuals either working or living in close association with animals, for

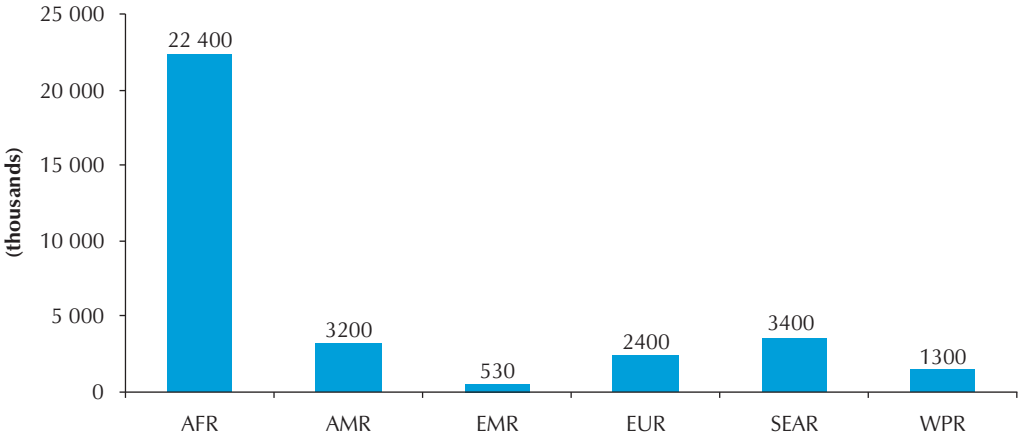
example, poultry in the case of avian influenza. This has led to the realization that human and animal health sectors should strengthen their collaboration in order to tackle such diseases "at source". This will likely require a thorough review of animal husbandry practices.

The above-mentioned emerging diseases have been included as examples to highlight the Asia Pacific Region's vulnerability to outbreaks of severe and potentially fatal diseases from unexpected organisms and to demonstrate that almost all such diseases are controllable by conventional public health and disease control measures. The capacity of the Region to detect potential outbreaks swiftly and mount a strong public health response needs to be strengthened.

7.2 HIV and sexually transmitted infections

Human immunodeficiency virus (HIV) first reached the Asia Pacific Region in the 1980s and by 2007 4.7 million people were living with HIV/AIDS (PLHA),[32] just over 14% of the total global HIV/AIDS case-load. In 2007 alone, there were an estimated 420 000 new infections and 293 000 deaths from HIV/AIDS. The estimated number of people living with HIV/AIDS for the different WHO Regions is shown in Figure 7.4. Economic losses from HIV/AIDS in 2001 were calculated at US$ 7.3 billion.[33]

Fig. 7.4 Estimated number of people living with HIV/AIDS by WHO Region, 2007



AFR = African Region; AMR = Americas Region; EMR = Eastern Mediterranean Region; EUR = European Region; SEAR = South-East Asia Region; WPR = Western Pacific Region

Source: Internal communication from UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance and Estimation, 2007.

Worldwide, close to one million people a day acquire a curable sexually transmitted infection (STI) and approximately half of these cases occur in the Asia Pacific Region. Sexually transmitted infections are among the top 10 reasons for seeking health care in most developing countries in the Region. The socioeconomic costs of STIs and their complications are substantial. Untreated common STI can result in infertility, ectopic pregnancy, infant death, congenital abnormalities and cervical cancer. As STIs are known to facilitate both the acquisition and spread of HIV, there is an added urgency to coordinate national and regional HIV/AIDS and STI programmes.

Together with industry, international and nongovernmental organizations, community and faith-based organizations, national governments in the Region are increasingly committed to responding to the challenges of HIV/AIDS and STI. Special efforts are being made to prevent new infections among vulnerable populations, provide necessary care and treatment to those in need, mitigate the impact of HIV/AIDS on families and communities, and strengthen national health systems capacity and multisectoral responses towards reaching Millennium Development Goal 6 of having halted and begun to reverse the spread of HIV/AIDS by 2015. This goal will continue to guide countries and partners in the Region as they confront the HIV/AIDS pandemic.

The burden of HIV/AIDS and sexually transmitted infections in the Region

The Asia Pacific Region comprises over 14% of the globe's landmass[34] and is home to almost 3.4 billion people, over 53% of the world's population. Among the most relevant features of HIV/AIDS and STI in the Region is the very large numbers of people at risk of infection. Even small changes in the incidence and prevalence of these diseases translate into very large numbers. Additionally, the HIV epidemic in the Region is best understood as a patchwork of epidemics, varying between and within areas of individual countries with regard to incidence and prevalence, and predominant risk factors for infection and trends. A snapshot of this evolving epidemiological situation in selected countries in the Region is provided in Table 7.2.

Diversity of the HIV epidemic in the Asia Pacific Region

With an estimated 4.7 million (range 3.9–6.0 million) PLHA in the Region, the overall adult (>15 years) prevalence of HIV infection is about 0.3% in the WHO South-East Asia Region and 0.1% in the Western Pacific Region, a toll that is below the estimated 5.9% prevalence seen in hard-hit sub-Saharan Africa.[35] Four countries in the Region have adult HIV prevalence rates (frequently determined by prevalence among female antenatal clinic attendees for methodological reasons) in excess of or nearing 1%: Cambodia (0.9%), Myanmar (0.7%), Papua New Guinea (1.3%) and Thailand (1.4%). In the remainder of the Region's countries, the national burden of HIV infection is concentrated in selected high-risk populations. However, the level of the HIV epidemic varies not only geographically but also between and within countries. Large areas across southern Indian states, for example, are experiencing HIV prevalence rates markedly higher than in the northern states.

While the Democratic People's Republic of Korea has no reported cases of HIV infection, Cambodia, China, India, Myanmar, Thailand and Viet Nam account for the majority of the Region's HIV case-load. India, the second most populated country in the Region, is estimated to be home to approximately 2.5 million adult PLHA. In terms of prevalence, however, India reports an adult prevalence of just 0.36%, compared to South Africa where one in five is infected.[36]

Cambodia, Myanmar and Thailand have seen steady declines in HIV prevalence in adults aged 15–49. In more severely affected southern states of India, studies show a decrease in HIV infections among women attending antenatal clinics (Figure 7.5).

With few exceptions, the HIV/AIDS pandemic has grown significantly in the Region. Recent increases in reported HIV cases in Papua New Guinea and AIDS cases in Indonesia show the potential for HIV to reach epidemic proportions even in countries with generally low HIV prevalence rates (Figure 7.6).

Table 7.2 HIV burden for selected countries in the Asia Pacific Region

Country	Estimated total population (2005)	Estimated number of PLHA		HIV prevalence in adults	
		Number	Year	%	Year
Australia	20 310 000	16 000	(2005)	0.1	(2005)
Bangladesh	153 281 000	11 000	(2005)	<0.1	(2005)
Bhutan	637 000	<500	(2005)	<0.1	(2005)
Brunei Darussalam	374 000	<100	(2005)	<0.1	(2005)
Cambodia	13 956 000	65 000 *	(2006)*	0.9% *	(2006)*
China	1 312 979 000	700 000 *	(2007)*	<0.1 *	(2007)*
Democratic People's Republic of Korea	23 616 000	...	...	<0.2%	(2005)
Fiji	828 000	<500 *	(2007)*	<0.1 *	(2007)*
India	1 134 403 000	2 500 000 **	(2006)**	0.36 **	(2006)**
Indonesia	226 063 000	170 000	(2005)	0.2	(2005)
Japan	127 897 000	17 000	(2005)	<0.1	(2005)
Lao People's Democratic Republic	5 664 000	3 700	(2005)	0.1	(2005)
Malaysia	25 653 000	69 000	(2A005)	0.5	(2005)
Maldives	295 000	...	...	<0.2	(2005)
Mongolia	2 581 000	<500	(2005)	<0.1	(2005)
Myanmar	47 967 000	360 000	(2005)	0.7	(2005)
Nepal	27 094 000	75 000	(2005)	0.5	(2005)
New Zealand	4 097 000	1 400	(2005)	0.1	(2005)
Papua New Guinea	6 070 000	46 300 *	(2006)*	1.3 *	(2006)*
Philippines	84 566 000	7 500 *	(2007)*	<0.1 *	(2007)*
Republic of Korea	47 870 000	13 000	(2005)	<0.1	(2005)
Singapore	4 327 000	5 500	(2005)	0.3	(2005)
Sri Lanka	19 121 000	4 000 ***	(2005)	<0.1	(2005)
Thailand	63 003 000	580 000	(2005)	1.4	(2005)
Timor-Leste	1 067 000	...	...	<0.1	(2005)
Viet Nam	85 029 000	260 000	(2005)	0.5	(2005)

... Data not available

Source for estimated population in 2005: *World population prospects: 2006 revision*. United Nations Department of Economic and Social Affairs, Population Division [http://esa.un.org/unpp].

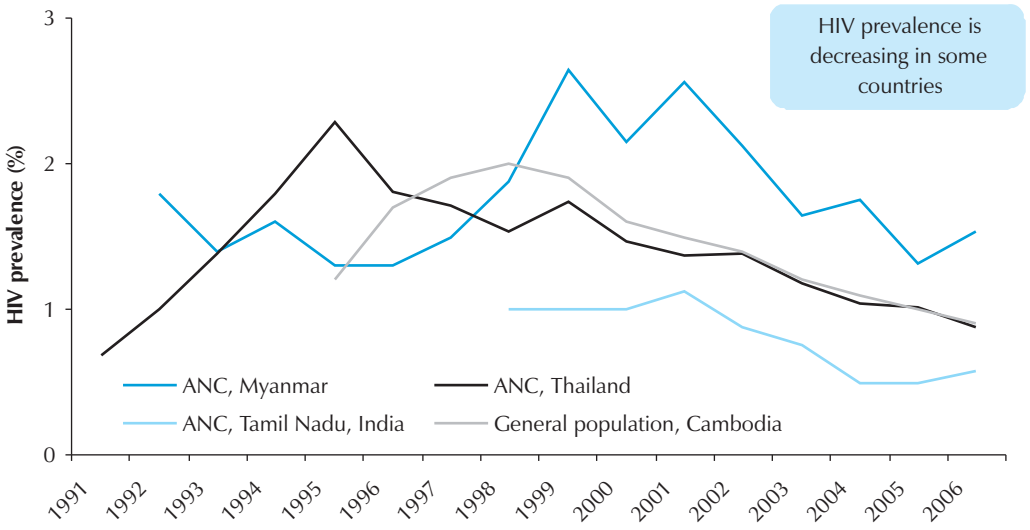
Unless otherwise specified, HIV estimates are based on the *2006 Report on the global AIDS epidemic*. UNAIDS, 2006.

* HIV estimates are based on 2007 national consensus meetings.

** HIV estimates are based on 2007 AIDS epidemic update. UNAIDS, 2007.

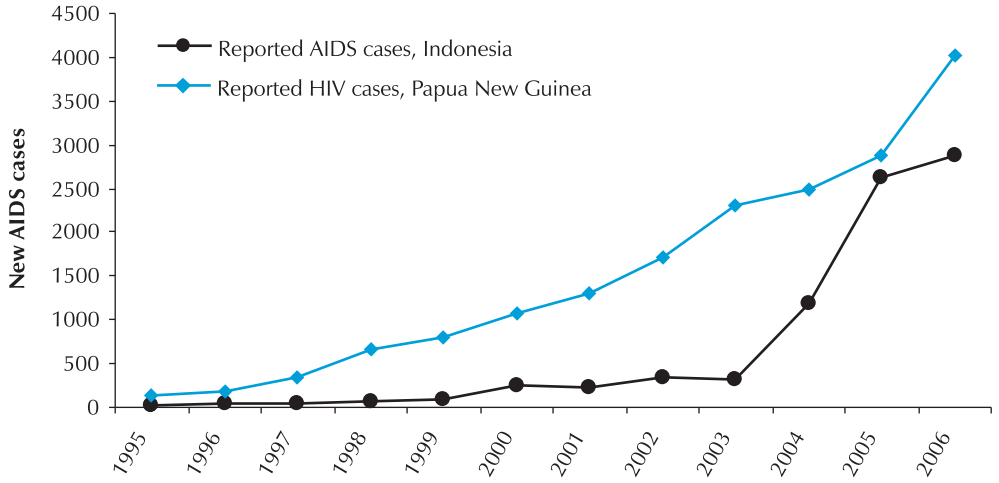
*** Country report. National AIDS Programme, Ministry of Health, Sri Lanka, 2006-2007.

Fig. 7.5 HIV prevalence among antenatal attendees in selected Asia Pacific countries, 1991–2006



Source for Myanmar, India, Thailand: *HIV/AIDS in South-East Asia*. New Delhi, WHO Regional Office for South-East Asia, March 2007: 6. (http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm)
Source for Cambodia: *Report of a Consensus Workshop on HIV Estimates and Projections for Cambodia, 2006-2012*, Phnom Penh, 25-29 June 2007. Phnom Penh, Ministry of Health.

Fig. 7.6 Reported HIV or AIDS cases in selected Asia Pacific countries, 1995–2006



Source for Indonesia: *HIV/AIDS in South-East Asia*. New Delhi, WHO Regional Office for South-East Asia, March 2007: 6. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm
Source for Papua New Guinea: *Quarterly report*. National AIDS Council of Papua New Guinea and National Department of Health, December 2006.

Surveillance data indicate that in some countries HIV is spreading from high-risk populations to the general population. In some areas of Yunnan, Henan, Xinjiang and other provinces in China, HIV prevalence is already ≥1% among pregnant women attending antenatal care, as is the case in the states of Andhra Pradesh, Karnataka, Maharashtra, Manipur and Nagaland in India.[37,38]

HIV/AIDS and sexually transmitted infections in select vulnerable populations

Although there is diversity within countries and across the Region, virtually all countries have the same risk behaviours and vulnerabilities that promote, facilitate and fuel HIV and STI transmission.[39] Widespread or defined pockets of such factors as sex work, low condom use, a high prevalence of STI, injecting drug use combined with sharing of injecting paraphernalia, poverty, illiteracy, limited access to health information and services, gender inequalities, taboos and "conservative cultures" that avoid open and frank discussions about sexual matters, urbanization, and migrant or mobile labour forces all contribute to the vulnerability of epidemic HIV within individual countries and regions.

Females are more vulnerable to acquiring HIV and STI, and although women currently comprise just over 29% of adults aged 15–49 years who are infected with HIV in the Region, their infection rates have been increasing steadily in most countries.[40] Groups especially vulnerable to HIV/AIDS infections and at high risk of acquiring and spreading HIV have special relevance to the Asian HIV epidemic, and are found in all countries. Populations such as sex workers, injecting drug users (IDUs) and men who have sex with men and transgender populations are frequently at high risk of acquiring infection and transmitting HIV to other people through unsafe sexual or needle-sharing behaviours. Through such practices infection can spread widely in a community, either directly or through "bridging populations" such as clients and partners of sex workers. Because many of these populations are also widely stigmatized and socially marginalized, they can present special challenges for public health programmes seeking to reach them with prevention interventions and services for care, support and treatment.

The importance and diversity of high-risk behaviours associated with HIV transmission is similarly evident in the entire Asia Pacific Region, where almost 50% of HIV is associated with sex workers and their clients and 22% of infections are related to unsafe injecting drug use.[41] In China, HIV outbreaks among IDUs have been seen in nine provinces as well as in Beijing, while HIV is being spread heterosexually in Guangdong, Guangxi and Yunnan provinces.

Sex workers

National surveillance data show that HIV prevalence among female sex workers has consistently and significantly exceeded that of the general population (i.e. all women attending antenatal clinics). For example, HIV prevalence among selected female sex workers is 50% in Mumbai, India (2005), over 30% in Kathmandu, Nepal, and Myanmar (2005), and 13% in Cambodia (2006). Documented HIV infections among female sex workers has been increasing markedly in several Indonesian cities, from approximately 1% in 2001 to almost 4% in 2003 in Jakarta, and from around 3% in 2000 to nearly 20% five years later in Sorong.[42] In India, HIV surveillance among sex workers was conducted at 83 sites in 2005. Six states had HIV prevalences above 10% and one site in Maharashtra had a prevalence above 20%.[38] In Cambodia, HIV surveillance showed a high rate of 17% among sex workers in 2003.

Men who have sex with men and transgender populations

Men who have sex with men (MSM) and transgender populations are also at high risk of acquiring and spreading HIV and have drawn the attention of regional and country health authorities. HIV outbreaks among MSM have occurred in Cambodia, China, India, Nepal and Viet Nam, and MSM are recognized as an especially important part of the HIV epidemic in Australia and New Zealand. Unsafe sex between men has been associated with more than two thirds of newly diagnosed infections in Australia since 2000. In New Zealand there has been an increase in HIV diagnosed among MSM, reaching over 50% of all new infections in 2005. Infection rates related to MSM have also been growing in many other urban centres across the Region. In Bangkok, Thailand, HIV prevalence among MSM increased from 17.3% in 2003 to 28.3% in 2005. Increasingly a cause for concern nationally, HIV prevalence among MSM has ranged from 1% to 40% across 18 targeted sites in India.[43] Documented HIV among MSM in Villupuram district in Tamil Nadu, India, has doubled from 4% in 2002 to 8% in 2005.

Injecting drug users

High HIV infection rates have been found among IDUs in China, India, Malaysia, Myanmar, Thailand, Viet Nam and, most recently, in Nepal and Indonesia. Injecting drug users account for an estimated 45% of the HIV positives in China (2005), 76% of reported cases in Malaysia (2003), and 54% of reported HIV infections in Indonesia and Viet Nam (2005). India's north-eastern states bordering Myanmar have documented HIV infections of up to 70% among IDUs, and infection rates in IDUs in New Delhi have increased from less than 2% to over 20% between 2001 and 2005. Especially noteworthy in the Region is a rapid increase in documented HIV in IDUs in Jakarta, Indonesia, from 16% in 1999 to almost 70% in 2003. Rapid increases in HIV infections among IDUs in Bangladesh provide evidence that the country is moving from a low-level to a concentrated epidemic.[44]

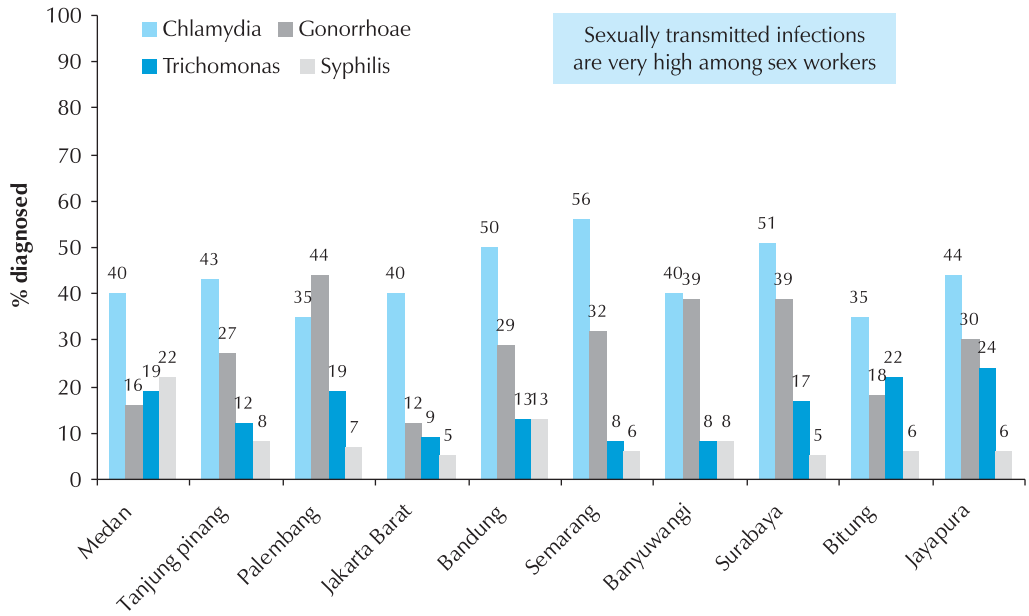
Sexually transmitted infections and HIV

Sexually transmitted infections remain a serious and growing problem in many countries in the Region, both as consequential diseases in their own right and also in how they relate to HIV transmission. These infections are most frequently found among individuals who are exposed to high-risk, unprotected sexual practices that are similarly associated with HIV transmission. Thus, STIs can be sensitive markers for HIV transmission as the presence of STI in an individual or group suggests these individuals may also have been exposed to HIV. All STIs, not only ulcerative STI such as syphilis, chancroid and genital herpes, also facilitate HIV transmission to a third party through unprotected sex.

Surveys conducted during 2004–2005 in six sentinel countries of the Pacific (Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu) revealed that chlamydia was the most prevalent STI, at an overall 18% prevalence among pregnant women and up to a high of 29% in Fiji. In China, a surge in STI has been reported over the last two decades. The Ministry of Health reported around 5800 cases in 1985, but by 2005 this had risen to over 700 000. Of added relevance to this finding are estimates that reported cases in China represent only about 10% of the actual disease incidence. In Mongolia, National Health Indicators for 2006 reveal that the total number of cases of STI (gonorrhoea, syphilis and trichomoniasis) comprised 47.3% of all reported communicable diseases. Among pregnant women STI prevalence was found to be as high as 30.3% in a 2002 national survey among women attending antenatal clinics in Mongolia, where the number of syphilis cases among blood donors increased 12.3 times between 1992 and 2002.[45]

The burden of STI among sex workers, MSM and transgender populations has been of special concern at the country level because of their relationship to the acquisition and spread of HIV. A survey in Ulaanbaatar, Mongolia, in 2001 revealed that 67% of sex workers had at least one STI. Across a selection of sites in Indonesia, surveys in 2005 revealed that the prevalence of STI among direct and indirect sex workers was uniformly high and even approached or exceeded 50% in some localities (Figure 7.7).[46]

Fig. 7.7 Prevalence of sexually transmitted infections among sex workers in 10 sites in Indonesia, 2005



Source: *HIV/AIDS in South-East Asia*. New Delhi, WHO Regional Office for South-East Asia, March 2007: 17. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm

Patterns of STI vary greatly in Asia. Some countries have high rates of curable STI, while others have controlled these infections and see more incurable STI such as infection with *herpes simplex* virus type 2 (HSV-2). Syphilis prevalence among pregnant women is very low in Sri Lanka and Thailand, and is declining in Myanmar. Surveys in 2002–2003,[47] for example, revealed HSV-2 prevalence rates ranging from 10% to 30% among women in antenatal clinics in Fujian, China, and among seafarers in Tarawa, Kiribati. In 2007 HSV-2 was documented as high as 70.8% among sex workers in Yunnan, China.[48] Overall, however, data on STI are incomplete. STI surveillance remains inadequate to inform STI control and HIV prevention programmes in much of the Region.

Because of the high-risk sexual behaviours of some MSM, including recreational drug use during sex, elevated and increasing STI prevalence rates are also found among this vulnerable group. Studies in Sydney, Australia, for example, have documented a tenfold increase in syphilis cases between 1999 and 2003, and a sharp increase in unprotected sex between men since 2000.[49]

Tuberculosis and HIV

Tuberculosis (TB) is the most common opportunistic coinfection among immunologically compromised individuals infected with HIV, and is the leading cause of death among persons with AIDS. With the likelihood of finding a higher prevalence of HIV among people infected with TB, and because of the need to coordinate treatment for HIV and TB in coinfected individuals, special attention has been directed to voluntary counselling and HIV testing among TB patients.

The Asia Pacific Region carries the highest tuberculosis burden in the world. It has been roughly estimated that among the 9.7 million cases of active TB in the Region, 227 000 were coinfected with HIV as of 2006.[50]

HIV surveillance among TB patients in many countries of the Region has shown a moderate to high prevalence of HIV coinfection and incident cases (Table 7.3).

Table 7.3 Prevalence of HIV in new adult tuberculosis cases aged 15-49 in selected countries of the Asia Pacific Region

Country	Percent prevalence of HIV in new adult TB cases
Thailand	11.0
Cambodia	10.0
Viet Nam	5.0
Myanmar	2.6
Nepal	1.4
India	1.2
Indonesia	0.6
China	0.3

Source: *Global tuberculosis control 2008:. surveillance, planning, financing*. Geneva, World Health Organization, 2008. Available from: http://www.who.int/tb/publications/global_report/2008/en/index.html

Blood transfusion and HIV

Intravenous exposure to HIV-infected blood or untreated blood products is the most efficient transmitter of HIV. Globally, 5%–10% of HIV transmission is estimated to be through transfusion of blood.[51] Fortunately, screening donated blood for HIV is now almost universal in the Region. Prevalence rates of HIV in screened blood across South-East Asia ranges from 0% to 0.9%. Notwithstanding this advance, transfusion related transmission has been documented in a few countries.

Extensive HIV transmission related to HIV-contaminated plasma collection equipment and procedures was recorded in central China up to the mid-1990s. While the burden of these early HIV infections and current AIDS disease is still an important feature of the epidemic in this area of China, other countries in the Region have not reported large transfusion-related outbreaks.

Response to the HIV pandemic

The global response to HIV/AIDS began with a primary emphasis on prevention between 1990 and 2002. The availability of antiretroviral therapy (ART) brought expanded treatment services, which were advanced through WHO's 3 by 5 Initiative (2000–2005). Recently, the goal of achieving universal access has stressed the need for a comprehensive and coordinated approach to prevention, care and treatment in the response to HIV/AIDS and STI.

The Asian Development Bank and the United Nations Joint Programme on HIV/AIDS (UNAIDS) study series estimated that unless prevention, care and treatment programmes are significantly expanded, 10 million new HIV infections could occur in the Asia Pacific Region between 2004 and 2010, and the annual death toll will rise to 760 000 by 2010. However, it is also estimated that with an improved response to the regional pandemic, the number of newly infected persons can be contained to 4 million by 2010 and the number of deaths limited to approximately 660 000 per year.[52]

The national and regional health sector response to the HIV pandemic has three principle tracks: improving strategic information systems for monitoring national epidemics, especially linked to identify needs and provide an evidence base for plans to strengthen health services; prevention of HIV spread, especially targeting the needs of vulnerable populations; and assuring the necessary medical treatment, care and support for HIV infected individuals, their families, friends and communities. There has been an important evolution in the global and regional strategic response to HIV/AIDS and STI in the last two decades.

In all these areas, there is a focus on activities that are: (1) appropriate to the national and local governmental, legal, religious and cultural imperatives; (2) sensitive to the stigma and discrimination experienced by vulnerable groups and people living with HIV; (3) able to mobilize and coordinate the resources of a full range of partners, including multiple sectors of national and local government, international and bilateral organizations, national and international NGOs, faith-based organizations and private sector business; and (4) designed to scale up comprehensive services that include and synergize prevention and treatment efforts in a coordinated manner.

Strategic information systems

National programmes need reliable information to guide the response to HIV/AIDS. Such information is especially important for policy and programme advocacy, resource mobilization, targeting resources to vulnerable population groups and highly impacted areas, measuring progress and impacts against planned programme objectives and accounting to governments, donors, policy-makers and the public. Key components of strategic information systems include second-generation HIV surveillance, monitoring and evaluation of essential interventions, such as ART, HIV testing and counselling, prevention of mother-to-child transmission of HIV, prevention in high-risk groups, care and treatment, and STI control and related operational research. New approaches recently introduced in some areas are HIV incidence surveillance and HIV drug resistance surveillance and monitoring.

Second-generation HIV surveillance systems have been established in most countries in the Region. HIV/AIDS case reporting and HIV sero-surveillance (HSS) have been widely implemented. Attention is being paid to improving STI surveillance across the Region. Repeated rounds of HSS and behavioural surveillance surveys (BSS) are organized at sentinel sites in selected vulnerable populations in Bangladesh, Cambodia, China, India, Indonesia, Mongolia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand and Viet Nam. Highly impacted countries, such as Cambodia, India, Myanmar, Papua New Guinea and Thailand, have also monitored HSS among more general population groups (women attending antenatal care, male military recruits and youth). Behavioural surveillance is being extended to the general population in Cambodia, India, Mongolia, Myanmar, Thailand and Viet Nam, and sentinel surveillance in countries in the Pacific such as Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. HIV incidence surveillance has only been implemented in Thailand.

Programme monitoring and evaluation is increasingly applied across the Region for specific country programmes. HIV drug resistance surveillance has been the subject of targeted regional efforts to establish coordinating mechanisms, and to develop capacity, including laboratory capacity, in selected countries including Cambodia, China, India, Indonesia, Myanmar, Thailand and Viet Nam.

Prevention

The prevention of HIV and STI has long been a major challenge for governments and partners in the Region. Virtually all countries have instituted HIV awareness programmes to inform the public about the threat of HIV/AIDS and STI and to promote safer sex behaviours that prevent the acquisition and spread of infections. Because of the critical role that high-risk and "bridging groups" play in epidemics, special or "targeted" prevention programmes have been directed at these vulnerable groups.

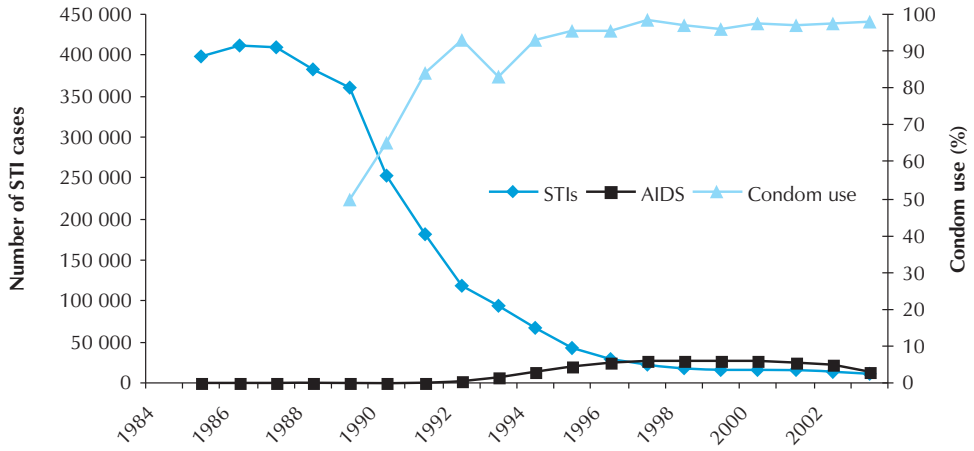
Sex work

Where sex work plays an important role in national or local HIV/AIDS and STI transmission, targeted prevention programmes have been initiated that seek to promote safer sexual practices, condom use, and improved STI detection and treatment. The 100% Condom Use Programme (100% CUP), which was developed in Thailand, has been a successful approach in the Region and is being adapted and implemented in Cambodia, China, the Lao People's Democratic Republic, Myanmar, Mongolia, the Philippines and Viet Nam. Implementation has usually begun with piloting the programme in a small number of localities and then progressively expanding it to other sites, often with good support from the international community. The programme has now been expanded virtually nationwide in Cambodia and Thailand. This programme strategy is particularly designed to empower sex workers to better negotiate condom use and to enlist the support of "gatekeepers" of establishment-based sex work (e.g. brothel owners, managers of entertainment establishments, police and local authorities) to enforce an area-wide policy of "No Condom No Sex". The involvement of police in such programmes has been criticized by NGOs and community-based organizations as being counterproductive in the long run and an infringement on human rights. Subsequent experience, as in Mongolia, has shown that the 100% CUP strategy can be adapted to non-establishment-based or "freelance" sex work. Strengthening STI surveillance and treatment services has also been a significant feature in the 100% CUP in many countries. The 100% CUP has been credited with contributing to the reversal of the HIV epidemic in Cambodia and Thailand (Box 7.1).

Box 7.1: Lessons learnt from Thailand's 100% Condom Use Programme

The 100% Condom Use Programme began in the central Thai province of Ratchaburi in 1989. Expanded to neighbouring provinces, it was successful in rapidly increasing condom use among sex workers and impacting STI in their clients. In 1991 the Thai National AIDS Committee, under the chairmanship of the Prime Minister, agreed to implement the programme nationwide. Condom use in sex work nationwide increased from 14% in 1989 to over 90% by mid-1991. The national incidence of STI dropped from 400 000 cases in 1998 to less than 15 000 cases per year since 2000. HIV prevalence among Thai sex workers and populations representative of the general public (e.g. military conscripts, women attending antenatal clinics, blood donors) also showed steep declines after the programme was launched. In his opening speech at the 15th International AIDS Conference in Bangkok 2004, the Thai Prime Minister reported that "the 100% Condom Use Programme has already prevented over 5 million HIV infections in Thailand". Figure 7.8 shows the effect of 100% CUP on the incidence of STI and AIDS after its nationwide introduction in 1991.

Fig. 7.8 Impact of implementation of 100% Condom Use Programme on the incidence of sexually transmitted infections and AIDS in Thailand, 1985–2003



Source: *HIV/AIDS in South-East Asia*. New Delhi, WHO Regional Office for South-East Asia, March 2007: 21. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm

As the programme has been introduced in other countries in the Region, it has had strong political support from the highest levels of government, and a multisectoral approach that involves the sex business (managers, workers), government sectors (police, business registration) health services (STI, family planning), NGO and community-based organizations (condom social marketing, sex worker self-help groups), the media and donors.

In other countries, and in response to patterns of sex work that are particular to their environment, other prevention strategies have been implemented on a smaller but no less important scale. Strategies concentrated on the involvement of NGOs, community-based and civil society organizations, and sex workers have been particularly successful in Bangladesh and India.

In Bangladesh, NGOs, with political support from the government, have spearheaded interventions among highly vulnerable groups such as sex workers that include outreach interventions, peer education, condoms and STI management. In 2005 these activities succeeded in keeping the epidemic's burden in these groups to 1% or less. Estimates suggest that in the absence of these prevention measures, HIV prevalence would have been 10% among sex workers and 2% among their clients in 2005.[53]

Condoms are the essential component of prevention efforts for protection from sexually transmitted HIV. In the Region, condoms have been provided for free, through commercial means and also through social marketing. Most countries in the Region use social marketing programmes which have helped make condoms more accessible and affordable to various segments of society, including low-income and high-risk groups in many developing countries. An example of a social marketing company is Population Service International, actively working in Cambodia, the Lao People's Democratic Republic, Myanmar and Nepal. Programmes are developed in collaboration with governments to complement existing services and distribution systems.

Other strategies have been used elsewhere to promote safer sex practices among sex workers and their clients. In Sonagachi, a large "red light" district in central Kolkata, India, an "empowerment model" has been employed in which HIV and STI services, including condom promotion, are but one part of a broad effort to organize and improve the conditions for sex workers. Sex workers participate actively in all aspects of community-led structural interventions, from savings and credit schemes to reduce dependency on sex work, to confronting trafficking and child prostitution. HIV prevalence remains low in Kolkata compared to other large Indian cities. This empowerment strategy has now been extended to over 60 000 sex workers in the state of West Bengal.

In India's six high-prevalence states, the Avahan India AIDS Initiative targets both sex workers and their high-risk clients. With support from the Bill and Melinda Gates Foundation, Avahan works in highly-affected districts and along national highways, supporting community mobilization and STI clinics for sex workers and their clients, MSM and IDUs. This programme has expanded greatly since December 2004, reaching over 200 000 sex workers including female, male, transgenders and IDUs.[54]

Injecting drug use

China, Indonesia, Malaysia and Viet Nam have adopted an essential harm reduction package in addressing the prevention needs for IDUs (Box 7.2). The largest harm reduction programme in the Region is in China, with 307 methadone clinics in the country now covering two thirds of the nation's 31 provinces, autonomous regions and municipalities.[55] The Chinese Government also plans methadone maintenance treatment for 300 000 opioid dependent people and 1000 needle and syringe outlets by 2008.[56]

In Indonesia, the first two drug substitution clinics were established in Jakarta and Bali, with plans for expansion underway. Antiretroviral medication is available to IDUs, and Indonesia's Ministry of Health has reported that at least half of the patients receiving ART therapy are drug users. In Viet Nam 20 provinces have established needle and syringe exchange programmes and advocacy for the expansion of drug dependence treatment services to include substitution treatment.

India, Malaysia, Myanmar and Nepal have started initiatives which include drug treatment, needle syringe programmes, oral substitution treatment, outreach, and HIV counselling and testing, care and

treatment. Services for drug users are established in Thailand and a variety of abstinence-oriented treatment models are offered. Methadone clinics have been in operation since 1989 but were mainly confined to the capital and, in general, offered methadone detoxification and not methadone maintenance. Some education and HIV prevention programmes targeting IDUs have been initiated in selected prisons in Indonesia and Thailand.

Box 7.2: Essential Harm Reduction Package and HIV

The Essential Harm Reduction Package is a regional strategy that embodies a comprehensive response to the individual and public health implications of drug use. It combines outreach, education, opioid substitution therapy, such as methadone or buprenorphine maintenance therapy for dependant IDUs, and needle supply or exchange programmes. Together, they form part of an integrated response to HIV/AIDS prevention and control in reducing exposure to contaminated injecting equipment, a major factor in HIV transmission. Additionally, the strategy provides access to IDUs for education and counselling about HIV/AIDS, including issues that may be associated with their treatment and care as well as their need to practice safe sex.

Despite the significant progress that has been achieved in HIV/AIDS and STI prevention programmes in the Region, greater efforts must be made if governments are to keep pace with the expanding epidemic. Overall, it has been estimated that HIV prevention programmes reach less than 2% of MSM in South-East Asia. It has been further estimated that access to prevention programmes has been limited to only 20% of sex workers and 3% of IDUs. In East Asia and Pacific Ocean countries these prevention programmes reach only 38% of sex workers and 8% of IDUs.[57] Modelling analysis indicates that reversing epidemic trends in these most vulnerable groups means 60% of them must incorporate prevention strategies and adopt safer behaviours.

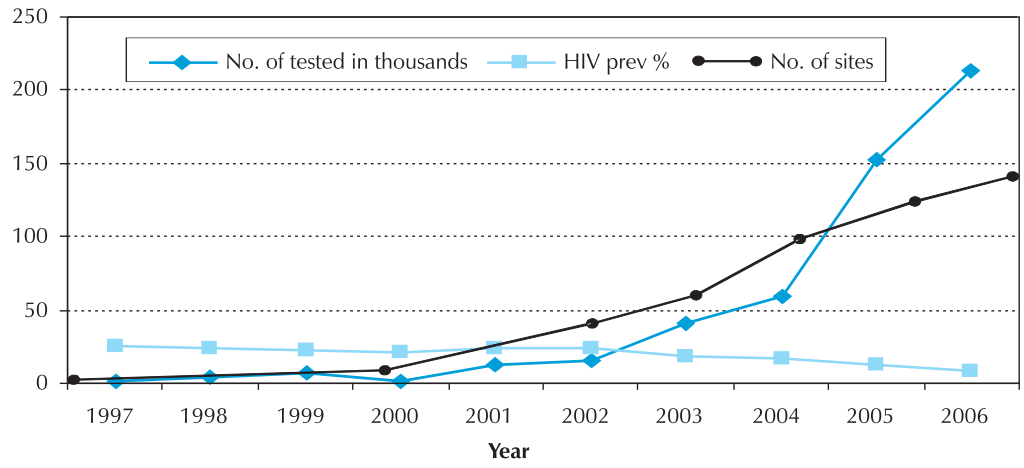
Voluntary counselling and testing

Despite global recommendations to expand services for voluntary counselling and testing (VCT), especially for all pregnant women attending antenatal care, STI clients and TB patients, such services are still underdeveloped across the Region, except for Cambodia where VCT has expanded rapidly (Figure 7.9).

By March 2006 India had expanded VCT to 935 centres covering all districts.[58] From 2002 to 2005, 3.02 million people were counselled and tested in these centres with an average rate of post-test counselling increasing from 40.7% to 71.9%.

In Thailand, the first VCT service was established in 1991 in Chiang Mai province with the support of the Thai-Australia Northern AIDS Prevention and Care Program and Communicable Disease Control Region 10. It was followed by the opening of a clinic for anonymous testing by the Thai Red Cross in Bangkok. These VCT settings were designed to offer preventive measures to the general population. Subsequently, the Ministry of Public Health promoted the development of VCT clinics in public hospitals throughout the country. In 2007, a WHO report indicated that HIV/AIDS counselling and VCT are now available at approximately 1000 hospitals and clinics across the country. These services

Fig. 7.9 Rapid expansion of coverage of HIV testing and counselling in Cambodia, 1997–2006



Source: *Comprehensive report on HIV/AIDS*. NCHAIDS, Ministry of Health of Cambodia, 2006.

can be delivered in specific HIV counselling units, integrated in outpatient departments or general health counselling units. All antenatal care units also offer VCT. Tuberculosis patients are increasingly offered HIV testing and counselling as part of the National TB Programme policies.[59]

Prevention of mother-to-child transmission

Pregnant women with HIV infection are at high risk of transmitting HIV to their infants, either during pregnancy, at birth, or through breastfeeding. Studies demonstrated that without intervention between 20%–45% of infants may become infected. The risk can be reduced to below 2% by a package of evidence-based interventions. Prevention of mother-to-child transmission is now a standard of care in many developed countries and has reduced transmission to almost zero. Despite the virtual elimination of paediatric HIV/AIDS in resource-rich countries, limited progress has been made in resource-limited settings to scale-up interventions for the prevention of mother-to-child transmission. The majority of infants and young children living with HIV have become infected through mother-to-child transmission and half of these children die before their second birthday.

Mother-to-child transmission prevention programmes are complex interventions, of which HIV testing and counselling, the provision of preventive ART regimen, and the avoidance of breastfeeding are some of the components. Reaching the ultimate goal of eliminating HIV infection in infants and young children requires a standard package of services that includes HIV primary prevention services, prevention of unintended pregnancies among HIV-infected women, antiretroviral drugs for mother-to-child transmission prevention or treatment, safer delivery practices, infant feeding counselling and support, and sexual and reproductive health services for HIV-infected women. This also includes linkages to ongoing care and support services and women's empowerment.

Of an estimated 500 000 Cambodian women per year who become pregnant, only 48.6% ever attend an antenatal clinic at least once.[60] Breastfeeding remains a major issue in the Region due to lack of access to clean water and formula milk.

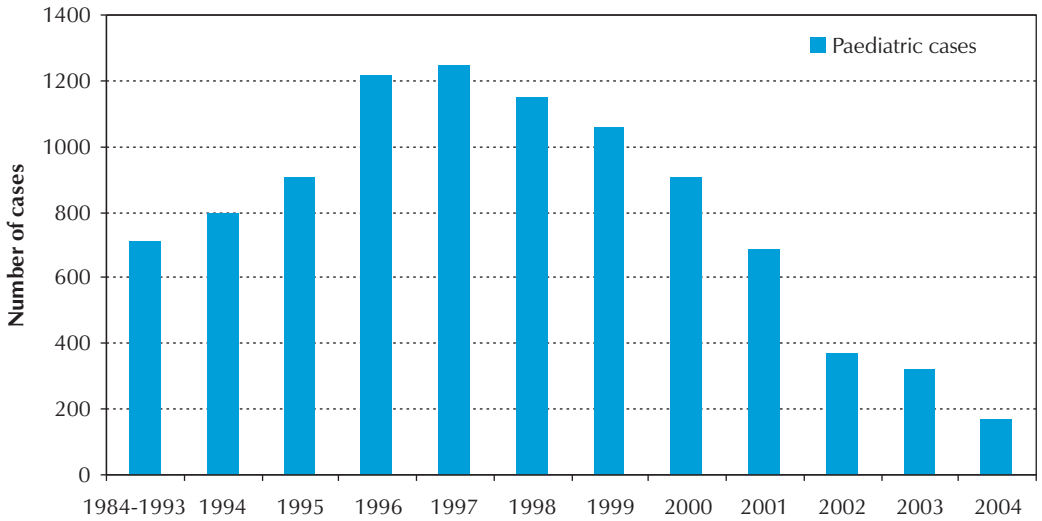
In India, about 55 000–60 000 children are born to mothers who are infected with HIV every year.[61] The national Prevention of Parent to Child Transmission Programme includes HIV testing and counselling, single-dose nevirapine given to mother and baby, safe delivery practices and infant feeding counselling and support.[62] Only 3.94% of all pregnant women (27 million) had been counselled and tested for HIV and 2.35% of all HIV-infected women (189 000) had received ART prophylaxis by the end of 2004. Assessment of maternal eligibility for and functional links to ART and HIV care services are less than optimal. Cotrimoxazole prophylaxis for mothers and HIV exposed and infected children is not included in the national policy, and less than 1% of HIV-infected children receive ART.[63] There are plans to adapt the prophylactic antiretroviral regimen to include multiple drugs.

In Myanmar, the nationally supported prevention of mother-to-child transmission programme includes HIV testing and counselling, single-dose nevirapine for mother and baby, safe delivery practices and infant feeding counselling. The health centre-based programme began in 2000 and hospital-based services were added in 2004. The programme has been expanding at the rate of about 5–10 townships per year and 79 townships, of which 17 include hospital-based services have been covered. The coverage of HIV-infected pregnant women was estimated in 2004 to be 4.8%. The estimated number of infections averted in 2005 was 60 (3.4% of perinatal infections).[64]

Of 639 363 women who gave birth in Thailand in 2005, 98% attended an antenatal clinic, 99.7% were HIV tested, and 93.8% of those found to be positive received ART.[65] The effective prevention of sexual transmission of HIV and a contraceptive prevalence of 79% (1997–2005)[66] have also contributed to this success. As a consequence, the number of reported AIDS cases of children under-five declined significantly (Figure 7.10).

Other countries such as Bangladesh, Bhutan, Cambodia, Indonesia, Nepal and Sri Lanka have also started prevention of mother-to-child transmission (PMTCT) programmes on a small scale.

Fig. 7.10 Number of AIDS cases among children (age 0-4 years) in Thailand, 1984–2004



Source: *Scaling-up HIV prevention, care and treatment*.Report of a regional meeting. Bangkok, Thailand, October 31 to November 2, 2006: 15. New Delhi, WHO Regional Office for South-East Asia, 2007. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm

Blood transfusion services

Blood safety has long been a priority area for WHO and national governments in the Region. Pursuing the WHO Global Strategy for Safe Blood, the focus of this effort has been on a nationally coordinated blood transfusion service with adequate government commitment and a national policy. The key elements of the WHO Global Strategy for Safe Blood include the establishment of nationally coordinated blood transfusion services, collection of blood only from voluntary blood donors, quality testing of blood to ensure its freedom from infectious markers and rational use of blood in clinical setting.

Despite efforts and achievements made, there is a need for further strengthening of national blood services in the Region. Approximately 61% of total blood collected in South-East Asian countries is from voluntary, non-remunerated blood donors. Paid or non-voluntary blood donations still continue in China, although this is down from 42% in 2000 to less than 10% in 2004. Such donations are as high as 75% in Cambodia. In India, where six million units of blood are collected annually, 50% are from voluntary donors, a figure that drops to less than 20% in Bangladesh where professional blood donors are still permitted.

Treatment and care

By 2003, approximately 7% of the people in need of ART in developing countries were receiving it. People living with HIV/AIDS and other sectors of civil society led a growing worldwide political movement advocating treatment as a fundamental right. Thailand was already implementing a national treatment programme since the early 1990s although covering only a few thousand people. Since then, tremendous progress has been made in the Region. The 3 by 5 Initiative stimulated a dramatic increase in access to ART. At the end of 2006 it was estimated that over two million people living with HIV/AIDS in low- and middle-income countries were receiving ART, representing 28% of the estimated 7.1 million people in need of such treatment. Within the Region, an estimated 280 000 were receiving ART by the end of 2006, 19% of those in need. Although far from desired rates of coverage, the number of people receiving ART in the Region had increased rapidly.[67]

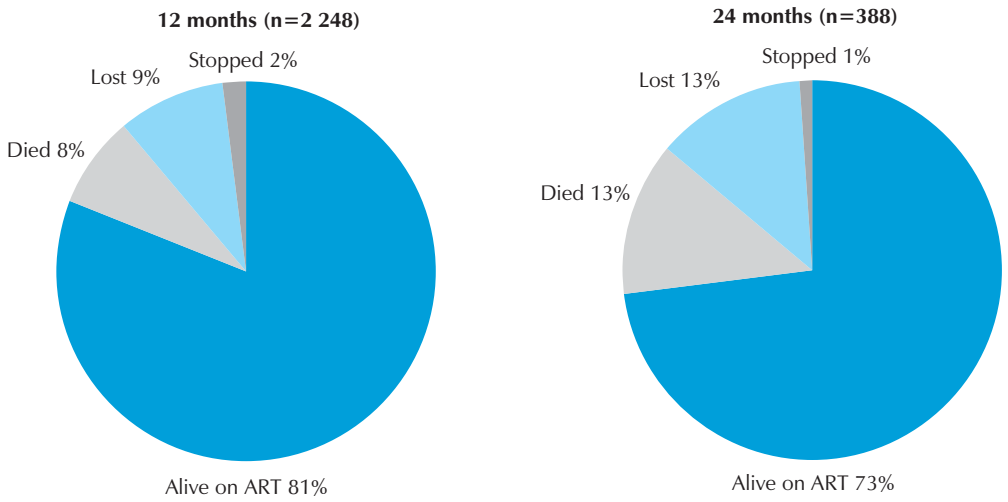
The 3 by 5 Initiative contributed to increased political commitment and partnerships in providing the care and treatment of PLHA, including capacity-building of health services, with training in and strengthening of infrastructure and logistics of the supply of drugs and diagnostics (Box 7.3). The momentum of the 3 by 5 Initiative in countries of the Region is seen in the scale-up of national ART programmes.

Box 7.3: The 3 by 5 Initiative

Access to ART and care has been accelerated through the 3 by 5 Initiative, which incorporated a global target to provide three million people with ART by 2005. This target was estimated to be half of the people in urgent need of treatment throughout the world in 2003. This initiative was launched in September 2003 by WHO/UNAIDS and partners, including the Global Fund to Fight AIDS, Tuberculosis and Malaria. This initiative took place seven years after combined ART first became available in developed countries (1996) and in view of the decreasing prices for first-line regimen from an estimated US$ 10 000 per patient per year to US$ 350 (minimal producer price).

The Government of India launched free ART in April 2004. By June 2006, ART delivery scaled up to 54 public sector facilities. In addition, free ART is available in 19 other collaborating centres. Health-care providers were trained in using the ART recording and reporting system. Standardized recording and reporting forms and definitions were used to collect longitudinal (cohort) data at 6 months, 12 months and 24 months after start of treatment on following treatment outcomes and on first-line treatment, i.e. patients currently on treatment. The analysis showed high rates of treatment continuation and survival. The lower proportion of women enrolled in ART may be related to the HIV/AIDS epidemic profile. As expected, deaths occurred mainly during the first six months and decreased thereafter. Survival rates of women on treatment were slightly better than that of men. Most patients remained on first-line regimen at 12 and 24 months. At the end of 12 months, 81% of patients were alive and on treatment and at the end of 24 months, 73% of patients were alive and on treatment, indicating high effectiveness of first-line antiretroviral drugs. The effectiveness and quality of the ART programme forms the basis for further expansion and decentralization of ART services in the country (Figure 7.11).

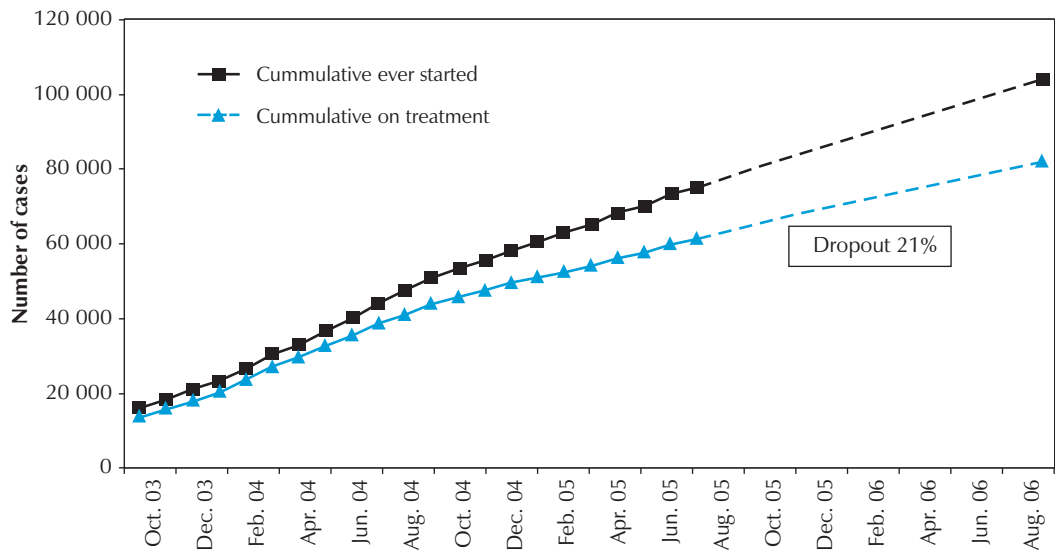
Fig. 7.11 Treatment outcomes of patients at 12 and 24 months after start of treatment in India, 2004–2006



Source: *HIV/AIDS in South-East Asia*. New Delhi, WHO Regional Office for South-East Asia, March 2007: 29. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm

The Royal Thai Government reached the national treatment target of delivering ART to all those in need by the end of 2006 and many other countries in the Region have followed suit. Due to its substantial prevention efforts since the early 1990s, as of end 2006 Thailand has been able to offer treatment to all those in need. The rapid expansion of ART coverage was possibly through strong political commitment and harnessing the full potential of the strong public health system in Thailand. The rapid scale-up of ART is based on comprehensive systems for care, support and treatment and involving PLHA as well as the broader community in the planning and implementation of services. The ART delivery system was initiated at tertiary level hospitals, and at the same time at district-level health facilities (Figure 7.12).

Fig. 7.12 Scale-up of antiretroviral programme, Thailand, 2003–2006



Source: *Scaling-up HIV prevention, care and treatment*. Report of a regional meeting, Bangkok, Thailand, October 31 to November 2, 2006: 19. New Delhi, WHO Regional Office for South-East Asia, 2007. Available from: http://www.searo.who.int/en/Section10/Section18/Section356_4609.htm

Challenges and opportunities

A range of complex challenges still exist. Many of the laws, policies, and cultural and social norms that increase the vulnerability of particular groups to HIV infection remain. Although significant progress has been made in establishing an enabling environment for HIV prevention, treatment and care in many countries, there are still countries that have not found ways to begin this process. Even within countries with well-advanced HIV/AIDS strategies and policies, there are still groups and communities whose access to prevention, treatment and care is extremely limited.

In relation to prevention, a range of successful strategies exist for different populations and contexts of risk. These include comprehensive, targeted 100% condom use programmes, expanded access to STI services, and harm reduction for injecting drug users, in addition to general awareness and education programmes. However, these interventions have rarely been taken to scale or achieved the kind of coverage needed to bring about long-term individual and societal change. Reluctance to openly confront difficult issues, such as sex outside marriage, sex between men and drug use, have led to a proliferation of general HIV/AIDS awareness campaigns that have not had a long-term impact on risk behaviour. The coverage of prevention of mother-to-child transmission services remains extremely low and must be rapidly expanded. Significantly more attention needs to be paid to the prevention needs of people living with HIV/AIDS.

Most PLHA are still not aware that they are infected. There is a need to implement innovative strategies to significantly expand access to HIV testing and counselling. Several countries are showing the way to scale up HIV testing without jeopardizing human rights or increasing stigma and discrimination.

HIV/AIDS-related stigma and discrimination, particularly in health-care settings, remains a significant access barrier. However, it is particularly so for people from marginalized groups such as sex workers, drug users and men who have sex with men. The centralization of HIV prevention, treatment and care services in urban centres also acts as a persistent barrier for people from rural areas.

The price of first- and second-line therapies continues to present a challenge. Although the price of first-line treatment has dropped by between 37% and 53% in the last two years, large variations in price exist between regions and countries. First-line treatment prices remain particularly unstable in middle-income countries. Second-line treatment prices remain high and will present a significant challenge for universal access as people currently on first-line treatment progress to these treatments. The prices of laboratory diagnostics and supplies will also need to be reduced in order to lower the financial burden as more people access HIV/AIDS treatment and care.

Current financing to implement regional and national HIV/AIDS plans is inadequate and available funding is often unpredictable and of short duration. Sustainable financing strategies are essential to enable countries to develop and implement long-term responses.

Responses involving the NGO and private sectors in a structured manner remain inadequate. Although people living with HIV and affected communities have formed self-help groups, and networks and are increasingly involved in service provision, they should be fully involved in policy and programme planning with sufficient resources and capacity-building.

7.3 Tuberculosis

About 5 million cases of tuberculosis (TB) occur in the Asia Pacific Region every year, claiming the lives of about 800 000 people—more than all other infectious diseases combined. WHO estimates that almost 60% of these cases are detected and officially reported by countries and areas in the Region. The remaining 2 million go undetected and untreated. The Region accounts for approximately 60% of all TB cases detected globally.[68]

Tuberculosis is a potentially fatal infectious disease caused by the bacillus *Mycobacterium tuberculosis* and is spread when a person with TB of the lungs expels airborne droplets carrying the bacteria, which are then inhaled by another person. The lungs are most commonly involved, but the disease can affect any organ. Although most infected people never develop active disease, approximately 5%–10% do so over their lifetime, half within the first two years following infection.[69] As TB is the leading cause of death among people with HIV/AIDS, the increasing spread of this epidemic exacerbates the TB problem. Among people with HIV/AIDS, the risk of developing TB increases by 10%–15% per year.[70]

In low-income countries and areas, diagnosis is typically made through microscopic examination of sputum samples for acid-fast bacilli in symptomatic persons reporting to the health system. Laboratory diagnosis can be confirmed by a culture of the bacilli, although this can take up to two months. Once diagnosed, TB patients are generally treated with a combination of four drugs for a period of at least six months. In several countries in the Region including China, India and the Philippines, TB control programmes face a rising number of patient who are infected with bacilli that have developed a resistance to the most commonly used anti-TB drugs.

More than a decade after it was declared a global emergency by WHO in 1993, TB remains one of the leading infectious causes of death among adults and continues to levy a heavy toll on social and

economic development in the Asia Pacific Region, where an estimated 900 million people live on less than US$ 1 a day.[71] Tuberculosis thrives in poor populations, where people often reside in overcrowded areas with poor housing and sanitation and limited access to the health system. Apart from the poor, TB also affects vulnerable populations such as the homeless and injecting drug users, as well as remote and mountainous populations with little access to health services. A group that is particularly vulnerable are those living with HIV/AIDS.

Prevalence and mortality

In 2005 there were an estimated 8.4 million cases in the Region, of which almost 5 million cases were new. Six countries—Bangladesh, China, India, Indonesia, the Philippines and Viet Nam—account for about 90% of new cases. With 71% of the Region's population, India and China are the two most populous countries and rank first and second in total number of cases, with 66% of all newly detected TB.

The global HIV/AIDS epidemic has had a profound effect on the TB situation in the Region. As it is the leading cause of death among AIDS patients,[72] mortality from TB is increasing in countries where the HIV epidemic is spreading. The prevalence of HIV/AIDS in reported TB cases in 2005 was 9.7% in Papua New Guinea, 7.6% in Thailand, 7.1% in Myanmar, 6% in Cambodia, 5.2% in India and 3% in Viet Nam. More importantly, many people living with HIV eventually develop clinical TB.[73]

Tuberculosis mortality is also affected by increasing resistance to the usual first-level anti-TB drugs. Varying levels of resistance to the most commonly used TB drugs were found in almost all settings surveyed in the Region. The prevalence of multidrug-resistant TB (MDR-TB)—defined as resistance to two of the most potent anti-TB drugs—among previously untreated TB cases varied widely across settings, ranging from less than 1% in Cambodia to approximately 10% in some provinces in China.[74]

Tuberculosis control strategy

A total of 46 out of the 48 countries and areas in the Asia Pacific Region have adopted directly observed treatment, short-course (DOTS), the strategy recommended by WHO to fight TB. The DOTS strategy has several components, including diagnosis through sputum smear microscopy, an uninterrupted supply of quality anti-TB drugs, supervised administration of a standardized regimen of medicines, and a comprehensive monitoring system. These components, coupled with the political will to tackle the disease, form the foundation of modern TB control. Effective implementation of DOTS has lead countries and areas in the Asia Pacific Region towards the achievement of the three targets set for 2005 by WHO: access to DOTS services for 100% of the population; a case detection rate of at least 70%; and an 85% treatment success rate among new smear-positive TB cases. Reaching these targets is an important step towards meeting the global target of reducing by one half the burden and deaths due to tuberculosis by 2015, a goal set by WHO and its partners. The achievement of the global target in 2015 will be critical for reaching the United Nations Millennium Development Goal of halting and beginning to reverse the incidence of major communicable diseases, including TB, by 2015. Meeting these targets requires a coherent strategy which can sustain existing achievements and address remaining constraints and challenges more effectively. The Stop TB Strategy, which underpins the Global Plan to Stop TB (2006–2015), developed by the Stop TB Partnership envisions a world free of TB, and sets out the steps that national TB control programmes and their partners need to take, assisted actively by all stakeholders.

Progress

Over the past five years, remarkable progress has been made towards achieving the three targets established by the World Health Assembly in 2000. By the end of 2005, over 95% of the Region's population was living in areas where DOTS services were available. Almost 90% of TB patients are being successfully treated, exceeding the target of 85%. The case-detection rate increased from 37% in 2002 to more than 65% in 2005, closing in on the target of 70%.

A major factor in improving case detection has been the inclusion of health-care providers-that are not operating under the Ministry of Health, such as military and prison health services, as well as private providers, through an approach called Public-Private Mix DOTS. This approach consists of DOTS implementation in non-Ministry of Health services and in the private sector through, for example, the provision of free drugs, ensuring continuity of care and extending quality assurance to laboratories outside of the public health system. The scheme also includes improved referral mechanisms between the private and public sectors, and between different ministries within the public sector. With support from the Global Fund to Fight AIDS, Tuberculosis and Malaria and other partners, Public-Private Mix DOTS activities are rapidly expanding throughout the Asia Pacific Region, particularly in China, India, Myanmar and the Philippines. In areas where Public-Private Mix DOTS initiatives are under way, increments in case detection of up to 25% are being reported.[75] In China,[76] India[77] and Indonesia,[78] strengthening collaboration between large public hospitals and TB clinics has contributed to improved case-detection rates.

Quality control mechanisms have been introduced in TB laboratories in most of the countries and areas with a high burden of tuberculosis. The implementation of external quality assessments, one of the components of quality control for TB laboratories, has led to improvements in the quality of TB laboratory services across the Region. There is now a need to establish strong links between national reference laboratories and supra-national reference laboratories, a network of international laboratories that support TB laboratory services in the countries of the Region. The need for external quality assessment and drug resistance surveillance in the smaller Pacific island countries and areas has been addressed through the establishment of the Pacific TB Laboratory Initiative.

Recognizing the threat of TB–HIV coinfection, national HIV/AIDS and TB programmes in some of the most affected countries and areas in the Region have developed or are developing national frameworks for TB–HIV. Progress in pilot projects and the scaling up of collaborative activities in Cambodia and Thailand have been impressive. Other countries in the Region, including China, India, Indonesia, Myanmar and Viet Nam, have developed national strategies to address TB–HIV coinfection.

In several countries and areas in the Asia Pacific Region, surveys were conducted to assess the extent of anti-TB drug resistance among TB patients. In India, Mongolia, Nepal and the Philippines, projects to manage MDR-TB under programme conditions have been established in collaboration with the Green Light Committee and are being expanded. These projects aim to identify and treat increasing numbers of MDR-TB cases. In Bangladesh, Bhutan, Cambodia, China, Indonesia, Myanmar, Sri Lanka, Timor-Leste and Viet Nam, programmatic management of drug-resistant TB is being established.

Sustainability of TB control services

On account of the very large numbers of persons infected with TB, sustained financing is required to effectively address the issue in the Region. With up to 10% of those infected expected to develop active TB during their lifetime, TB control efforts need to be sustained for decades. Governments must increase domestic financing in addition to securing external resources to ensure adequate future funding for TB control services in their countries.

Funding for tuberculosis control greatly improved between 2000 and 2005 when many of the countries most affected increased their TB budgets substantially. In addition, bilateral and multilateral agreements with donor countries and various partners helped to increase spending on TB control in the Region. A further boost of funding for TB control in countries and areas with a high burden of TB was provided by the Global Fund to fight AIDS, Tuberculosis and Malaria. By the end of 2006, a total of 32 proposals with a value of US$ 538 million were approved by this fund in support of TB control programmes in the Region.

Partnerships

Stop TB Special Projects were established in WHO's Western Pacific Region in 2000 and in the South-East Asia Region in 2001. The two WHO regions include the 48 countries and areas that make up the Asia Pacific Region. The Special Projects, based at WHO's Regional Offices in Manila and New Delhi, help coordinate the efforts of governments and their national and international partners. Through this partnership, the Stop TB Special Projects were able to respond to regional challenges, mobilize financial resources, and keep TB control high on the agenda of countries and areas in the Region. Three key ingredients—leadership, sound technical advice and effective partnerships—have contributed to strong government commitment and increased funding in recent years, resulting in well-performing national TB control programmes and successful DOTS implementation. With the support from their partners, countries and areas in the Region are now better able to take on the challenges of TB control.

Much has been done to build capacity to fight TB in high-burden countries and areas in the Asia Pacific Region by deploying national and international experts and supporting field staff. India has successfully expanded the DOTS programme by contracting national consultants who assist the state-level national TB programme managers in implementing and monitoring the programme. Quarterly monitoring takes place to ensure the quality of DOTS implementation in the Region. In addition, in-country missions and support for improved surveillance efforts have helped sustain the quality of TB interventions and monitor their impact.

In the Asia Pacific Region partnerships with the private health sector, NGOs, business and industry, medical schools, the media, and communities and development partners are making a significant contribution to TB control. There are outstanding examples of successful collaboration between governments and NGOs at the grass-roots level in Bangladesh, Cambodia, India, Indonesia, Myanmar, Nepal and the Philippines, where NGOs provide DOTS at the community level. Public-Private Mix DOTS has gone from a pilot programme in a few countries and areas to being adopted as an integral part of national TB control programmes in many. China, India, Indonesia, and Myanmar have recently experienced a substantial increase in case detection rates as a result of a strong political commitment at all levels, together with countrywide implementation of a partnership linking private practitioners, large public and general hospitals, and TB dispensaries. Other countries are in the process of building and scaling up these very successful partnerships. Employees in the public and private sectors are

beginning to benefit from DOTS at their workplaces. In India, a business alliance against TB was launched in March 2004 in collaboration with WHO and the World Economic Forum. DOTS has also been included in teaching, practice and research agendas of medical schools in Bangladesh, India, Indonesia, Myanmar, Nepal, the Philippines, Sri Lanka and Thailand.[79]

Challenges to tuberculosis control

The Asia Pacific Region faces important challenges to TB control, including identifying and reaching out to those in need of care, especially poor and vulnerable populations. Increasing the case-detection rate to over 70%, while sustaining the good treatment success rates, would be required for TB programmes to have an epidemiological impact on the burden of TB.

The HIV-TB coinfection and MDR-TB pose challenges to hard-won gains in TB control in the Asia Pacific Region. Increased technical assistance is needed to expand drug resistance surveillance and establish and scale up projects to diagnose and treat TB patients with multidrug resistance. In most countries, establishing a laboratory network with culture and drug sensitivity testing to support the programmatic management of MDR-TB continues to be a challenging task.

Similarly, the increasing prevalence of the HIV–TB coinfection in countries and areas in the Region requires urgent and decisive action. National HIV/AIDS and TB programmes need to initiate and scale up TB–HIV collaborative activities, including surveillance of HIV among TB patients, intensified case detection and prevention, treatment and care. In order to ensure that HIV-positive TB patients requiring antiretroviral therapy have full access to treatment, and that all people living with HIV/AIDS are screened and those with active TB treated effectively, national HIV/AIDS and TB programmes will need to collaborate effectively.

Increasingly, there is also a need for greater coordination with providers of TB services that work in the private sector and in public health services operating outside the national TB programme. Their involvement should increase access to quality TB services and improve community awareness about TB, thus leading to better utilization of health-care facilities where TB services are available. In addition, effective use of health promotion, advocacy and communication tools should be promoted to enhance the reach of DOTS and address the stigma associated with TB.

Efforts to control TB should go hand-in-hand with efforts to strengthen health systems as a whole. Primary health-care systems in many countries and areas are stretched thin and suffer from inadequate infrastructure and a shortage of adequately skilled staff. The transition from centralized to decentralized health-care systems in many countries and areas poses a challenge to maintaining successful TB programmes because of the limited management capacity and insufficient human resources at provincial, district and peripheral levels. Ensuring sufficient human resources in health-care has been one of the persistent challenges in the Asia Pacific Region. China and Indonesia have given priority to human resources development, making a significant contribution to overcoming the difficulties arising from decentralization of the health-care system. Throughout the Asia Pacific Region, opportunities have been created by WHO and several partners, such as the International Union Against Tuberculosis and Lung Disease, to increase human resources capacity for TB control by establishing training courses and workshops on TB control.

Tuberculosis control programmes also need to address the needs of population groups at higher risk of contracting active TB. These risk groups include prison populations, refugees and other displaced

people, migratory workers, illegal immigrants, PLHA, and other marginalized groups. Special situations requiring extra attention include unexpected population movements occurring at times of political unrest, war or natural disaster.

Tuberculosis control means long-term commitment. While funding for TB control programmes is fairly secure with most short-term resource gaps filled, concerns remain regarding funding over the long term. The substantial progress in TB control achieved thus far needs to be sustained and further developed to enable individual countries and areas in the Region to achieve the targets set for TB control in the Millennium Development Goals. This concern led to the adoption of a resolution on sustainable financing for TB control at the World Health Assembly in 2005. Increased domestic funding by governments, in addition to enhanced support from donor agencies, will be required to ensure that global and regional TB targets are met. Countries in the Asia Pacific Region should make full use of the new resources that have and will become available from the Global Fund to Fight AIDS, Tuberculosis and Malaria, development banks and bilateral development agencies. However, increased domestic funding should remain a priority, particularly in countries with a positive economic development as this may eventually lead to withdrawal of bilateral support.

Future plans

Following the achievement of the TB control targets set by WHO for 2005, countries and areas in the Asia Pacific Region need to address remaining challenges to make further progress towards the global target of reducing the prevalence of and mortality due to TB by one half by 2015. In January 2006, the Global Plan to Stop TB 2006–2015 was launched by WHO and its partners. The Stop TB Strategy, which underpins the Global Plan, envisions a world free of TB and sets out the steps that national TB control programmes and their partners need to take. The new strategy is now reflected in the regional and national multi-year plans for TB control that will run up to 2015.

The rapid progress in TB control in the Asia Pacific Region has led WHO and its partners to move the regional target from 2015 to 2010 by which to reduce by half the burden and mortality due to TB. Data from China, Indonesia and a district in India, which have all shown a decline in TB prevalence, indicate that this regional target can be achieved.[80,81,82]

Conclusion

The first five years of the 21st century saw unprecedented progress in TB control in the Asia Pacific Region. The progress has, in large part, been due to the widespread implementation of the DOTS strategy. Sharp increases in case-detection and cure rates, as well as innovative strategies to address challenges in TB control, paved the way for a turnaround in the fight against TB. Moreover, health systems issues, such as human resources development and health financing, increasingly affect TB control and will need to be considered in planning and implementing TB control activities.

New strategies are being developed in the Region to sustain and further strengthen TB control, as well as address new challenges such as TB–HIV coinfection and multidrug-resistant TB. Strong partnerships have been developed across the Region involving a wide range of stakeholders in TB control. Stronger political commitment and improved financing have contributed to more effective and efficient TB control services. With sustained efforts from all stakeholders it will be possible to reduce the prevalence and mortality due to TB by one half by 2015 and take another significant step towards a future without TB.

7.4 Malaria

Malaria is a potentially fatal tropical disease caused by a parasite transmitted to humans by the bite of an infected female *Anopheles* mosquito. Intracellular protozoa members of the genus *Plasmodium,* four species of the parasite infect humans: *P. falciparum, P. vivax, P. malariae* and *P. ovale*. Several recent reports of human infections of the simian parasite *P. knowlesi* in Brunei Darussalam and Malaysia include at least two recorded deaths, suggesting that it may eventually become the fifth human species of malaria.

The parasitic infection and ensuing illness are characterized by paroxysms of fever, chills and headache. In a mild form, it may also manifest with other presentations of systemic disease. If untreated, *P. falciparum* infections can deteriorate into severe or fatal disease with multiple organ failure leading to cerebral malaria, anaemia, prostration, renal failure, pulmonary oedema and eventually circulatory collapse.[83,84]

Disease burden and mortality

With about 3.2 billion people living in malaria endemic areas at risk, the disease afflicts almost 500 million people worldwide each year.[85] This mosquito-borne disease is therefore a serious public health problem. Endemic in 20 countries in the Asia Pacific, the Region accounts for 7% of global cases and 6% of all deaths.[86,87] The number of malaria cases in endemic countries in the Asia Pacific Region in 2005 is shown in Table 7.4.

WHO estimates that in 2002 about 3.2 million DALYs were lost to the disease in the Region.[88] While *P. vivax* is more predominant in China, the Indian subcontinent, the Korean peninsula, and some Pacific island countries, in almost all other areas, *P. falciparum* is the major cause of malaria, with a very small number of cases due to *P. ovale* and *P. malariae*. Even though Bangladesh and India have seen a decline in malaria in recent years, there has been a surge in the proportion of *P. falciparum* cases, possibly due to the westward spread of drug-resistant falciparum malaria from the Mekong region.[89] In countries where effective treatment and control measures for falciparum malaria are in place, the proportion of reported vivax cases is increasing. A re-emergence of vivax malaria in the Democratic People's Republic of Korea and the Republic of Korea in the mid-1990s and outbreaks in five provinces of central China in 2003 have been effectively controlled. As it remains widespread, greater attention to the health impact of *P. vivax* must be paid in countries where it is most prevalent. Figure 7.13 presents the distribution of malaria cases by species for selected countries in the Asia Pacific Region in 2005.

Malaria affects mainly poor, underserved and marginalized populations in remote rural areas, which are characterized by inadequate control measures and limited access to health care. Several studies show higher malaria prevalence among ethnic minorities and tribal groups living in remote forested areas, as well as mobile and migrant populations.[90] Underreporting of malaria cases and deaths remains a major challenge in these areas due to inadequate and limited access to health services and weak surveillance systems. Parasitic drug resistance, poor treatment-seeking behaviour and the presence of counterfeit antimalarial drugs, especially in Greater Mekong subregion countries, further hinders control efforts.[91,92]

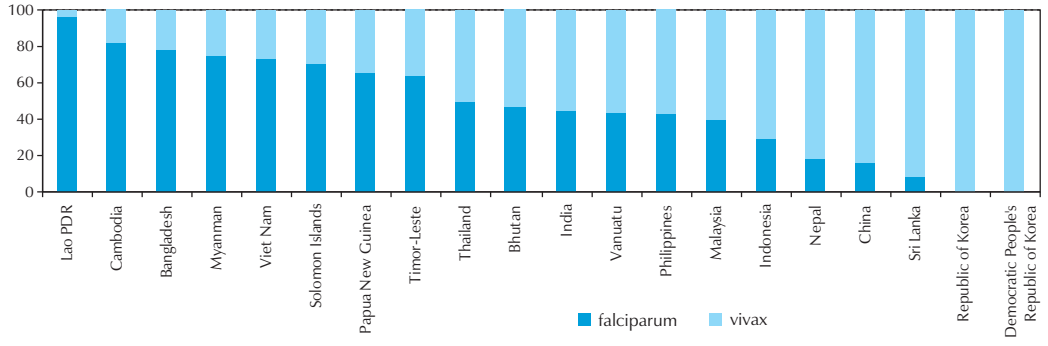
Table 7.4 Malaria situation in malaria-endemic countries of the Asia Pacific Region, 2005

Country	Population[a] (thousands)	Confirmed malaria cases	No. of probable malaria cases	No. of *P. falciparum* cases	Confirmed malaria deaths	% *P. falciparum* cases
Bangladesh	153.3	48 096	190 724	37 754	501	78.5
Bhutan	0.7	1 825	1 947	853	5	46.7
Cambodia	14.0	49 436	...	40 432	296	81.8
China	1 313.0	21 935	3 705 444	3 588	48	16.4
Democratic People's Republic of Korea	23.6	6 728	11 507	0	0	0.0
India	1 046.2	1 817 093	15 000 000	805 699	963	44.3
Indonesia	211.7	433 326	2 519 222	127 290	88	29.4
Lao People's Democratic Republic	5.2	13 602	34 028	13 091	77	96.2
Malaysia	23.3	5 569	5 569	2 222	33	39.9
Myanmar	45.9	151 508	506 041	114 671	1 707	75.7
Nepal	24.4	4 962	67 244	879	10	17.7
Papua New Guinea	5.4	98 762	1 525 857	64 684	725	65.5
Philippines	76.2	46 485	3 343	29 613	145	63.7
Republic of Korea	46.8	1 323	0	0	0	0.0
Solomon Islands	0.4	76 762	...	54 148	...	70.5
Sri Lanka	18.7	1 640	2 733	133	0	8.1
Thailand	60.7	29 782	...	14 793	71	49.7
Timor-Leste	0.8	43 857	185 336	27 945	71	63.7
Vanuatu	0.2	9 834	...	4 267	10	43.4
Viet Nam	79.1	19 497	...	14 231	18	73.0

Remark: Maldives is a malaria-free country and is not included in the table
... Data not availbale
* : Incomplete information about malaria deaths
[a] : United Nations population (thousands)

Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas for 2005.

Fig. 7.13 Percentage distribution of malaria cases by species in selected countries in the Asia Pacific Region, 2005



Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas for 2005.

Drug resistance and national treatment policies

In the Asia Pacific Region, antimalarial drug-resistant strains have spread slowly but steadily. Chloroquine resistance was initially reported in 1962 on the Thai-Cambodian border, then in 1969 on the Thai-Myanmar border, two areas of the Greater Mekong subregion now identified as the primary foci for multidrug-resistant falciparum malaria. Presently, resistance to the 4-aminoquinolines and sulfadoxine-pyrimethamine monotherapy is widespread in almost all Asia Pacific countries, with varying levels of severity.[93] Mefloquine has reduced susceptibility in Cambodia and Thailand where it was used as monotherapy from the mid-1980s to the early 1990s. Although quinine is still effective in the treatment of severe malaria, it is generally combined with tetracycline to improve efficacy. With progression from single drug to multidrug resistance, the problem is becoming acute, prompting most countries to shift to highly effective artemisinin-based combination therapy (ACT). During the last four years, however, data have started to show increasing treatment failures with the mefloquine and artesunate combination along the Thai-Cambodian border.[94]

The Democratic People's Republic of Korea and the Republic of Korea do not have falciparum malaria. Except for Malaysia, Nepal and Sri Lanka, the remaining 15 of 20 falciparum malaria-endemic countries in the Region have officially adopted artemisinin-based combination therapy within their respective treatment guidelines as a first- or second-line treatment for falciparum malaria. China and Viet Nam pioneered the use of artemisinin-derivatives as monotherapies in the late 1980s. Thailand started using artemisinin-based combination therapies in 1995, followed by Cambodia in 2000, and then other countries. These countries have shown a significant reduction in falciparum cases and malaria deaths over the last 15 years.

Chloroquine resistance in *P. vivax* was first reported in the Pacific island countries of Solomon Islands, Vanuatu and Papua New Guinea (1989), and recently in India, Indonesia, Myanmar, Timor-Leste and Viet Nam, while primaquine tolerance (e.g. of the Chesson strain) was already well documented in the 1950s and 1960s. The current treatment recommendations of 3-day chloroquine and 14-day primaquine against vivax malaria are inadequate in these areas, and a higher dose of primaquine is required to achieve a radical cure of infections. However, evidence on prevalence and distribution of glucose-6-phosphate dehydrogenase deficiency in most countries is not well established, which limits the use of primaquine. Likewise, very little is known about the characteristics of relapsing vivax strains circulating in the Region, which makes treatment and control of vivax malaria even more challenging. In November 2004, WHO's Regional Offices for the South-East Asia and Western Pacific Regions began collaborating with countries and partners in operational research on *P. vivax* and its control through the newly founded Asian Vivax Network.

To meet the need for a continuous evaluation of the efficacy of antimalarial drugs, WHO established a systematic inventory of in vivo and in vitro drug efficacy studies from 1990 to the present, gathering data from malaria-endemic countries in the Region. A database was created to facilitate the analysis and tracking of drug efficacy studies. The inventory and database helped identify trends of *P. falciparum* and *P. vivax* drug resistance in 19 countries in the Region, including a review of how national treatment policy changes evolved and recommendations for future action.[95]

The malaria situation in neighbouring countries can vary significantly. Most malaria-prone countries in the Asia Pacific Region have established drug-resistance sentinel sites in strategically located areas and have conducted therapeutic efficacy tests of a 28-day or 42-day duration. A network has been established that facilitates intercountry information exchange, as well as discussions on trends in the development of drug resistance and evidence-based antimalarial drug policy changes.

Malaria vectors

Malaria is a focal disease with wide variations and therefore requires stratified, area-specific strategies for effective, sustainable control.

There are several ecological zones where malaria flourishes: forests and forest fringes, irrigated agricultural areas, and coastal areas. The environment plays a substantial role in vector species prevalence, with geographical areas playing a major role in the predominance of a particular type of *Anopheles* mosquito. *An farauti* and *An litoralis* are brackish water-breeding species responsible for malaria transmission in coastal areas of the Pacific islands and the Philippines, respectively. On the Indian subcontinent, there are about 40 identified malaria vectors, but *An stephensi* (urban vector) and *An culicifacies* complex (rural vector) are the predominant species. *An minimus* and *An dirus* complex are effective vectors in the forest and forest fringes of the Greater Mekong subregion. *An sinensis* is common in China and on the Korean peninsula, and *An sundaicus* is prevalent in the estuaries and brackish water of the Mekong delta. *An kunmingensis* has been recently described as an effective vector in Yunnan, China, and the border regions of the Lao People's Democratic Republic, Myanmar and Viet Nam. The *An sundaicus* complex, *An flavirostris, An balabacensis* and *An fluviatilis* are effective vectors in the Malay-Indonesian subregion, breeding mainly in forested mountainous areas but also found in lowland rice paddies, irrigation canals and streams.

Ecological changes brought about by the agro-industrial exploitation of forest resources and forested lands, such as mining, large-scale farming, development projects with the construction of hydro-electric dams, roads and bridges, housing and urbanization, along with the appearance of insecticide-resistant mosquitoes, have all contributed to the increasing complexity of vector control.

Strategies adopted by country malaria control programmes

Faced with variability in topography, climate, population movement, intensity of transmission and vector diversity, a dynamic drug resistance situation, the varying efficacy of therapeutic and preventive measures, and vector control, many countries have an increasingly difficult task in adopting and sustaining effective antimalaria strategies.

Building on the Global Malaria Control Strategies from the 1992 Ministerial Conference on Malaria in Amsterdam, the Netherlands, most countries in the Asia Pacific Region adopted the Roll Back Malaria initiative in 1998 in an effort to significantly reduce the burden of the disease. Key strategies stress effective management through: (1) early diagnosis and effective treatment; (2) integrated multiple vector control measures, including epidemic management; and (3) strengthening partnerships with all stakeholders, especially communities at risk, public and private organizations, and local governments. Operational strategies include securing political commitment, mobilizing resources, creating a stratified approach based on endemicity and transmission, strengthening the health system, mobilizing communities, building partnerships with stakeholders, and intensifying monitoring and evaluation.[96]

The success of implementing these Global Strategies depends on budgetary allocations and the capacity of malaria control programmes. While some are operating as vertical programmes, other countries already have decentralized malaria control programmes and have integrated them into the local health infrastructure. In either setting, good programme management at the local and national level is essential. Indonesia, Papua New Guinea and the Philippines have decentralized programmes,

but continue to struggle with the acceptance of responsibilities, limited mid-level programme management capacities and the competing health priorities of local government officials. While these are tried and proven strategies, the capacity of many countries to implement them is inadequate.

Early case detection and prompt treatment

While a few countries have diagnostic services using malaria microscopy at hospitals and community clinics, diagnostic networks in the periphery are inadequate and need to be strengthened in most countries. Most countries have moved towards the use of malaria rapid diagnostic tests (RDT), with all Greater Mekong subregion countries, Pacific island countries and the Philippines now deploying RDT for field use in very remote areas. This change from exclusive use of microscopy is most important for Pacific island countries and remote border regions because it allows confirmed diagnosis prior to treatment in difficult-to-access areas. A programme is in place to conduct laboratory testing to ensure the quality of malaria rapid tests prior to deployment in the field. Cambodia, India, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, Pacific island countries and the Philippines are part of a global programme to improve the quality of malaria microscopy diagnosis. Many countries in the Asia Pacific Region have recently changed their treatment guidelines and are now using highly efficacious ACT medicines, but the availability of these supplies for health workers and dispensing facilities in remote areas is not assured, which hampers prompt access to effective treatment.

Vector control

An effective, integrated vector management strategy is based on the selective application of various control measures determined by the ecology of the area and the local epidemiological patterns of the disease. While insecticide-treated bednets or long-lasting insecticidal bednets are distributed to households in non-mobile communities of endemic areas, insecticide-treated nets, including hammock nets, have been recommended for mobile groups, i.e. forest workers, soldiers and miners. Indoor residual spraying complements insecticide-treated nets in some areas where vectors usually feed indoors, and is also used to control focal epidemics. Biological and environmental modification control methods have been used in the Pacific, including Solomon Islands and Vanuatu, and considerable work has been done in this field in India. With the ongoing threat of cross-border malaria epidemics and the increasing likelihood of epidemics in areas where malaria has been greatly reduced, good surveillance, preparedness, logistics and intercountry coordination are key to epidemic recognition and management.

Regional, country and community level partnerships

In recent years, countries in the Asia Pacific Region have come to realize that national control programmes need to incorporate partnerships with all stakeholders at the regional, country and community level. Most countries have made efforts to increase intersectoral activity and promote community participation in malaria control. Promotion of community-based care and the creation of links between communities and health systems are crucial for effective control strategies. This is being achieved through community mobilization and communication for behaviour change in several countries in the Asia Pacific Region. The entry of the Global Fund to Fight AIDS, Tuberculosis and Malaria in recent years has promoted the active involvement of the private sector, especially villagers, private physicians and pharmacies, NGOs, the business and corporate sector, faith-based groups and multilateral and bilateral agencies in malaria

control. In the Asia Pacific Region, 16 countries are currently recipients of funds for malaria control from the Global Fund to Fight AIDS, Tuberculosis and Malaria. Further regional partnerships in malaria control exist between the United States Agency for International Development (USAID) and the Greater Mekong subregion, and the Pacific Malaria Initiative by the Australian Agency of International Development (AusAID) to support Solomon Islands and Vanuatu, and in the future, Papua New Guinea.

Challenges to malaria control

It must be noted that countries most affected by malaria not only have the lowest gross domestic product (GDP) in the Region, but also large inequities in family income, education, work opportunities, access to health services, and environmental and housing quality. While no group is exempt, malaria is a disease of poverty. Indigenous or tribal minorities of these countries are most vulnerable and less protected against the disease, have the least access to health services, and are hampered by socioeconomic and cultural barrier s. These minorities remain an important focus for national control programmes if the countries where they reside are to achieve a significant reduction of malaria. Mobile populations and migrants, often with a non-formal status, are other groups with similar limited access to health services, and are therefore highly vulnerable to malaria.

Like many other public health efforts, national malaria control programmes face several health system-related challenges. Primary health care systems often suffer from limited management capacity, inadequate infrastructure and logistic support, a lack of skilled human resources, weak surveillance, monitoring and reporting systems, and lack of health insurance. Low-income countries and those beset by civil unrest and political repression are particularly affected, while the situation in middle-income countries such as Malaysia, the Republic of Korea and Thailand is quite different. Some countries must overcome obstacles arising from decentralization, with significant investment required in human resources development and capacity strengthening. With the constant turnover of field managers, more training courses and workshops are needed, such as management of field operations, advocacy workshops and training on technology transfer, all specifically designed for malaria programme managers. The Asian Collaborative Training Network for Malaria (ACT Malaria), founded more than 10 years ago, currently has 11 country members and plays a very important role in human resource capacity-building in the Region.

All countries face the continuing threat of multidrug-resistant falciparum malaria and the emerging resistance of vivax malaria. There is an increasing and urgent need for the availability of affordable Good Manufacturing Practice-certified antimalarial medicines as well as alternative drugs should currently recommended drugs reach their efficacy limits. The presence of counterfeit and substandard antimalarial medicines, especially in the Greater Mekong subregion, continues to take a toll on unsuspecting patients. Even if countries have made efforts to warn the public of the danger of counterfeit drugs, stronger intercountry and interagency cooperation, drug regulation and policing are essential to curtail their circulation. The Region is spearheading efforts to cooperate with the International Criminal Police Organization (INTERPOL) to stop the production and interrupt the distribution of counterfeit antimalarial medicines.

Malaria impedes economic growth and human development, but it is preventable and curable, with good returns on investment. With support from external donors, successful large-scale malaria control was achieved in Viet Nam and several Indian states. At a cost to the Government of Viet Nam

of about US$ 11 in 1998 for a clinic visit plus medicines to treat one episode, direct savings amounted to over US$ 9.5 million, about twice the amount spent on malaria control annually. Added to this is approximately US$ 14 million in reduced out-of-pocket health-care costs to households. Eight states in northern India with the highest risk for malaria received financing for the Enhanced Malaria Control Project in 1997.[97] After six years, there was a dramatic reduction in the malaria burden in Gujarat (58%), Rajasthan (79%) and Maharashtra.[98,99] Significant investments were made in strengthening diagnosis and treatment, vector control and health systems, but the most important factor was commitment and leadership at all levels of the government. Notably, decentralization of programme implementation and financing boosted progress, but the cohesive and centralized malaria control programme conducted during the campaign was equally important.

Outlook

Successful malaria control means long-term commitment and sustainability by national governments, communities and partners. While funding seems secure in the next few years with the infusion of money from the Global Fund to Fight AIDS, Tuberculosis and Malaria (and others) bridging identified resource gaps in most countries, stable future financing remains a major priority. This is a particular challenge in the light of quickly diminishing numbers of malaria cases.

In a number of countries, notably Malaysia and the Republic of Korea, malaria incidence rates have now dropped so low that they have embarked on malaria elimination. Other countries, for example, China and the Philippines, have changed their national goals from control to a gradual scaling up towards elimination by successively increasing the number of malaria-free provinces. The substantial progress achieved by most countries must be maintained by the Asia Pacific Region to make a lasting contribution to global malaria control and, eventually, elimination.

7.5 Vaccine-preventable diseases

Although immunizations today save more than three million lives worldwide annually, millions of children in the Asia Pacific Region remain unimmunized and continue to die from diseases that can be prevented with vaccines available in their own countries.[100] A safe, proven strategy for reducing disease and death, vaccines are a highly effective public health intervention. Vital for social and economic development, immunization programmes are also one of the most cost-effective means of addressing economic disparity within health-care sectors. With a heavy disease burden from vaccine-preventable diseases in many countries in the Region, support for immunization efforts is a high priority.

Many countries in the Region maintain high routine immunization coverage with the six traditional antigens and have expanded immunization programmes by introducing new vaccines. However, challenges persist, such as increasing coverage and ensuring vaccine quality and safety, especially for underserved and hard-to-reach populations, enhancing disease surveillance and laboratory capacity, and improving vaccine security. Immunization programmes in many countries are highly donor-dependent, leaving them vulnerable to shifting donor priorities.

Poliomyelitis

Poliomyelitis is a highly infectious disease caused by the poliovirus. The virus enters the body through the mouth and multiplies in the intestine, from where it can invade the central nervous system causing paralysis. Among those paralysed, some will die when the muscles used for breathing become immobilized. Many infected with the virus show no symptoms but can infect others. Polio is incurable but the disease can be prevented through immunization.

In the Asia Pacific Region 37 countries and areas were officially certified as poliomyelitis-free in October 2000, with the last locally circulating poliovirus reported among them from Cambodia in March 1997. Of the remaining 11 countries in the Asia Pacific Region, seven have remained poliomyelitis-free after successful interruption of wild poliovirus transmission several years ago. India continues to be poliomyelitis-endemic, and Bangladesh, Indonesia and Nepal, after having been poliomyelitis-free for several years, have suffered recent importations of wild poliovirus.[101] In India, the disease continues to occur in some states and despite immunization campaigns that reach 90% of the population, wild poliovirus has continued to circulate because of high population density, poor sanitation, malnutrition and large birth cohorts. In response, India implemented a range of intensified and specific initiatives since 2005 designed to interrupt the transmission of wild poliovirus, including intensifying advocacy efforts; utilizing monovalent oral poliomyelitis vaccine in high-risk areas; employing new strategies to reach underserved populations; and vaccinating at transit points such as railway and bus stations, ferries, markets and religious fairs, netting 3 million vaccination sites. Despite these initiatives, in 2006 there was a setback with India reporting 676 new cases of poliomyelitis.[102] However, there has been a dramatic decline in the number of cases of poliomyelitis due to subtype P1 from western Uttar Pradesh in the early part of 2007, and this is seen as a positive step towards finally ending wild poliomyelitis transmission in India.

After having been poliomyelitis-free for 10 years, Indonesia had an importation of wild poliovirus in March 2005. The index case, occurring in Sukubumi, West Java, was linked to wild poliovirus circulating in West Africa. The outbreak continued for several months, paralysing over 300 children and affecting several dozen districts on the islands of Java and Sumatra.[103] The wide circulation of wild poliovirus required several rounds of nationwide immunization and intensive technical support in the high-risk provinces to support planning, implementation and monitoring of the vaccinations, as well as an improvement of poliomyelitis surveillance.

Imported wild poliovirus has the potential to spread widely since vaccination rates have dropped in many communities over the past few years. Low coverage led to 46 poliomyelitis cases due to vaccine-derived poliovirus on Madura Island in East Java, Indonesia, and one case in Myanmar in early 2006.[104,105] The oral poliovirus vaccine has proven to be safe and effective in almost 50 years of widespread use. However, in certain circumstances, mainly where there is low immunization coverage, vaccine-related polioviruses are able to persist for extended periods through transmission in unprotected people.

For similar reasons as in Indonesia and Myanmar, vaccine-derived polioviruses also emerged in China in 2004 and in the Lao People's Democratic Republic in 2004–2005 in communities with low vaccination rates and resulting immunity gaps. After certification of poliomyelitis-free status, supplementary immunization activities with poliomyelitis vaccine have been reduced in several countries in the Asia Pacific Region, mainly due to lack of funding. Although priorities are now focused on strengthening routine immunization systems, progress is often slow. Therefore, in areas of the

Region where wild poliovirus has been controlled, the emergence of vaccine-derived polioviruses remains a threat. High vaccination rates to prevent such occurrences also reduce the risk of imported wild poliovirus outbreaks.

Surveillance for poliomyelitis is based on the detection of children under the age of 15 years who get acute flaccid paralysis (AFP). Rapidly obtaining and testing the stool of cases of AFP for poliovirus enables accurate identification of poliomyelitis cases. Stool specimens have to be tested for poliovirus at a quality laboratory accredited under WHO standards. These AFP surveillance results are regularly reported to WHO and quality standards are applied to ensure that almost all cases are investigated and to be certain no poliomyelitis cases are missed. Countries in the Region rely upon quality indicators, based on regular data analysis, to strengthen their surveillance systems.

Positive highlights of the work regarding polio in the Asia Pacific Region include the ongoing implementation of the poliomyelitis laboratory network, which is composed of two global specialized laboratories, four regional reference laboratories, 23 national laboratories and 31 provincial laboratories. All countries have access to a WHO accredited laboratory, and all except two laboratories were fully accredited for 2005.[106] Laboratory results are available in a timely fashion and reflect a high degree of accuracy. The network has provided an excellent basis for international collaboration in the surveillance of poliovirus.

For several years 47 out of the 48 countries and areas in the Asia Pacific Region remained poliomyelitis-free, making the maintenance of poliomyelitis-free status a top priority.[107] Addressing the ongoing risk of wild poliovirus importation into poliomyelitis-free countries is crucial, and most countries have recently conducted risk assessments and have updated or enhanced their preparedness plans. Events in Bangladesh, Indonesia and Nepal emphasize the importance of interrupting the transmission of wild poliovirus as swiftly as possible, since no country is safe from wild poliovirus as long as any country is endemic.

Laboratory monitoring for poliomyelitis-free status, which includes accurate and updated national inventories of wild poliovirus infectious materials retained in laboratories to ensure that they are safely stored under required biosafety conditions, is another important priority.

Once wild poliovirus no longer circulates in human populations, its only source will be laboratories that retain materials infectious for polioviruses. Therefore, all countries should conduct a thorough review of all biomedical laboratories to establish a national inventory of wild polioviruses and implement required biosafety measures to ensure that these viruses will not be re-introduced to communities. Almost 30 000 laboratories in the Region have been surveyed, indicating that wild poliovirus infectious materials are currently being held in only 10 countries.[108]

Of notable achievement in the Region is the success of the poliomyelitis network in highly diverse countries under a range of differing conditions. Laboratories participate in regular data exchange and mutual technical support for immunization campaigns, surveillance reviews and alert systems. Indeed, the high-quality surveillance systems developed for poliomyelitis eradication, the demonstrated commitment to infrastructure and capacity-building, and the establishment of coordination mechanisms for external partner support can serve as a model for infectious disease control for other diseases such as influenza.

The Global Polio Eradication Initiative, spearheaded by national governments, Rotary International, the United States Centers for Disease Control and Prevention, UNICEF and WHO, is the world's

largest public health initiative. Its demonstrable success is testimony to the commitment of the many participants in the fight against the disease. Perhaps no better example than poliomyelitis eradication is needed to underscore the value of collaboration, for no other solution would have permitted such achievements. Collaboration must continue as the basis of the ongoing commitment to eradicate this burdensome disease.

Measles

Measles is a highly contagious respiratory infection caused by a virus and is best known for the rash and fever it causes. Despite a substantial reduction in deaths in the Asia Pacific Region compared to the pre-vaccine era, measles continues to be a leading cause of vaccine-preventable morbidity and mortality in children. An estimated 183 000 deaths from measles occurred in 2006 in the Region, compared with 265 000 in 2000.[109] However, children who survive measles may also endure lifelong disabilities, including brain damage and blindness. A disproportionate amount of measles-related death and disability affects the poorest and most disadvantaged children. The burden of the disease is greatest in countries still struggling with health systems development, difficult-to-reach populations, and populous areas and cities.

Many countries in the Region have set a goal of measles elimination by 2012. Other countries have not set a specific target date for elimination, but have adopted a policy of accelerated measles control to rapidly decrease measles mortality, disability and morbidity. Virtually all countries in the Region have developed multi-year national plans of action specifically addressing measles elimination or control using WHO-recommended strategies. These include: a high routine immunization coverage (≥95% for elimination) with a first and second dose of measles vaccine, or a second opportunity for a first dose, given either through routine services or supplementary immunization activities (SIA); sensitive and timely surveillance; and case management for children with measles, which includes providing vitamin A.

Based on population estimates by WHO-UNICEF and best estimates of vaccination coverage, routine immunization coverage for the first dose of measles vaccine was 73.1% in 2005.[110] However, measles vaccination coverage varied widely between countries. Countries with the lowest coverage in 2005 included the Lao People's Democratic Republic (41%) and Timor-Leste (48%). The next lowest were Kiribati (56%), Samoa (57%), India (58%) and Papua New Guinea (60%). In addition to India, WHO-UNICEF best estimates of routine first-dose measles vaccination coverage in other countries with very large populations include Indonesia (72%), Bangladesh (81%) and China (86%). Routine immunization in priority countries is being strengthened using GAVI Alliance (formerly known as the Global Alliance for Vaccines and Immunization) funds to implement the "Reaching Every District" approach. This approach emphasizes re-establishment of regular outreach services, supportive supervision with on-the-job training, community links with service delivery, monitoring and use of data for action, and microplanning for better management of human and financial resources and more effective service delivery. Additional initiatives in many countries in the Region have been taken to include national financing for all Expanded Programme on Immunization (EPI) vaccines, ensuring adequate salaries for immunization staff, introducing a routine second dose of measles vaccine, and requiring school entry checks of children's immunization status throughout the country.

Many countries in the Region have conducted large-scale, age-range measles SIA to provide a second opportunity for measles vaccine. Countries having recently conducted successful large-scale measles SIA include Bangladesh, Cambodia, China (11 of 31 provinces), Indonesia,

the Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Sri Lanka, the Philippines and Viet Nam. However, many susceptible children in China and India, the largest countries in the Region, have yet to receive this opportunity through SIA. Of 59 228 000 surviving infants in the Region in 2005, India and China covered 41% and 28% respectively. Most countries conducting SIA use the opportunity to include additional health and child survival interventions, including vitamin A supplements and deworming medications.

Measles surveillance is being strengthened throughout the Region and benefits from the high-quality surveillance infrastructure established for poliomyelitis eradication. In many countries, measles surveillance strengthening is conducted in a manner that strengthens surveillance for all vaccine-preventable diseases. Currently, all countries include measles as a reportable disease requiring investigation in their routine communicable disease surveillance systems. In countries targeting measles for elimination, case-based epidemiological surveillance systems are developed with specific indicators to monitor measles incidence and surveillance performance. In countries with measles control goals, the measles surveillance objective is usually to identify measles outbreaks quickly to enable a timely response. Laboratory networks have been established consisting of subnational and national measles laboratories, and regional reference laboratories. Regional reference laboratories, which are located in Australia, China, Hong Kong (China), Japan and Thailand, provide quality assurance to national laboratories and conduct virus isolation and sequencing of measles virus. These laboratories work in collaboration as part of a global measles laboratory network that allows for confirmation of suspected measles cases and identification of specific genotypes of measles virus to determine whether the measles virus is indigenous or imported.

National governments provide the lion's share of financial support for measles elimination activities, with additional support provided by partners. A total of US$ 48.1 million was provided to countries in the Asia Pacific Region through the United Nations Foundation (UNF) in 2007–2008. These funds were used primarily to support procurement of measles vaccine and injection equipment and operational costs for SIA, and also for strengthening routine immunization and improving measles surveillance. Most of the UNF funds were obtained from the International Finance Facility for Immunization Company (IFFIm), a consortium of countries that have created an innovative mechanism for financing health priorities through issuance of long-term debt (bonds) to the public. Funds from IFFIm are channelled through the GAVI Alliance to the UNF. While many countries and development partners have contributed to measles elimination efforts, core members of the Measles Initiative include the American Red Cross, the United States Centers for Diseases Control and Prevention, UNF, UNICEF and WHO.[111]

The need for 95% population immunity and a second dose of measles vaccine beyond infancy requires measles elimination strategies to include strengthening immunization and health service systems. Success against measles in both Regions will require ongoing cooperation among a broad array of national and international partners as well as unprecedented levels of support from local stakeholders.

Hepatitis B

Worldwide, two billion people, or roughly one in three people, are infected with hepatitis B, with an estimated 350 million people being chronic carriers.[112] An inflammatory liver disease caused by the *hepatitis B* virus (HBV), it is transmitted through percutaneous or mucous membrane contact with infected blood (e.g. through unsafe injection, blood transfusion) or other body fluids (e.g. serous exudates from a wound or cut, saliva, semen or vaginal fluids during unprotected sex). Infants infected

at birth become chronic carriers of the disease. Unlike other vaccine-preventable diseases, hepatitis B infection rarely causes disease in children. Instead, 90% of infants infected with hepatitis B will develop chronic infections leading to late-onset diseases such as liver cancer and cirrhosis. The risk of dying from HBV-related cirrhosis and hepatocellular carcinoma (HCC) in those chronically infected range from 15%-25%. [113,114] Hepatitis B is 100 times more infectious than the AIDS virus, killing about 500 000 people a year and inflicting an enormous strain on public sector health systems.

Most countries in the Asia Pacific Region are either endemic or hyperendemic for hepatitis B. With an estimated 258 million chronic carriers in the Region, hepatitis B is an important public health priority and regional plans have been developed for control through universal childhood immunization.[115,116] Interrupting transmission of the disease at the earliest opportunity is the best strategy and vaccination remains the best means of doing so.

A common, long-term issue faced by countries in the Region is financial sustainability of hepatitis B vaccination programmes, as several countries have financed vaccine costs with support from the GAVI Alliance. In addition, many countries with weak immunization services face challenges in achieving sustained high coverage with three doses of hepatitis B vaccine.

All countries in the Region, except for Timor-Leste, have introduced hepatitis B vaccine into their national immunization programmes, though some countries have yet to introduce the vaccine nationwide. Maldives and Thailand, both non-GAVI Alliance eligible countries, introduced the vaccine even before the launch of the GAVI Alliance programme. India, with an annual birth cohort of more than 25 million infants, began introducing the vaccine in a phased manner, initially targeting 15 metropolitan cities and 33 districts.[117] The next phase of expansion targeted at least 11 states in 2006–2007. The state of Andhra Pradesh in southern India introduced the hepatitis B vaccine several years before the country began its phased introduction for the entire country. Japan follows a nationwide high-risk approach with the screening of all pregnant women and provision of hepatitis B vaccination for infants born to hepatitis B-positive mothers and other high-risk groups.

It is estimated that 30%–50% of all chronic infections in the Region were acquired by transmission from infected mother to newborn child at the time of birth.[118] Hence, timely delivery of the first dose of the vaccine is critical for reducing the spread of the disease. While increasing coverage with three doses of hepatitis B vaccine depends on strengthening routine systems, delivery of the first dose within 24 hours of birth to prevent transmission at the time of birth provides a special challenge in countries where a substantial proportion of births occur at home, unsupervised by any trained health worker. Despite this, the delivery of a birth-dose of hepatitis B vaccine is an opportunity to link maternal health care with immunization services, and may have positive effects on access to trained maternity care—an important Millennium Development Goal.

WHO has set a goal of reducing chronic hepatitis B infection rates in the Western Pacific Region to less than 2% by 2012. With sustained efforts, the entire Asia Pacific Region is well positioned to substantially reduce the hepatitis B disease burden.

Japanese encephalitis

Japanese encephalitis is caused by a virus spread by mosquitoes. While usually starting as a flu-like illness, encephalitis may develop when the virus invades the central nervous system, including the brain and spinal cord. Japanese encephalitis can be fatal in 30% of cases. It is a neglected disease in

the Asia Pacific Region, with more than 50 000 cases and 10 000 deaths occurring annually.[119] Furthermore, outbreaks of Japanese encephalitis have occurred in areas previously non-endemic for the disease. In 2005, a suspected Japanese encephalitis outbreak in northern India and southern Nepal resulted in at least 8900 cases and 1700 deaths.[120]

Vaccination and environmental control are necessary to combat the disease. However, vaccination of at-risk populations has been proven to be the most effective intervention. Current best practices for Japanese encephalitis control and prevention begin with campaigns focused on high-risk groups and geographical areas, followed by the progressive introduction of the vaccine into routine immunizations. While some countries, such as China, Japan, the Republic of Korea and Thailand, have used vaccinations effectively to control Japanese encephalitis, it has only recently been integrated with vaccination initiatives in other endemic countries such as several provinces in China and endemic states in India, Sri Lanka and Viet Nam. Many countries which have only recently begun using vaccinations as the major control strategy are faced with issues of high cost and limited supply of inactivated mouse-brain derived vaccine, lack of WHO prequalified manufacturers of the vaccine, and difficulty in choosing the type of vaccine. As a result, only a handful of countries have introduced Japanese encephalitis vaccines into their national immunization programmes.

More recently the live attenuated SA14-14-2 vaccine has become available in large quantities and at affordable prices. As a result, several countries including India, Nepal, and Sri Lanka have developed plans to introduce this vaccine into their national immunization programmes. India began its first phase of introduction in May 2006 by immunizing about seven million children aged 1 to 15 years in six districts of Uttar Pradesh, and in June an additional two million children in the same age group were immunized in Bardhaman district in West Bengal.[121]

Several new vaccines against Japanese encephalitis that may be more effective are expected to be available in the next three to five years. Availability of these new, improved vaccines will greatly facilitate the prevention and control of Japanese encephalitis in endemic countries through routine immunization efforts.

Disease epidemiology, laboratory support and surveillance are sketchy, contributing to the low political commitment to control this disease. Efforts are being made to set up surveillance systems to generate data in countries where the disease is considered to be endemic, but at present no credible disease estimates are available in countries such as Cambodia, the Lao People's Democratic Republic and the Philippines. However, there is an urgent need to standardize both the surveillance reporting and laboratory testing for Japanese encephalitis.

Other new vaccines

The stable picture of routine national immunization priorities is changing. Recent research progress in developing new vaccines for several infectious diseases of worldwide importance is resulting in an unprecedented number of new immunization options. How countries and national immunization programmes deal with these new prevention opportunities will be a critical issue in this decade and the next.

Two new vaccines in an advanced stage of development are the multivalent pneumococcal and rotavirus vaccines. These are expected to substantially reduce childhood mortality from pneumonia and diarrhoea.[122] While vaccines for widespread use are not likely to be available for the next three

to five years, countries need to prepare by generating sufficient disease burden data to guide the policy on future vaccination. GAVI Alliance funding has been instrumental, through special accelerated development and introduction plans, in helping countries in the Region generate the necessary data through multicountry surveillance networks.

Maternal and neonatal tetanus elimination

Tetanus, also known as lockjaw, is a serious but preventable disease that affects the body's muscles and nerves. It typically arises from a skin wound that becomes contaminated by a bacterium commonly found in soil. Neonatal tetanus is an often deadly form of tetanus in newborn infants who lack protective passive immunity because their mothers also lack immunity. It usually occurs through infection of the unhealed umbilical stump, particularly when the stump is cut with an unsterilized instrument. Neonatal tetanus is estimated to kill over 200 000 newborns each year and almost all of these deaths occur in rural areas of developing countries where births often occur in unsanitized conditions.[123] Vaccination is the best protection against tetanus.

Reducing deaths from neonatal tetanus is one of the simplest and most cost-effective means by which to support the Millennium Development Goal of reducing neonatal mortality. Neonatal tetanus can be prevented by immunizing women of childbearing age, thereby permitting antibodies to be transferred to the baby; by promoting clean delivery and cord-care practices; and by strengthening disease surveillance and case investigation. Of further benefit, vaccination with tetanus toxoid will protect expectant mothers from maternal tetanus during pregnancy and delivery. Though the data are incomplete, it is estimated that maternal tetanus is responsible for 5% of maternal mortalities, almost exclusively among the poorest and most underserved populations.[124]

Neonatal tetanus remains one of the most underreported diseases and is often called the "invisible killer", as it tends to occur in areas with poor or no access to health care and remains unidentified within the community. WHO continues to work closely with UNICEF and the United Nations Population Fund to reach worldwide elimination of both neonatal tetanus and maternal tetanus. Elimination is defined as less than one case of neonatal tetanus per 1000 live births. Eradication is, of course, impossible as tetanus survives in the environment. This means that high levels of immunization must be maintained even after national goals have been reached.

All countries in the Asia Pacific Region have made progress towards neonatal tetanus elimination. Currently, 10 countries in the Asia Pacific Region continue to report neonatal tetanus cases above the elimination goal: Bangladesh, Cambodia, China, India, Indonesia, the Lao People's Democratic Republic, Myanmar, Papua New Guinea, the Philippines and Timor-Leste.[125] In Viet Nam, maternal and neonatal tetanus elimination was formally validated in December 2005.[126] National elimination goals have been set in Cambodia and the Philippines for 2008, China for 2010 mainly through enhancement of clean and institutionalized deliveries, and the Lao People's Democratic Republic for 2010. Maternal and neonatal tetanus is regarded as eliminated in Bhutan, the Democratic People's Republic of Korea, Maldives, Nepal, Sri Lanka, Thailand and seven states in India.[127,128] Indonesia has completed nationwide supplementary immunization activities for women of childbearing age. Myanmar has provided supplementary immunization in most of its high-risk districts and plans to cover those remaining by 2006. Bangladesh began tetanus toxoid supplementary immunization activities in high-risk areas in 2005, with completion in 2006.

In September 2003, WHO passed a resolution on child health that strongly urged placing child health higher on political, economic and health agendas, targeting child survival interventions, and increasing allocation of financial resources to reduce child mortality and morbidity, especially in developing countries. In line with this resolution WHO and UNICEF initiated a joint Regional Child Survival Strategy, in which the essential package included tetanus toxoid immunization during antenatal care and skilled assistance during delivery and care of newborn children for the entire Asia Pacific Region.

Tetanus prevention is a tremendous opportunity for various public health programmes to collaborate and make an impact far beyond health alone. Every year, close to 600 000 women—more than one woman every minute—die globally from complications related to pregnancy and childbirth. In addition, these complications contribute to more than three million infant deaths within their first week of life.[129] A maternal death has an impact on the family, the community and society. A significant proportion of these deaths can be prevented with safe, inexpensive vaccinations.

7.6 Dengue and dengue haemorrhagic fever

Dengue fever is an acute febrile viral disease characterized by the sudden onset of a fever lasting 3–5 days, intense headache, pain in the muscles, joints and behind the eyes, loss of appetite, gastrointestinal disturbances, and rash. Flaviviruses, which include four serotypes DEN 1, 2, 3 and 4, and *dengue* viruses cause the more acute dengue haemorrhagic fever (DHF), characterized by increased vascular permeability, a decrease in blood volume (hypovolaemia), and abnormal blood clotting. The disease is now endemic in most tropical and subtropical countries, and is transmitted to humans by the bite of infective mosquitoes, mainly *Aedes aegypti*. The incubation period is 3–14 days, but most commonly 4–7 days.

Dengue fever, with its severe manifestations of DHF and dengue shock syndrome (DSS), has emerged as a major public health problem of international concern. Geographical distribution of dengue fever has greatly expanded over the last 30 years, in lockstep with an increase in breeding grounds for the vector species. This is due to an explosive growth in population and urban areas, which strain public health services and potable water supply systems.[130] This encourages rainwater harvesting in diverse types of containers, which offer perfect breeding conditions for dengue carrying mosquitoes.[131]

Current estimates show at least 100 countries are endemic for DHF and about 40% of the world population (2.5 billion people) is at risk in tropical and subtropical regions. During 1998, over 1.2 million cases and 3442 deaths were reported to WHO by 56 countries. Over 50 million infections, with about 500 000 cases of DHF and at least 12 000 deaths, occur annually, with dengue being a leading cause of childhood mortality in several Asian countries.[132,133]

In March 2006, WHO organized a Meeting of Partners on Dengue Prevention and Control in the Asia-Pacific in Chiang Mai, Thailand. Attended by representatives from Asia Pacific Region countries, the meeting highlighted the problems of dengue emergence in the Region, and the decision was made to form the Asia Pacific Dengue Partnership. Following the meeting, a core group was formed to prepare a partnership strategic framework and initiate effective advocacy for additional resources for dengue control.

Key strategies for dengue control in the Region

An intercountry consultation of programme managers was held in Batam, Indonesia, in July 2001, where a regional strategy for prevention and control of dengue was discussed and approved featuring the following key elements:[134]

- Establishing an effective disease and vector surveillance system based on reliable laboratory and health information systems.
- Ensuring early recognition and effective case management of DHF/DSS to prevent case mortality.
- Undertaking disease prevention and control through integrated vector management with community and intersectoral participation.
- Undertaking activities to achieve sustainable behavioural changes and partnerships.
- Establishing emergency response capacity to control outbreaks with appropriate medical services, vector control, communications and logistics.
- Strengthening regional and national capacities to undertake prevention and control of dengue and research related to epidemiology, disease and vector management, and behavioural changes.

Integrated vector control with community and intersectoral participation has been successfully implemented in Indonesia through the 3M Strategy—covering water containers (*menutrap),* clearing and brushing water containers (*mengguras),* and burying water containers (*mengubur).* The success of this effort was due to the active participation of the Indonesian Women's Organization.[135] In Thailand the national dengue prevention and control plan, aiming to prevent morbidity and mortality, integrated DHF control with the primary health care programme. The case-fatality rate due to DHF/DSS dropped from 2.45% (1978) to 0.58% (1987) as a result of access to standard treatment.[136] In Malaysia, the Communication for Behavioural Impact (COMBI) programme has been very successful in Johor Baru.[137] The dengue control programme in Singapore was implemented by the National Environmental Agency through strong legislative measures and several effective strategies, including the use of ovitraps.[138] In Viet Nam, copepods of genus *mesocyclops* are being used effectively for biological control of *Aedes aegypti* larvae, which is principal vector of dengue fever.[139] In Cambodia, partnerships were developed with the private sector in the design and introduction of suitable water-storage covers to reduce vector breeding.[140] There are many other success stories that have been implemented on a smaller scale.[141,142]

The Asia Pacific Strategic Plan for Dengue (2007–2015) was developed in response to the increasing threat of dengue as an emerging high-burden disease, and for meeting the requirements of the International Health Regulations (2005). The goal of the strategy is to reverse the rising trend of dengue in affected countries in the Region. There are differences between countries in the Region in terms of preparedness, response capacity and the allocation of financial resources. The strategic plan provides generic recommendations to allow local adaptation in preparing national operational plans, identifying resource gaps, developing capacity, strengthening health systems, establishing networks and harmonizing partnerships for dealing with dengue.

As the disease does not respect international boundaries, effective dengue control is not possible if efforts are limited to one country or a few countries. Adoption of a regional approach is required, through collaboration between countries and sustained partnerships, to enable the implementation of evidence-based interventions using the best practices for expansion.

To achieve the goal of reducing the rising trend of dengue in the Region, it is proposed to strengthen the system for prediction, early detection, preparedness and early response to dengue outbreaks and epidemics; improve standard case management of dengue; support prevention of dengue through strengthening of integrated vector management and community mobilization; and refine strategic interventions through access to innovations in the prevention and control of dengue.

Currently, national programmes are expending only modest resources and a major part of what is being spent goes to insecticide sprays and chemical larviciding, which have little impact on the control of epidemics. In contrast, the evidence shows that vector control through larval monitoring, source reduction and personal protection, combined with adequate sanitation and improvements to the environment of households and communities, are proven options for the prevention of dengue. Good public health policies are an essential prevention and control measure in both urban and rural settings.

Community participation and social mobilization for behaviour impact have started to show good results in many different settings. Investments in the use of this approach and in integrated vector management will produce the desired results.

The role of the health sector needs strengthening as does intersectoral and programme collaboration. Efforts to improve case management of DHF/DSS are already showing good results with reduced case fatality rates, and this initiative is to be scaled up.

For prevention of dengue outbreaks, monitoring the virus and vector is key, allowing timely prediction of dengue outbreaks and prompt investigation. Collaboration between disease surveillance programmes in various countries also helps reverse the rising trend of dengue. Such networking plays an important role in the success of programmes and will be included in future operational plans.

Dengue and DHF in countries of the Region

The Asia Pacific Region is home to 53% of the world's population and only a few of the Region's countries do not report dengue cases: the Democratic People's Republic of Korea, Japan, the Republic of Korea, Mongolia and New Zealand (except for occasional imported cases). Bhutan and Timor-Leste first reported dengue fever outbreaks in 2004, followed by Nepal in 2006.

Dengue fever (DF) is a major public health issue in many Pacific island countries and areas. Although the disease has been reported in the Pacific for over 100 years, in the early 1970s Pacific island countries experienced a re-emergence of dengue after an absence of more than 25 years, with DHF occurring for the first time in 1975. Since then, several Pacific island countries have experienced significant outbreaks and epidemics, including cases of DHF and DSS. High morbidity during outbreaks is often observed, and in some countries more than 20% of the population has been affected during epidemics. However, dengue has never progressed to very dramatic epidemics with high case-fatality rates (CFR), as might be expected in isolated communities where the entire population is vulnerable.

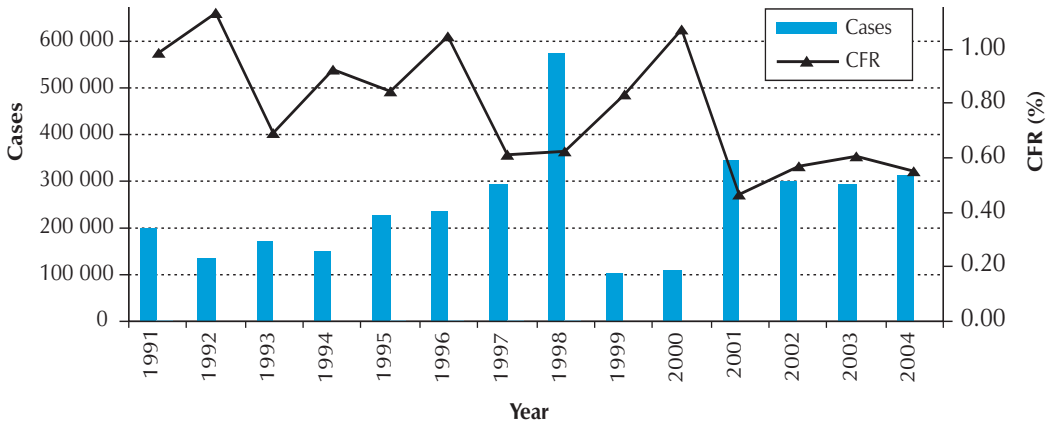
Epidemics are difficult to predict, but historically they are cyclical, occurring roughly every three to four years.[143] In the past decade, two major epidemics broke out, one in 1998 and another in 2001, each affecting an estimated 30 000 people.

Between 2000 and 2004, the seven most affected Pacific island countries and areas were French Polynesia (33 047 cases), New Caledonia (6616 cases), Wallis and Futuna (2488 cases), Cook Islands (2282 cases), Palau (2188 cases), Kiribati (2143 cases) and the Federated States of Micronesia (658 cases). During the same period, other countries had no cases or a low number of cases.

From 1991 to 2004, 72 deaths were reported. Most of these occurred in outbreaks in 1998 (14), 2001 (12) and 2003 (24) in Fiji, French Polynesia, New Caledonia, Palau, Solomon Islands and Tonga. All four serotypes of dengue have been reported in the Pacific, where *Aedes aegypti* is the principal vector, with *Aedes albopictus* and *Aedes polynesiensis* secondary vectors. All four serotypes have been detected circulating in all the countries, but the transmission potential is different both at the macro and micro levels.

The combined total reported dengue cases in the Asia Pacific Region ranged from 198 932 (1991) to 312 820 (2004). Case-fatality rates for DHF declined as a result of improved case management. Over the last seven years, the combined fatality rate was 0.5%–1%. While there is a declining trend in mortality, reported cases have consistently remained over 300 000 since 2001(Figure 7.14).

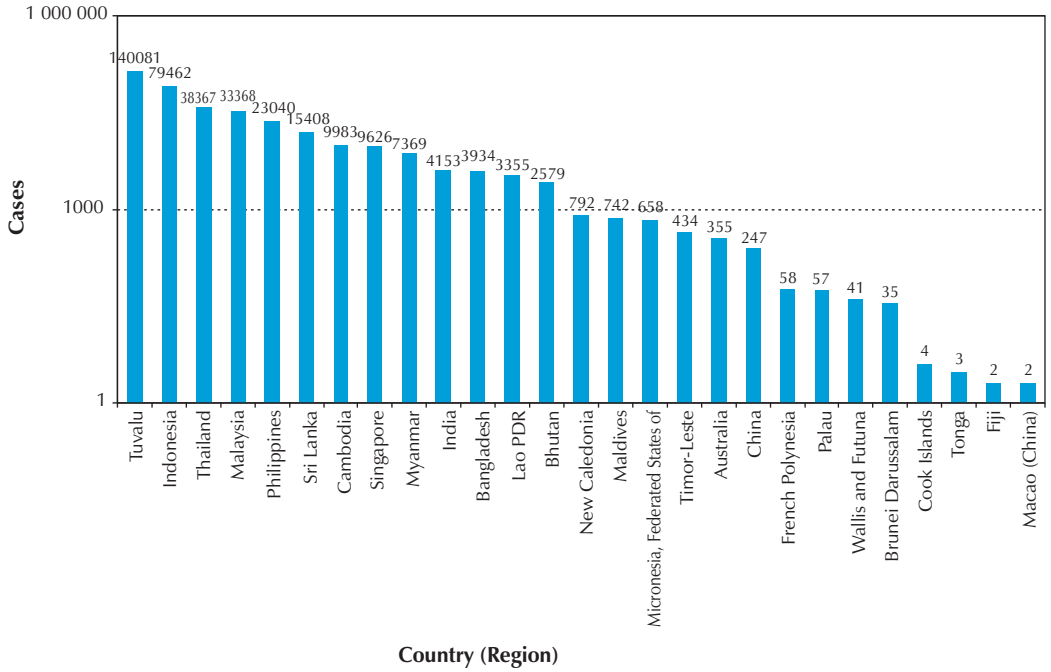
Fig. 7.14 Number of reported dengue cases and case-fatality rates (CFR) in the Asia Pacific Region, 1991–2004



Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas.

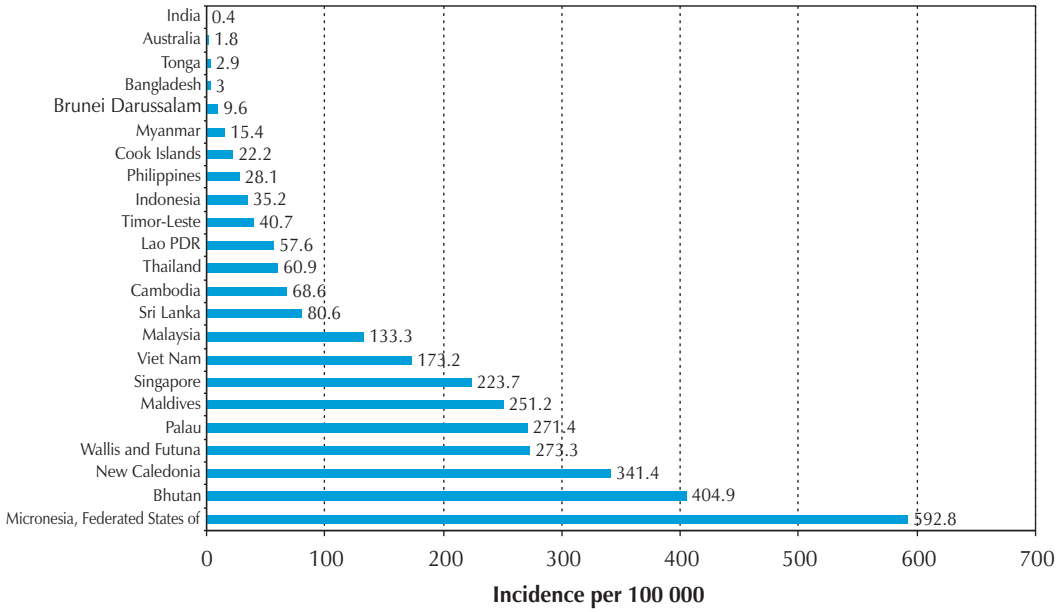
The number of cases reported by 27 countries in the Region between 1991 and 2004 varied from a low of 2 to a high of 140 081 (Figure 7.15). Incidence rate per 100 000 in selected countries is shown in Figure 7.16. These rates are very high in countries reporting focal outbreaks for the first time, especially smaller countries with less population.

Fig. 7.15 Number of reported dengue cases by country and area in the Asia Pacific Region, 1991–2004



Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas.

Fig. 7.16 Dengue incidence rate per 100 000 in selected countries and areas in the Asia Pacific Region, 2004



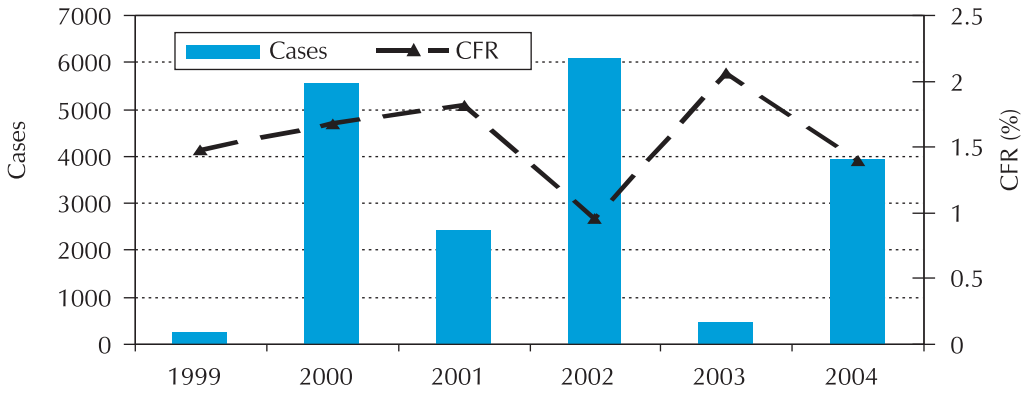
Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas.

Review of select countries

Bangladesh

During the epidemics in 2000 and 2002 in Bangladesh, the number of reported cases was 5550 and 6000, respectively. Case-fatality rates varied from 1% to 2% and fell below that by 2004 (Figure 7.17).

Fig. 7.17 Number of reported dengue cases and case-fatality rates in Bangladesh, 1999–2004

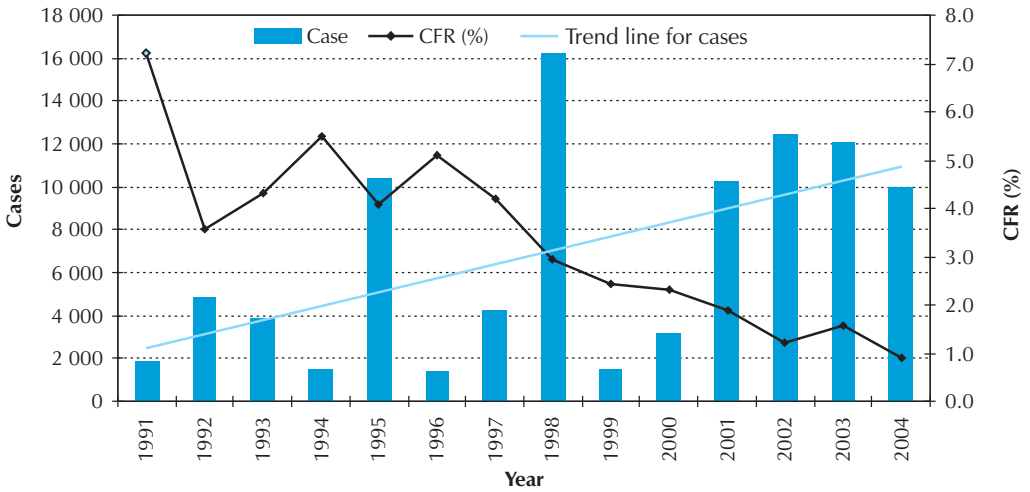


Source: Unpublished data. Compiled from country reports of Bangladesh.

Cambodia

Following a decline in dengue cases in 1999 in Cambodia, there was an upward trend in 2004. The total number of reported cases between 1991 and 2001 was 93 852, with 2444 deaths or a CFR of 2.6%. In 2004 Cambodia had an incidence rate of 68 per 100 000 with a CFR of 0.9%, the first year since 1991 that the CFR was below 1% (Figure 7.18).

Fig. 7.18 Number of reported dengue cases and case-fatality rates in Cambodia, 1991–2004



Source: National Dengue Control Programme, Ministry of Health, Cambodia, 2004.

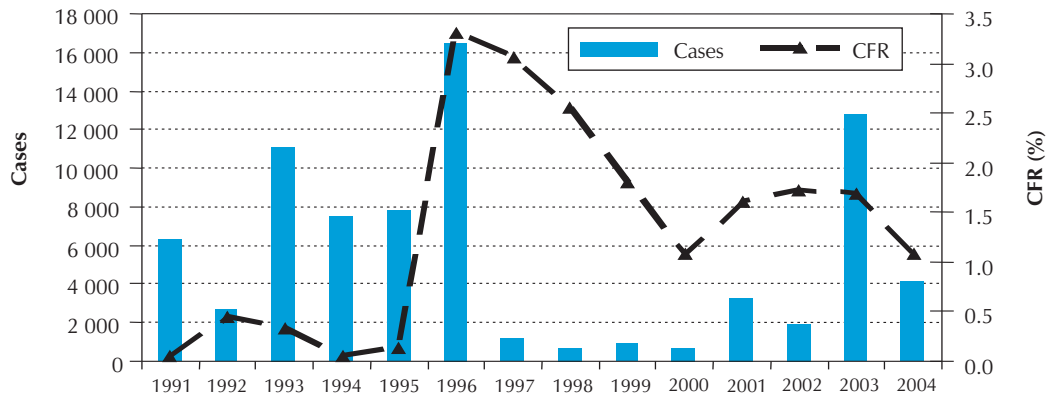
Since the 1998 nationwide dengue epidemic Cambodia has intensified dengue surveillance activities, including hospital-based sentinel surveillance, which has meant an increase in the number of reported hospitalized cases. The National Malaria Centre has taken a number of steps to reduce vector breeding. In collaboration with NGOs and WHO, the Ministry of Health designed and distributed insecticide-impregnated jar covers on an experimental basis, which reduced or eliminated mosquito breeding in numerous water-storage jars that are common in nearly every rural Cambodian household. Mass campaigns have been conducted since early 2001 to distribute the mosquito larvicide temephos throughout the provinces, and a biodegradable insecticide for spraying used in ponds, stream margins, standing or polluted water, and other possible larvae breeding sites.

In addition, some other vector control trials have been conducted in Cambodia. In 2003 a novel, controlled-release formulation of pyriproxyfen, an insecticide that acts as an insect growth inhibitor, was tested under semi-field conditions in Phnom Penh, Cambodia, against a local strain of *Ae. aegypti*. With a view to creating a single application, the test formulation was designed to inhibit adult emergence for six months, the approximate duration of the main dengue transmission season in Cambodia and many other endemic countries. The application of *Mesocyclops* spp *(Copepod)*, a predator of *Aedes aegypti* larvae, in combination with community participation has been piloted. However, the evaluation results did not show a significant reduction in vector density.

India

Serious outbreaks occurred in India in 1993 (11 125 cases), 1996 (16 517) and 2003 (12 754). From 1997 to 2002 cases were relatively lower, with an abrupt rise in 2003. Case-fatality rates were between 2% and 4% from 1996 to 1998, and have fluctuated between 1% and 2% since 1999 to fall below 1% in 2004. However, the reported data were from only a few states with most states not reporting (Figure 7.19).

Fig. 7.19 Number of reported dengue cases and case-fatality rates in India with available data, 1991–2004

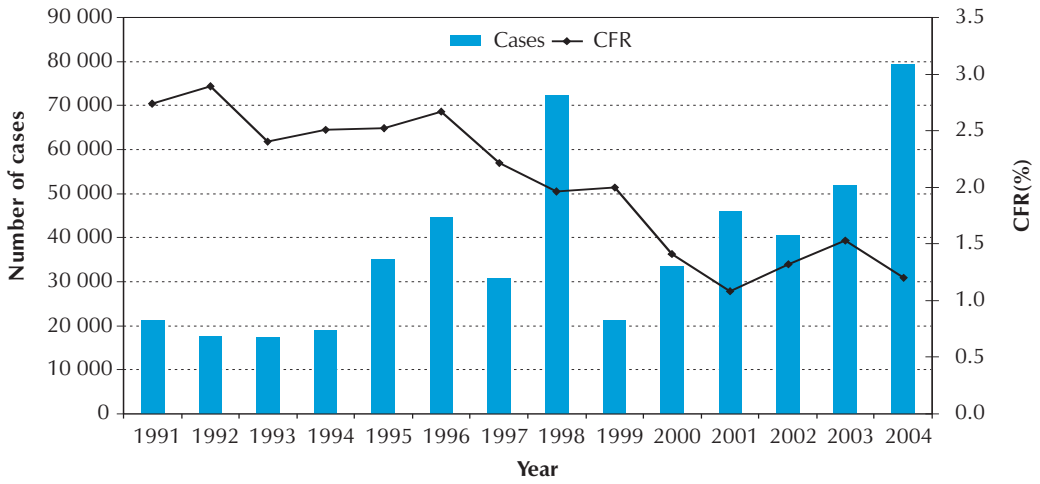


Source: Unpublished data. Compiled from country reports of India.

Indonesia

From 1991 to 1998 cases in Indonesia increased threefold and further increased to 79 462 in 2004. During inter-epidemic years, the incidence varied from 10 000 to 25 000 cases. The case-fatality rate was 2%–3% during the period 1991–1999 and dropped to less than 2% since 2000 (Figure 7.20).

Fig. 7.20 Number of reported dengue cases and case-fatality rates in Indonesia, 1991–2004



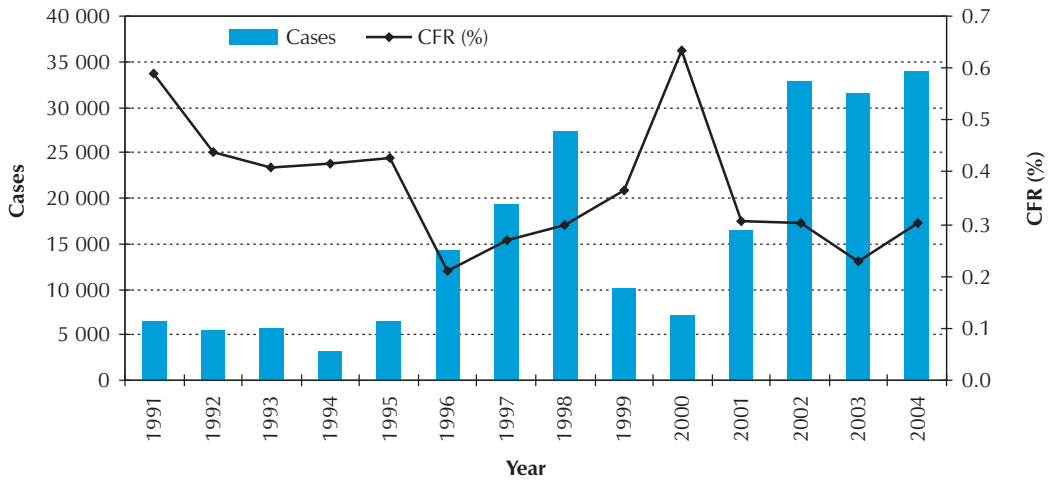
Source: Unpublished data. Compiled from country reports of Indonesia.

Malaysia

Dengue fever has been increasing in Malaysia in recent years. In the early 1990s an average of 5000 cases were reported annually. However, between 2002 and 2004 there were more than 30 000 cases per year. The highest number of cases and deaths were reached in 2004, with 33 895 cases and 102 deaths (Figure 7.21).

In Malaysia, the Communication for Behaviour Impact programme has been very successful in reducing the incidence of dengue fever in Johor Baru.

Fig. 7.21 Number of reported dengue cases and case-fatality rates in Malaysia, 1991–2004

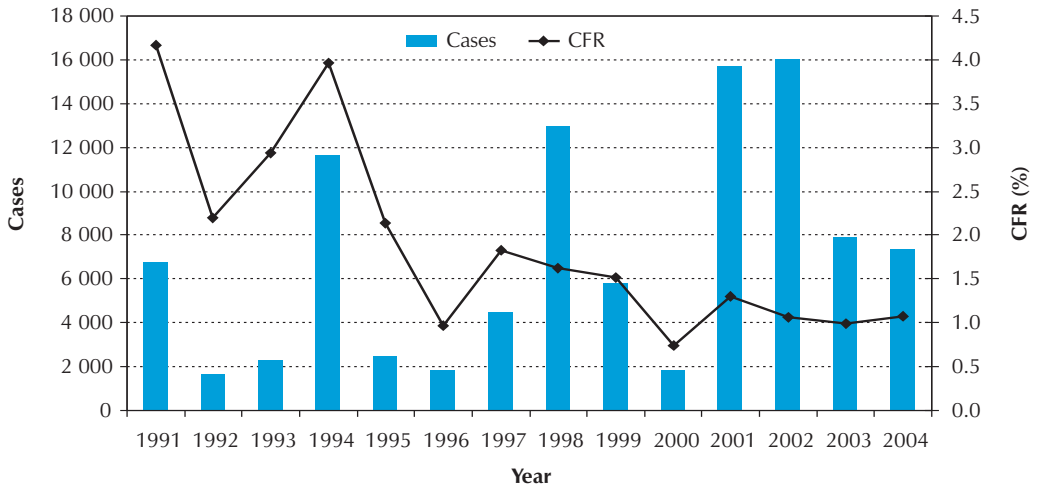


Source: Unpublished data. Compiled from country reports of Malaysia.

Myanmar

Figure 7.22 shows that cases recorded in Myanmar during epidemics maintained a range between 5000 and 16 000, and in the inter-epidemic period the figure fluctuated between 1000 and 2000. The case-fatality rate remained high (>5%) until 1990. Thereafter, it fluctuated by 3% to 4% and dropped below 2% after 1995.

Fig. 7.22 Number of reported dengue cases and case-fatality rates in Myanmar, 1991–2004



Source: Unpublished data. Compiled from country reports of Myanmar, 2004.

Philippines

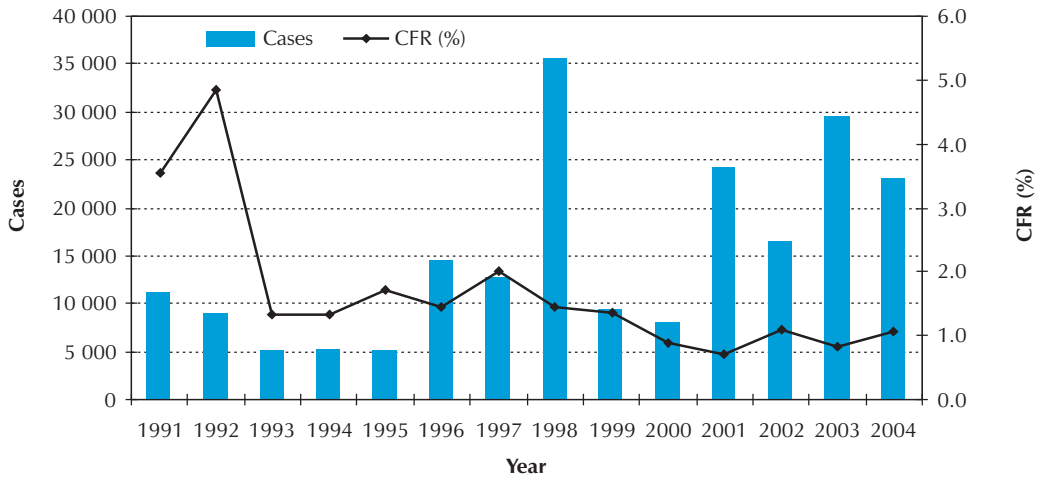
Dengue fever and DHF are endemic in all regions of the Philippines, with epidemics occurring every three to four years. The areas with the highest morbidity and mortality are urban centres such as Metro Manila, Cebu and Davao.

Dengue occurs throughout the year, with rates increasing one to two months after the onset of the rainy season in June. The main vector responsible for dengue transmission in the Philippines is *Ae. aegypti*, which is predominantly urban. *Ae. albopictus* may be a secondary rural vector.

The largest number of cases recorded in recent years was in 1998, when a nationwide dengue epidemic was declared, which totalled a reported 36 162 cases and 514 deaths. In 2001, another outbreak occurred with 25 216 cases and 177 deaths. Since 2001, the annual number of cases has remained high. These are shown in Figure 7.23.

All four *dengue* virus serotypes are present in the Philippines, although according to available data DEN 2 and DEN 3 were predominant during the period 1995–2004. Children under the age of 15 account for about 75% of all cases, and the majority of the fatalities occur among children below age 9 with males and females equally affected.

Fig. 7.23 Number of reported dengue cases and case-fatality rates in the Philippines, 1991–2004

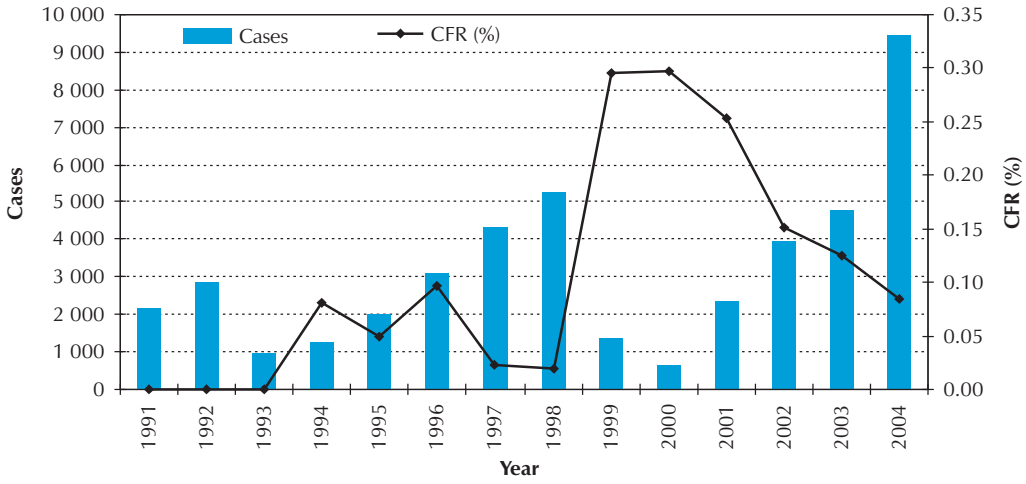


Source: National Epidemiology Center, Ministry of Health, Philippines.

Singapore

In Singapore, larger outbreaks of dengue tend to occur every five to six years. Since the early 1990s, dengue incidence during major outbreaks has been rising steadily in the country (Figure 7.24). In 2004, 9459 cases and eight deaths were reported. This is the highest number of cases reported during the last 15 years, and is almost twice as many cases as that of the 1998 epidemic. This has occurred in spite of Singapore's sophisticated control and monitoring system and strict legislation measures. Control of *Ae. aegypti* and *Ae. albopictus* is largely done through source reduction. Other strategies involve health education and the application of public health regulations and chemical control. The control programme is implemented by the National Environment Agency. The programme has been implemented through strong legislative measures and several strategies, including the use of ovitraps.

Fig. 7.24 Number of reported dengue cases and case-fatality rates in Singapore, 1991–2004

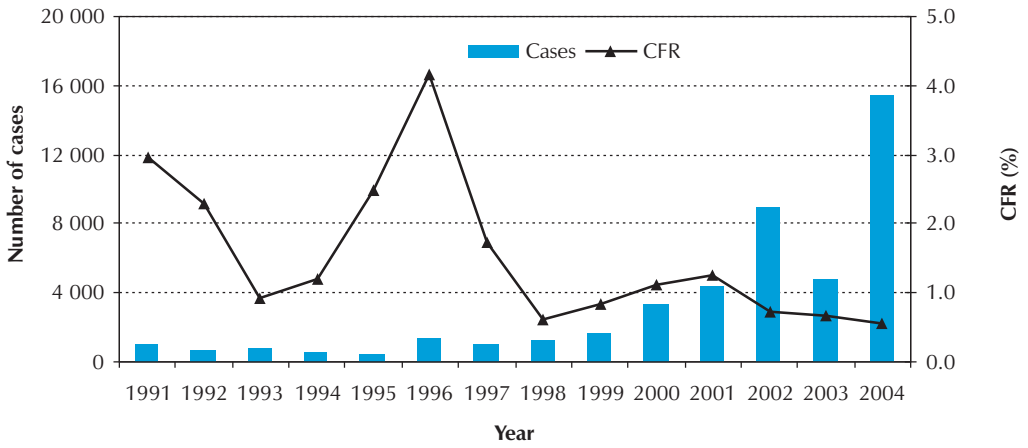


Source: DengueNet. Information available from: www.who.int/csr/disease/dengue/denguenet/en/index.html

Sri Lanka

Outbreaks of DF and DHF are becoming a major public health problem in Sri Lanka. With the first 10 reported cases in 1988, incidence gradually increased to just fewer than 2000 cases in 1999. By 2004, however, 15 408 cases were reported. Case-fatality rates were high (4.2%) until 1996, and then dropped to under 2% from 1997 to 2001. Since 2002, fatalities have been less than 1% (Figure 7.25).

Fig. 7.25 Number of reported dengue cases and case-fatality rates in Sri Lanka, 1991-2004

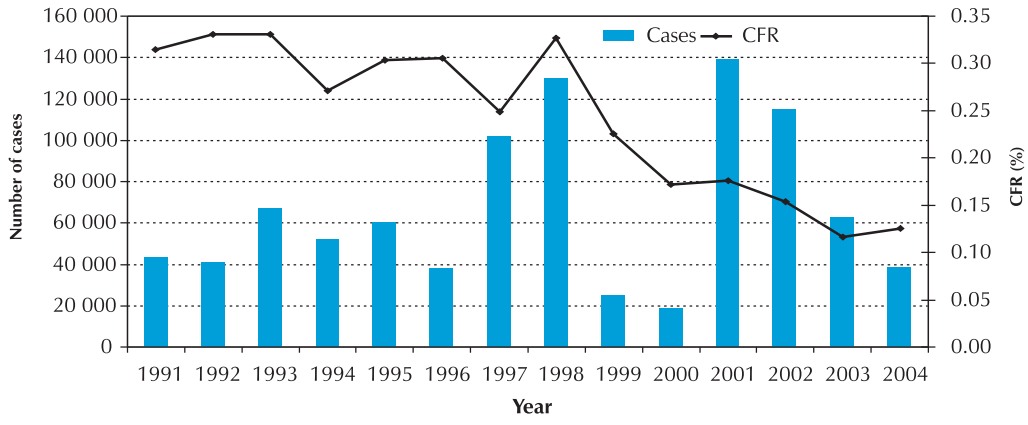


Source: Unpublished data. Compiled from country reports of the National Dengue Control Programme, Sri Lanka.

Thailand

Thailand is the epicentre of DHF in the Region. The number of reported cases was over 100 000 annually from 1987 to 2002 (Figure 7.26). During the inter-epidemic years, the incidence fluctuated from 18 000 to over 90 000 cases. Thailand achieved an early breakthrough in case management and brought down CFR to below 1% by 1985. It was further lowered to under 0.5% by 1990 and since then has remained below 0.2%.

Fig. 7.26 Number of reported dengue cases and case-fatality rates in Thailand, 1991–2004



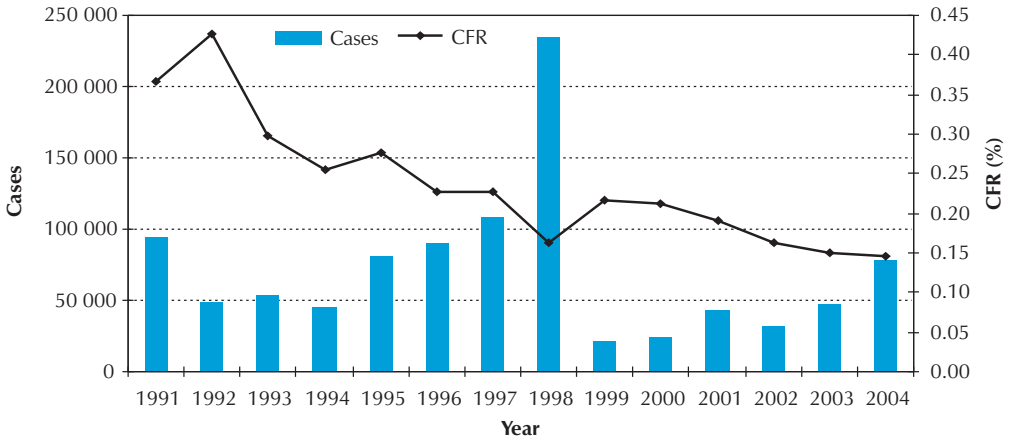
Source: Unpublished data. Compiled from country reports of Thailand.

Viet Nam

Dengue fever and DHF are leading causes of hospitalization and death in Viet Nam. Viet Nam had the highest reported dengue cases in the Region during the period 1991–2004 with a total of 1 000 866 cases and 2299 deaths.

In 1997 there were 108 000 cases with 245 deaths. During the 1998 dengue pandemic there were 234 866 cases and 383 deaths, the highest figure ever recorded in one year. Like other South-East Asian countries, the number of reported dengue cases has shown an increasing trend in 2004, after a decline in 1999. There were 78 669 reported dengue cases and 114 deaths in 2004, representing an incidence of 97.25 per 100 000. However, case-fatality rates remained below 1% and showed a decreasing trend over the period 1991–2004 (Figure 7.27). In Viet Nam, copepods of genus *mesocyclops* have been used effectively for dengue vector control.

Fig. 7.27 Number of reported dengue cases and case-fatality rates in Viet Nam, 1991–2004



Source: Unpublished data. Compiled from country reports of Viet Nam.

The most intense transmission of dengue in Viet Nam is concentrated in the Mekong Delta region with a population of some 25 million people. There is a very high population density living in areas where the ground water is not potable due to its salt content, thus forcing people to collect and store rainwater in large jars or tanks that provide breeding places for *Aedes* mosquitoes. Although knowledge about dengue is widespread in the country, private and commercial establishments continue to construct buildings with open drinking-water reservoirs that are the source of a large number of vector mosquitoes. It is difficult to securely cover these large water tanks.

Conclusion

There is a need for more advocacy and the acceleration of specific public health interventions to contain dengue fever in countries of the Region. The Asia Pacific Dengue Partnership should be strengthened for the effective mobilization of resources and the implementation of prevention and control measures in accordance with the global strategy.

7.7 Leprosy

Leprosy is a chronic disease caused by a bacillus, *Mycobacterium leprae*, which multiplies very slowly and has an incubation period of about five years, although symptoms can take as long as 20 years to appear. Leprosy is not highly infectious and is transmitted via droplets from the nose and mouth during close and frequent contact with untreated cases.

Leprosy mainly affects the skin and nerves. If untreated, progressive and permanent damage to the skin, nerves, limbs and eyes can result. Due to this progressive and visible disability, leprosy-affected people are often stigmatized and discriminated against by their families and communities.[144,145,146,147]

Today, leprosy is a curable disease and treatment provided in the early stages averts disability. After a short period of training, any health worker can easily diagnose leprosy on clinical signs alone. Only in rare instances is there a need to use laboratory or other investigations to confirm a diagnosis of leprosy. In an endemic country or area, an individual should be regarded as having leprosy if one of these cardinal signs is present: a skin lesion consistent with leprosy and accompanied by sensory loss, with or without thickened nerves; or a positive skin smear.[148,149,150]

Leprosy can be classified on the basis of clinical manifestations and skin smear results and is grouped as paucibacillary leprosy (PB), with less than five skin lesions, or multibacillary leprosy (MB), with five or more skin lesions.[151] In 1981, a WHO study group recommended multidrug therapy (MDT) consisting of dapsone, rifampicin and clofazimine. This drug combination kills the pathogen and cures the patient. Since 1995, WHO has been supplying MDT free of cost to leprosy patients in all endemic countries.[152]

Once diagnosed, PB cases (adult and child) are treated with MDT and cured in six months; MB cases (adult and child) treated with MDT are cured in 12 months. Safe, effective and easily administered under field conditions, MDT is available to all patients in convenient monthly calendar blister packs. Patients are no longer infectious to others after the first dose of MDT, as transmission of leprosy is interrupted and there are virtually no relapses after treatment is completed.[153,154] No resistance of the bacillus to MDT has been detected. WHO estimates that early detection and treatment with MDT has prevented disability in about four million people. The huge economic and social loss averted shows the great cost-effectiveness of MDT as a health intervention.[155]

Current situation in the Asia Pacific Region

In the Asia Pacific Region there were 126 536 cases of leprosy on MDT treatment at the end of 2006, and a prevalence of 0.71 per 10 000 population. In the past, the Region accounted for the highest burden of leprosy in the world with India the most afflicted, but in 2006 nine of the 48 countries and areas in the Region reported zero prevalence and no new case detection. Another 17 countries reported less than 10 new cases and 14 reported less than 1000. However, five countries reported more than 1000 but less than 5000 cases, and three reported more than 5000 new cases. Table 7.5 shows the countries reporting more than 1000 new cases in 2006.[156,157,158]

Table 7.5 Countries in the Asia Pacific Region reporting more than 1000 new leprosy cases in 2006		
	Country	**Number of new cases detected in 2006**
1	Bangladesh	6 280
2	China	1 506
3	India	139 252
4	Indonesia	17 682
5	Myanmar	3 721
6	Nepal	4 253
7	Philippines	2 517
8	Sri Lanka	1 993

Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas for 2006.

Leprosy elimination strategy and its impact

In 1991 the Forty-fourth World Health Assembly (resolution WHA44.9) called on WHO Member States to work towards elimination of leprosy as a public health problem, defined as less than one case per 10 000 population.[159,160]

Through increased political commitment, enhanced resource allocation and intensified efforts in all endemic countries, by the end of 2006, 44 of the 48 countries in the Region had reached the leprosy elimination goal. India, the country with the highest burden of leprosy globally as well as in the Region, attained the elimination target in December 2005.

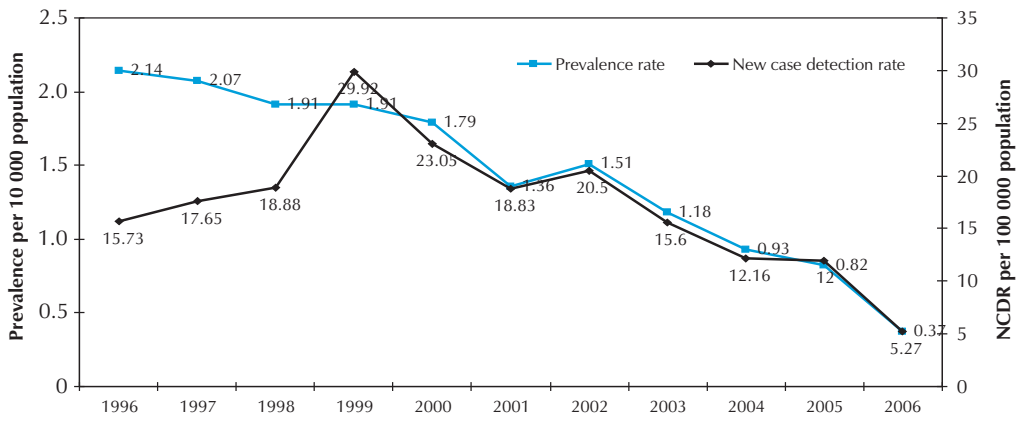
Those yet to achieve elimination are the Federated States of Micronesia, the Marshall Islands, Nepal and Timor-Leste. However, the absolute number of new cases in three of these countries is small: 151 in the Federated States of Micronesia, 42 in the Marshall Islands and 248 in Timor-Leste.[161,162,163]

As shown in Figure 7.28, the prevalence of leprosy has steadily declined from a peak of 2.14 per 10 000 population in 1996 to 0.37 per 10 000 population in 2006. The annual new case detection has declined from a peak of 29.92 per 100 000 population in 1999 to 5.3 per 100 000 population in 2006. Thus, the burden of leprosy has dramatically declined in the Asia Pacific Region.[164,165,166,167,168]

Between 1996 and 2006, the prevalence of leprosy declined by 66.8% and new case detection fell by 31.3%. These are significant achievements considering the huge population of the Region. This declining trend can be attributed to the wide coverage, efficacy and effective implementation of MDT.[169,170,171]

Of more than 15 million cases cured globally with MDT, about 13 million were from the Asia Pacific Region, representing a significant contribution to reducing the global leprosy burden. More than 11.8 million cases were from India alone.[172,173,174]

Fig. 7.28 Trends of leprosy prevalence rate (PR) and new case-detection rate (NCDR) in the Asia Pacific Region, 1996–2006



Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas.

Seven countries in the Region have achieved elimination at the subnational level—Bangladesh, Cambodia, China, the Lao People's Democratic Republic, Myanmar, the Philippines and Viet Nam. These seven countries used to be known as "hyperendemic". The deformity rate among new cases has also dramatically declined, from more than 10% in 1985 to 2% in 2006. Development of the Geographic Information System (GIS) among various large countries contributed to identifying leprosy-endemic pockets.[175,176,177]

Increased community awareness has resulted in decreased stigma and discrimination, and greater integration and acceptance of leprosy-affected people in communities.

Remaining challenges in the Asia Pacific Region

Challenges in the Region include achieving the goal of elimination of leprosy in the remaining four countries (the Federated States of Micronesia, the Marshall Islands, Nepal and Timor-Leste); maintaining political commitment and ensuring adequate resources to sustain elimination at the national level; and making progress towards further reducing the burden of leprosy in all countries. It is crucial to provide resources for the prevention and care of disabilities caused by leprosy and to establish facilities for physiotherapy, reconstructive surgery and protective footwear for those affected. Increasing community awareness through advocacy and information, education, and communication activities promotes voluntary case detection and reduces stigma.[178,179,180]

Strategy to sustain leprosy services following elimination in the Asia Pacific Region

WHO held a meeting in Manila, Philippines, in 2004 for 18 participants from 16 countries in the Region to develop a comprehensive post-elimination strategy.[181] The strategy focuses on timely new case detection and treatment with MDT to further reduce cases of leprosy and sustain high-quality leprosy services, including rehabilitation. There are four key elements in the strategy. The first deals with the integration of leprosy services into general health services, with an emphasis on detection of

cases under low-endemic conditions; management of cases, including rehabilitation; referral services and capacity-building; as well as the logistics and supply of MDT. The second element deals with subnational approaches, as leprosy is not uniformly distributed in any given area and cases tend to cluster. The spatial distribution of cases at different administrative levels must, therefore, be studied to identify areas and groups where cases are more frequent. A GIS would be useful in identifying pockets of high endemicity and clustered cases and would aid in understanding their spatial distribution. The third element concentrates on monitoring, supervision, surveillance and evaluation; and focuses on the importance of the absolute number of new cases detected rather than the prevalence proportion under very low endemic conditions. The fourth deals with the importance of political commitment and partnerships to ensure an adequate flow of resources over a long period. To sustain gains made and progress towards a leprosy-free society, advocacy campaigns should be planned for key groups such as policy-makers, politicians, senior government officials, media, NGOs and local leaders. This element also outlines the future role of WHO in low-endemic situations.

Partnerships

The remarkable success of elimination efforts in recent years reflects the close working relationship between national programmes and partners. Two of the most notable partners having generously funded the supply and shipment of MDT drugs are the Nippon Foundation of Japan (1995–1999) and the Novartis Foundation (2000–2010). Most member organizations of the International Federation of Anti-Leprosy Associations work closely with various international and nongovernmental organizations. In implementing leprosy activities, the main operational partners within countries are the national programmes.[182,183]

The future of leprosy services in the Asia Pacific Region 2007–2010

Quality leprosy services within the general health system in the Region should be available and sustained in all countries. This includes improved quality of diagnosis and greater attention to prevention and care of disabilities and rehabilitation. Annual new case detection will be less than 10 per 100 000 population for the Asia Pacific Region, including among large countries with a population of more than 500 000. National-level elimination targets should be sustained to reduce the burden of leprosy.[184,185]

Even with sustained elimination at national levels, between 100 000 and 125 000 new cases are expected to be detected annually in the Region. In addition, a substantial number of cured people with disabilities will continue to need care and rehabilitative services. However, in view of the low endemic situation in most countries, there is a risk of declining political commitment, decreased resources and insufficient capacity for timely detection and treatment of cases, with the potential for marginalization of remaining older patients with deformities who continue to need care and support.

Future plans

Towards the achievements in elimination of leprosy as a public health problem, WHO continues to play an important role in sustaining effective leprosy services. Specific WHO inputs include assisting national governments and their partners in developing country-specific action plans and implementing

the regional strategy to sustain leprosy services within the general health system. WHO also provides technical support for implementing the elimination programme based on national operational guidelines, as well as support in convening intercountry, national and subnational periodic review meetings. WHO also supports advocacy to sustain political commitment and the mobilization of adequate resources.

Conclusion

The leprosy elimination programme, spearheaded by WHO, is a success story in the global health field. The WHO recommended MDT treatment, initiated in phases by the mid-1980s in most countries, has produced a dramatic decline in prevalence and new case detections worldwide, including the Asia Pacific Region.

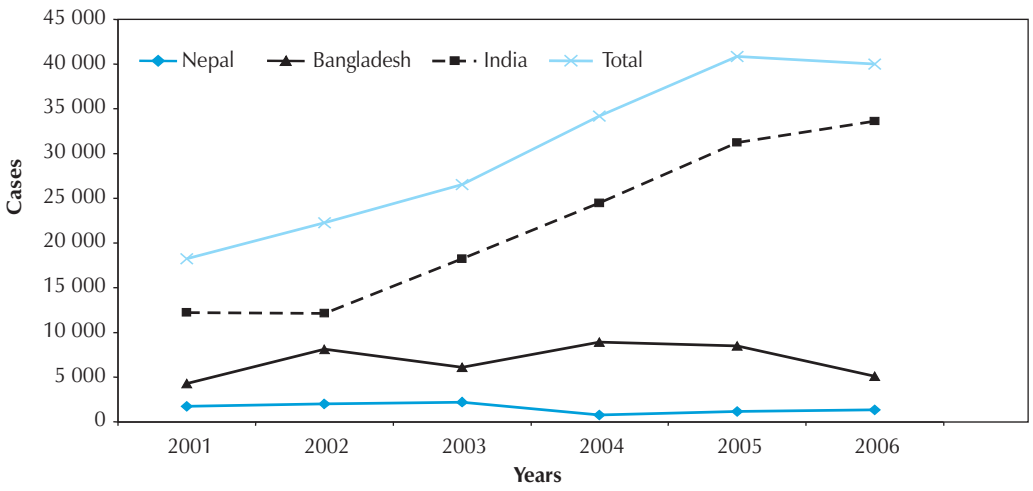
However, the elimination of leprosy as a public health problem by reducing prevalence to below 1 case per 10 000 population is an intermediary goal. As new cases will continue to occur, albeit in smaller numbers, there is a need to sustain leprosy services.

The implementation and success of the post-elimination strategy is dependent on global and regional partnerships between all stakeholders, with national governments assuming a leadership role. With WHO providing the necessary technical inputs, it is expected that partnerships will sustain commitment for leprosy elimination at all levels, allocate the required additional resources, ensure free supply of MDT drugs and materials, and establish an effective monitoring and evaluation mechanism.

7.8 Kala azar

Kala azar (KA) or visceral leishmaniasis (VL) is a chronic and potentially fatal parasitic disease of the viscera (the internal organs, particularly the liver, spleen, bone marrow and lymph nodes) due to infection by *Leishmania donovani*, a parasite transmitted by sandfly bites. An estimated 200 million people are at risk for KA in Bangladesh, India and Nepal, largely in low-income or marginalized rural communities where health-care is poorly developed. The number of reported cases of kala azar in the Indian subcontinent from 2001 to 2006 is shown in Figure 7.29. Elimination of KA in these South Asian countries is feasible because of its unique epidemiological features: the sandfly vector species responsible for transmission can be controlled and has limited geographical distribution, and humans are the only reservoir for the disease. Successful intervention can be achieved using rapid diagnostic tests rK39 and treatment with miltefosine, an effective and relatively safe oral drug, together with indoor residual spraying. Although political commitment to eliminate KA is high, including an endorsement from health ministers of endemic countries, until recently resource allocation has been low, implementation inadequate, and the capacity of national health systems insufficient. Eliminating KA in South Asian countries will relieve much suffering, promote poverty reduction and socioeconomic development, and augment the capacity of health systems.[186]

Fig. 7.29 Burden of kala azar in the Indian subcontinent

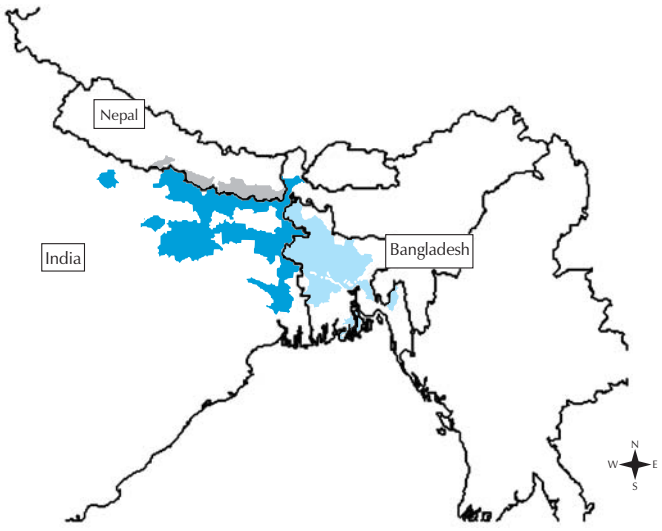


Source: Routine kala azar reporting data from Bangladesh, India and Nepal, 2007.

Situational analysis

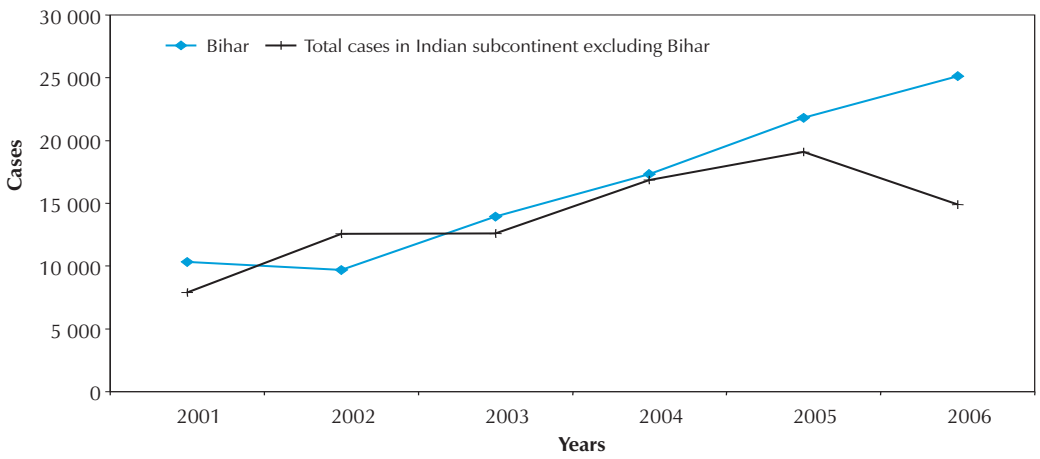
Regular epidemic cycles of KA every 15–20 years put about 200 million people at risk. Nearly 25 000–40 000 cases and 200–300 deaths are reported every year, but these official figures are gross underestimates.[187] One study suggests there are 420 000 cases, highlighting a need to determine the true burden of disease.[188] The disease has been reported in 109 districts (45 in Bangladesh, 52 in India and 12 in Nepal) (Figure 7.30).[189] The number of cases fluctuate in Bangladesh and Nepal, but is steadily increasing in India. With almost 50% of all cases in the Indian subcontinent, the state of Bihar is a major source of infection for neighbouring countries. Figure 7.31 shows the number of kala azar cases in Bihar compared with those from other endemic areas. The disease is also reported in Bhutan.[190,191]

Fig. 7.30 Kala azar-endemic areas in Bangladesh, India and Nepal



Source: *Kala azar status in South-East Region. Current disease burden*. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/en/Section10/Section2163_11668.htm

Fig. 7.31 Kala azar case comparison between Bihar and other endemic areas



Source: Routine VL reporting data from Bangladesh, India and Nepal, 2007.

Estimation of the kala azar burden

The UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, supported multicentric studies in Bangladesh, India and Nepal to estimate the burden of disease, health-care-seeking behaviour, knowledge of care providers in the formal and informal health sector, and policy applications about KA elimination programmes, both in the public and private sector.[192] The estimated total annual number of KA cases in 2007 for Bangladesh, India and Nepal were 136 500, 270 900 and 12 600, respectively. The allocated budget per head per year for the risk population by national programme was calculated at approximately US$ 0.20, 0.40 and US$ 0.30 for Bangladesh, India and Nepal, respectively (Table 7.6). Kala azar leads to an annual loss of about 400 000 DALYs in the WHO South-East Asia Region.[193] Diagnosis and treatment of KA is expensive and families are often forced to sell their assets and take out loans to pay for care, thereby causing further poverty and disease.[194,195]

Table 7.6 Risk population, burden of disease and kala azar budget allocation

Countries	Population at risk (millions)	Annual KA cases	Estimated cases based on WHO/TDR study 21 per 10 000 population	Annual budget allocated in millions US$	Budget allocated per head for risk population (US$ per person/year)
Bangladesh	65	5 067	136 500	14	0.2
India	129	33 613	270 900	50	0.4
Nepal	6	1 341	12 600	2	0.3

Source: *Multicentric study on VL, 2007*. Geneva, WHO Special Programme for Research and Training in Tropical Diseases (TDR), 2007.

Major findings showed that the current burden of disease for kala azar (21 cases per 10 000 population) is 20 times higher than the elimination target for the period 2010–2015. Treatment delay is high with 20% of cases taking more than three weeks between observation of symptoms and diagnosis. An even higher proportion (31%) takes more than three weeks from the time of diagnosis to treatment. Community knowledge about KA and precautions taken are acceptable in India and Nepal, but less so in Bangladesh. The rK39 test is used by 45%–58% of care providers in India and Nepal, but not yet in Bangladesh; knowledge among care providers about drugs other than antimony, and miltefosine in particular, is good in India and Nepal but unsatisfactory in Bangladesh. Policy applications in the Indian states of Bihar and West Bengal were found to be deficient and not available for the private sector. A blueprint was presented for a focused intervention in KA hot spots identified by GIS mapping. Based on the current burden of disease, there is an estimated number of 420 000 cases per 200 million population at risk. This clearly indicates that the disease is highly underreported.[196]

In Bangladesh a direct agglutination test and rK39 are available in some areas on a pilot basis, but their use is limited. Programme and funding constraints have been identified in the operational plan of the KA elimination programme. There is a need to strengthen integrated vector control measures, surveillance and community participation. In India diagnostic kits rK39 are available at the district and primary health-care level, and supply chain management is adequate in India and Nepal. However, planning and close monitoring are required to ensure that the supply chain remains uninterrupted.

In Bangladesh periodic vector surveys are done and control includes the use of dichlorodiphenyltrichloroethane (DDT) spraying on a limited scale, even though it has been banned for general use such as agriculture since 1994 and fresh stocks are not being procured. Indoor residual spraying is a main vector control strategy, but during the past several years none has been done for either malaria control or KA elimination.

For three consecutive years in India, vector control comprised of DDT indoor spraying, entomological monitoring, sanitation and personal protection. As part of active case detection, every two weeks a KA information, education and communication activity is held with limited success.[197] Capacity-building has been emphasized at all levels. NGOs and the private sector have not been fully involved. In all countries, localized spraying of DDT could not be completed due to logistic and technical problems.

Milestones in kala azar elimination

A memorandum of understanding was signed by the health ministers of Bangladesh, India and Nepal to eliminate KA through intercountry cooperation at an event organized during the World Health Assembly in May 2005. This high-level political support played an important role in mobilizing national commitment and support for cross-border collaboration.

In 2005 a technical consultation with partners was organized by WHO at Behror, Rajasthan, India, and participants included UNICEF, the World Bank, the Bill and Melinda Gates Foundation, Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, and the Drugs for Neglected Diseases Initiative. The consultation was organized to develop a common understanding among partners on various interventions for the elimination of KA in endemic countries in the Region. The goals and targets for elimination of KA in Bangladesh, India and Nepal were endorsed during the consultation. An advocacy kit developed by WHO was released in Dhaka, Bangladesh, in August 2006 during a meeting of health ministers.

Early diagnosis and case management

Effective case management of KA requires improved home care management (improved health-care practices) and an increase in trained health-care personnel (including but not limited to doctors and nurses) and reliable laboratory facilities and adequate supply of medicines. Early diagnosis and treatment helps reduce case-fatality rates and raises the credibility of the health system, thus improving the utilization of health services by people suspected to be suffering from this disease. The case definition for suspected KA is a history of fever of more than two weeks in a patient with no response to antibiotics and antimalarials**.** The case definition is likely to be sensitive but not specific and should apply only to areas known to be endemic for KA. Additional symptoms include darkening of the skin, weight loss and an enlarged spleen. Patients with these symptoms in endemic areas should be screened by rK39 and if positive, treated with an effective drug approved by national policy. Confirmation of KA can be done by examination of bone marrow aspirate, but this is an invasive and technically demanding procedure.

Integrated vector management and vector surveillance

The mainstay of vector control is indoor residual spraying. While DDT can still be used for the control of KA in India, suitable alternatives are needed in Bangladesh and Nepal since DDT is not available there or is not recommended by national policy. Pyrethroids can be considered, although these are expensive and rapid development of resistance is a constraint. Adoption of a uniform insecticide strategy is advisable through intercountry cooperation.

District water bodies relevant to KA should be identified and spraying carried out within a radius of one kilometre. Where available, the use of remote sensing and GIS, or both, can facilitate the mapping process. The mapping of district water bodies is useful in limiting spraying operations to areas where the highest impact on vector control is likely. Selective indoor residual spraying is advisable only when surveillance is effective and geographical mapping with validation is available. If this is not the case, indoor residual spraying based on incidence reporting should continue. Community mobilization enhances indoor residual spraying by ensuring maximum cooperation from households. Another strategy that complements such spraying is reducing human vector contact through insecticide-treated nets (ITNs). Strategies for ITNs should be developed and distribution monitored for impact, as has been done in some districts in all three countries. The success of ITNs and environmental sanitation depends on effective behavioural change communication (BCC). A BCC strategy that includes ITNs and environmental management is to be considered a part of integrated vector management. Information on vector surveillance is crucial for the planning and programming of an integrated vector management strategy.

Effective disease surveillance through passive and active case detection

For surveillance purposes, KA cases should be classified into (a) suspect, (b) clinical, and (c) confirmed. Surveillance includes the reporting of cases of post-kala azar dermal leishmaniasis since these are responsible for continued transmission of the disease.

Surveillance through passive case detection is currently done in government institutions, but this does not represent an accurate picture of case numbers, since the majority of KA cases go to private doctors and quacks and there is no reporting from these sources. Treatment is often started without a

definitive diagnosis of KA and many people do not seek health care at all because of poverty and sociocultural constraints. Despite this, passive case detection and reporting is used to monitor disease trends. The best strategy is to strengthen reporting through improved diagnosis and treatment and to establish partnerships with private health-care providers, including private doctors. Ensuring that communities are empowered with knowledge of the risks of seeking the services of quacks for diagnosis and treatment, and making appropriate treatment available through qualified professionals, will help elimination efforts. For improved surveillance, KA should be made a notifiable disease in affected areas. Proper recording of KA cases is recommended for surveillance on a sentinel basis. Disease surveillance for KA should comprise of monthly reporting and feedback at the district level, and a regular reporting mechanism with state and national authorities.

As the elimination programme improves and capacity increases, passive case detection should be supplemented with active case detection supported by laboratory diagnosis. While active case detection is recommended at least once a year in the beginning, and if possible, two times per year, it becomes more important as cases reported through passive case detection declines. Active case detection should also be supplemented by laboratory confirmation of suspected cases.

Social mobilization and building partnerships

Behaviour change interventions are central to KA elimination programmes and for the success of early diagnosis and treatment adherence. Effective BCC can also help in promoting early care seeking. The participation of community and families in indoor residual spraying and in reducing human vector contact is essential. Social mobilization should be an integral part of the elimination programme from inception. For effective BCC, national programme plans need to include provision for adequate resources.

Developing partnerships between district, state, national and international stakeholders improves effectiveness of elimination programmes. Networking and collaboration with other programmes, such as vector-borne diseases (malaria, dengue and lymphatic filariasis), HIV/AIDS, tuberculosis and leprosy, help reach mutual goals. Kala azar elimination efforts can ideally partner with programmes such as anaemia control and nutritional and poverty alleviation.

Clinical and operational research

Diagnostic and therapeutic tools are available for elimination of KA but diagnostic tests should be validated under field conditions. More clinical research is required to enable the addition of new drugs, including combination drugs, and diagnostics. More research is needed to identify and evaluate techniques for rapid assessment and mapping of the disease and to develop mechanisms for monitoring the effectiveness of intervention strategies. Operational research is recommended to establish monitoring of drug resistance, drug efficacy and quality of drugs used in the programme. Research is also needed in searching for cases of post-kala azar dermal leishmaniasis and for satisfactory treatment of cases, as this is currently constraining KA elimination efforts. The implementation of research is required in pilot districts, where elimination programmes should be closely monitored to identify operational constraints and lessons learnt. Research is also needed on increasing access to interventions for the poorest people. Integrated vector management, development of public-private partnerships and translation of research outcomes to policy reforms and action will be essential to accelerate the KA elimination programme in the Region.

Implementation of the elimination programme

The KA elimination programme consists of four consecutive phases:[198]

Preparatory phase: two years (2005–2006)

The preparatory phase began after the operational plan had been prepared and was approved by Bangladesh, India and Nepal. This included preparation for operations, with a pilot total-coverage spraying operation and establishment of diagnosis and treatment facilities in selected districts in endemic countries; and monitoring, including passive and active case detection and vector monitoring.

Attack phase: five years (2007–2011)

The attack phase began in 2007 when the preparatory phase had ended. This phase is providing effective implementation and monitoring of the designed programme.

Consolidation phase: three years (2012–2014)

The consolidation phase will begin when total coverage by spraying has concluded, for example, at the end of the attack phase. This phase will end after three years of active surveillance has shown no increase in the incidence rate at district and subdistrict levels in endemic countries.

Maintenance phase: duration to be decided

During this phase, surveillance against reintroduction of KA will be the responsibility of the country disease control programme until KA is no longer a public health problem. During this phase, the case incidence at the district and subdistrict level should be less than 1 per 10 000 population. An international review commission should verify the achievements of the programme. Countries, or affected districts in countries where elimination targets have not been reached, will require corrective measures. The maintenance phase will be followed by certification of the elimination status.

7.9 Lymphatic filariasis

Lymphatic filariasis is a parasitic infection with filarial worms transmitted to humans through the bite of an infected mosquito. There are three species of human filarial parasites: *Wuchereria bancrofti, Brugia malayi* and *Brugia timori*. The parasites develop into adult worms in the lymphatic vessels and nodes, producing microfilaria that circulate in the blood and can be picked up by vector mosquitoes when they bite an infected person.

The microfilariae develop through three larval stages in the flight muscles of mosquitoes, ending up in the mouth from which they are transferred to the victim's skin when the mosquito bites. The parasites then pass through the wound and enter the bloodstream, eventually ending up in the lymph system where they mature into adults.

In many cases, infected individuals show no signs of the disease even though microfilaria can be found in their blood. Individuals with the acute form of the disease suffer from filarial fevers associated with inflammation of the glands or lymph nodes, lymphatic vessels or connective tissue under the skin. In chronic forms of the disease, the adult worms damage the lymphatic system, resulting in

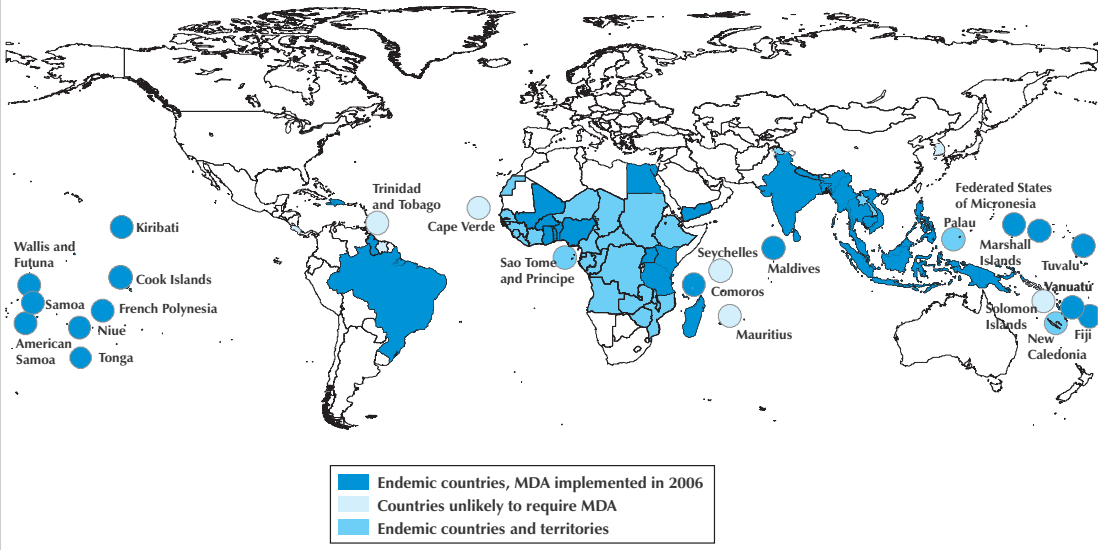
hydrocele, lymphoedema or elephantiasis. Hydrocele is swelling caused by the accumulation of fluid in the scrotal tissues, including the *tunica vaginalis*. Lymphoedema, or build-up of lymph fluid in the legs, combined with secondary infections, results in hardening of the skin and eventual elephantiasis. Both hydrocele and elephantiasis cause debilitating physical and emotional suffering to those infected.

The disease is transmitted by a variety of mosquito species from the three major vector groups: *Culex, Anopheles* and *Aedes*. While both *B. malayi* and *B. timori* are transmitted by night-biting mosquitoes, there are two forms of *W. bancrofti:* one is transmitted by night-biting mosquitoes and the other by day-biting mosquitoes.

Burden of disease

Globally, lymphatic filariasis is endemic in 83 countries and represents one of the leading causes of disability worldwide. In the Asia Pacific Region, lymphatic filariasis is endemic in 34 countries, with a total estimated population at risk of 882.9 million people (Figure 7.32). The Region accounts for about 68% of the global population at risk.[199] With more than 500 million people at risk of lymphatic filariasis, India alone represents 42% of the global population at risk.[200] Other countries with large populations at risk are Indonesia (150 million), Bangladesh (70 million), Myanmar (40 million) and the Philippines (21.3 million).[201,202] In terms of economic impact, the 34 endemic countries of the Asia Pacific Region account for 63% of the total global burden, estimated at 5.8 million DALYs lost annually due to lymphatic filariasis.[203]

Fig. 7.32 Countries classified as endemic for lymphatic filariasis and covered by mass drug administration in 2006



Source: Global programme to eliminate lymphatic filariasis: Annual report on lymphatic filariasis 2006. *Weekly epidemiological record*, No. 42, 2007, 82: 361-380.

Control measures

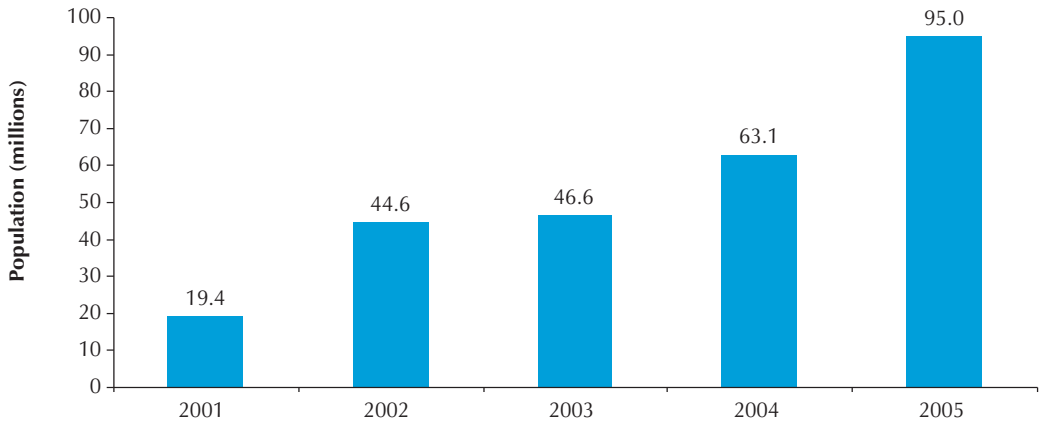
The Global Programme for the Elimination of Lymphatic Filariasis was launched in 1999 following a resolution adopted by the Fiftieth World Health Assembly in 1997, which called for the global elimination of lymphatic filariasis by 2020. The global programme is built on two strategies: (1) mass

drug administration (MDA) of the entire population at risk with high rates of coverage using a combination of albendazole and diethylcarbamazine (DEC) annually for a period of five to six years; and (2) alleviation and care of disability associated with lymphatic filariasis.

Progress

In 2005 MDA campaigns covered 370 million people living in 21 endemic countries in the Asia Pacific Region.[204] The MDA scale-up from 2001–2005 is given in Figure 7.33.

Fig. 7.33 Progress of mass drug administration (DEC+albendazole) in the Asia Pacific Region, 2001–2005



Source: Unpublished data. Compiled from country reports of Asia Pacific countries and areas.

In seven of 16 countries and areas in the Pacific Ocean, 1.7 million people will have completed five rounds of mass drug administration by the end of 2006.[205,206] Samoa and Cook Islands will continue with a sixth round because they were not able to meet the criteria for stopping MDA after the fifth round. Although the population covered by lymphatic filariasis elimination in the Pacific is small, it marks a major achievement and an example of how small island countries and areas can effectively work together. Among the countries with large populations carrying out MDA, Sri Lanka completed five rounds in 2006.

China has the distinction of being the first country to have eliminated lymphatic filariasis based on the global criteria. The Chinese programme began in the 1950s and used a variety of strategies including both mass drug administrations and medicated salt. The Republic of Korea is expected to be the second country to meet the global criteria to confirm elimination.

The number of lymphatic filariasis chronic patients, people with elephantiasis, receiving regular care is steadily increasing due to a home-based approach adopted in many countries.

Future outlook

The successful elimination of lymphatic filariasis by 2020 will require substantial scaling up of MDA coverage, especially among countries with the highest populations at risk, namely Bangladesh, India, Indonesia, Myanmar and the Philippines. Insufficient resources are currently the main obstacle to

scaling up in these and other countries. In the Philippines, for example, funds are currently available only to cover roughly 50% of the endemic population. Therefore, the national elimination programme had to abandon plans to scale up and instead has focused on completing MDA in areas where the programme is already under way. Nepal and Myanmar face similar problems.

At present the largest global donor partner is GlaxoSmithKline PLC, which donates all the albendazole required by the national elimination programmes. Many countries are finding it difficult to procure diethylcarbamazine, either due to insufficient funds or due to the global shortage of the drug since only a few manufacturers are WHO pre-qualified.

The Global Alliance for Elimination of Lymphatic Filariasis was established in 1999 to support global lymphatic filariasis control and treatment efforts. The members of the alliance are the ministries of health of endemic countries and about 35 other partners drawn from bilateral and multilateral development agencies, international foundations, and representatives of pharmaceutical companies, NGOs and universities.[207] The fourth meeting of the Global Alliance for Elimination of Lymphatic Filariasis was held in March 2006 in Fiji. The alliance was restructured during the Fiji meeting in order to strengthen its support to lymphatic filariasis endemic countries.

If adequate funding and issues related to diethylcarbamazine procurement are not resolved, mass drug administration scale-up both globally and in the Asia Pacific Region will be adversely affected, putting some countries at risk of not achieving their goals by the 2020 target.

7.10 Soil-transmitted helminthiasis and schistosomiasis

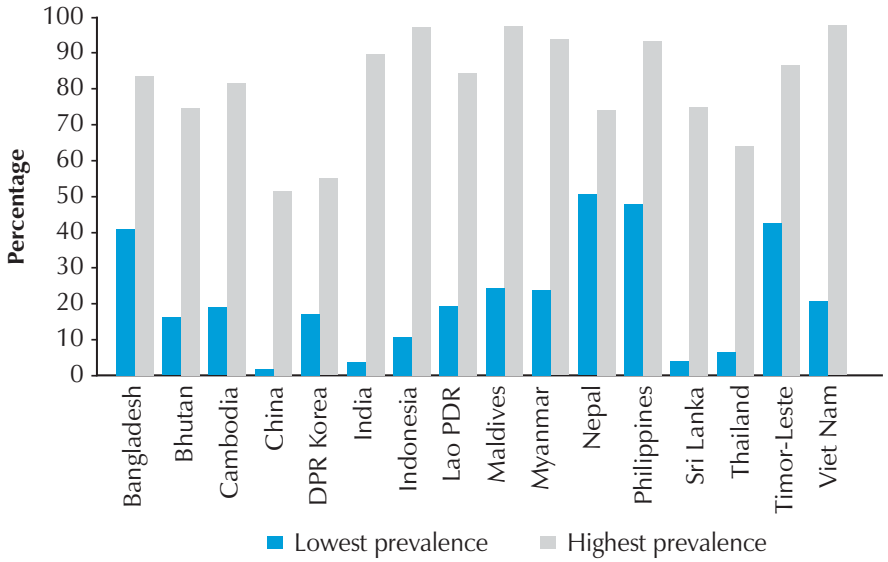
It is estimated that more than 1.2 billion people in the Asia Pacific Region are chronically infected with soil-transmitted helminthiasis (STH) and/or schistosomiasis. The most important soil-transmitted helminth infections in humans are caused by *Ascaris lumbricoides* (roundworms), *Trichuris trichiura* (whipworms), *Ancylostoma duodenale* and *Necator americanus* (hookworms).

Available data suggest that the disease burden due to STH is enormous. According to the World Bank, STH is responsible for 16.7 million DALYs lost among children aged 5–14, representing 11.3% of the total disease burden in this age group.[208]

High prevalence of STH is closely associated with poverty, poor environmental hygiene including poor sanitation, contaminated food, inadequate personal hygiene and lack of health services. It is also generally associated with areas that are basically agricultural and low on the economic and human development scale. Such conditions prevail in the poorer sections of most countries of the Asia Pacific Region. Prevalence of STH is found to be as high as 100% among high-risk communities.

The STH worms do not multiply in the human host, but they produce a large number of eggs which are passed in the faeces. The life cycle of these worms includes a soil stage, whereby immature stages must undergo development and multiplication before entering the human body again. There are many ecological factors such as temperature, humidity, soil quality and rainfall that affect the transmission of STH infections. Hence, the infection rates significantly differ by ecological zones even when the living conditions, personal hygienic habits and socioeconomic status do not differ significantly. This means that even within a single country, the prevalence of STH may vary greatly depending on ecological factors. These differences can be seen in Figure 7.34 that shows the

Fig. 7.34 Highest and lowest recorded prevalence of STH in selected Asia Pacific countries



Sources: *Magnitude of STH in the South-East Asia Region*. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/en/Section10/Section2289_12107.htm

Van der Hock W, *et al*. Current status of soil-transmitted helminths in Vietnam. *Southeast Asian journal of tropical medicine and public health*, 2003, 34: (supplement 1) 1-11.

Sinuon M, *et al*. Financial costs of deworming children in all primary schools in Cambodia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2005, 99: 664-668.

Phommasack B , *et al*. Coverage and cost of the school deworming targeting all primary schools in LAO PDR in 2007. *Transactions of the Royal Society of Tropical Medicine and Hygiene,* 2008 (in preparation).

Easton A. Intestinal worms impair child health in the Philippines. *British medical journal*, 1999, 318(7178):214.

Ministry of Public Health. *Report of the national survey of the current situation of major human parasitic diseases in China*. Beijing, National Institute of Parasitic Diseases, 2005.

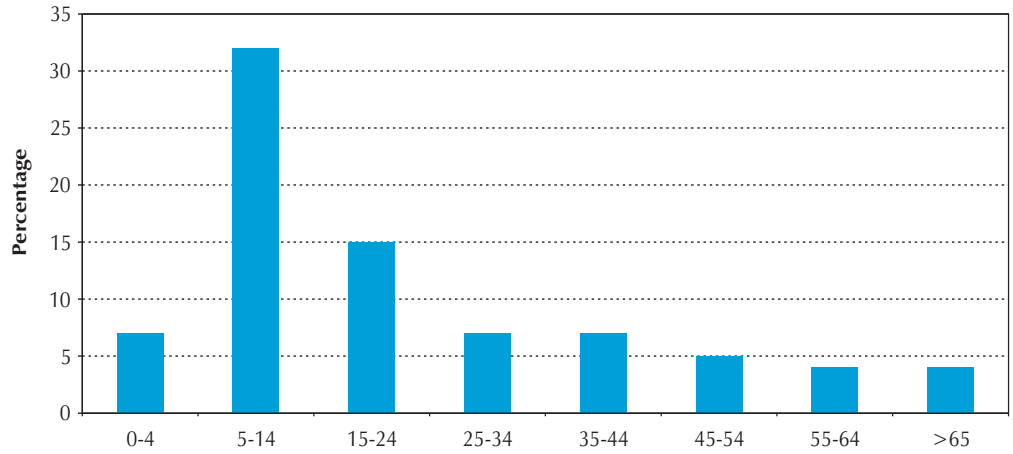
highest and lowest prevalence of STH within selected countries from surveys conducted over the past decade.

All age groups and both sexes are vulnerable to infection; however, in most places the prevalence and intensity rates are lower in extreme ages and higher among schoolchildren aged 5–14 years. Figure 7.35 shows the age distribution of STH in Pemba Island (United Republic of Tanzania) in 1988–1992. This is an example of a typical age distribution of infections in an endemic country.

The situation seen with hookworm is slightly different. The prevalence and intensity of hookworm infection show a slow increase with age in contrast to what is seen with roundworms and whipworms. In general, more adults than children have high infection rates with hookworms and a higher worm burden.

Some countries (Sri Lanka and Thailand) which had high worm burdens in the past show a steady downward trend over the last two decades due to targeted deworming campaigns combined with an overall improvement in socioeconomic conditions. Both Sri Lanka and Thailand currently have overall infection rates of less than 25%.

Fig. 7.35 Age distribution of STH in Pemba Island: 1988–1992



Source: Renganathan E, *et al*. Evolution of operational research studies and development of a national control strategy against intestinal helminths in Pemba Island, 1988-92. *Bulletin of the World Health Organization*, 1995, 73(2):183-190.

Effects of soil-transmitted helminthiasis infections

Soil-transmitted helminthiasis infections cause morbidity by affecting nutritional equilibrium, reducing growth, inducing intestinal bleeding, causing physical complications such as obstruction and rectal prolapse, and have been demonstrated to affect the cognitive development of children. Although death is a rare complication, each year throughout the Asia Pacific Region 20 000 deaths are directly attributable to hookworm infections, another 20 000 to *Ascaris lumbricoides* and 6000 to *Trichuris trichiura*. School-age children and women of reproductive age are the two groups with the highest risk of morbidity and mortality. A study conducted in Sri Lanka in 2003 showed that deworming of pregnant women during the second trimester improved their anaemia status significantly by the third trimester, increased the weight of children at birth by 60 grams and reduced infant mortality by 40% in the first six months.[209] Another study in Nepal conducted showed that two rounds of deworming of preschool children within a year reduced the prevalence of STH infections by 43% and of anaemia by 77%.[210]

Progress in the control of the disease and major achievements

Until recently very little attention was paid to controlling STH infections, mainly due to the prohibitive cost of interventions including chemotherapy. The improvement of sanitation was considered to be essential for any significant sustainable impact. Chemotherapy alone was not considered sufficient due to the high probability of rapid reinfection. There is, however, evidence from many Asian countries that regular treatment with anthelminthics alone can improve the health of affected groups despite reinfection. Four drugs have been recommended by the World Health Organization for deworming: albendazole, mebendazole, levamisole and pyrantel. These broad-spectrum anthelminthic drugs are now available at a low cost, and treatment with single doses is both safe and highly effective. It has

also been shown that regular and systematic treatment of those population groups at highest risk of morbidity can be delivered in an affordable and sustainable manner through existing channels. For many Asian countries, it has been estimated that the cost of deworming one school-age child costs approximately US$ 0.03.

With this background of a new hope for effective control of STH, the World Health Assembly in May 2001 adopted resolution WHA 54.19 that called for a global target to cover at least 75% of school-aged children annually with regular deworming by 2010. Many countries in the Asia Pacific Region are progressing towards achieving this target.

Bhutan, Cambodia, the Lao People's Democratic Republic, Maldives, Myanmar, Sri Lanka, Thailand and Timor-Leste, together with most of the Pacific island countries and areas, were targeted to cover their entire high-risk school-aged populations with regular deworming by the end of 2005. In addition, there has been increased interest in expanding the scope of deworming to cover other high-risk groups, including pregnant women and infants. Nepal became the first country in the world in 1999 to have covered its entire preschool population with two annual rounds of deworming. A few countries have also introduced deworming for women of childbearing age. Sri Lanka in 1988 was the first country to target all pregnant women for deworming during antenatal visits, and many more countries are considering adopting similar deworming policies.

In the Philippines, mass deworming of preschool and school-aged children has been conducted in a campaign for children known as the *Garantisadong Pambata*, which is usually done twice a year in April and October. The high cost of sustained mass deworming treatment for STH hinders most local governments from pursuing control measures. This prompted the Department of Health to formulate the Integrated Helminth Control Policy that brought together all existing health programmes, such as the National Filariasis Elimination Program and *Garantisadong Pambata*, within the Department of Health; the deworming programme for schoolchildren under the purview of the Department of Education; and the feeding programmes under that of the Department of Social Welfare and Development. NGOs and governmental organizations involved in mass deworming pooled all their resources and created a Technical Working Group for this purpose in 2006.

Due mainly to the simplicity and safety of the intervention, deworming can easily be integrated into other public health intervention programmes. There are many successful examples of countries that have integrated deworming into general school health programmes or into programmes for vitamin A distribution, school feeding, lymphatic filariasis elimination and immunization. Additional programmes need to be added.

Major problems and constraints

Despite its cost-effectiveness and simplicity, helminth control is still not a priority among some policy-makers. Even though it costs a very little to deworm an individual, most developing countries still require external financial support to treat large numbers who are at risk.

Schistosomiasis

Schistosomiasis is totally absent from the Pacific island countries and areas. The only Schistosoma species transmitted in Asia are *Schistosoma japonicum* and *S. maekongi*.

The transmission of *S. japonicum* is confined to China, where schistosomiasis is a major problem in parts of eight provinces (Anhui, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan and Zhejiang), Indonesia (Central Sulawesi) and the Philippines. *S. maekongi* is transmitted in areas along the Mekong River in southern parts of the Lao People's Democratic Republic and two adjacent provinces in Cambodia, namely Kratie and Stung Treng.

Effects of schistosomiasis

The manifestations of infections with *S. japonicum* and *S. mekongi* are very severe and can lead to the progressive illness and death of infected individuals, especially when the disease has been established for several years and periodic treatment was not provided.

The major symptoms and signs include hepato-splenomegaly, stunting and retardation of puberty; portal hypertension; ascites; cachexia; and rupture of esophageal varices.

The disease also significantly decreases productivity and, therefore, has had a palpable impact on the economy of the populations affected, contributing to and perpetuating poverty.

Progress in the control of schistosomiasis and major achievements

Annual treatment with praziquantel (60 mg/kg) greatly reduces the number of parasites infecting the individual and prevents the development of severe morbidity. The intervention is very cost-effective and possible even when resources are scarce.

If mass campaigns are maintained for sufficient time, perhaps seven or eight years, complete control of the morbidity is achieved and in some cases interruption of transmission is also observed. Once morbidity and transmission are under control, it is important not to discontinue mass treatment abruptly because this could lead to the resurgence of the disease. The strategy presently suggested maintains the disease under control and reduces the cost of the mass distribution by increasing the intervals between mass administrations and providing very sensitive monitoring of the prevalence of the infection.

Limited control activities are in place in Indonesia. In the Philippines, the creation of the "Formula One for Health Initiative (F1)" provided a new implementation framework for vital health sector reforms intended to implement critical health interventions with speed, precision and effective coordination to achieve the three major goals of the health-care system: better health outcomes, more responsive health system and more equitable health-care financing. This initiative focuses on disease for elimination as a public health problem and includes schistosomiasis among the diseases targeted. A much higher budget was allotted to the programme in order to realize the programme goal.

In China, control measures were successful in nearly eliminating the disease. But there has been a recent resurgence of cases in some areas, leading China to once again place schistosomiasis high on its list of priority communicable diseases.

In Cambodia, after eight years of MDA the prevalence dropped dramatically from 80% to no cases being identified in 2006. In the Lao People's Democratic Republic, control activities restarted in 2007 following the example of Cambodia.

Partnerships and collaborative efforts for STH and schistosomiasis

Partners for Parasite Control is a major partnership working towards expanding the prevention and control of STH and schistosomiasis. It is a partnership made up of WHO Member States, United Nations agencies, research institutes, universities, the pharmaceutical industry and a multitude of nongovernmental organizations. Unlike many other partnerships, the Partners for Parasite Control has a loose structure with no formal membership. It serves as a platform for sharing the latest technical and scientific information, as well as providing practical programmatic information to control programmes. In addition to Partners for Parasite Control, several partnerships at country and local levels have been formed and are functional across the Asia Pacific Region. In most of these partnerships, national governments are the key partners. In order to be successful there must be intense collaboration between ministries of health and education as well as other local bodies. Parasite control must be a multisectoral programme where activities are coordinated. It cannot be left to ministries of health alone.

There are many success stories of STH control from countries in the Asia Pacific Region, including Cambodia, the Lao People's Democratic Republic, Myanmar, Nepal and Viet Nam.[211,212,213,214,215] Other partners for helminth control in the Asia Pacific Region are The Bill and Melinda Gates Foundation, Sasakawa Memorial Health Fund, German Pharma Health Fund, United Nations agencies, Japan International Cooperation Agency, the United Kingdom Department for International Development, Cooperative for Assistance and Relief Everywhere, Save the Children Fund, the Government of Luxembourg and the Carlo Urbani Italian Association. Schistosomiasis was effectively controlled in parts of China and Cambodia with financial support from the World Bank in China and Sasakawa Memorial Health Fund in Cambodia.

Schistosomiasis and STH control in the context of Millennium Development Goals

Regular distribution of anthelminthic drug to high-risk groups contributes towards reducing susceptibility to infections, improving nutritional status, improving school attendance and achievements, and decreasing maternal morbidity and infant and child mortality – all of these increases productivity. It therefore contributes towards the achievement of four of the Millennium Development Goals and, more importantly, towards the eradication of extreme poverty and hunger.

For more information please visit www.who.int/wormcontrol

7.11 International Health Regulations and the Asia Pacific Region

The substantially revised International Health Regulations (2005), popularly known as IHR (2005), are a legally binding global framework for preventing, protecting against and providing a public health response to the international spread of disease while avoiding unnecessary interference with international traffic and trade. IHR (2005) set out many new requirements, rules and procedures concerning public health event detection, reporting, risk assessment and rapid response at national, regional and global levels. The Regulations entered into force on 15 June 2007 and are legally binding on all WHO Member States.

The challenges associated with emerging infectious diseases such as *Nipah* virus, SARS, avian influenza A (H5N1) and cholera in the Asia Pacific Region clearly highlight the need for effective implementation of IHR (2005) and further development of basic capacities required for surveillance, response and emergency preparedness. IHR (2005) provide a good opportunity for countries and WHO to strengthen such core capacities and international collaboration. Effective implementation of the Regulations in the Region contributes greatly to national, regional and international health security.

Regional approach to comply with IHR (2005)

The Asia Pacific Region is home to 53% of the world's population. In recent years, the combined efforts of Member States, WHO and international partners in this Region have led to significant improvement in the response to outbreaks and public health events of international significance. Key to an effective response is the capacity for early detection at local and national levels and early response to outbreaks, thereby minimizing morbidity, mortality and the spread of disease.

Infectious diseases do not respect geographical and political boundaries. Given that the countries of the Asia Pacific Region share common borders and face similar disease threats, an Asia Pacific Strategy on Emerging Diseases (APSED) has been developed to guide countries, WHO and other partners to strengthen country core capacities required in the fight against emerging infectious diseases. The Strategy was endorsed by the WHO Regional Committees for South-East Asia and the Western Pacific in September 2005 as a regional tool to comply with IHR (2005) core capacity requirements. The Asia Pacific Region intends to build capacity within countries and implement sustainable, and as far as possible, evidence-based measures that will help countries cope not only with the current threat of an influenza pandemic but other emerging diseases as well. To ensure a consistent approach across countries in the Region and in line with IHR (2005) requirements, the Strategy is currently being used as a common framework for strengthening national core capacities required for effective prevention and control of emerging infectious diseases and other public health threats in the Region.

The Asia Pacific Strategy on Emerging Diseases is intended to improve health protection through effective prevention, preparedness, early detection of, and rapid response to any emerging infectious disease, thereby minimizing its potentially severe health, economic and social impact. The Strategy provides guidance to Member States to prepare for, identify and respond to emerging diseases, with specific and immediate support for a response to avian influenza A (H5N1), preparedness for pandemic influenza, and compliance with IHR requirements. A five-year APSED Workplan (2006–2010) has been developed to help achieve a regional capacity-building goal: all countries will have at least the minimum capacity for epidemic alert and response by 2010.

The Asia Pacific Regional Technical Advisory Group on Emerging Infectious Diseases has been established to provide technical advice and a monitoring mechanism for implementation of the APSED and IHR (2005) in the Region. The first Technical Advisory Group meeting held in Manila in 2006 recommended that all countries in the Region develop a national APSED implementation plan to support the establishment and maintenance of the core capacities required under the IHR (2005).

Regional activities

With the world facing the increasing threat of pandemic influenza arising from avian influenza A (H5N1) outbreaks or possible other novel influenza viruses, the Asia Pacific Region has been actively responding to avian influenza outbreaks and improving pandemic influenza preparedness in the context

of IHR (2005). For example, a conference of ministers of health, agriculture and livestock in the Asia Pacific Region, organized by the Government of India in collaboration with WHO and the Food and Agriculture Organization of the United Nations in July 2006, endorsed the "Delhi Declaration on Prevention and Control of Avian Influenza". The agreed actions include developing a framework for prevention and control of avian influenza and the pandemic influenza threat; defining uniform standards and monitoring their implementation; sharing available knowledge and expertise; and intensifying efforts to make sufficient resources available. A task force has been formed to take the Delhi Declaration forward in line with the development of IHR (2005) core capacities. Some countries have incorporated activities related to avian influenza and pandemic preparedness into their national capacity development plan for surveillance and response.

The Asia Pacific Region is committed to its obligations under IHR (2005) and has been taking action to comply with them to contribute to public health security. Considerable efforts and activities have been implemented in the Region to:

- increase awareness and improve understanding about IHR (2005) and foster regional partnerships;
- improve regional outbreak and public health event alert and response systems and operational capacities, including effective communications and timely information sharing between National IHR Focal Points and WHO;
- develop, strengthen and sustain the country core capacities for surveillance and response through effective APSED implementation;
- strengthen public health measures and capacities at points of entry; and
- ensure national legislative support and meet IHR (2005) legal and procedural requirements.

International Health Regulations advocacy, awareness and partnerships

Understanding the new obligations and procedures under IHR (2005) is the first important step towards ensuring compliance with the Regulations. A series of regional meetings and workshops were organized in the Asia Pacific Region to advocate IHR (2005) for policy-makers and major stakeholders. Advocacy materials, including IHR guidance for national policy-makers and partners, have been developed and distributed to increase awareness. Information and documents about IHR (2005) have also been disseminated through various websites.

Considering the regional importance of IHR (2005) and challenges ahead for the development of the core capacities, IHR implementation issues were discussed in detail in several important regional forums. WHO technical and financial support was also provided to many countries in need to assist in organizing multisectoral national workshops on IHR (2005) implementation. Most countries have now conducted their national-level workshops and meetings to inform government ministries, sectors and agencies of the new IHR (2005) requirements and opportunities. These country-level efforts have greatly helped build multisectoral collaboration and foster partnerships in facilitating national implementation of IHR (2005).

International Health Regulations: communication, regional alert and response

International Health Regulations (2005) emphasize the importance of early detection, timely verification and notification, risk assessment of, and rapid response to public health events, especially those that may contribute to a public health emergency of international concern. In order to manage public health events of international importance, effective communications and operational links between Member States and WHO are essential.

In the Asia Pacific Region, all Member States have now officially designated their National Focal Points for urgent, event-based communications with WHO. To ensure that WHO can be accessible at all times for urgent communications with the National Focal Points, the WHO IHR Contact Points in the Region have established their IHR Communications Systems. Relevant operating protocols on event communications have been developed and are currently being used to guide necessary actions.

International Health Regulations (2005) also requires WHO to strengthen its regional and international outbreak alert and response capacities. Both WHO Regional Offices of South-East Asia and the Western Pacific have now established a Strategic Health Operations Centre (SHOC) with necessary communications technology and facilities. The Regional Strategic Health Operations Centre is equipped to enable WHO conduct collective event risk assessments and operational responses and provide timely support to Member States in dealing with public health emergencies. Standard operating procedures for outbreak or public health event reporting and communication are being developed. Regional outbreak alert and response capacities are being improved through the strengthening of the Global Outbreak Alert and Response Network (GOARN).

The WHO Regional Office for South-East Asia has established communicable disease surveillance and response subunits in Delhi (India) and Bangkok (Thailand). The role of these subunits is to increase the reach and efficiency of the Regional Office in alert and response operations and bring technical support operations closer to countries. Meanwhile, WHO country offices are the front-line offices of the Organization and closest to national counterparts. To facilitate national implementation of IHR (2005), WHO country offices continue to establish and strengthen close day-to-day communications with the national governments to receive and respond to any information regarding disease outbreaks and other public health events.

Strengthening national core capacities required under IHR (2005)

The assessment of core capacities required under IHR (2005) is necessary to identify gaps in technical competency and resource mobilization. Many countries will need to invest significant effort and resources in achieving the 2010 deadline for core capacity development under the Asia Pacific Strategy for Emerging Diseases. In some countries, the capacity for detection and reporting is limited in that there is a lack of adequately trained personnel, necessary laboratory support and information systems to detect, verify and respond to unusual events. These gaps in capacity have been defined through systematic assessments, and plans have been developed to strengthen capacity in the area of legal framework, surveillance and response, laboratory support, clinical case management, infection control and risk communication. Strengthening core capacities in those areas would help facilitate early detection, verification and response to unusual events.

As of December 2007, with the support of WHO more than 20 countries in the Asia Pacific Region have conducted assessments of their existing surveillance and response systems and capacities, using relevant assessment tools from IHR (2005) and the APSED. As a result of such assessments, a number of countries have developed draft national plans of action for strengthening core capacities.

The country assessments have helped identify strengths and weaknesses of existing systems in the Region. The assessments have shown that capacity development and preparedness levels vary from country to country. They also highlighted an urgent need to operationalize or institutionalize National IHR Focal Points. Many ongoing activities for strengthening national capacities for surveillance and response of avian and pandemic influenza under National Influenza Pandemic Preparedness Plans were complementary for implementation of the IHR (2005).

Preventing disease spread through international travel

Ensuring public health measures and response capacities at points of entry and border crossings contributes to public health security in travel and transport. Member States are required to designate their international airports, ports and ground crossing points that need to develop the core capacity required under IHR (2005). Given that the volume of international travel and trade is huge and the risk of cross-border transmission and international spread of disease persists in the Region, there is the need to strengthen this area of work, including the mobilization of regional experts in supporting those countries with the greatest needs and in documenting best practices.

National legislation to support IHR (2005)

To support national compliance with IHR (2005) and ensure that domestic legislation is compatible with the Regulations, many countries have started reviewing and adjusting their existing laws or public health acts.

Conclusion

Meeting all the requirements for IHR (2005) compliance is a challenging task. However, IHR (2005) provides a good opportunity for the Region to work collectively to fight emerging diseases and other public health threats. There is the need for continuing advocacy and improved understanding at all levels about the new IHR (2005) requirements. Ensuring functions of National IHR Focal Points, strengthening surveillance and response capacity at all levels, implementing public health measures and capacity-building at designated points of entry, cross-border collaboration and communication, and national legislation to support implementation of IHR (2005) will continuously require collective efforts and international collaboration.

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8

Priority noncommunicable diseases and conditions

This chapter reviews the situation of priority noncommunicable diseases (NCDs) in the Asia Pacific Region, with subchapters covering the well-known "lifestyle" diseases, tobacco control, injuries and violence, mental and neurological illness and substance abuse, and thalassaemia.

Due to rapid epidemiological and demographic transitions, chronic NCDs have become a leading cause of death, morbidity and disability in the Region. Cardiovascular diseases, cancer, chronic lung diseases and diabetes have emerged as major public health problems, and mental health and associated disorders affect a great number of people, especially in the more industrialized countries. Certain genetic diseases are being increasingly recognized and the incidence of accidents and other injuries are growing.

High levels of major risk factors for NCDs in much of the Region suggest that resulting health problems will continue to rise and affect progressively younger age groups, creating a significant impact on the workforce and on overall development. Families and communities of sufferers are also affected through direct and indirect economic loss. The increasing incidence of NCDs among poor and vulnerable groups is widening health inequities within and between countries.

The causes of NCDs are known and are mostly modifiable. Unhealthy diet, physical inactivity and tobacco consumption are risk factors common to several major NCDs. Although many socioeconomic and behavioural factors lie outside the domain of the health sector, health systems should assume responsibility for prevention, care and treatment of most NCDs and prepare for the additional burden and resource needs this will bring.

Effective collaboration between health and other sectors could prevent up to 80% of all cases of heart disease, stroke and diabetes, and 40% of cancers.[1] Accidents and violence are largely civil and regulatory issues. Mental illness is a direct family and community concern. More intersectoral involvement

down to the community level is needed to manage many of these problems on a large scale. Coordinated international efforts have so far focused on tobacco control and the implementation of the first global public health treaty, the WHO Framework Convention on Tobacco Control.

8.1 Lifestyle diseases

Cardiovascular diseases

Cardiovascular disease (CVD) is a range of conditions dominated by coronary heart disease, also referred to as ischaemic heart disease. In a process known as atherosclerosis, a slow accumulation of fatty plaques eventually narrow and block the heart's coronary arteries. This starves the heart muscle of blood and causes crippling chest pain or a heart attack. By blocking critical blood vessels of the brain, atherosclerosis is also responsible for the majority of strokes (cerebrovascular disease). The global upsurge in CVD is due to changing lifestyles that accelerate the risk of atherosclerosis, such as the growing prevalence of obesity, smoking and high blood pressure, as well as dietary changes and diminished physical activity, all discussed later in this chapter. Rheumatic heart disease falls under CVD but is caused by infection and is, therefore, discussed separately on page 293.

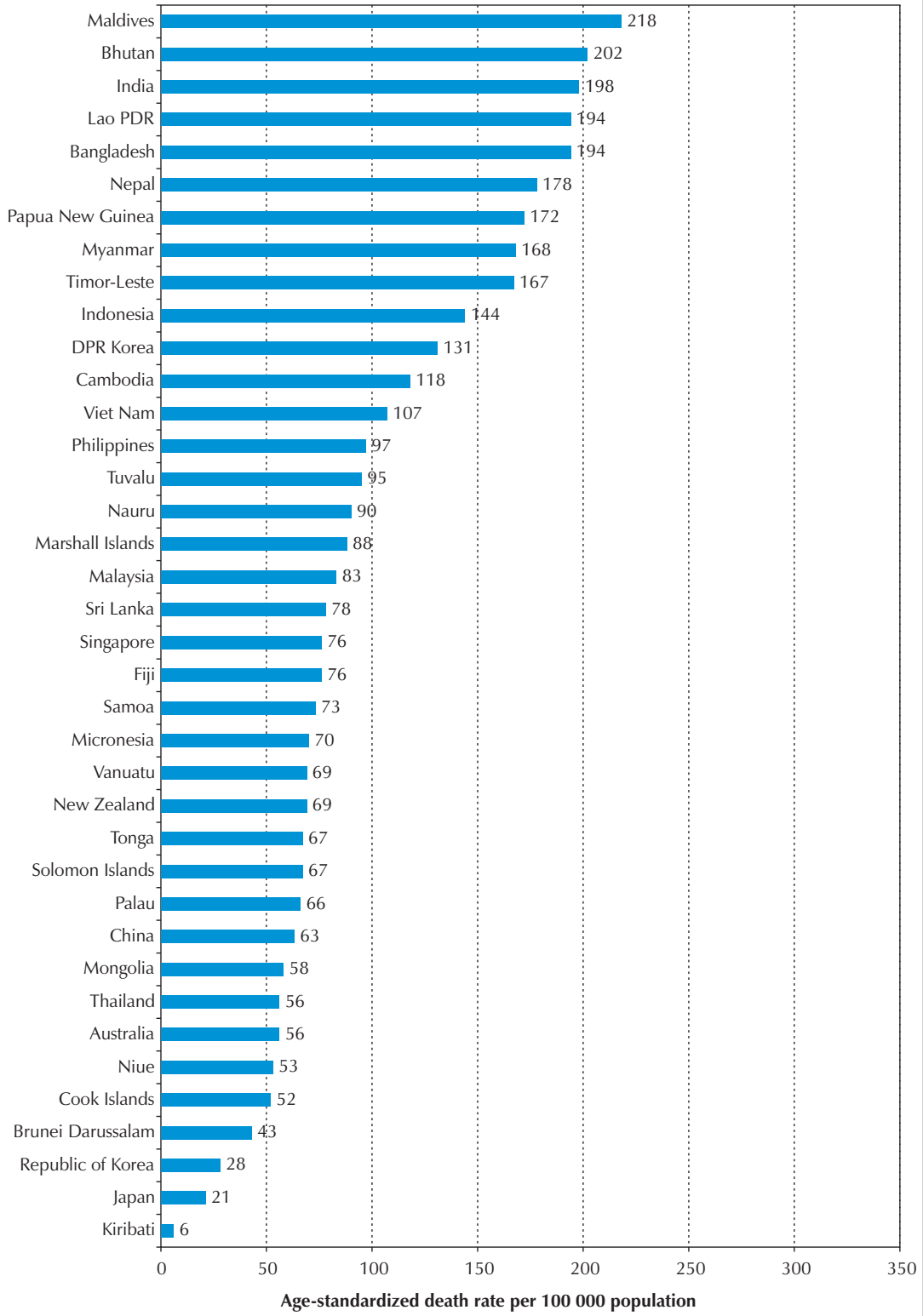
Projected to be the leading killer in all countries by 2020,[2] CVD is responsible for nearly 17 million deaths a year, a staggering one third of global mortality and over 10% of the entire global burden of disease.[3] By comparison, HIV/AIDS claims 3 million lives annually.[4] Often incorrectly seen as a disease of wealthy nations, most deaths from CVD occur in developing countries. As a rising wave of CVD engulfs the Asia Pacific Region, throwing enormous strain on health systems and felling ever growing numbers of people in their most productive years, it poses a grave threat to economic development. By adding to the burden of poor families, who lack the resources to cope when a heart attack or stroke strikes a family member, CVD also creates health inequity.

There were over six million deaths due to CVD in the Region in 2002, with mortality equally divided between ischaemic heart disease and stroke. The absolute burden is similar for males and females. Overall death rates for ischaemic heart disease are higher among men than women, but these differences are not so pronounced for stroke.[5] In some Pacific island countries, Mongolia and Thailand, death rates from stroke are higher among women. Bhutan and India have one of the highest age-standardized rates for ischaemic heart disease for both males and females, while Fiji has the highest rate for males at 304/100 000, and the Maldives the highest rate for females at 218/100 000. Sri Lanka has the highest rate for stroke for males (256/100 000) followed by Vanuatu, Australia and Brunei Darussalam. Mongolia has the highest rate of stroke for females (189/100 000) followed by Tuvalu, Nauru and the Marshall Islands.

Figures 8.1 and 8.2 show mortality estimates for the Asia Pacific Region for females and males for ischaemic heart disease, and Figures 8.3 and 8.4 show mortality estimates for females and males for stroke.

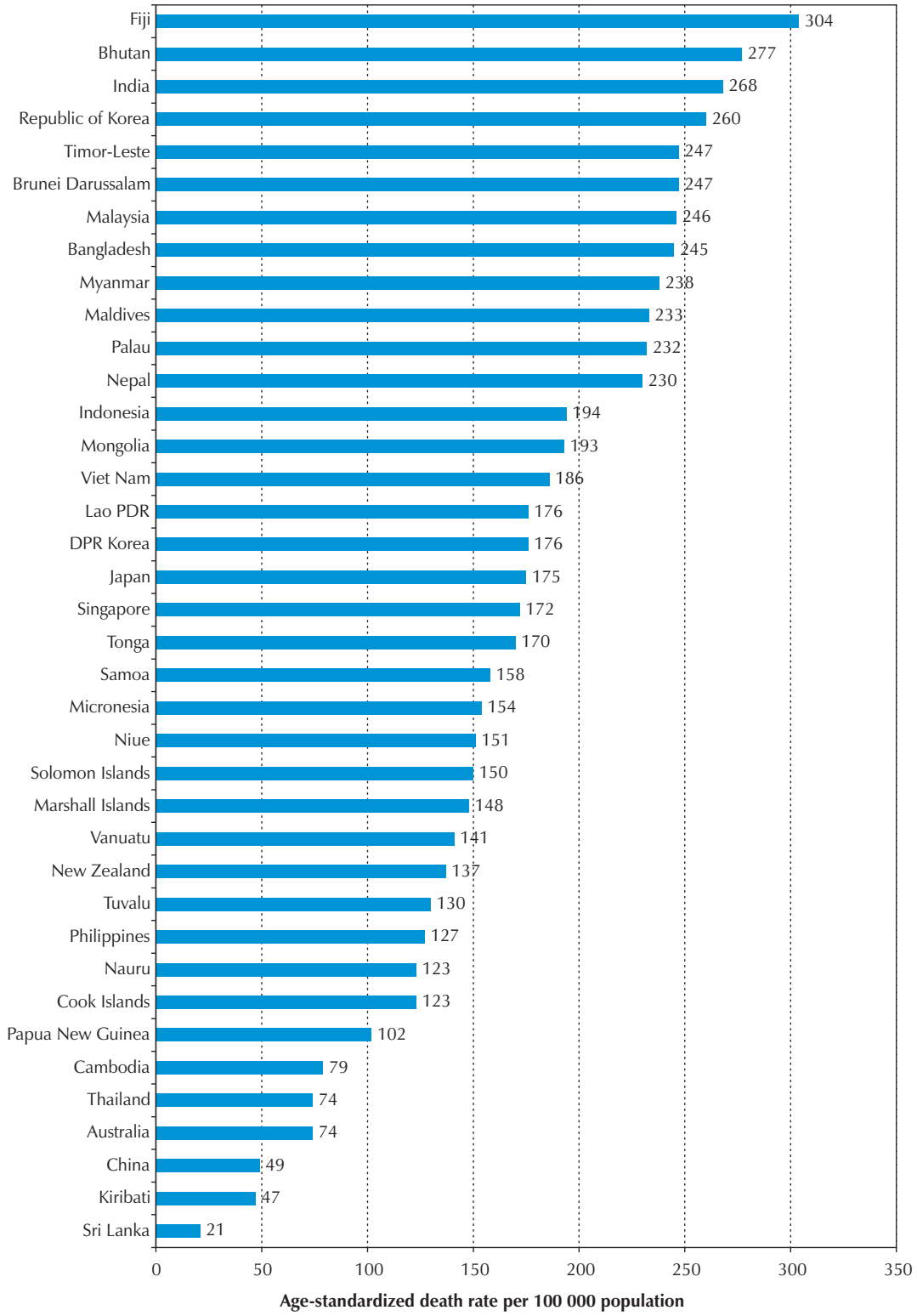
Derived from the WHO Global InfoBase,[6] Table 8.1 shows the burden of CVD for the Asia Pacific Region in terms of disability-adjusted life years (DALYs) lost. It can be seen that the Region contributed to over half the world burden attributable to CVD in 2005, with just over 78 million DALYs lost. Ischaemic heart disease and cerebrovascular disease contribute the major burden of DALYs lost both globally and in the Region.

Fig. 8.1 **Age-standardized death rates (per 100 000 population) for ischaemic heart disease among females in selected countries and areas in the Asia Pacific Region, 2005**



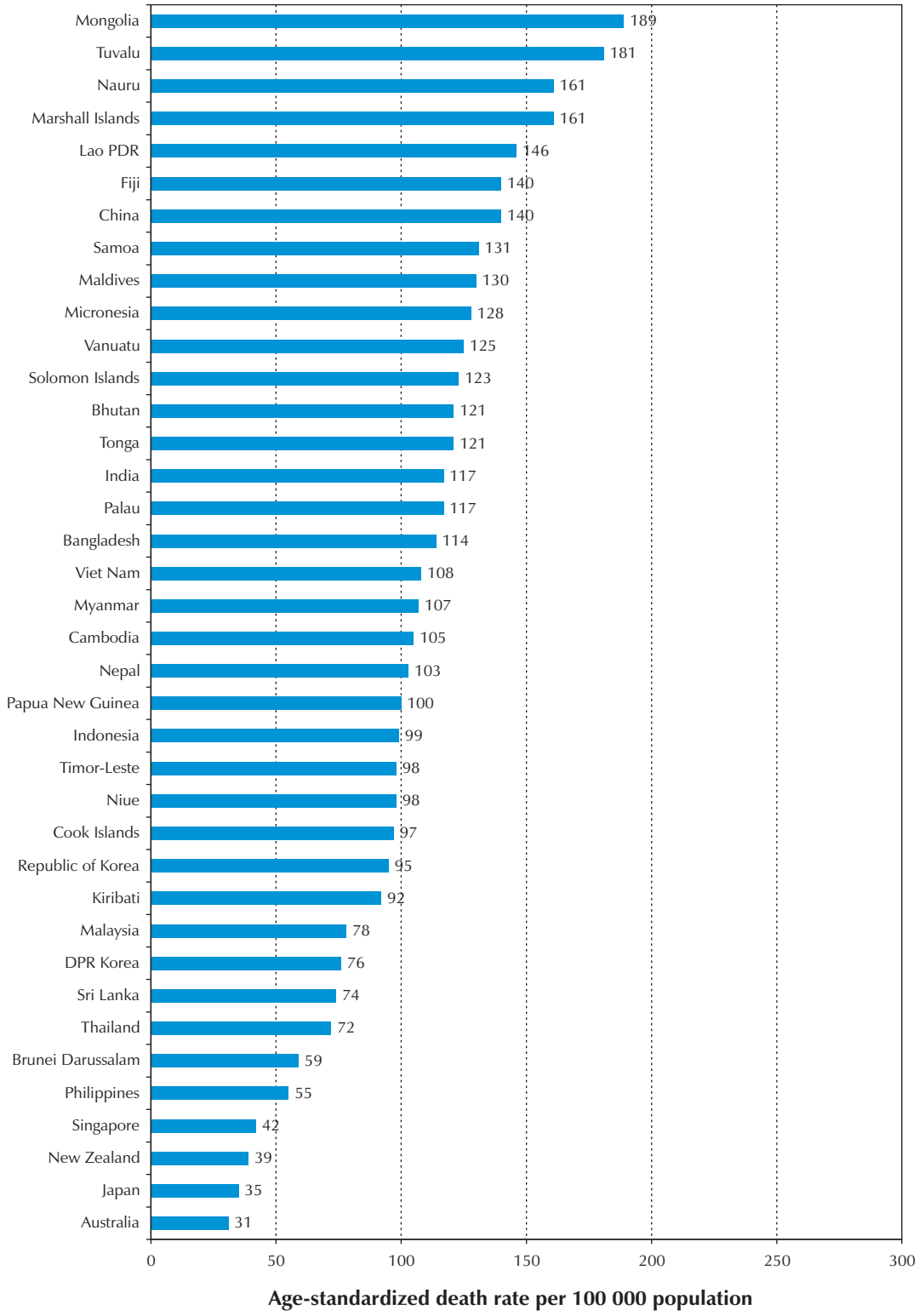
Source: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

Fig. 8.2 **Age-standardized death rate (per 100 000 population) for ischaemic heart disease among males in selected countries and areas in the Asia Pacific Region, 2005**



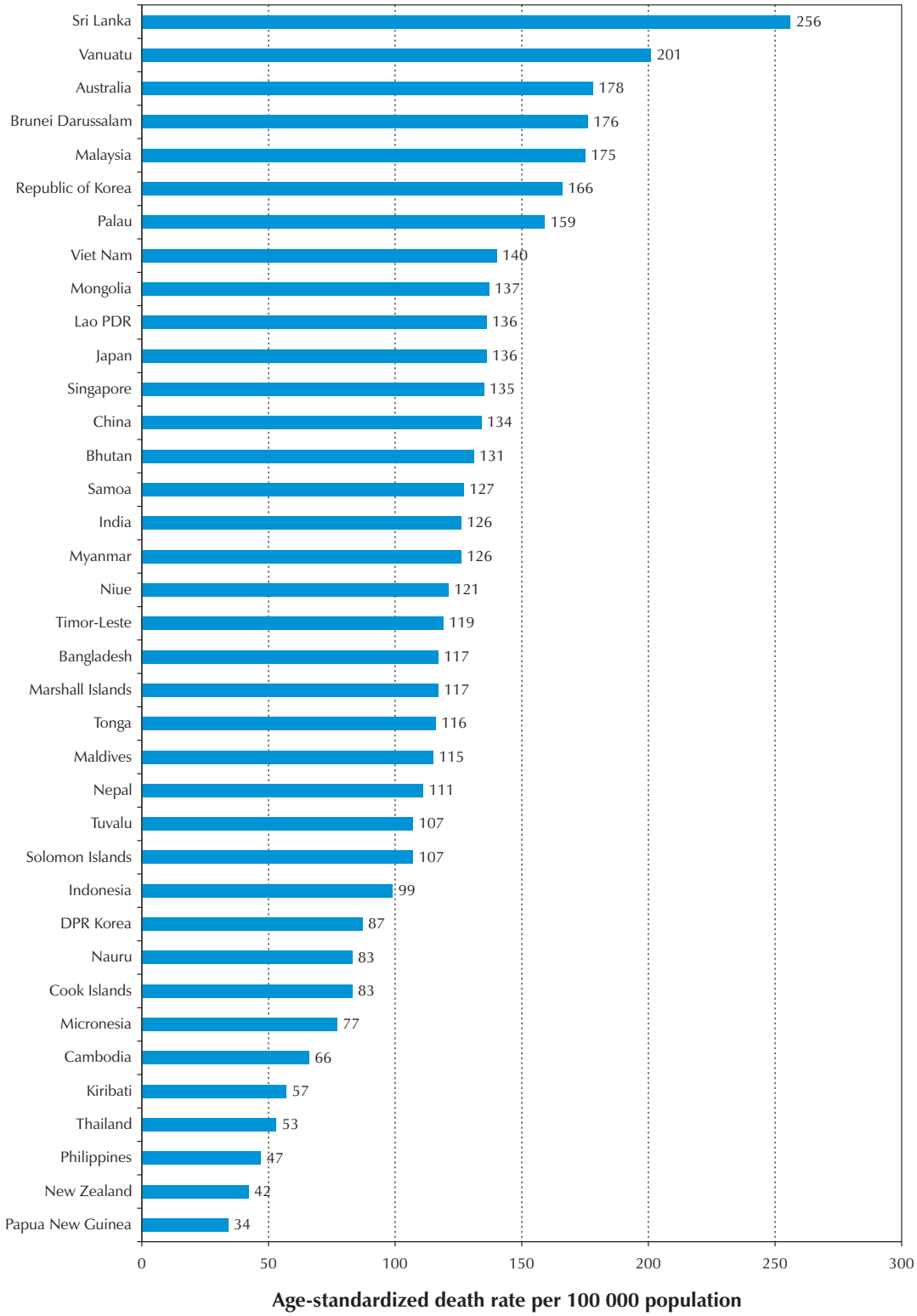
Source: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

Fig. 8.3 **Age-standardized death rates (per 100 000 population) for stroke among females in selected countries and areas in the Asia Pacific Region, 2005**



Source: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

Fig. 8.4 **Age-standardized death rates (per 100 000 population) for stroke among males in selected countries and areas in the Asia Pacific Region, 2005**



Source: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

Table 8.1 Total DALYs lost due to cardiovascular disease in the Asia Pacific Region, 2005

	DALYs (000s), all ages			
	Females		Males	
	World	Asia Pacific	World	Asia Pacific
Ischaemic heart disease	25 328	12 814	36 144	16 905
Cerebrovascular disease	24 374	12 982	26 411	15 703
Hypertensive heart disease[1]	3 840	1 839	4 023	2 167
Inflammatory heart disease[2]	2 416	1 041	3 449	1 235
Rheumatic heart disease	3 193	2 259	2 566	1 866
Cardiovascular diseases	**70 016**	**35 698**	**82 994**	**42 323**

[1] hypertensive heart disease is a late complication of hypertension in which the heart is affected

[2] inflammatory heart disease is inflammation of the heart muscle and/or the tissue surrounding it.

Note: conditions are listed in descending order of total world burden.

Sources: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

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Rheumatic fever and rheumatic heart disease

Rheumatic fever and rheumatic heart disease remain a significant public health problem in developing countries and in socioeconomically disadvantaged groups in developed countries, especially among children. In 1994 it was estimated that 12 million people worldwide suffered from rheumatic fever and rheumatic heart disease, and at least 3 million people had congestive heart failure due to rheumatic heart disease that required repeated hospitalization.[7,8]

Both rheumatic fever and rheumatic heart disease are complications of Group A streptococcal pharyngitis. The most common infections caused by Group A streptococci are streptococcus pharyngitis and skin impetigo, with a peak in children aged 5–15.[9]

Reliable data are scarce on the incidence of rheumatic fever and rheumatic heart disease and in many developing countries hospital morbidity data is all that is available. Based on this data, rheumatic heart disease accounts for 12–65% of hospital admissions related to cardiovascular disease.[10]

The prevalence of rheumatic heart disease in the Asia Pacific Region has been estimated in surveys of schoolchildren (Table 8.2). Although the data are old, they show that there is a wide variation between and within countries, especially among ethnic groups.

It is generally accepted that socioeconomic and environmental factors greatly influence the incidence and prevalence of rheumatic fever and rheumatic heart disease. Shortages of health-care provision and expertise and low levels of awareness have major impacts on rheumatic heart disease, with crowding exacerbating incidence. Conversely, prevention and early treatment of pharyngitis prevents rheumatic fever and subsequent rheumatic heart disease from developing. For secondary prevention of rheumatic heart disease, prophylactic use of long-acting penicillin is recommended.

Table 8.2 Reported prevalence of rheumatic heart disease in schoolchildren in the Asia Pacific Region

Country	Year	Rate per 1000 population
Australia (Northern Territory)	1989–1993	9.6
Cook Islands	1982	18.6
French Polynesia	1985	8.0
India	1984–1995	1.0–5.4
India (Northern)	1992–1993	1.9–4.8
Nepal (Kathmandu)	1997	1.2
New Zealand (Hamilton Maoris)	1983	6.5
New Zealand (Hamilton non-Maoris)	1983	0.9
Samoa	1999	77.8
Sri Lanka	1998	6.0

Source: *Rheumatic fever and rheumatic heart disease*. Report of a WHO Expert Consultation, Geneva, 2001. Geneva, World Health Organization, 2001 (Technical report series no. 923).

Risk factors for cardiovascular disease

Elevated blood pressure

Hypertension, commonly known as high blood pressure, is a leading risk factor for CVD. Table 8.3 shows estimates of the mean systolic blood pressure (SBP) for people aged 30–44 in the Asia Pacific Region in 2005. For SBP alone, the normal adult range is <120 mmHg and high-normal (pre-hypertensive) 120–139 mmHg. Hypertension is generally considered to begin at or above 140 mmHg.[11,12]

As with ischaemic heart disease and stroke, the general trend is for females to have lower mean SBP values than males. The two exceptions are the Maldives and Papua New Guinea, with mean SBP for females of 133.5 mmHg and 120.3 mmHg respectively. The mean SBP for Maldivian females is the highest of all countries in the Region, for both males and females, and falls into the pre-hypertensive range. The mean SBP for males of the Maldives, New Zealand, Tonga and Vanuatu also fall into the pre-hypertensive range (Table 8.3).

Biological and behavioural risk factors

Heart disease and stroke share a group of common risk factors arising out of genetic factors, personal behaviour and socioeconomic environments. These include:

- Raised blood lipids, raised blood pressure, impaired metabolism of glucose, and overweight and obesity (especially central, or abdominal obesity) are a set of physiological risk factors that lead to CVD and are frequently seen in clusters, with more than one present in the same individuals at the same time.
- Tobacco use, physical inactivity, unhealthy diets and excessive alcohol consumption form an antecedent cluster of behavioural risk factors, i.e. aspects of personal behaviour that are associated with an increased risk of noncommunicable disease.
- The operation of these risk factors on individuals and populations is affected by certain non-modifiable risk factors. Sex, ethnic group and age affect the severity of risk exposure and vulnerability to CVD. For instance, increasing age brings a higher incidence of heart disease and stroke and accounts for part of the rise in CVD in ageing populations.

Table 8.3 Mean systolic blood pressure and corresponding standard deviation (SD) among adults aged 30–44 in selected countries of the Asia Pacific Region, 2005

Country	Systolic blood pressure (mmHg)			
	Males		Females	
	mean	SD	mean	SD
Australia	114.1	11.7	122.6	15.2
Bangladesh	116.6	11.5	115.5	12.8
Bhutan	122.3	12.7	118.2	13.4
Brunei Darussalam	118.5	14.8	115.3	15.7
Cambodia	118.2	15.0	109.5	14.7
China	118.0	15.0	114.5	15.8
Cook Islands	126.7	15.2	124.2	16.2
Democratic People's Republic of Korea	122.5	16.0	117.2	16.4
Timor-Leste	122.3	12.7	118.2	13.4
Fiji	115.2	12.7	109.8	13.1
India	123.8	13.0	120.9	14.0
Indonesia	121.3	15.4	120.0	16.8
Japan	125.4	14.1	116.2	13.7
Kiribati	126.0	15.0	115.7	14.4
Lao People's Democratic Republic	118.2	15.0	109.5	14.7
Malaysia	118.8	14.9	111.7	14.9
Maldives	130.1	14.4	133.5	16.8
Marshall Islands	122.4	14.2	116.8	14.6
Micronesia, Federated States of	123.3	14.4	116.0	14.4
Mongolia	123.3	16.2	118.8	16.8
Myanmar	119.0	15.2	113.0	15.5
Nauru	127.9	15.5	117.7	14.8
Nepal	122.3	12.7	118.2	13.4
New Zealand	130.9	15.4	117.7	14.1
Niue	124.1	14.6	119.7	15.3
Palau	128.9	15.7	121.9	15.7
Papua New Guinea	117.1	13.1	120.3	15.4
Philippines	121.6	15.5	115.2	15.7
Republic of Korea	125.1	16.5	117.1	16.4
Samoa	124.3	14.6	112.8	13.7
Singapore	119.8	15.1	111.9	15.0
Solomon Islands	114.7	12.5	110.6	13.2
Sri Lanka	122.0	15.6	120.1	16.8
Thailand	116.1	14.3	112.4	15.1
Tonga	132.2	16.4	124.1	16.2
Tuvalu	122.4	14.2	116.8	14.6
Vanuatu	130.1	15.9	122.9	16.0
Viet Nam	117.8	14.9	114.0	15.7

Source: WHO global infobase: data for saving lives. Geneva, World Health Organization. See: http://www.who.int/infobase/compare.aspx

Environmental risk

Personal risk factors are only a part of the CVD picture. As more people move to cities and economies grow, a number of social changes occur which directly increase CVD risk.

- **Transport and work:** The once ubiquitous bicycle is disappearing throughout Asia. Cityscapes once dominated by this active, non-polluting form of transport have been overtaken by successive waves of motorcycles and then cars, bringing noise, injuries and inactivity in the rush for convenience and speed. In developing countries, most physical activity takes place in transport and work domains, unlike developed countries where leisure-time physical activity is much more important. The loss of cycling is not being replaced by other forms of activity in the Region. With the move to cities, occupational patterns are changing too. Rural, active occupations are replaced by more sedentary, urban jobs.
- **Prices:** The price of tobacco, alcohol, processed and fast food is often well within the means of the growing income of the Region's populations. A poor person in the Philippines is able to purchase loose cigarettes,[13] a beer,[14] a mini-sized bottle of sugared soft drink[15] and a fast food combination meal for a total of not much more than US$ 1.[16] While conventional wisdom suggests that these commodities are for the rich who can afford to buy them, the marketing strategy of companies concerned will ensure availability for all but those living in absolute poverty.
- **Social norms:** Norms are not changing as fast as economies develop. As many of the Region's countries emerge from times of major food insecurity, parents still consider an overweight child healthy and slim one sickly. This compounds the problem of consumption of unhealthy processed and convenience foods high in calories, fats and salt; and plays into the hands of advertising aimed at children, which reinforces their changing dietary preferences.
- **Policy myths**: Despite overwhelming evidence to the contrary, national and international policy-makers continue to cling to the belief that CVD is limited to the rich and that it is possible to first deal with infectious diseases before solving problems of noncommunicable diseases (NCD), or that the risk of CVD is determined by personal responsibility and not the need for government intervention. There are many examples of what one might term "myth-informed" policy-making.

These environmental factors, together with increasing longevity, are the main reason for the current epidemics of NCD in general and CVD in particular. They must become the main points of intervention if there is to be effective prevention. Campaigns that limit themselves to raising awareness and providing information are doomed to fail and may simply be "blaming the victim" when the main attention should focus on the causes and the social and environmental determinants of risk.

Health services as a determinant of cardiovascular diseases

A key environmental determinant of CVD morbidity and mortality is the health service itself. Apart from the personal and environmental risks outlined above, the risk of developing a stroke, for example, is strongly related to the control of blood pressure. Thus the management of raised blood pressure is an intervention of major importance for the prevention of strokes and their recurrence.

Yet access to control of raised blood pressure is not given due priority in many developing countries of the Asia Pacific Region, where most often there is no access to socialized medicine and private medical services provide care for chronic diseases. Social health insurance schemes exist in some countries (e.g. the Philippines, Sri Lanka, Thailand and Viet Nam), yet often there is no coverage for

regular drug treatment of raised blood pressure. Countries such as India are now beginning to put in place risk factor surveillance as the first step towards a comprehensive NCD control programme integrated with the public sector health delivery system.

Lowering cardiovascular risk in high-risk individuals

Several forms of therapy, including the lowering of blood lipids, blood pressure and blood sugar can prevent CVD by decreasing the risk of coronary heart disease and stroke. There is a close association between cardiovascular risk and levels of blood lipids, blood pressure and blood sugar. Therefore, defining cut-off points for treatment based on single risk factor levels is arbitrary and can no longer be justified. Treatment decisions need to be based on total cardiovascular risk.

Decisions about whether to initiate specific preventive action, and with what degree of intensity, should be guided by estimation of the risk of vascular events. The recently released WHO/International Society of Hypertension cardiovascular risk prediction charts for all WHO regions, allow treatment to be targeted according to predictions of total cardiovascular risk.[17] People with established coronary heart disease or cerebrovascular disease are at very high risk of recurrent heart attacks and strokes and need intensive interventions.[18] For example, the effectiveness of statin drugs for lowering lipids in those at high risk is well established. With regard to lowering lipids for primary prevention of CVD, many studies confirm that the benefits depend on the level of cardiovascular risk: the higher the total cardiovascular risk the greater the benefit. Overall, primary prevention trials have provided evidence that lowering lipids with a statin is justifiable on risk-benefit grounds, and is cost-effective in subjects who are at high risk of developing CVD, realizing a reduction in risk of over 20% over a period of 10 years.[19] The CVD risk threshold for lowering lipids with statins should be decided at a national level, because whether a risk threshold is cost-effective will, to a large extent, depend on the financial resources available and the cost of statin drugs.

For those receiving treatment, ample anecdotal evidence shows that in developing countries of the Region there is no easy access to effective counselling, and control of blood pressure is of poor quality.

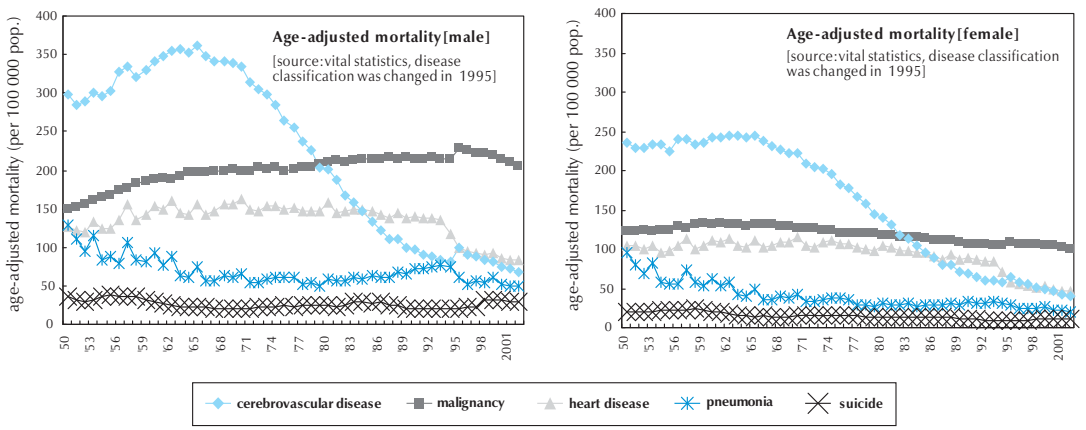
The potential for prevention

There are numerous examples of a successful reduction of CVD burden or risk in countries such as Finland, Mauritius and Poland. This section will consider a remarkable success in the Asia Pacific Region—the fight against stroke in Japan. The overall change is seen in Figure 8.5.

From the year after the Tokyo Olympics (1964), an immediate and dramatic drop is seen for both men and women in the age-adjusted mortality from stroke. This was a prominent feature of the health transition in Japan over the last half century and contributed greatly to the increase in life expectancy. One recent review[20] estimated that the decline for all types of stroke averaged around 5% annually for both men and women from 1965 to 1974, accelerated to a decline of around 8% annually from 1975 to 1989,[21] and then slowed to an average 1% (men) and 3% (women) annual decline from 1990 to 1997.

The dramatic fall in stroke mortality in Japan over the last decades has been correlated with a reduction in tobacco smoking and the control of blood pressure. The same study suggests that annual declines in smoking and blood pressure in middle-aged and elderly men and women correlate with declines in mortality. Such findings favour a combined primary, population approach (tobacco control, salt reduction, alcohol control, physical activity and healthy diet) and secondary prevention (lowering of cardiovascular risk by lowering blood pressure, blood lipids and blood sugar) as essential and complementary techniques for preventing CVD.

Fig. 8.5 Age-adjusted mortality rates by sex for stroke and selected cardiovascular diseases in Japan, 1950–2003



Source: *Public health of Japan 2007*. Japan Public Health Association. Available from: http://www.jpha.or.jp/jpha/english/index.html

Even though concerns have been expressed on the recent slowing of the decline of stroke mortality in Japan, the rapidity and steepness of the fall lend great support to arguments that a rapid reversal of the epidemic is possible and that the means to do so are within the resource constraints of developing countries in the Region. The technology that brought about this decline in Japan is based on population prevention and systematic primary care.

Reducing risk

The world health report 2002 – reducing risks, promoting healthy life[22] estimated the burden of disease by major risk factors for all regions of the world. It also estimated the cost-effectiveness of population and high-risk interventions to prevent and control CVD. The report considered various scenarios for CVD prevention and control that included population approaches (promoting small reductions in risk across the whole population) and individual approaches (achieving major risk reduction in people at high risk).

Examples of interventions deemed cost-effective (depending on the burden and specific country situation) include:

- Tobacco control is the most cost-effective of interventions considered in this report, and ranks high in the top five interventions for risk reduction worldwide. Taxation is the most cost-effective of the tobacco control interventions, and from a pure NCD prevention standpoint, the higher the rate of tax, the greater the effect. Advertising bans, control of smoking in public places, and health education for tobacco control add to the range of cost-effective interventions. Nicotine replacement therapy would be effective but adds considerably to costs.
- Population-wide salt reductions, based on either voluntary agreements with industry to reduce salt in processed food or on legislated changes with quality control and enforcement.
- Individual-based hypertension treatment and health education is cost-effective, especially if it targets people with higher levels of blood pressure (systolic blood pressure above

160 mmHg)[23]. However, as there is a continuous relationship between cardiovascular risk and blood pressure, blood lipids and blood sugar, the report does not recommend an approach based on individual treatment of high blood pressure alone (single risk factor approach), but that a comprehensive risk approach should be taken. In 2002, WHO produced a comprehensive CVD-risk management package for low- and medium-resource settings.[24] More recently, WHO released CVD prevention guidelines enabling a total risk approach, which is feasible and cost-effective, even in low-resource settings.[25]

- Strategies to reduce cholesterol levels, whether through population-wide health education or through individual approaches that provide statins to people with cholesterol above 6.2 mmol/l, were deemed very cost-effective in all regions.[26,27]
- Measures focused on the early detection and management of diabetes.

The WHO STEPwise approach to Chronic Disease Risk Factor Surveillance

Cardiovascular disease prevention programmes can be integrated with others that share common risk factors, such as diabetes, cancer and chronic respiratory disease. This can be organized in a **WHO STEPwise approach to Chronic Disease Risk Factor Surveillance** (STEPS) fashion,[28] which implies that programmes would be evidence-based and devised in a manner that is responsive to resources and other constraints in the country.

Using STEPS for intervention was first explored in the Pacific countries and areas; and the following table from *The world health report 2003 – shaping the future*[29] illustrates an example of such a comprehensive, population-based, integrated STEPS package.

Table 8.4 was adapted from the proceedings of the Meeting of Ministers of Health for the Pacific Island Countries in Nukualofa, Tonga, between 9 and 13 March 2003. As WHO moves to develop a core package of interventions on NCD for publication in the near future, this table is reproduced for historical purposes and to illustrate the contribution made by countries in the Asia Pacific Region to global approaches in CVD and NCD control.

Planning, policies and programmes

Planning for CVD has been integrated with other aspects of NCD prevention and control covered in this publication (tobacco page 313, diabetes page 302, rheumatic heart disease page 293 and nutrition page 363). This section focuses on how to better understand the overall approach to the epidemic, with selected examples of work being done.

As a result of country requests, high-level resolutions were adopted by WHO regional committees,[30,31] for the development of global and regional frameworks for prevention and control of NCDs. Many countries in the Region now have national NCD plans. Additionally, training in capacity building for policy-makers and programme managers from health and other sectors has been undertaken, facilitated by WHO.

The Tonga National NCD Plan 2003–2004 was the first STEPS plan developed, with the collaboration of the Australian Agency for International Development and the Secretariat of the Pacific Community. Viet Nam's national NCD plan was the first of the Region's developing countries to receive endorsement at the highest level of government. Indonesia and Thailand have framed national integrated NCD policies and strategies, and India launched the National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases and Stroke in late 2006.

Table 8.4 STEPS approaches for the prevention and control of noncommunicable diseases

Resource Level	Population approaches		Individual high-risk approach
	National level	Community level	
Step 1: Core	WHO Framework Convention on Tobacco Control (FCTC) is ratified in the country. Tobacco control legislation consistent with the elements of the FCTC is enacted and enforced. A national nutrition and physical activity policy consistent with the Global Strategy is developed and endorsed at cabinet level; sustained multisectoral action is evident to reduce fat intake, reduce salt (with attention to iodized salt where appropriate); and promote fruit and vegetable consumption. Health impact assessment of public policy is carried out (i.e. transport, urban planning, taxation, and pollution).	Local infrastructure plans include the provision and maintenance of accessible and safe sites for physical activity (such as parks and pedestrian-only areas). Health-promoting community projects include participatory actions to cope with the environmental factors that predispose to risk of noncommunicable diseases, such as inactivity, unhealthy diet, tobacco and alcohol use. Active health promotion programmes focusing on noncommunicable diseases are implemented in settings such as villages, schools and workplaces.	Context-specific management guidelines for noncommunicable diseases have been adopted and are used at all health-care levels. A sustainable, accessible and affordable supply of appropriate medication is assured for priority noncommunicable diseases. A system exists for the consistent, high-quality application of clinical guidelines and for the clinical audit of services offered. A system for recall of patients with diabetes and hypertension is in operation.
Step 2: Expanded	Tobacco legislation provides for incremental increases of tax on tobacco, and a proportion of the revenue is earmarked for health promotion. Food standards legislation is enacted and enforced, and includes nutrition labelling. Sustained, well-designed national programmes (counter-advertising) are in place to promote non-smoking lifestyles.	Sustained, well-designed programmes are in place to promote: • Tobacco-free lifestyles, e.g. smoke-free public places and smoke-free sports; • Healthy diets, e.g. low-cost, low-fat goods, fresh fruit and vegetables; • Physical activity, e.g. "movement" in different domains (occupational and leisure).	Systems are in place for selective and targeted prevention aimed at high-risk populations, based on absolute levels of risk.
Step 3: Optimal	Country standards are established that regulate marketing of unhealthy food to children. Capacity for health research is built within countries by encouraging studies on noncommunicable diseases.	Recreational and fitness centres are available for community use.	Opportunistic screening, case-finding and management programmes are implemented. Support groups are fostered for tobacco cessation and overweight reduction. Appropriate diagnostic and therapeutic interventions are implemented.

Source: *The world health report 2003: shaping the future*. Geneva, World Health Organization, 2003.

Monitoring and surveillance

The STEPS approach covers the essential risk factors for CVD,[32] and has been adopted as the standard across the Asia Pacific Region. The last five years have seen STEPS surveys in 15 Pacific island countries and/or STEPS-compatible surveys in China, Bangladesh, the Democratic People's Republic of Korea, India, Indonesia, Malaysia, Maldives, Mongolia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand and Viet Nam.

This has created an invaluable and unique resource of comparable data sets on CVD and NCD risk factors. They are currently in use in their countries of origin but efforts are being made to develop policy mechanisms to permit a wider sharing of data. In South-East Asia, WHO has made progress with the creation of an InfoBase consisting of data from STEPS and other surveys, becoming a unified resource for researchers and policy-makers interested in comparable data on NCD.

Community-based initiatives for health promotion

In the Asia Pacific Region there has been an effort to foster community demonstration projects, with most countries now able to report some action at the community level. These projects have had a number of notable successes:

- In Cambodia, Mongolia and Viet Nam, NCD projects have attracted substantial external funding and diabetes initiatives are spreading as a result.
- In the Philippines, projects among the Pateros and Guimaras communities were used as the testing ground for a range of initiatives, which included the development of training materials for primary care workers across the country, and contributed to the development of national standards for primary care centres of wellness.
- Community-based interventions for prevention of NCD were implemented with WHO support in Bangladesh, India, Indonesia and Sri Lanka. These projects furnished evidence on the feasibility and appropriateness of applying community-based approaches for integrated prevention and control of NCD in developing countries. A project in Depok, near Jakarta, Indonesia, has gained considerable recognition and paved the way to initiate further subnational interventions in Indonesia.

Clinical prevention guidelines

Through the work of ministries of health in many countries of the Region, and extensive technical support from WHO, there are now evidence-based guidelines (usually in national languages) for the control of elevated blood pressure and diabetes. This is only a first step. For both elevated blood pressure and diabetes, there is a need to achieve good, lifelong control in order to reduce CVD complications. Where evidence exists, for example in Cook Islands, India, Mongolia, Nepal and Viet Nam, the level of clinical control of these conditions in primary care is poor. This is likely to be the general case in developing countries of the Region and experiences point to a number of urgent health systems developments that are still needed:

- **Guidelines are only documents.** Guidelines need intensive support for implementation, including their incorporation into undergraduate and in-service training, and in quality assurance and incentive mechanisms. These are still rare in the Region.
- **Health systems are generally private**. Insurance schemes, where present, only sporadically cover CVD and NCD, and the burden usually falls on patients to buy lifelong treatment.

- **There is insufficient investment in patient education and information**. Chronic diseases are best managed in a self-care setting and health-illiterate patients are less effective in self-care.
- **Chronic diseases are handled in separate vertical programmes**. While this is logical for all chronic diseases, for instance HIV/AIDS, tuberculosis, cancer and CVD, in reality decisions are made based on the availability of funds and the priorities of donors rather than the burden of disease or community needs. Thus, individual vertical projects have evolved that have resulted in fragmented care, rather than a wider, integrated health systems approach.

Network development

Networks are needed in the area of NCD prevention and control in order to foster communities of practice among policy-makers with a responsibility for these diseases. The Region has developed networks of managers involved in the area of NCD prevention and control.

The South-East Asia Network for NCD Prevention and Control (SEANET-NCD) has developed its charter and plan of action at its regional meeting hosted by the Ministry of Health, Maldives, in November 2005. The network plays an important role as a forum for promoting intercountry collaboration in adopting an integrated approach to NCD control. It contributes to dissemination of information and the exchange of expertise, and facilitates multisectoral, multidisciplinary and multilevel collaboration.

In the Western Pacific, a network has been operating since 2000 under the Western Pacific Declaration on Diabetes (WPDD). Diabetes is a disease in its own right, but it is also a major risk factor for CVD, and the work of WPDD is a direct contribution to CVD prevention and control. The work of WPDD is further described on page 307. An informal network based on an electronic mailing list under the name of Mobilization Of Allies in NCD Action (MOANA) has been operating since April 2006 and serves as a source of news and updates for members.

Apart from the regional networks, similar networks are encouraged at the national level as a vehicle for information dissemination and for joint advocacy. An example of excellence exists in the Philippines, where a coalition of more than 40 governmental and nongovernmental agencies have come together and, at the time of writing, are nearing the end of their third year of active collaboration.

Diabetes mellitus

Diabetes is a group of heterogeneous disorders characterized by hyperglycemia (high blood sugar level) due to insulin deficiency, impaired effectiveness of insulin action, or both. Diabetes can lead to serious complications, such as cardiovascular disease, stroke, blindness, renal failure, foot ulceration and sensory neuropathy. Women with gestational diabetes (GDM) and children of GDM pregnancies are at increased risk of developing diabetes and heart disease later in life.

Type 1 diabetes, Type 2 diabetes and GDM are of major public health importance. Type 1 diabetes is most frequently first diagnosed in children and young adults and often has an autoimmune basis. In most countries of the Asia Pacific Region, Type 1 diabetes accounts for less than 5% of diabetes cases, except in Australia and New Zealand, where the figure is 10%–15%. Type 2 diabetes typically occurs in adults, but is increasingly affecting all ages, including children. Type 2 diabetes accounts for approximately 85%–95% of all diabetes cases in the Region.[33] The highest prevalence is noted in Pacific island countries and areas. This is due to rapid changes from traditional to more affluent lifestyles. Gestational diabetes refers to glucose intolerance diagnosed for the first time during pregnancy.

There is currently little information available about modifiable risk factors for the development of Type 1 diabetes. Type 2 diabetes is strongly associated with modifiable behavioural risk factors such as overweight and obesity, abdominal obesity, physical inactivity, maternal diabetes, total fat intake, some saturated and trans fats intakes, and intrauterine growth retardation. Obesity doubles the risk of Type 2 diabetes.

Prevalence and mortality

In 2007 it was estimated that nearly 113 million people in the Region, or about 5.1% of the adult population, have diabetes, and an additional 157 million adults (7.0%) have impaired glucose tolerance (IGT).[34] Figure 8.6 shows the 2007 prevalence estimates of diabetes and IGT by country. Estimates in 2000 showed that there were 2.9 million deaths worldwide directly due to diabetes, of which 51%, or 1.5 million deaths, were in the Asia Pacific Region. Worldwide, there were an additional 4.6 million people with diabetes who died from other causes such as CVD. Therefore, annual mortality attributable to diabetes in the Region could be over of two million.[35,36]

The prevalence figures shown are a substantial increase on previous years; and although detection, diagnostic and surveillance techniques have improved, the incidence of diabetes in almost all countries is increasing, following a general trend worldwide. Of the 44 countries listed, 30 have a significant diabetes prevalence of 5% and higher. As could be expected, the general trend in IGT prevalence is much higher than that of diabetes. Only seven countries have an IGT prevalence of less that 5%. If left unmanaged, there is a strong possibility that IGT will develop into diabetes.[37]

What can be done: noncommunicable diseases programmes

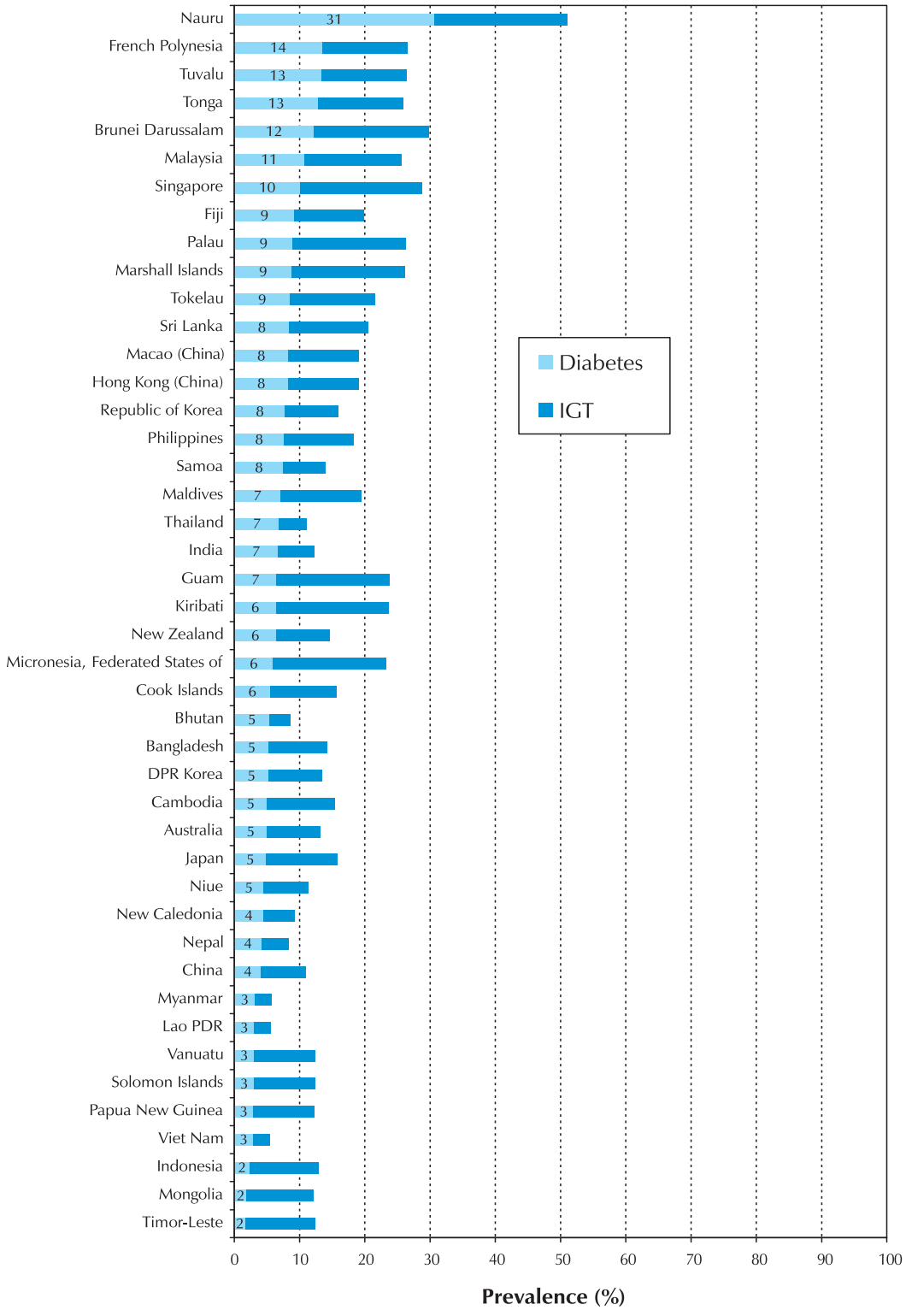
Diabetes contributes greatly to other noncommunicable diseases and is part of the metabolic syndrome, which is typically a set of risk factors that include: abdominal obesity, a decreased ability to process glucose (diabetes, IGT, insulin resistance), dyslipidemia (unhealthy blood lipid levels), and hypertension. These components of metabolic syndrome are intermediate risk factors for developing CVD. Many of the common risk factors for diabetes are the same as those for CVD, as explained in Figure 8.7.

The control of underlying and intermediate risk factors will reduce the incidence of chronic diseases. Therefore, comprehensive NCD programmes that include action on diabetes have been developed with WHO support in many countries of the Region. This response to the NCD epidemic is outlined in a framework based on four action areas: national planning, surveillance, healthy lifestyles and environments, and clinical preventive services.

National planning

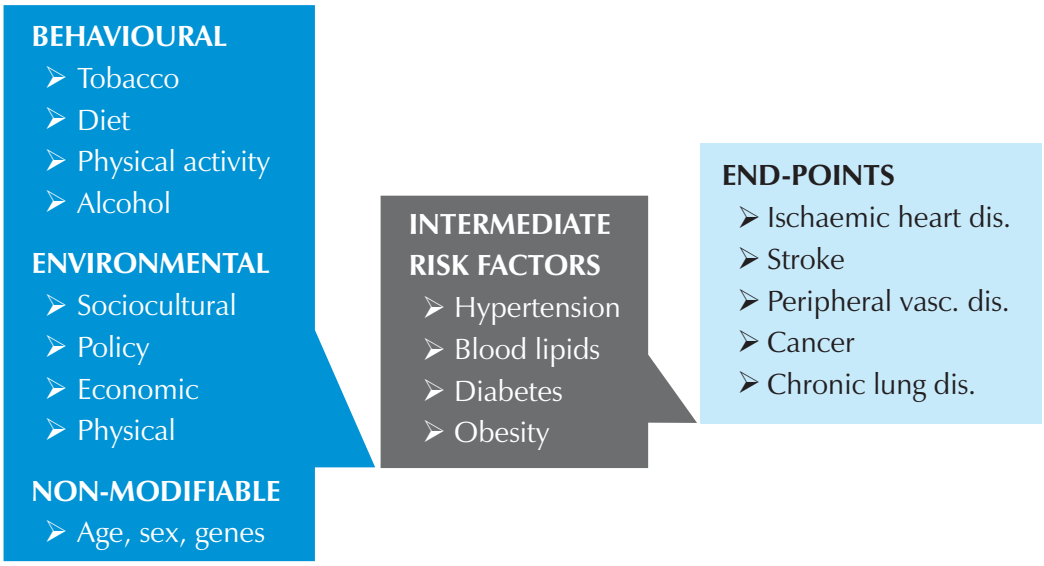
High-level policy interventions are needed to promote intersectoral collaborations to create an environment that is conducive to the development of healthy lifestyles through informed choices. WHO supports and encourages all countries in the Region in making comprehensive national NCD policies and plans. As a result, integrated NCD policies and plans have been developed in most countries, together with specific policies on tobacco, nutrition, physical activity, alcohol, hypertension, diabetes and cancer.

Fig. 8.6 Prevalence estimates of diabetes and impaired glucose tolerance in the Asia Pacific Region, 2007



Source: *Diabetes atlas*. 3rd ed. Brussels, International Diabetes Federation, 2006.

Fig. 8.7 Critical pathways in the causation of chronic disease



Source: *Preventing chronic diseases: a vital investment: WHO global report*. Geneva, World Health Organization, 2005.

The creation of health promotion foundations for funding NCD prevention and control activities is well underway. Several countries including Australia, Fiji, India, Malaysia, New Zealand, Thailand and Tonga have passed legislation to enable the establishment of health promotion foundations. Elsewhere in the world, health promotion foundations are involved in a wide range of activities funded from the taxes imposed on items such as alcohol and tobacco. They also use strategies such as social marketing, provision of health information and education, and the creation of environments and settings that are supportive of health.

Surveillance

The WHO Stepwise approach to Risk Factor Surveillance (STEPS) framework for NCD intervention has been accepted as the regional standard, and STEPS surveys have been undertaken, or are being undertaken, in 30 countries in the Region. American Samoa, China, Cook Islands, Fiji, India, Indonesia, Malaysia, the Marshall Islands, Mongolia, Nauru, Nepal, the Philippines, Samoa, Sri Lanka, Thailand, Tokelau, Vanuatu and Viet Nam have undertaken STEPS surveys and have published reports. STEPS surveillance technical meetings have been conducted in most of these countries to support them in analysing the results of STEPS survey information.

The results have provided baselines on NCD and risk factor prevalence and identified priorities for intervention programmes. In most of these countries, STEPS has been incorporated into the routine health information system and will provide future data on trends and programme effectiveness.

Healthy lifestyles and environments

Many countries in the Region have developed demonstration activities in community-based prevention. These include:

- Integrated community-based NCD prevention projects in Bangladesh, India and Indonesia.
- Childhood obesity reduction through health-promoting schools in China.
- Diabetes control in Cook Islands.
- Development of a physical activity campaign in Mongolia.
- Diabetes prevention in two provinces in Viet Nam.
- Community projects on diet and physical activity in several Pacific island countries.

Guidelines for the monitoring of community-based interventions have been produced to facilitate implementation of these projects.

Working in informal networks has been a tradition over the past years for NCD managers in the Region. Exchange of knowledge and information is passed across the Region in this way. Maintenance of networks is managed by regional organizations. Formalization of such networks can develop into partnerships and coalitions that serve as effective mechanisms in NCD prevention and control. The Philippine Coalition for the Prevention and Control of NCD and the developing Asia Pacific Physical Activity Network are examples. In 2005 the South-East Asia Network for NCD Prevention and Control was initiated with WHO support.

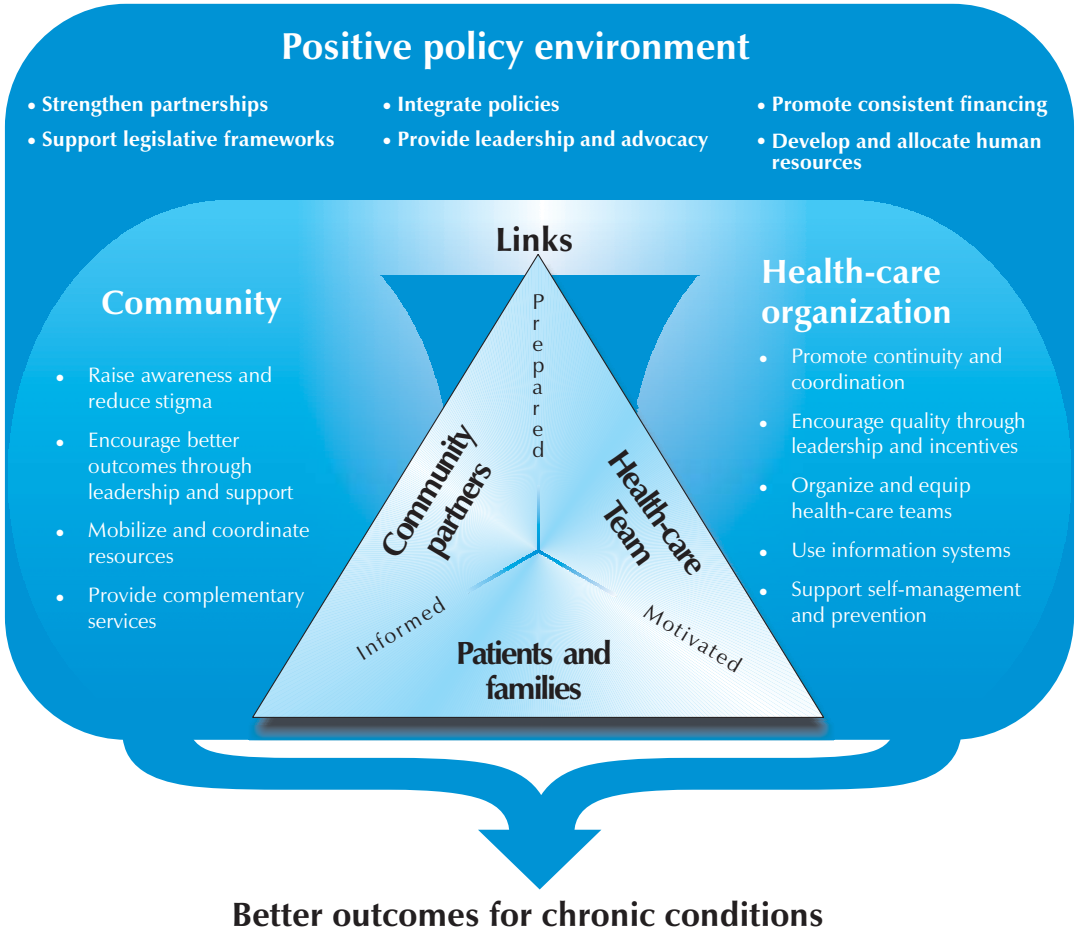
Clinical preventive services

In populations with established disease, improved control of blood glucose, blood lipids and blood pressure, and use of appropriate treatment such as rennin-angiotensin system (RAS) blockers are associated with marked reduction in morbidity and mortality due to cardiovascular and renal diseases. Furthermore, the use of a multidisciplinary team with particular emphasis on patient empowerment, treatment to target, and periodic assessments can lead to a 50%–70% reduction in mortality, cardiovascular and renal events.[38]

Although the availability of diabetes education and care programmes will depend both on resources available and current health-care infrastructure, given the highly preventable nature of complications and the cost-effectiveness of many of these interventions it is suggested that all health-care systems, across a wide range of resource levels, should be able to provide the medication, preventive care and counselling to every patient, and educate health-care providers about the importance of these prevention and intervention strategies.

WHO's Innovative Care for Chronic Conditions (ICCC) Framework (Figure 8.8) outlines the importance of integrating multiple components for patient and family (micro), health-care organizations and community (meso), as well as policy and financing (macro) to make high-quality chronic care possible. This comprehensive system aims to avoid fragmentation of care and emphasizes the need to create a system which works across the disease continuum, spanning health promotion, disease prevention, treatment and rehabilitation. Clinical management and care guidelines have been developed in many countries.

Fig. 8.8 Innovative care for chronic conditions framework



Source: *The Innovative Care for Chronic Conditions Framework*. Geneva, World Health Organization. Available from: http://www.who.int/diabetesactiononline/about/ICCC/en/index.html

Specific activities on diabetes prevention and control in the Region

There are marked differences between the Asia Pacific Region and more developed regions such as North America and Western Europe. Therefore, there is clearly a need to identify Regional and country specific solutions for coping with the diabetes epidemic. In 2000, the Western Pacific Declaration on Diabetes (WPDD) was developed in partnership with the International Diabetes Federation and the Secretariat of the Pacific Community. The WPDD Action Plan 2000–2005, and more recently the WPDD Action Plan 2005–2010, is a strategic approach to deal with the diabetes epidemic in the Region.

A primary focus of the WPDD lies in its support of educational programmes and conferences to increase regional awareness of diabetes as a priority health issue. These include the Diabetes Leadership Workshop, 3rd Asia Pacific Epidemiology Course, and the 3rd World Congress on Prevention of Diabetes and its Complications. Through these meetings and workshops, the WPDD has trained and communicated with a large number of doctors, nurses, epidemiologists and related health-care workers

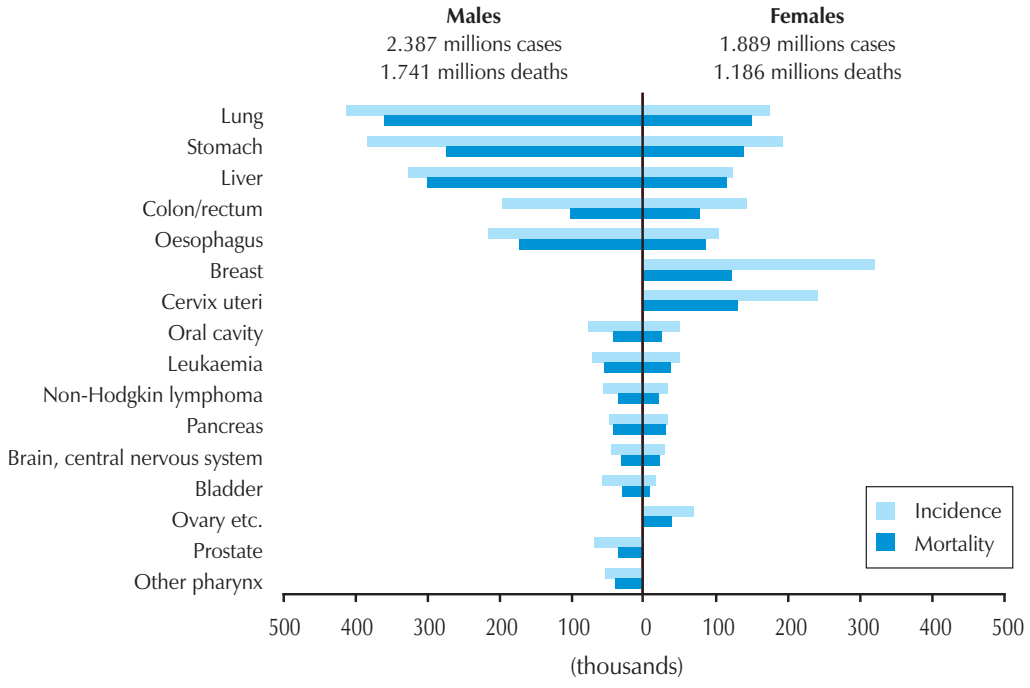
regarding the magnitude of diabetes as a public health problem, and the principles of conducting research and developing education and care programmes in diabetes. Many of these participants have become champions and leaders in their own countries or areas by documenting facts and figures about diabetes, initiating pilot clinical prevention programmes, and lobbying for government support to set up national plans for the prevention of diabetes and its complications.

The WPDD Action Plan strategies have been instrumental in stimulating and supporting Cambodia, China, Cook Islands, Fiji, India, Malaysia, the Marshall Islands, the Federated States of Micronesia, Mongolia, the Philippines, Samoa, Tonga and Viet Nam to set up diabetes prevention and control activities. In India, studies show that lifestyle modification or use of metformin is effective in preventing diabetes in people with persistent IGT.

Cancer

A leading cause of death worldwide, cancer is a generic term for a group of more than 100 diseases which can affect any part of the body, with lung, breast, colorectal, stomach and liver cancers being the most common. The disease occurs through a pathological breakdown of the processes which control the proliferation, differentiation and death of cells. Malignant cells which form a tumour most frequently arise from the epithelial tissue and are known as carcinoma. More than 70% of all cancer deaths occur in low- and middle-income countries; however, it must be kept in mind that these same countries have a similarly large proportion of the world's population.[39] Cancer accounts for 13% of all deaths in the Asia Pacific Region with demographic, socioeconomic and other characteristics producing a wide variance in rates between individual countries.[40] It is estimated that in 2000 there were 4.3 million cases and 2.9 million deaths from cancer in the Region, with lung cancer the most common.[41] Cancer incidence and mortality is shown in Figure 8.9.

Fig. 8.9 Cancer incidence and mortality by sex and site of cancer in the Asia Pacific Region, 2000



Source: Ferlay J, *et al. GLOBOCAN 2002: Cancer incidence, mortality and prevalence worldwide*. Lyon, IARC Press, 2004 (IARC CancerBase No: 5. version 2.0).

Major types of cancer

The age-standardized incidence of lung cancer in males per 100 000 population ranges from 53 in Korea and 42 in China to less than 10 in India and Sri Lanka.[42] Tobacco smoking causes a wide range of cardiovascular and respiratory diseases, including cancer of the lungs and other organs. If strong anti-tobacco measures within the WHO Framework Convention on Tobacco Control are not properly implemented, it is anticipated that lung cancer rates will continue to rise. Prevention is critical as therapy for lung cancer is irrelevant and early detection is not useful.

Stomach cancer is another common cancer in the Asia Pacific Region, largely caused by *Helicobacter pylori* infection. The path of transmission of *Helicobacter* infection is still unclear. High consumption of salt and salted, smoked, pickled and preserved food is another cause, but the introduction of refrigerators in Japan reduced the use of traditional preservatives and thereby rates of stomach cancer. The prevalence of stomach cancer in China is likewise dropping due to better methods of food preservation. Preventive measures include improving the quality of food and lowering salt intake. Stomach cancer rates range from less than 70 per 100 000 in China, Japan and South-East Asia to less than 6 per 100 000 in India and Sri Lanka.[43] In these countries, the disease carries a very high mortality due to lack of access to early diagnosis.

Liver cancer is the third major cancer in the Asia Pacific Region, with approximately 470 000 people affected annually. The age-standardized incidence rate per 100 000 people for liver cancer ranges from 100 to less than 15. More than two thirds of liver cancer cases occur in men. Since it is invariably lethal, the number of deaths due to this cancer is as high as the incidence. While liver cancer is predominantly caused by hepatitis B infection, in countries such as Japan hepatitis C infection is a significant cause. The incidence of liver cancer is likely to drop over the next 20 years through higher immunization coverage for hepatitis B, and when the vaccine eventually becomes available it should drop for hepatitis C. Most of the middle-income countries and some least-developed ones in the Region have included immunization against hepatitis B as part of WHO's Expanded Programme on Immunization (EPI). It must be kept in mind that because immunization is carried out in childhood, for routine immunization against hepatitis B to show an impact on the incidence of cancer of the liver it would be necessary to wait for the immunized cohort to reach the age when cancer of the liver manifests itself. Even in countries where there is low endemicity of hepatitis, chronic alcoholism predisposes heavy drinkers to liver cancer. Aflatoxins in food also enhance the risk of liver cancer.

Breast cancer is the most common cancer among women in the Asia Pacific Region. In a few countries in the Region it is second only to cancer of the uterine cervix. Age-standardized rates range from 92 per 100 000 in New Zealand to less than 20 per 100 000 in China and India.[44] Breast cancer is intimately related to a high-calorie diet, lack of exercise and reproductive factors. Early detection through proper screening and improvements in therapy have reduced mortality. Unfortunately, early detection and therapy are inaccessible to large segments of the population in the Region.

Cancer of the uterine cervix is another major disease affecting women and is caused by sexually transmitted *Human papillomavirus* (HPV) infection. It is also associated with socioeconomic conditions. While the age-standardized incidence in India is above 30 per 100 000 population, it is less than 10 per 100 000 in China and Australia.[45] Rates are dropping in India due to improved socioeconomic conditions.[46] Further improvement requires the introduction of an active screening programme, such as the cytological Pap test or visual inspection with acetic acid (VIA). Survival can be improved considerably by early detection linked with radiotherapy treatment, but developing countries lack the financial resources to carry out such a cytological screening programme. Alternative methods more suitable for low-resource countries, such as VIA followed by cryotherapy, are under investigation.

Cancer of the oral cavity caused by chewing tobacco ranks among the three most common types of cancer in south-central Asia.[47] Tobacco is chewed alone or with lime, betel leaf, betel nut and other compounds as a combination called *paan*, a local combination used with or without tobacco now being replaced largely by pre-packed *pan masala* granules. Both *paan* and *paan masala*, especially when they contain tobacco, can lead to corrosion of the oral mucosa, leukoplakia or submucus fibrosis, and eventually, cancer. Legislation on tobacco in many countries has been silent on use and sale of these products. Countries with the greatest burden of oral cancer in men are Papua New Guinea, Solomon Islands and Sri Lanka.

The data as presented above serve to highlight the fact that the distribution of types and sites of cancer vary greatly from country to country. This difference has also been demonstrated in different parts of the same country. India has generated good data on the distribution of types of cancer by its network of cancer hospital and community-based registries and shows a very marked difference in the type of cancer found in different states. Such data have value in planning education and awareness programmes specific and relevant to the local situation.

Risk factors for cancer

Tobacco use remains the major preventable risk factor for cancer. In other parts of the world, active and passive tobacco smoking is the main cancer risk, but in the Asia Pacific Region the widespread use of chewing forms of tobacco is a leading cause of oral cancer. In parts of China and South-East Asia, and especially in north-west India, Indonesia, Malaysia and Singapore, there are high rates of nasopharyngeal cancer, with the main causal factors being smoking and alcohol.[48,49]

The Region bears a heavy burden of cancer due to various acute and chronic infections. This includes endemic liver cancer due to hepatitis B and C. There is a very high incidence of stomach cancer in China, Japan, Mongolia and the Republic of Korea largely due to *Helicobacter pylori* infection.[50] In South Asia, cancer of the uterine cervix due to HPV infection is prevalent.

Two other major risk factors alcohol and improper diet—are of importance in the Region. Heavy alcohol consumption is a major risk factor for cancers of the oral cavity, larynx, pharynx, oesophagus, liver and breast. It is estimated that alcohol consumption results in 5% of attributable cancer deaths in low- and middle-income countries.[51] Diet-related cancers, such as breast, colon and cancer of the prostate, have shown only a mild increase during the last decade.

Strategies for cancer control

Approximately 40% of cancers could be avoided through primary prevention by avoiding or reducing risk, and one third could be cured if diagnosed early.[52] Those with incurable cancers should receive appropriate palliative care, but there are several constraints to achieving these goals. Effective cancer control requires a comprehensive national cancer control policy and programme with adequate resource allocation, development of diagnostic and therapeutic capacity, and good resource utilization in palliative care. High levels of female illiteracy, gender discrimination and other forms of socioeconomic inequalities, as well as poor enforcement of tobacco, alcohol and other food and drug legislation hinders the efforts of cancer control programmes in many countries in the Asia Pacific Region.

The WHO Strategy for Prevention and Control of Cancer aims to reduce the cancer burden and risk factors and improve the quality of life of patients and their families. In 2005, the 58th World Health Assembly adopted Resolution WHA58.22 on cancer prevention and control, which calls for the reinforcement of national cancer prevention and control programmes and integrating them with

health systems, strengthening information systems (like cancer registries), and ensuring the availability of opiate analgesics. Table 8.5 compiles the information on major strategies available for prevention and control of eight common cancers occurring in the Asia Pacific Region.

Cancer registries, either hospital- or community-based, such as those set up in India, serve an important preventive role as they provide information about the area-specific prevalence of different types and locations of cancer. This knowledge is important not only for advocacy but can also ideally be used to develop evidence-based intervention programmes.

Table 8.5 Assessment of strategies for eight common cancers

Site of cancer	Prevention		Early detection		Curative therapy		Palliative care	
	Effectiveness	Cost	Effectiveness	Cost	Effectiveness	Cost	Effectiveness	Cost
Mouth/pharynx	++	$	-	$$	+	$$	++	$
Oesophagus	+	$	-		-		++	$
Stomach	++	$	+	$$	-		++	$
Colon/rectum	++	$	+	$$	+	$$	++	$
Liver	++	$	-		-		++	$
Lung	++	$	-		-		++	$
Breast	+	$	++	$	++	$	++	$
Cervix	+	$	++	$	++	$	++	$

++ Effective; + partly effective; - largely ineffective

$ Less expensive; $$ more expensive

Source: *National cancer control programmes: policies and managerial guidelines*. 2nd ed. Geneva, World Health Organization, 2002.

Primary prevention

Childhood immunization against hepatitis B is the most cost-effective strategy to prevent adult mortality from liver cancer. Several vaccines have been developed for cervical cancer caused by HPV. The safety profiles of these vaccines are very good and the immunity produced has been found to be satisfactory in prevention of the disease. Broad introduction of HPV vaccine, especially in low-resource settings, is hindered by its high cost and other challenges in implementing vaccination programmes.

Tobacco use, a common cause of cancer in the Region, accounts for 18% of disability-adjusted life years lost.[53] Two forms of tobacco use, chewing and smoking, are highly prevalent in the Region and each cause cancer in different parts of the body. While cigarette smoking is prevalent in China and many South-East Asian countries, chewing tobacco is predominant in Central and South Asia. Oral tobacco use is also associated with cancer of the oral cavity, whereas smoking tobacco causes cancer of the lung, larynx, pancreas, stomach, bladder and cervix. The long-term strategy for control of tobacco-related cancer involves education, advocacy, and legislative and fiscal measures.

Colorectal cancer is another cancer in which primary prevention is feasible through improvement in diet and related lifestyle modifications. The risk for colorectal cancer can be reduced by limiting meat consumption and increasing intake of vegetables and fruits. The major difficulty in shifting to a healthy diet is the rising cost and inadequate availability of vegetables and fruits. This shortage could be mitigated by better horticultural and marketing practices. Lack of physical activity is another risk

factor for colorectal cancer. With socioeconomic advancement, there is a tendency to refrigerate food in middle- and upper-class households. This may reduce stomach cancer rates attributed to salted, pickled and preserved food. A joint programme for control of chronic diseases aimed at lowering salt consumption can reduce hypertension as well as stomach cancer.

Early detection of common cancers

For many cancers such as those of the lung, oesophagus, stomach and liver, early detection is of no significant value. Three types in which early detection has proven value are oral cavity, breast and cervical cancers. Only in the case of oral cancer has a feasible and cost-effective screening strategy been developed. The adoption of this strategy could prevent at least 37 000 deaths worldwide every year.[54]

Mammography is the gold standard for early detection of breast cancer. It can reduce mortality by up to one third among women age 50–69.[55] But mammography is a high-cost, technology-intensive screening procedure beyond the reach of most developing countries. Monthly self-examination of the breast and periodic breast examination by trained technical personnel have demonstrated a marginal improvement in survival rates. Even though such screening may not yield detection rates as high as mammography, it can certainly lead to earlier detection and thereby provide a better chance of a cure.

Cytology-based screening and treatment programmes have reduced cervical cancer incidence and mortality by as much as 80% in North America and the Nordic countries of Europe.[56] Broad implementation of this approach in the Asia Pacific Region is hindered by financial constraints and inadequate health infrastructure and outreach. Alternate strategies like visual inspection with acetic acid are being proposed. To implement such a programme on a national scale, the investment in basic health infrastructure, including human resources and facilities, is considerable, as a substantial proportion of women may require further coloscopy, biopsy, Pap smear, cryosurgery or close follow-up for which the services of pathologists, gynaecologists and health workers are essential.

Early detection of colorectal cancer, which is predominant in East Asia, is a formidable challenge. Even though primary prevention would be the long-term goal, early detection and therapy should be considered as an appropriate approach, since many countries have adequate resources and good health system infrastructure. Colonoscopy is the preferred method of early detection of colorectal cancer. As colonoscopy is impractical for screening of asymptomatic individuals, it should be restricted to a subpopulation of people over age 50, identified through a risk-factor questionnaire. Screening with faecal occult blood test, which is more acceptable, requires further evaluation in settings where it is proposed for use.

Early diagnosis in symptomatic populations depends upon raising awareness of early warning signs and symptoms of various types of cancer, and motivating people to seek early examination, investigation and treatment. This approach is particularly successful when used to detect mouth, cervix and breast cancer, which contribute to 50% of the cancer burden.

Therapy for cancer

Among the major cancers occurring in the Asia Pacific Region, early treatment is of value in cancers of the head and neck, colon and rectum, breast, and cervix. There are several other tumours where early treatment results are excellent, such as childhood cancer and germ cell tumours. The predominant forms of cancer treatment are surgery, radiation and chemotherapy. The type of cancers which are

curable, with their approximate load in India and modality of treatment, are given in Table 8.6. Palliative care should be extended to people with advanced stages of cancer that cannot be treated by presently available modalities.

The major difficulty in the management of cancer in the Region is the inaccessibility of treatment and care due to geographical and financial constraints. Countries such as Bangladesh, Bhutan and Timor-Leste have very little access to either radiotherapy or other modern cancer treatment services. Specialists are few and tend to be located in metropolitan areas. In the absence of appropriate financial mechanisms and protection, out-of-pocket payments for the treatment of cancer can devastate families and individuals. The cost of installation and maintenance of equipment stands in the way of equitable radiotherapy service. The recent manufacture in India of new cobalt units under US$ 200 000, is expected to help fill this gap. The Chinese linear accelerator programme already provides access to radiotherapy for many people. The introduction of Indian and Chinese generic drugs has improved the affordability of cancer chemotherapy in the Region.

Table 8.6 Curable cancers for which treatment is justifiable, India

Cancer	Load %	Primary modality
Childhood cancer	5	CT/S/RT
Breast	20	S/RT/CT/HT
Cervix	18	RT/S
Oral	11	RT/S
Gestational trophoblastic disease	1	CT
Germ cell tumours	3	CT/S
Colon	7	S/CT
Osteosarcoma	2	CT/S
Soft tissue sarcomas	2	S/RT
Central nervous system	2	S/RT
Total	71	

CT- chemotherapy, S – surgery, RT – radiotherapy, HT – hormone therapy

Source: Nair MK, Varghese C, Swaminathan R. Cancer: *current scenario, intervention strategies and projections for 2015*. In: *Burden of disease in India*. New Delhi, National Commission on Macroeconomics and Health, 2005 (Background papers): 219.

8.2 Chronic noncommunicable diseases and the WHO Framework Convention on Tobacco Control

The tobacco epidemic

Chronic noncommunicable diseases accounted for almost 60% of global deaths and 47% of the global burden of disease in 2005.[57,58] The global tobacco epidemic is the second major cause of all deaths from NCD, and the fourth most common risk factor for disease worldwide; and is responsible for almost five million deaths in 2006, mostly in low- and middle- income countries. If current smoking

patterns continue, almost 10 million deaths will result annually by 2025.[59] Half of the 650 million who smoke today will eventually be killed by their habit. In the Asia Pacific Region alone, about 6000 people a day die prematurely from tobacco-use related diseases, a death toll of 2.3 million annually. In addition, millions of nonsmoking adults and children in the Region are exposed to tobacco smoke pollution (also known as second-hand smoke and environmental tobacco smoke), which causes death, disease and disability.[60]

The economic costs of tobacco use are equally devastating. In addition to the high public health costs of treatment, tobacco-caused diseases kill people at the height of their productivity, depriving families of breadwinners and nations of a healthy workforce. Globalization of the tobacco epidemic has been instigated by the tobacco industry which targets youth and disadvantaged groups and takes advantage of weak control measures and a lack of public awareness of the dangers of tobacco use, especially in developing countries.

Tobacco use patterns

Compared with other regions the Asia Pacific Region has the greatest number of smokers, estimated at 661.6 million; the highest rates of male smoking prevalence and the fastest increase in tobacco use by women and young people. In most countries, tobacco use is more prevalent among the poor and disadvantaged segments of the population.

While cigarette smoking predominates, a variety of tobacco products are consumed in the Region. Tobacco is chewed, sucked, sniffed and gargled using *zarda, khaini, betel leaf, gutkha, gul, mawa*, *betel quid* and *mishri*. There are specific indigenous smoking products such as *bidis and hukkas/hookahs* (hubble bubble) in India and Bangladesh, *kreteks* in Indonesia, and cheroots and bamboo waterpipes in Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam, and betel nut chewed with tobacco in many Micronesian countries as well as Papua New Guinea and Palau. In some countries, various tobacco products are combined or have supplanted other forms of tobacco use. For example, in India there has been an overall reduction in the use of *bidis* and cigarettes but an increase in smokeless tobacco use in rural areas**.** There is also use of *shisha* waterpipes (also known as *hookahs*, *bhangs* or *nargiles*) in nightclubs and restaurants in Brunei Darussalam, India, Malaysia and Thailand.[61,62]

Smoking prevalence has decreased in the past decade in developed countries such as Australia, Japan, New Zealand and the Republic of Korea. In less than five years cigarette smoking among Korean men dropped from 61.8% to 52.8%, one of the most significant declines worldwide.[63] Tobacco prevalence is still very high among men in the Region (up to 45% in some areas), with smoking rates as high as 60%–70%. Smoking is increasing in developing countries, and among young women and youth in some countries. Tobacco use among women is as low as 3%–4% in the Region, but there are several notable exceptions. For example, 50.8% of women in Nauru smoke tobacco daily.[64] In many other Pacific island countries the majority of women smoke or use other tobacco products. Tobacco use, especially smoking among young women, appears to be increasing in many countries including China, Malaysia, the Republic of Korea and many Pacific island countries. [65]

In the Region boys are significantly more likely than girls to smoke cigarettes.[66] In 7 of 29 sites within the Region (i.e., WHO Member States and their populations) included in the Global Youth Tobacco Survey, 15% or more students aged 13–15 years currently use tobacco products other than cigarettes.[67] Similarly, 25% or more of the youth surveyed currently use cigarettes in 7 of 29 sites.[68] However, these figures may be misleading as some countries in the Region have not yet surveyed youth tobacco use and the Global Youth Tobacco Survey is not representative of all youths aged 13–15 from participating countries. In Thailand, 19.3% of youth currently use tobacco products and 13.8%

smoke cigarettes. In Cook Islands, current cigarette use prevalence among girls is 49.6%; and in Papua New Guinea, current cigarette use prevalence among boys is 52.1%, the highest in the Region.[69] Only 1.2% of youth aged 13–15 in Hanoi, Viet Nam, currently smoke cigarettes.[70]

In general, smoking by youth in the Asia Pacific Region is increasing and the average age at which people begin smoking is dropping from the early twenties to the teens. However, youth smoking rates are beginning to fall in countries where effective tobacco control measures have been implemented. In the Philippines following enforcement of municipal smoking bans, male youth current cigarette smoking prevalence declined by approximately one third, from 32.6% in 2000 to 21.8% in 2003. Among adolescent girls the decline was similar, from 12.9% in 2000 to 8.8% in 2003.[71] However, according to the 2007 Global Youth Tobacco Survey data, current cigarette smoking prevalence among male and female youth increased to 23.4% and 11.8%, respectively.[72] Reasons for this increase are currently being explored. The Republic of Korea instituted consecutive tax increases over a five-year period and introduced health education campaigns, which may have contributed to cutting male youth smoking in half from 35.3% in 1997 to 15.9% in 2004.[73]

Exposure to tobacco smoke pollution

Exposure to tobacco smoke pollution increases non-smokers' frequency of chronic respiratory conditions and raises their risk of acute coronary artery diseases by 25%–35%. Evidence links tobacco smoke pollution to other adverse health effects in adults, including exacerbation of asthma and reduced lung function. Small children whose parents smoke at home have a greater risk of suffering lower tract respiratory infections, inner ear infections, more frequent and severe asthma episodes, and the risk of Sudden Infant Death Syndrome (SIDS). [74]

People's exposure to tobacco smoke pollution in the Region, especially children, is staggeringly high. Most are involuntarily exposed inside their homes or in public places. In Jakarta, over 81.6% of children aged 13–15 are exposed to tobacco smoke pollution in public and almost 66.8% in their homes.[75] A seminal 1981 Japanese study found that non-smoking women married to men who smoke had significantly increased risk of lung cancer compared to non-smoking women married to non-smoking men.[76] In China a study found that exposure to tobacco smoke pollution kills as many women as does smoking; and estimated that in 2002, 48 400 women died from lung cancer and ischaemic heart disease attributed to exposure to tobacco smoke pollution compared with 47 300 lung cancer and heart disease deaths from smoking.[77]

Burden of tobacco use

World Bank estimates in 1993 showed that the global net social cost of smoking—factoring in the net social benefit of smoking—was US$ 200 billion each year.[78] This huge economic burden is now shifting from developed countries to developing countries.[79] About 75% of today's tobacco users live in developing countries, and most live in the Asia Pacific Region.[80] By 2030, developing countries will account for 70% of all tobacco deaths.[81]

Globally, tobacco use tends to be higher among groups with less education and less income and this holds true for most of the Asia Pacific Region. Poorer households spend a greater percentage of their income on tobacco than wealthier ones, and often children suffer most. Research from a broad range of countries shows that as much as 25% of household income is spent on tobacco and is given priority over other basic necessities of life, including food, clothing, health care and education.[82] In Viet Nam, for example, tobacco spending is often 1.5 times higher than that for education, five times

higher than health-care expenditures, and is one third of food budgets.[83] In China's Minhang district, smokers spent 17% of household income on cigarettes.[84] In Bangladesh, for example, money spent on tobacco is about 5% of total household expenditure. Poor people spend proportionately more compared to rich people and suffer and die more as a consequence of tobacco-related diseases.[85] Even homeless children in India spent a significant portion of their income purchasing tobacco, often prioritizing it over food.

Tobacco-related illnesses account for 16% of deaths in Bangladesh among people aged 30 and above. Of all hospital admissions for this age-group one quarter are due to tobacco-related illnesses, which imposed a net cost of US$ 442 million on the economy in 2004.[86] Table 8.7 shows the relative risk and population attributable risk of smoking two different forms of tobacco on selected NCD in Bangladesh.

Table 8.7 Relative risk (RR) and population-attributable risk (PAR) of selected NCD for tobacco usage in Bangladesh

Diseases	Smoking tobacco		Non-smoking tobacco	
	RR	PAR (%)	RR	PAR (%)
Ischaemic heart disease	1.5	21.4	2.0	25.3
Stroke	1.2	10.7	2.2	29.1
Buerger's disease	28.1	93.4	1.4	10.4
Oral cancer	4.8	66.3	2.5	30.5
Lung cancer	5.3	69.8	1.4	11.3
Laryngeal cancer	10.0	82.7	1.4	9.9
Chronic obstructive pulmonary disease	3.0	52.5	1.8	18.5

Source: *Impact of tobacco-related illnesses in Bangladesh*. New Delhi, WHO Regional Office for South-East Asia, 2007.

In India about one million people die every year due to tobacco-related diseases. In the Philippines, researchers have conservatively estimated total annual costs of illness for just four smoking-related diseases—cerebrovascular diseases, coronary artery disease, chronic obstructive pulmonary diseases and lung cancer—at US$ 2.86 billion, while real costs may be as high as US$ 6.05 billion each year.[87]

Tobacco use-related impairment of fetal nutrition, resulting in low birth weight, may be another vascular risk factor relevant to the Asia Pacific Region. It has been implicated in the causation of metabolic syndrome and diabetes, as well as in the mediation of vascular risk through other risk factors such as high blood pressure. The association may have profound effects on the incidence of diabetes and cardiovascular diseases in parts of the Region where tobacco use-related fetal malnutrition is common.

Progress of the WHO Framework Convention on Tobacco Control in the Asia Pacific Region

The challenge to public health is to avert this epidemic and its severe socioeconomic effects by prompt implementation of effective interventions through a proper, legally binding international framework. In response to the global tobacco epidemic, WHO Member States adopted the first global

tobacco control treaty—the WHO Framework Convention on Tobacco Control (WHO FCTC)—in May 2003. The objective of the treaty is to "protect present and future generations from the devastating health, social, environmental and economic consequences of tobacco consumption and exposure to tobacco smoke" by reducing tobacco use prevalence and exposure to tobacco smoke pollution through measures at the national, regional and international levels. The treaty entered into force on 27 February 2005, and as of March 2007 over 140 countries had ratified it, making it one of the most rapidly embraced treaties of all time.

In contrast to previous drug control treaties, the Framework Convention asserts the importance of demand reduction strategies as well as supply issues. The Framework Convention will help reduce tobacco use and exposure to tobacco smoke pollution in a number of ways. These, among other things, include the following:

- protect young people from exposure to tobacco use and from using tobacco;
- prevent people from taking up smoking, and help those who want to quit;
- ban smoking in public places and transportation;
- take steps to promote economies that are not dependent on tobacco products;
- strengthen women's roles in tobacco control;
- aid countries by teaching people about the dangers of tobacco; and
- protect communities most vulnerable to tobacco, especially indigenous populations.

Asia Pacific countries played an active role in all stages of the Framework Convention process from the beginning of initial negotiations to the adoption and ratification of the treaty. As of January 2007, 36 of 38 WHO Member States in the Region have become Contracting Parties to the Convention, indicating strong support and commitment to the treaty.

Several countries in the Asia Pacific Region now have comprehensive national tobacco control legislation conforming to the provisions of the Framework Convention. Australia, Bangladesh, Brunei Darussalam, India, Singapore, Malaysia, Myanmar, New Zealand, the Philippines, the Republic of Korea, Sri Lanka, Thailand and Viet Nam have undertaken significant efforts to control tobacco use though comprehensive legislation while others are in the process of developing legislation. All countries are putting in place necessary administrative, infrastructural and legislative measures, in line with the provisions of the Convention. Some countries in the Region have integrated several elements, linking tobacco control activities to NCD prevention.

WHO Framework Convention and its linkage to noncommunicable diseases

Globally, NCD are increasingly recognized as a major cause of morbidity and mortality. According to the 2005 WHO global report *preventing chronic diseases: a vital investment*,[88] global action to prevent chronic disease could save 36 million people who would otherwise die by 2015. Underlying determinants for NCD in the Region are rapid ill-planned urbanization, expanding industrialization, rising incomes, globalization and ageing population. The rapid pace of change is resulting in a high prevalence of common behavioural risk factors, namely, tobacco use, alcohol abuse, unhealthy diets and physical inactivity.

Tobacco use combined with exposure to second-hand smoke is the major component for NCD risk factors,[89] and its control would greatly benefit the Region. Numerous studies reveal that tobacco cultivation and use is harmful to a country's economy and [90, 91] the health costs associated with tobacco

use far outweigh any revenues. The WHO Framework Convention is the most effective tool to reduce tobacco consumption and can significantly reduce morbidity and mortality from NCD. Reducing tobacco use significantly reduces health-care expenses, money that could be spent to promote healthy lifestyles which provide greater workforce productivity and beneficial national economic gains.

Box 8.1: Thailand: pioneering tobacco control

Thailand has one of the strongest and most comprehensive tobacco control laws and measures in the Asia Pacific Region, with provisions of the Framework Convention and tobacco control best practices comprehensively reflected in its tobacco control measures. The salient features of best practices are:

- Total bans on advertising, promotion and sponsorship, such as direct advertising, point-of-sale advertising, product placement in all media and trademark diversification.
- Ban on all forms of promotion, e.g. free giveaways, exchanges, rebates, discounts, free premiums and others.
- Limit youth access through prohibition of sales to minors less than age 18, and a ban on cigarette vending machines.
- Disclosure of the constituents and emissions of products to the Ministry of Public Health; Thailand being one of only two countries in the world to have such a section of the law.
- Labelling of cigarette packages with six rotary pictorial health warnings, making Thailand the fourth country in the world to have such graphic warnings.
- Prohibition on import, production and sale of smokeless tobacco products.
- Prohibition on import, production and sale of *hookah*.
- Comprehensive smoking ban in public places and workplaces, including all public transport, cinemas, stores and air-conditioned restaurants.
- Strong presence and advocacy by civil society organizations, including foundations, institutes and nongovernmental organizations for tobacco control.
- Taxes from tobacco used for anti-tobacco and other health promotion activities.

Conclusions and recommendations

The Framework Convention is inextricably linked to future efforts to prevent NCD and effective implementation of the Convention and strict enforcement of tobacco control measures will significantly reduce their incidence.

Formidable challenges lie ahead in reducing illness and death from tobacco use in the Asia Pacific Region due to pervasive poverty and resource constraints in many countries. As the tobacco industry actively obstructs public health initiatives and efforts to reduce tobacco use, it is crucial that public education and advocacy for a healthy lifestyle, including campaigns against tobacco use, are intensified.

8.3 Injuries and violence

Injuries caused an estimated 5.2 million deaths worldwide, 9% of total, and resulted in 182 million DALYs lost in 2002, the latest year for which complete data are available.[92] If current trends continue, road traffic and intentional injuries (self-inflicted injuries or suicide, and interpersonal violence) will rank among the 20 leading causes of death by 2030 (Table 8.8).

Table 8.8 World rankings of injury-related mortality in 2002 and 2030

Type of injury	Ranking in terms of the number of deaths	
	Year 2002	Year 2030
Road traffic injuries	10	8
Self-inflicted injuries	14	13
Interpersonal violence	21	19

Source: Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS medicine*, 2006, 3(11), e442.

In the Asia Pacific Region it is estimated that injuries caused about 2.7 million deaths in 2002, or over 7000 deaths daily, which constituted 52% of worldwide injury deaths. The injury burden amounted to some 92.5 million DALYs lost in the Region in 2002, 51% of the global total (Table 8.9). Low- and middle-income countries have higher injury-related mortality rates than high-income countries. The 5-44 age group accounted for 55% of injury-related mortality. In 2002, the major causes of injury deaths in the Region were due to road traffic (an estimated 600 000 deaths), self-inflicted injury or suicide (577 000), falls (237 000), drowning (230 000), burns (204 000), interpersonal violence (179 000), and poisoning (170 000).[93] Unintentional injuries and those due to violence are significant public health problems in the Region.

Table 8.9 Injury-related mortality and burden of disease in the Asia Pacific Region in 2002

	Mortality		Burden of disease	
	No. of deaths (thousands)	% of the world total	DALYs lost (thousands)	% of the world total
All types of injuries	2 696	52	92 521	51
Road traffic injuries	600	50	18 919	49
Self-inflicted, suicide	577	66	13 959	67
Falls	237	61	10 201	63
Drowning	230	60	6 555	60
Burns	204	65	7 184	63
Interpersonal violence	179	32	5 877	27
Poisoning	170	49	3 433	46

Source: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html

Mortality and DALYs lost due to road traffic injuries, self-inflicted injuries, drowning and burns in the Region were almost equal to or more than 50% of the respective world totals.[94] The Asia Pacific Region has a very high burden of injuries compared to other regions.

In response to these injury-related problems, some governments (e.g. China, Mongolia, Myanmar, Thailand, Sri Lanka and Viet Nam) have developed national policies, plans and programmes for injury prevention and others have started public awareness programmes. However, there are still many challenges faced by developing countries of the Region in solving injury problems. These include insufficient awareness and understanding of the magnitude and cause of injuries; lack of national policies and plans for injury prevention; and limited national capacity to collect and analyse injury data and design and implement effective interventions.

Road traffic injuries

Road traffic is a major cause of injuries and deaths throughout the Asia Pacific Region. Pedestrians, bicyclists and motorcyclists are the most vulnerable road users and suffer the majority of fatalities and injuries. In most countries where rapid motorization is taking place, road traffic injuries are correspondingly rising in number and severity. Besides the ever-increasing number of cars and motorcycles other factors contributing to rising road traffic injuries include speeding; driving under the influence of alcohol; the lack of helmets, seat-belts, child restraints and other protective measures; mixed motorized and non-motorized transport; and poor road infrastructure and signage.

Many developing countries in the Region have recently passed, or are in the process of passing, legislation that mandates the use of helmets and seat-belts, sets speed limits and safety standards for motor vehicles, prohibits drinking and driving, and requires the use of daytime headlamps by motorcyclists. Legislation for child restraints may soon follow. However, law enforcement is not always successful.

In collaboration with the Asian Development Bank, countries of the Association of South East Asian Nations (ASEAN) developed national action plans for road safety in 2004 and have begun to implement them. Each country takes a multisectoral approach to road safety, involving transport, police, education, health and other departments. In Thailand, for example, a nationwide multisectoral project is piloted at the provincial level to promote motorcycle safety. Another multisectoral project promotes the use of motorcycle helmets for children aged 2–14 and focuses on three major components of behaviour modification: a predisposing factor (risk communication and education for appropriate use of motorcycle helmets); an enabling factor (production of child motorcycle helmets and availability in the pilot area); and a reinforcing factor (control and monitoring by families, schools, society and the police of the appropriate use of motorcycles and helmets for children).

The health sector is intensely involved in improving injury surveillance and emergency medical care systems and advocating for prevention and behavioural changes for motorists and non-motorist road users. The presence of an emergency response system that reaches the site of a road accident swiftly, provides on-the-spot immediate initial care and arranges for the safe transport of patients to properly equipped trauma units can save lives and minimize disability. Such networks are being established in some of the larger metropolitan areas in the Region.

In other developing countries, the multisectoral approach to road safety has become popular. In China, the ministries of public security, health, and communication have increased collaboration in reducing road traffic injuries and deaths. An alliance involving these government departments and the private sector has also been formed to tackle the increasing risk of road traffic to human health and lives.

The United Nations Road Safety Week, coordinated by WHO, has strongly supported multisectoral coordination to prevent road traffic injuries.

Suicide

Suicide is a major cause of injury deaths in the Asia Pacific Region and is often related to a state of impaired mental health or depression. Different social and economic factors affect the mental state of people and rates of suicide. The availability of poisons (e.g. pesticides and harmful substances) is linked to the occurrence of suicide. (Further discussion on this issue is provided in this publication's section on mental health.)

Research and investigation in the Region have shown that depression is not as strong a causal factor in suicide as impulse, and this link should be systematically explored to provide guidance for an appropriate response, including focusing attention on reducing access to the means of suicide.

Regarding interventions, programmes which screen for those at high risk can also create stigma that lowers compliance. Researchers should seek population-wide positive approaches for prevention.

Other innovative approaches are also being tried. For example, with the collaboration of nongovernmental organizations India has established telephone help lines for the depressed in many large urban areas.

Drowning

Drowning is a leading cause of death in children under the age of 15 in many countries including Bangladesh, China and Thailand.[95] It is the most common cause of unintentional deaths in Bangladesh and Maldives. Most drowning deaths take place in ponds, rivers and oceans, or during floods and typhoons. Very few are related to swimming pools.

Since victims of drowning have a slim chance of survival after immersion, prevention strategies are important. Limiting access by fencing off deep bodies of water has proven effective, but is not always possible. Drowning deaths during water recreation can be prevented by adult supervision of children, swimming instruction, and the training of lifeguards.

For surface water transport, legislation and enforcement of provisions for personal flotation and other lifesaving devices, and avoidance of overloading can prevent mass casualties. In the case of floods and storms, preventive measures include early warning and evacuation to safer places and prompt rescue activities.

Burns

Burns are a major injury problem in Asia, particularly in South Asia. The majority of burns occur at home. The risk factors associated with burns include cooking on open fires, explosion of pressure stoves, instability of small stoves, use of open fires to keep warm during winter, and the use of inflammable materials in housing and furnishings. Housing and clothing fires are the most severe events but not as frequent as scalds from hot liquids. Use of fireworks during festivals and celebrations

is common in Asia and leads to a significant number of burn injuries. Multiple deaths also occur each year from fires and explosions in factories and homes that manufacture fireworks. The lack of adequate treatment of burns in developing countries is also a factor that increases the severity of the injury.

Effective prevention interventions include promotion of more stable stands for lamps and stoves; installation of smoke detectors, fire alarms and extinguishers in houses and buildings; the provision of clear access to emergency exits, banning or strictly controlling the use and sale of fireworks, increased use of flame-retardant fabrics and materials, and the provision of first aid and treatment of burns. These practices are not common in developing countries and would require appropriate rules and regulations on product safety standards, close monitoring, and education. Improvements to infrastructure for cooking and heating are also likely to reduce the incidence of burns.

Violence

Interpersonal violence—such as child abuse and neglect, violence against intimate partners, elder abuse and homicide—is a major public health problem in the Asia Pacific Region, but its magnitude and causes are not fully known. However, some countries, such as Malaysia, Mongolia, Nepal, Sri Lanka and Thailand have completed a national report on violence and health and other countries are beginning to address the issue.

Effective interventions may include the control of lethal weapons; alcohol and drugs; documentation of cases of violence; advocacy for violence prevention; improved care for victims; promotion of gender and social equity; empowerment of weaker sections of society; and the promotion of life skills in children and parents, such as communication skills and discipline techniques that do not employ physical violence.

8.4 Mental and neurological illnesses and substance abuse

Mental and behavioural disorders are defined in the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD-10) as a set of clinically recognizable behavioural and psychological problems, accompanied by severe and long-lasting distress, disability, or impairment in one or more important areas of functioning, and a significantly increased risk of suffering, pain, disability, loss of freedom, or death. Examples of these disorders include schizophrenia, anxiety and depression. The latter is a condition closely associated with suicide. Mental and behavioural disorders also include mental retardation—characterized by intellectual difficulties that have their onset in childhood—as well as psychosocial problems, such as those related to the use of psychoactive substances and traumatic stress situations. Neurological disorders which cause substantial morbidity and mortality include epilepsy, stroke, Parkinsonism and headache, and are classified elsewhere in ICD-10.

Magnitude of the burden from mental and neurological disorders

Mental disorders do not spare any age, gender, class, social status or cultural group. They are found among rich and poor and in urban and rural areas in all countries. The notion that mental disorders are problems of the rich, industrialized nations is simply wrong, as is the belief that mental disorders do not exist in rural communities because they remain relatively unaffected by the fast pace of modern life.

An estimated 450 million people suffer from mental and neurological disorders worldwide.[96] Millions more suffer from so-called sub-threshold disorders, and experience often disabling psychological problems, even when their symptoms do not satisfy the criteria of a psychiatric condition as defined in current classification systems. Surveys conducted in developed as well as developing countries show that at least 2% of the population suffer from the most severe forms of mental disorder, such as schizophrenia, dementia, severe mental retardation and the consequences of brain injuries. Less severe but still disabling forms, such as depressive disorders, anxiety and obsessive-compulsive disorders, affect a further 3%–4% of the population. Mental retardation, often coexisting with other mental disorders, affects a further 2%–3% of the population in several countries. Table 8.10 is a summary of the disease burden of selected major mental disorders in the Asian Pacific Region.

Magnitude of the burden from alcohol abuse

Problems related to alcohol abuse and dependence vary in their frequency and severity among countries, but are reported as a major concern for public health in many countries**.** Data from the WHO *Global status report on alcohol 2004* show that there has been a steady increase in per capita consumption in many countries in the Asia Pacific Region since the mid-1980s. Some developed countries, such as Australia, Japan and New Zealand, have relatively high per capita consumption (6–9 litres of pure alcohol per year for those 15 years of age and above).[97] In some developing countries such as China, India, Viet Nam and most countries and areas in the Pacific, per capita consumption is relatively low but increasing rapidly. A recent study conducted on a sample of 3258 individuals drawn from rural, town, slum and urban areas in India found that nearly 33% of the adult population regularly consumed alcohol.[98] In China, for example, per capita annual alcohol consumption for those 15 years of age or above was 0.75 litres in 1970 but rose to 4.45 litres in 2001.[99]

Alcohol is rapidly becoming one of the most significant risks to public health, roughly of the same magnitude as tobacco. Further, changing patterns of drinking—such as binge drinking and more frequent and heavy drinking among young people—tend to lead to more harm. In addition to the impact on public health, there are substantial social and economic costs associated with the harmful use of alcohol. Alcohol-related problems not only affect the individual drinker but have a significant effect on others, including family members, victims of violence and accidents associated with alcohol use, and the community as a whole. The harmful use of alcohol results in considerable expense through lost productivity and costs to the health and welfare, transportation, and criminal justice systems. One estimate puts the yearly economic cost of alcohol abuse in Australia to be around 1% of the gross domestic product.[100] It is estimated that the Government of India spends nearly US$ 6.2 billion every year to manage the consequences of alcohol use, which is more than its total excise earning (US$ 5.5 billion).[101]

Mental health resources

Data from the WHO *Mental health atlas 2005* reveals that a mental health policy and substance abuse policy are present in 50%–58% of countries.[102] Only about half of all countries have a specified budget for mental health, and even where this exists, it is very often less than 1% of the total health budget. In almost one fifth of all countries, out-of-pocket payments are the primary means for obtaining care, a method which is a significant barrier to continued and adequate care.

The widespread stigma and discrimination against people who are mentally ill makes the provision of mental health care particularly difficult. Stigmatization leads to the rejection of patients and their families by communities and triggers negative discrimination with respect to access to treatment,

housing, employment and health insurance. The stigma attached to mental illness also makes psychiatry an unattractive choice of career for health professionals, which contributes to the continuing shortage of mental health professionals and the inadequacy of mental health services.

Table 8.10 Burden of neuropsychiatric diseases worldwide and in the Asia Pacific Region, 2002

Neuropsychiatric disease	World			Asia Pacific		
	DALYs lost (thousands)	Percentage of total disease burden	Percentage of neuro-psychiatric burden	DALYs lost (thousands)	Percentage of total disease burden	Percentage of neuro-psychiatric burden
1 Unipolar depressive disorders	67 295	4.52	34.82	36 501	5.28	38.48
2 Bipolar disorder	13 952	0.94	7.22	7 633	1.10	8.05
3 Schizophrenia	16 149	1.08	8.36	9 309	1.35	9.81
4 Epilepsy	7 328	0.49	3.79	3 420	0.49	3.61
5 Alcohol use disorders	20 331	1.36	10.52	8 272	1.20	8.72
6 Alzheimer and other dementias	10 397	0.70	5.38	4 722	0.68	4.98
7 Parkinson disease	1 570	0.11	0.81	631	0.09	0.67
8 Multiple sclerosis	1 477	0.10	0.76	716	0.10	0.75
9 Drug use disorders	7 388	0.50	3.82	1 366	0.20	1.44
10 Post-traumatic stress disorder	3 335	0.22	1.73	1 841	0.27	1.94
11 Obsessive-compulsive disorder	4 923	0.33	2.55	1 837	0.27	1.94
12 Panic disorder	6 758	0.45	3.50	3 662	0.53	3.86
13 Insomnia (primary)	3 477	0.23	1.80	1 703	0.25	1.80
14 Migraine	7 666	0.51	3.97	3 999	0.58	4.22
15 Mental retardation, lead-caused	9 956	0.67	5.15	4 837	0.70	5.10
16 Other neuropsychiatric disorders	11 277	0.76	5.83	4 399	0.64	4.64
Total	193 278			94 848		

Source: *Revised global burden of disease (GBD) 2002 estimates*. Geneva, World Health Organization. Available from: http://www.who.int/healthinfo/bodgbd2002revised/en/index.html.

The importance of mental health was recognized by WHO in its Constitution, which states: "Health is not merely the absence of disease or infirmity but rather a state of complete physical, mental and social well-being". The *World health report on mental health: new understanding, new hope*, published in 2001,[103] was a landmark in the formulation and promotion of policies and the training of health professionals involved with mental health.

The *World health report on mental health* recommended, among other actions, that treatment of mental disorders should be provided within the primary health-care setting, psychotropic drugs should be made available, care should be given in the community, the general public should be educated on mental health issues, and that communities, families and consumers be involved in mental health

care. The report also emphasized the importance of establishing national policies, programmes and legislation; stressed the need for the development of human resources for mental health care and reiterated; the importance of creating links with other sectors and of developing monitoring mechanisms for community mental health and the importance of conducting relevant research.

Development of community-based mental health systems to meet the essential needs of the community

Many countries in the Asia Pacific Region have noted that large segments of their population, particularly in rural and remote areas, do not receive appropriate care for people with common neuropsychiatric conditions. Patients are taken to faith-healers instead of doctors. These observations have led to the development of community-based strategies to reach the unreached segments of the population.

In order to illustrate best practices in mental health care in the community through use of information exchange, current evidence and practical experience, WHO has developed the Asia-Pacific Community Mental Health Project. The project was instrumental in the formation of a network of key representatives from ministries of health and organizations working in community mental health in the Region.

Suicide prevention

There is a shared view that suicide is a major public health concern in the Asian Pacific Region. The WHO Suicide Trends in At-Risk Countries and Territories (START) project was launched in March 2006 to promote to the creation of national databases, and to understand the various types of suicidal behaviour, certify suicide deaths and develop effective interventions.

Promotion of mental health

Concepts of mental health promotion, evidence for mental health promotion and strategies to be implemented the same are being developed throughout the Region. Two settings for mental health promotion activities are being given special attention. The first setting is adolescents, both in school and out of school. The suggested tools for this setting include life skills education, prevention of harm from alcohol and strategies for coping with stress. In the community setting, the recommended tools are building community resilience, prevention of harm from alcohol and using traditional methods such as meditation for coping with stress.

The experiences in the Asia Pacific Region over the past years have indicated that changes in mental health programmes require strong and persistent political commitment, and a reorientation of health systems to include mental health services as an essential component at all levels. Most importantly, substantial improvement of mental health can only be possible when there is a change of attitude towards mental health at both the community and government levels.

Control of alcohol-related harm

Growing awareness of the public health impact of the harmful use of alcohol led to action in 2005 at the Fifty-eighth World Health Assembly. Core areas for national action and regional collaboration were identified through consultations with key stakeholders. These include reducing the risk of harmful use of alcohol; minimizing the impact of its harmful use; regulating its accessibility and availability; and establishing mechanisms to facilitate and sustain implementation of the public health-oriented alcohol policy. There is general consensus over the fact that isolated measures such as media campaigns are unlikely to have effect. For effective control of alcohol-related harm a comprehensive and consistent set of measures is

required, involving a wide range of sectors and adapted to the national context. Some countries in the Region, such as Australia, New Zealand, the Republic of Korea and Thailand to mention just a few, have already taken up the challenge to define and implement policies that provide better protection against the harm associated with alcohol.

8.5 Thalassaemia

Thalassaemia is a hereditary blood haemoglobin disorder that results in varying degrees of anaemia. Although the disease was identified in the early 1950s, it is only in recent decades that its etiology, diagnosis, clinical syndromes and outcomes have been clarified. Thalassaemia is classified both by clinical manifestation and genetic background. The most common types of thalassaemia syndrome are alpha (α) and beta (β) thalassaemia, classified by which part of the haemoglobin molecule is lacking from red blood cells. Both forms of thalassaemia are prevalent in the Asia Pacific Region. The most severe form of α-thalassaemia, Hb Bart's Hydrops Fetalis, mainly affects those of South-East Asian, Chinese and Filipino ancestry and results in death during the fetal or newborn period. Many individuals with α-thalassaemia have milder forms of the disease with varying degrees of anaemia. β-thalassaemia ranges from a very severe form of anaemia with growth retardation—like the β-thalassaemia major, also called Cooley's anaemia—to a very mild form with no health effects.

Thalassaemia is a major cause of mortality and morbidity in the Asia Pacific Region. The growing demand on resources for the care of thalassaemia patients makes the disease an important public health issue. Available information on the prevalence of thalassaemia in selected countries and areas of the Region is shown in Table 8.11.

Table 8.11 Prevalence of thalassaemia and abnormal haemoglobins in selected countries in the Asia Pacific Region

Country	% carriers			
	α	β	Hb E	Hb CS
Bangladesh	…	3	4	…
Cambodia	(+)	(+)	(+)	…
China, Guangxi	15	5	(+)	…
China, Hong Kong	2.2	3–6	…	…
India	5–97	3–4	(+)	(+)
Indonesia	6–16	3–10	1–25	…
Lao People's Democratic Republic	(+)	(+)	(+)	
Malaysia	(+)	4.5	(+)	(+)
Maldives	28	18	0.7	0.4
Myanmar	10	0.5–1.5	2–28	…
Singapore	2.9	0.9	0.6	…
Sri Lanka	(+)	2.2	0.5	…
Thailand	10–30	3–9	10–53	…
Viet Nam	2.5	1.5	(+)	…

(+) = abnormal gene present, exact frequency not known.
… Data not available.

Source: Fucharoen S, Winichagoon P. *Preventional and control of thalassemia in Asia*. *Asian biomedicine*, 2007, 1 (1): 1-6.

Prevention

Prevention is the key strategy of thalassaemia control. This includes carrier screening, genetic counselling and prenatal diagnosis for at-risk couples. Blood examination and family studies can identify individuals with thalassaemia and asymptomatic carriers. Health education programmes, testing for the genetic trait, counselling and prenatal diagnosis help families make informed decisions and bear healthy children. Prenatal testing of fetal cells collected through cordocentesis, chorionic villus sampling or amniocentesis can detect or rule out thalassaemia in the fetus. Introduction of prenatal diagnosis with selective abortion is considered an important factor in the success of thalassaemia prevention programmes. However, medical termination of pregnancy is an ethical and legal issue in many countries.

Treatment

Thalassaemia carriers have no symptoms and thus require no treatment. Presently, many children born with major forms of thalassaemia are dying undiagnosed or untreated before age 10 due to anaemia and infection. Children with thalassaemia major require frequent blood transfusions to prevent complications and improve their quality of life, but this carries the risk of acquiring blood-borne diseases such as hepatitis, HIV, malaria and syphilis. Moreover, frequent blood transfusions lead to an accumulation of iron in the body which can damage the heart, liver and other vital organs. For many years desferrioxamine, administered daily by pump, was the only therapy for patients with iron overload. The administration of an iron chelator (chelation therapy) helps eliminate excess iron and prevents or delays problems related to iron overload and toxicity. Children with thalassaemia major who are treated with frequent blood transfusions and properly managed chelation therapy can live more than 30 years. Patients older than age 5 may benefit from a splenectomy. For a minority of patients who have a suitable donor and can afford the costly treatment, thalassaemia can also be treated by bone marrow or stem cell transplantation. There are numerous obstacles to providing appropriate treatment for thalassaemia. A lack of blood supplies means transfusions are unavailable to many patients, and often transfusion safety measures are inadequate. Chelation therapy can average US$ 250–US$ 300 per month and the pump for subcutaneous infusion costs approximately US$ 500.

National prevention and control programmes

Thalassaemia poses a significant burden on the health services and economic resources of many countries in the Asia Pacific Region. With advances in knowledge and technology it is now possible to effectively prevent and control the disease. Highly successful programmes have been implemented in Mediterranean countries such as Cyprus, Greece and Italy.

The WHO Regional Committee for South-East Asia in 1995 adopted resolution RC48.R3 on prevention, control and treatment of thalassaemia. The resolution urged Member States to increase community awareness of thalassaemia and requested WHO to facilitate an exchange of information. The Scientific Debate on Prevention and Control of Thalassaemia at the 28th South-East Asia Advisory Committee on Health Research held in 2003 recommended the strengthening of collaborative research on epidemiology, diagnostic and treatment methods, as well as health system research on development, implementation, monitoring and evaluation of models for the prevention and control of thalassaemia.

Increasingly, prevention programmes are being introduced in many parts of Asia such as China, India, Indonesia, Malaysia, Maldives and Singapore. National thalassaemia programmes in Thailand and some other countries are producing positive, measurable results. The prevention and control of thalassaemia serves as a good model for the introduction of comprehensive programmes for the control of other common genetic disorders.

The overall goal of a thalassaemia programme is to ensure the provision of basic facilities, skills and knowledge for prevention and management. Such programmes should be integrated into existing health-care systems. The main components of a national programme include:

- carrier screening in communities known to have patients with thalassaemia;
- integrating counselling by health services and the training of primary health-care staff;
- ensuring community involvement and public education;
- strengthening therapeutic services;
- providing adequate safe blood supplies and affordable chelation agents;
- prenatal diagnosis and selective termination of pregnancy; and
- monitoring and evaluation through maintaining registries of the number of new births, patients and prenatal diagnoses made.

Programmes should be developed that take into account the social and cultural needs of the community. Collaboration among countries in the areas of information sharing, human resources development, technical cooperation, research and technology transfer should be encouraged. The Asian Thalassaemia Network established in 2003 provides a promising forum for international collaboration.

Box 8.2: Prevention and control of thalassaemia in Thailand

The National Prevention and Control Programme for Thalassaemia was launched in Thailand in 1994 as a collaboration between the Thalassaemia Foundation of Thailand, university research groups and the Ministry of Public Health. The basis for prevention and control has been the adoption of phenotypic screening followed by counselling and prenatal diagnosis. In response to the need for a screening programme, a test was developed that incorporated primary screening for osmotic fragility followed by a simple dye test. The combination has been effective in detecting a wide range of thalassaemia phenotypes, including α-thalassaemia-1, β-thalassaemia, haemoglobin E and iron deficiency. A more specific test for α-thalassaemia-1 has also been available for some time. In terms of prenatal diagnosis, cordocentesis, amniocentesis and chorionic villi sampling are used to obtain fetal tissue for haemoglobin and genetic analysis.

Following a successful pilot programme, a model for the prevention and control of severe thalassaemia was expanded in 1998 to all of Thailand. In 2000, the thalassaemia programme was integrated into the existing health-care system with the Department of Health, universities, regional health centres, and general, district and community hospitals; coordinating a range of services including policy development, education, research, technical support, counselling and screening. In 2001 thalassaemia screening was formally covered by government health-care policy. Available statistics indicated that 518 thalassaemia cases had been prevented since the implementation of the programme. There are now 25 centres offering prenatal diagnosis in Thailand.

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9

Reproductive health, child and adolescent health, nutrition, and health for older persons

Introduction

This chapter reviews "life-cycle" health concerns in the Asia Pacific Region in four subchapters covering reproductive health, child and adolescent health, nutrition disorders, and social and health care for the older persons. These are issues that affect everyone at some stage of life.

Reproductive health now includes the concepts of sexuality and rights, along with family planning, maternal and newborn health, women's health care, infertility, and the prevention of abortion and management of its consequences. Maternal and neonatal mortality rates are unacceptably high in several countries in the Region, but can be reduced by providing access to skilled care at birth and other basic medical services.

Child mortality has been reduced significantly in the Region, but large disparities exist among countries. Preventable communicable diseases account for over 60% of childhood deaths. There are evidence-based interventions that are simple and affordable to address the causes of child mortality and promote healthy growth and development. After age 10 most children have weathered the hazards of infant and childhood diseases, but adolescents and youth, especially adolescent pregnant women, face a high risk of debilitating morbidity. Risk behaviour in this age group is often triggered by changing social conditions and lifestyle.

Poor infant and young child feeding continues to affect a high proportion of children, and can be attributed in part to rapid changes in lifestyle. While the quality and quantity of food consumption has generally improved, micronutrient deficiencies persist in some population groups. Anaemia is prevalent due to a combination of several micronutrient deficiencies in young children and women of reproductive age. Obesity, especially in urban areas, is an emerging problem in many countries.

There are already over 335 million people over age 60 in the Asia Pacific Region and their number and proportion are rising, including a rapid growth in the number of people aged 80 and over, who are generally the heaviest users of health and social care.

Multisectoral approaches are required to address many of these life-cycle issues through behaviour change, generating partnerships, mobilizing resources, and enlisting the collaboration of local communities, nongovernmental organizations and the private sector.

9.1 Reproductive health

Since the 1994 International Conference on Population and Development in Cairo, the scope of reproductive health has broadened to include the concepts of "sexuality" and "rights" along with family planning, safe motherhood, women's health care, the prevention and treatment of infertility, and the prevention of abortion and management of its consequences. Due to wide socioeconomic differences, the quality of reproductive health varies considerably between countries in the Asia Pacific Region. Of 62.4 million yearly births in the Region[1], the maternal mortality ratio in 2005 ranged from 4 per 100 000 in Australia to 830 per 100 000 in Nepal.[2] Approximately 200 000 maternal deaths, nearly 40% of the global burden,[3] and around two million newborn deaths, almost half the world's total, [4] occur annually in the Region. The lifetime risk of maternal death in the Region is as low as 1 in 13 300 in Australia and as high as 1 in 33 in the Lao People's Democratic Republic.[5]

Maternal and newborn health

The major risk factor for maternal and neonatal deaths in the Region is lack of access to skilled care at birth. While practically all births are attended by skilled health personnel in countries like the Democratic People's Republic of Korea, Mongolia, Sri Lanka and Thailand, there are also several countries in the Region where the corresponding proportion is less than 20% (Table 9.1). Progress in this regard has been uneven and one pervasive consequence is high neonatal mortality and poor child survival within families where maternal deaths occur. The other important determinants of maternal and neonatal survival are access to emergency obstetric care and family planning.

There are various reasons for the poor standard of maternal and newborn health in many countries of the Region, with poverty the most important factor. The low social status of girls and women limits their access to education, economic resources and, therefore, decision-making for better health outcomes. This also has adverse consequences on the health and nutritional status of children.

In most developing countries of the Asia Pacific Region, anaemia is almost universal in adolescent girls and women of reproductive age. This results in increased vulnerability and poor survival in obstetric complications, such as post-partum haemorrhage. Anaemia also has adverse effects on the growth of the fetus, which can contribute to increased neonatal morbidity and mortality.

Unacceptably high maternal and newborn mortality fails to attract world attention, resource allocation and prioritization. This is primarily due to lack of accurate and reliable data, with a lot of countries not having a system for vital registration. Neither can household-based surveys to estimate maternal and newborn deaths be conducted regularly because these are very costly and require a lot of technical expertise. More importantly, maternal death and disability affects the poorest of the poor and represents a low threat to the developed world, unlike epidemic diseases, which generate a far swifter and more substantial global response. Fortunately, the United Nations Millennium Development Goals target maternal and child health as does *The world health report 2005*, which has helped attract global attention. However, there is still no clear evidence of progress due to the complexity of the problem.

Table 9.1 Proportion of births attended by skilled personnel, and maternal and neonatal deaths in selected countries in the Asia Pacific Region				
No.	**Country**	**Proportion (%) of births attended by skilled health personnel**	**Neonatal mortality rate (per 1000 live births)**	**Maternal mortality ratio (per 100 000 live births)**
1	Bangladesh	13.4	36	570
2	Bhutan	50.9	30	440
3	Cambodia	43.8	48	540
4	China	82.8	18	45
5	DPR Korea	97.1	22	370
6	India	48.3	39	450
7	Indonesia	66.3	17	420
8	Lao PDR	19.4	30	660
9	Maldives	70.3	24	120
10	Mongolia	99.7	18	46
11	Myanmar	67.5	49	380
12	Nepal	18.7	32	830
13	Philippines	59.8	15	230
14	Papua New Guinea	42.0	32	470
15	Sri Lanka	96.6	8	58
16	Thailand	99.3	9	110
17	Timor-Leste	18.4	29	380
18	Viet Nam	85.0	12	150

Source: *Proportion of births attended by a skilled health worker: estimates by country – 2007*. Geneva, World Health Organization. Available from: http://www.who.int/reproductive-health/global_monitoring/data.html

Neonatal and perinatal mortality: country, regional and global estimates 2004. Geneva, World Health Organization, 2007

Maternal mortality in 2005: estimates developed by WHO, UNICEF, UNFPA and the World Bank. Geneva, World Health Organization, 2007

Unwanted pregnancy and unsafe abortion

Some 42 million unintended pregnancies worldwide are voluntarily terminated each year, of which an estimated 22 million are within the national legal systems and 20 million are not.[6] The Asia Pacific Region accounts almost 7.9 million unsafe abortions and almost 34% of maternal deaths due to unsafe abortions in the world.[7] There is a very wide variability in abortion rates among countries in the Region with available data, with reported figures ranging from 8 abortions per 1000 women in the reproductive age-groups in Sri Lanka to a high of 66 abortions per 1000 women aged 15 to 49 in Mongolia (Table 9.2).

Table 9.2 Abortion rate in selected countries of the Asia Pacific Region

Countries	Number of abortions (1000s)	Abortion rate per 1000 women age (15–49)	Abortion rate per 1000 births
Bangladesh	398	12	12
Bhutan	10	23	13
Cambodia	129	49	36
China	19	11	29
India	5 743	24	23
Indonesia	1 939	35	41
Malaysia	208	38	38
Mongolia	45	66	61
Myanmar	567	45	44
Nepal	116	21	14
Republic of Korea	458	35	66
Singapore	21	21	38
Sri Lanka	40	8	12
Thailand	223	13	22
Viet Nam	1 183	57	61

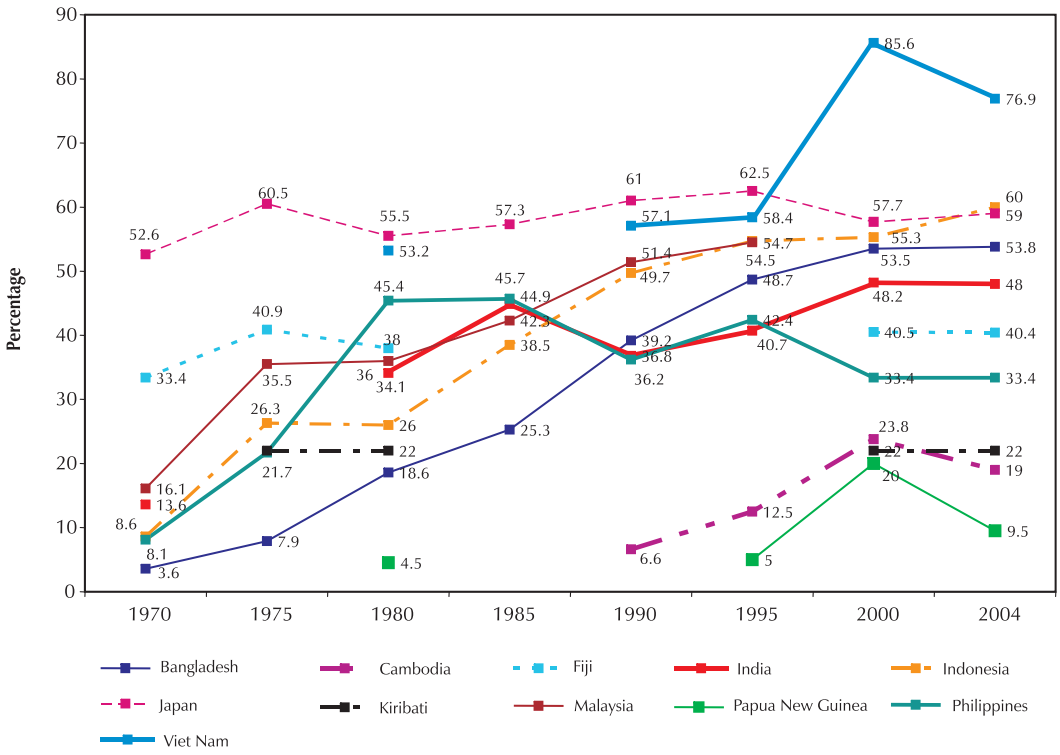
Source: Ross J, Stover J, Adelaja D. *Profiles for family planning and reproductive health programs (116 countries), 2nd edition.* Washington DC, Futures Group, 2005. Available from: http://www.policyproject.com/byTopic.cfm/POP

Access to abortion services is governed by laws and policies within countries. Cambodia, China, India, Japan, the Democratic People's Republic of Korea, Mongolia, Nepal and Viet Nam are legally permissive countries in the Asia Pacific Region, while Bangladesh, Bhutan, Indonesia, the Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, the Philippines, Sri Lanka, Thailand, Timor-Leste and most South Pacific island countries are legally restrictive. Although Bangladesh is a legally restrictive country for abortion, menstrual regulation service is provided at primary health care and higher levels. Thailand allows abortion services for rape victims or when pregnancy threatens a woman's health. Liberal abortion laws, however, do not guarantee that women can obtain safe abortions as there are issues related to access and quality of care.

Family planning

The positive outcome of birth spacing on the reproductive health of mothers and overall health and well-being of children is well known. Contraception further improves reproductive health outcomes by reducing the risk of abortion-related death and disability. The trend in contraceptive prevalence in some countries in the Region is shown in Figure 9.1. While there has been a general increase in use of contraception, there remains an unmet need for family planning programmes, which continue to be the backbone of reproductive health.

Fig. 9.1 Trends in contraception use in some countries in the Asia Pacific Region



Sources: *Global population profile: 2002. Washington DC, Bureau of the Census, 2002 (International population reports)*. Available from: http://www.census.gov/ipc/www/wp02.html

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Since the 1994 International Conference on Population and Development there has been increasing emphasis on providing a better informed and wider range of choices for contraception. Contraceptive use is governed by country policy on what is allowed to be promoted. Generally, female methods predominate, although the choice of contraceptive method varies between countries. It is projected that at least one out of every three married women of reproductive age will undergo female sterilization in China and India. In addition, projections for 2005 indicate that a considerable proportion of women (18%–26%) will continue to use traditional methods of contraception in Malaysia, the Philippines, Sri Lanka and Viet Nam (Table 9.3).

Table 9.3 Projected contraceptive prevalence by method among married women of reproductive age in selected countries of the Asia Pacific Region, 2005

Country	Contraceptive methods (%)						
	Sterilization		Pill	Injectable	IUD	Condom	Traditional methods/others
	Female	Male					
Bangladesh	7.3	0.5	22.8	7.5	5.3	4.4	11.2
Bhutan	11.8	0.4	10.5	4.8	3.7	1.4	10.3
Cambodia	2.2	0.2	4.9	7.0	1.3	0.9	5.5
China	33.6	9.6	2.9	0.2	31.7	1.9	0.2
DPR Korea	21.2	2.3	11.3	3.5	11.6	7.5	10.8
Hong Kong (China)	17.5	0.9	15.6	–	4.6	32.2	6.4
India	38.1	2.1	2.3	–	1.8	3.5	5.6
Indonesia	3.7	0.4	17.7	28.3	6.3	0.9	3.6
Lao PDR	10.0	0.3	9.6	4.6	2.8	1.0	9.6
Malaysia	10.0	0.3	14.8	2.2	9.8	9.0	26.4
Mongolia	19.6	1.8	11.6	4.0	9.9	6.0	11.0
Myanmar	9.2	0.9	9.0	6.5	2.7	0.9	8.0
Nepal	14.4	4.7	4.1	7.9	1.4	2.6	5.6
Philippines	13.2	0.4	11.3	3.2	5.1	2.5	18.4
Papua New Guinea	9.2	0.2	6.2	7.4	0.7	0.7	8.0
Republic of Korea	29.6	12.0	1.9	–	10.9	14.8	11.0
Singapore	23.9	3.1	10.8	2.7	14.6	10.0	10.6
Sri Lanka	25.6	4.0	6.0	5.0	3.3	3.6	24.4
Thailand	22.2	2.0	23.3	16.6	3.2	1.8	2.4
Viet Nam	4.5	0.3	4.9	1.8	43.3	6.3	18.1

Note: (–) the quantity is negligible.

Source: Ross J, Stover J, Adelaja D. *Profiles for family planning and reproductive health programs (116 countries), 2nd edition.* Washington DC,Futures Group, 2005. Available from: http://www.policyproject.com/byTopic.cfm/POP

Country response

Increased advocacy and attention to maternal and newborn health by policy-makers was brought about by initiatives such as the International Conference on Population and Development (Cairo, 1994) and its Programme of Action; the United Nations Millennium Declaration and Development Goals; articles in the *Lancet's Neonatal Survival Series* and *The World Health Report 2005*.[8,9] The issue of skilled birth attendance has been taken up at the highest level, especially in countries with a low proportion of such deliveries. Bangladesh has initiated training of community-level skilled birth attendants (SBAs) throughout the country. Bhutan has begun strengthening institutions at the primary care level to improve deliveries, and India has expanded the practice of primary care providers and prioritized skilled birth attendance within the national health programme. Timor-Leste is strengthening midwifery schools to improve training, and Nepal has developed a national strategy.

To address maternal mortality, Cambodia has increased resources for the management of third-stage delivery and the promotion of effective long-term family planning methods, since postpartum haemorrhage and unsafe abortion are major causes of maternal deaths. Similarly, the Government in Papua New Guinea has made clean delivery at the community level a priority as sepsis accounts for 28% of maternal deaths, a much higher percentage than in other countries.[10] Unsafe abortion and related mortality and morbidity are increasingly being recognized as important issues and there is a huge demand for expanding services to address this problem.

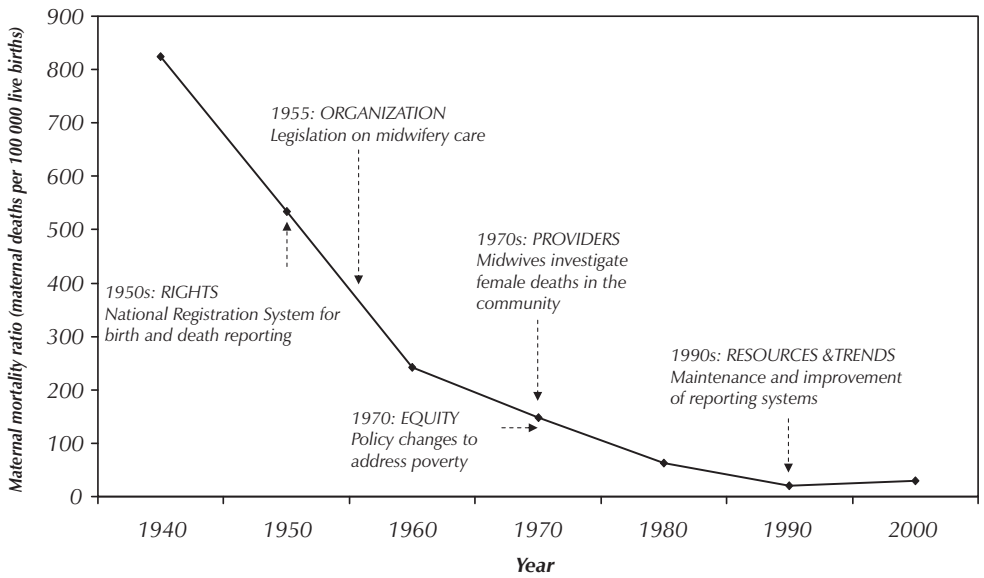
While all these activities are taking place at the country level, there are constraints related to lack of resources, including human resources, in both numbers and quality. Monitoring and supervisory mechanisms for field-based workers need to be strengthened as do functional linkages with the health system. It is important to realize that health systems by themselves cannot address the complex issues related to reproductive health. Collaboration and partnerships with such sectors as education, social, finance and the nongovernmental sector should be expanded and strengthened. As many women are denied access to care—either because of cultural practices or because decision-making is seen as the responsibility of other family members—it is crucial to work with families and communities to improve maternal and newborn health.

Lessons learnt

Maternal mortality reduction in Malaysia

A rapid decline in maternal mortality took place in Malaysia even before the 1950s, when the nation had a relatively low gross national product (GNP) per capita and a female literacy rate of only 17%. Despite these constraints, Malaysia reduced its maternal mortality rate with impressive speed (Figure 9.2). Between 1950 and 1957 the rate was halved, and then in the following 13 years, halved again.[11] This remarkable achievement was due to improved maternal health care for the rural population, followed by the systematic application of the stepwise strategies to improve organizational and clinical management.

Fig. 9.2 Maternal mortality reduction in Malaysia



Source: Graham WJ and Hussein J. Universal reporting of maternal mortality: an achievable goal? *International journal of gynaecology and obstetrics*, 2006, 94: 234-242.

Maternal mortality reduction in Thailand

Until the 1960s Thailand had a maternal mortality ratio (MMR) above 400 per 100 000 live births. In the next 15 years, during the first three health plans from 1961–1976, priority was given to training paramedic personnel. During the 1960s there were 7191 registered midwives. Certified village midwives substituted as traditional birth attendants. The result was a 50% drop in mortality rates by 1970. Registration of midwives was stepped up by the 1970s to 18 314. These midwives were key figures enjoying a high level of professional and social esteem in their villages. Subsequently between 1977 and 1987, during the fourth and fifth health plans, district hospitals were strengthened and better equipped. During this period, the number of hospital beds increased from 2540 to 10 800. By 1985, the maternal mortality rate was reduced to 42 per 100 000 live births and continued its downward trend to fall to an estimated 25 per 100 000 live births by 1990.[12]

Demand-side financing scheme in Bangladesh

Bangladesh has made significant improvements in health over the last three decades by reducing the total fertility rate, infant mortality rate (IMR) and child malnutrition. Nonetheless, health conditions are still far from desirable, and the highest burden of illness is concentrated among poor and vulnerable groups. The level of health services utilization is quite low, especially for maternal and neonatal health care, contributing to high levels of maternal and neonatal mortality and morbidity. Curative health services are dominated by informal sector providers where the quality of care is poor.

Even though health services are provided free of charge (or with a small user fee) in the public sector, evidence suggests that the poor often do not utilize these services. This is due to supply side problems in the public sector, including absent health staff, non-availability of drugs and commodities, discriminatory behaviour by providers, and high costs through illegal payments or ineffectual exemption systems. Demand-side barriers also lead to underutilization. These include social norms that prevent women from obtaining health care, high access costs (e.g. transportation and indirect costs), lack of appropriate health-care education, and inadequate information about prevention and treatment options. At the same time, out-of-pocket health-care expenditures by households are extremely high, at an estimated 70% of all health spending (National Health Accounts 2003). Improving the effectiveness of health spending both in the public and private sectors is a priority.

In order to improve access to health services, the Government initiated demand-side financing in the Vulnerable Group Development, Food Security for Vulnerable Group Development, and Women and their Dependents programmes. Under these programmes, beneficiaries are identified from a resource allocation map based on a number of poverty indicators and given a card that entitles them to a monthly ration of wheat. Other experiences include the School Stipend Scheme, which provides tuition and stipends for female students. In the health sector there are a number of projects that provide subsidized services or micro-credit facilities to the poor.

Future direction

Addressing maternal mortality

Progress in the area of maternal mortality reduction has been patchy. At current rates of progress, most developing countries in the Asia Pacific Region will miss the MDG target by a wide margin. Concerted effort is required to ensure effective implementation of national plans of action. In order to provide skilled care during pregnancy, at childbirth and after childbirth for all women and newborn babies training of health workforces is essential, as is strengthening health systems, improving monitoring and supervisory systems, training staff on data analysis, information interpretation, and feedback mechanisms at the regional and country levels. Improving the capacity for managing essential and emergency care

for women and newborn babies with life-threatening complications means that functional referral mechanisms with community involvement need to be developed. To achieve reductions in maternal and neonatal mortality, programmes should be integrated into health system reforms, health finance and poverty alleviation in a manner that ensures that mothers, infants and children are not excluded from health services provision and that these services are not subjected to policies such as user fees.

Reduction in unwanted pregnancy

In order to decrease the burden of unwanted pregnancies it is imperative to satisfy the unmet needs in all segments of the population. This implies, on one hand, provision of accessible and affordable family planning and reproductive health services to prevent and manage unintended pregnancies and unsafe abortions and, on the other, dissemination of appropriate and culturally sensitive information. The agenda on accelerating adolescent and young people's sexual and reproductive health should be actively pursued to ensure that pregnancy before maturity and unsafe abortions are averted.

Women's empowerment and health

There is a need for continued improvement in the decision-making powers of women in relation to access to reproductive health services. Gender equality should be mainstreamed in all health programmes. Given that women's health issues cut across many sectors, coordination should be enhanced among government departments and agencies whose constituencies affect reproductive health, such as education, information, welfare, employment and finance.

9.2 Child and adolescent health and development

Child health and development

Overview

Remarkable progress has been made in child survival over the last three decades, with worldwide mortality for children under the age of five dropping from an estimated 146 per 1000 live births in 1970 to 74 per 1000 live births in 2005, a trend also seen in countries of the Asia Pacific Region.[13,14] Much of this success is due to an improved standard of living and effective public health interventions delivered to large numbers of children.

Despite this achievement, a staggering 10.6 million children under five worldwide died in 2000.[15] *The Lancet Series on Child Survival,* published in 2003, shows that in 2000 only 42 countries had contributed 90% of annual child deaths. In the Asia Pacific Region, nine countries accounted for about 39% of the global child mortality burden: Bangladesh (343 000), Cambodia (63 000), China (784 000), India (2 402 000), Indonesia (218 000), Myanmar (132 000), Nepal (76 000), the Philippines (82 000) and Viet Nam (63 000).[16] Almost half of these child deaths were due to neonatal conditions and just a few preventable communicable diseases, all compounded by undernutrition.[17] Most childhood deaths occur in low-income countries or poor communities in middle-income countries where many deaths may go unrecorded.

Regional and national averages hide vast disparities in child mortality among and within countries. In 2005, the infant mortality rate computed from 37 countries in the Asia Pacific Region with available data ranged from 3 infant deaths per 1000 live births for Japan and Singapore to 98 per 1000 live births in Cambodia. The variability in under-five mortality rate was equally wide, with values ranging from 3 to 143 deaths among children less than five years old per 1000 live births for Singapore and Cambodia respectively (Table 9.4).

Table 9.4 Infant and under-five mortality rates for selected countries and areas in the Asia Pacific Region, 2005

Country	Total population (thousands)	Population under-five (thousands)	Annual number of under-five deaths (thousands)	Infant mortality rate	Under-5 mortality rate
Australia	20 155	1 253	2	5	6
Bangladesh	141 822	17 399	274	54	73
Bhutan	2 163	293	5	65	75
Brunei Darussalam	374	40	0	8	9
Cambodia	14 071	1 835	61	98	143
China	1 312 979	84 483	467	23	27
Cook Islands	18	2	0	17	20
DPR Korea	22 488	1 723	19	42	55
Fiji	848	92	0	16	18
India	1 103 371	120 011	1 919	56	74
Indonesia	222 781	21 571	162	28	36
Japan	128 085	5 871	5	3	4
Kiribati	99	12	0	48	65
Lao People's Democratic Republic	5 924	895	16	62	79
Malaysia	25 347	2 734	7	10	12
Maldives	329	46	0	33	42
Marshall Islands	62	7	0	51	58
Micronesia, Federated States of	110	16	0	34	42
Mongolia	2 646	270	3	39	49
Myanmar	50 519	4 657	102	75	105
Nauru	14	2	0	25	30
Nepal	27 133	3 639	58	56	74
New Zealand	4 028	274	0	5	6
Palau	20	2	0	10	11
Papua New Guinea	5 887	815	13	55	74
Philippines	83 054	9 863	67	25	33
Republic of Korea	47 817	2 412	2	5	5
Samoa	185	26	0	24	29
Singapore	4 326	216	0	3	3
Solomon Islands	478	72	0	24	29
Sri Lanka	20 743	1 628	5	12	14
Thailand	64 233	5 012	21	18	21
Timor-Leste	947	179	3	52	61
Tonga	102	12	0	20	24
Tuvalu	10	1	0	31	38
Vanuatu	211	30	0	31	38
Viet Nam	84 238	7 969	31	16	19

Source: *State of the world's children 2007: women and children: the double dividend of gender equality*. New York, United Nations Children's Fund, 2006.

In 2006 under-five mortality averaged 6 per 1000 live births in industrialized countries, and as high as 79 per 1000 in developing countries. Estimates from 2006 suggest under-five mortality per 1000 live births ranges from 3 in Singapore, 6 in Australia, 9 in Brunei Darussalam, 13 in Sri Lanka, 55 in Timor-Leste and a high of 104 in Myanmar.[18] Within countries, child health indicators tend to be worse among the poor. For example, in the Philippines the poorest quintile has more than three times higher under-five mortality rates than the richest quintile.[19] Gender differentials in child mortality are significant in some areas. For instance, a girl in India is 30%–50% more likely than a boy to die between her first and fifth birthdays.[20] These inequalities are ethically indefensible, and they extend far beyond survival to documented inequities in exposure to risks in the physical and social environment, and in access to information and services.

It is a matter of concern that in several countries progress in reducing child deaths has slowed, and in some areas past gains have even been reversed, as cited in *The world health report 2005*. While cost-effective, evidence-based child survival interventions have been implemented to a varying degree, they have not received due attention or the investment necessary to take them to scale. A failure to effectively address neonatal mortality is another problem, which contributes to more than 40% of all child mortality.[21] Access to health services is unequal across and within countries due to geographical, financial and other barriers. Health service utilization in some areas is very low, partly due to inadequate quality of care, particularly in poor areas. Unsafe environments prevail in many parts of the Region, contributing to unintentional injuries such as drowning, poor environmental hygiene and indoor air pollution. In countries and areas in transition, the proportion of childhood deaths due to accidents and injuries is increasing.

A series of previous activities has highlighted the need to revisit and pursue the unfinished child survival agenda. These include the United Nations General Assembly Special Session on Children (May 2002) and the *Team Residency: Knowledge into Action: Improving Equity in Child Health* (Bellagio, February, 2003) which brought together experiences from the Child Health Epidemiology Research Group, the ongoing Multi-Country Evaluation of Integrated Management of Childhood Illness strategy, and the WHO/World Bank/UNICEF Working Group on Child Health and Poverty. The major conclusion of *The Lancet's* 2003 series on child survival and the 2005 series on neonatal survival is that we already have the tools to attack the problem. What is needed is the resolve to provide resources to ensure equitable access to known, effective interventions for all children. Increased accountability of governments and the international community was also sought through the conference Countdown to 2015 – Tracking Progress in Child Survival, held in London in December 2005, which will continue to track progress towards the agreed goals of reducing child mortality on a biannual basis.

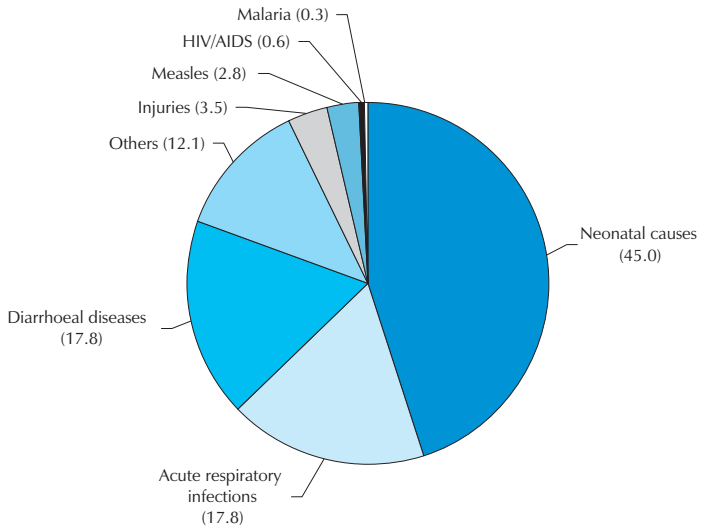
Issues in child health in the Asia Pacific Region

Millennium Development Goal 4 calls for a reduction by two thirds, between 1990 and 2015, of the under-five mortality rate. This goal is contingent on all other Millennium Development Goals, but particularly Goal 1 (eradicate extreme poverty and hunger) and Goal 5 (improve maternal health). With adequate resources and appropriate policies, millions of young lives could be saved through simple, proven, low-cost prevention and treatment measures. If current trends continue, the reduction in under-five mortality worldwide from 1990 to 2015 will be just 15%.[22] This is well short of the two thirds reduction target pledged by world leaders in 2000.

Stagnating mortality reduction, persistence of preventable and treatable causes of childhood mortality, huge disparities in child survival, insufficient investment to scale up evidence-based interventions, and gross deficiencies in human resources for health are major concerns in regard to achieving Millennium Development Goal 4 in the Region.

While many countries in the Asia Pacific Region are known for economic prosperity, there are enormous disparities between countries and even within them, reflected in the wide range of national rates of infant and under-five mortality and undernutrition. Furthermore, analysis of some indicators suggests that the disparities are widening. Many countries do not allocate enough general government resources to health, and mechanisms such as insurance for collecting more resources are poorly developed. Many countries with high rates of under-five mortality spend less than 5% of their GDP on health, and per capita health spending is lower than that recommended by the Commission on Macroeconomics and Health.[23] Additionally, processes such as the decentralization of health-care financing may affect public health interventions if they are not linked to capacity-building. The inadequate finances commonly allocated to health are not necessarily spent in a way that reflects a public health priority. Due to relatively modest government contributions to overall health-care financing, and limited financial protection mechanisms for the poor, households continue to face financial barriers to essential health care. The broad use of out-of-pocket payments increases inequity in accessing and financing health care. Health expenditures can be catastrophic for many low-income families, pushing them deeper into poverty.

Fig. 9.3 Annual number of deaths by cause for children under age five in the Asia Pacific Region, 2000–2003



Note: Amalgamated data for 2000–2003

Source: *The world health report 2005: make every mother and child count*. Geneva, World Health Organization, 2005.

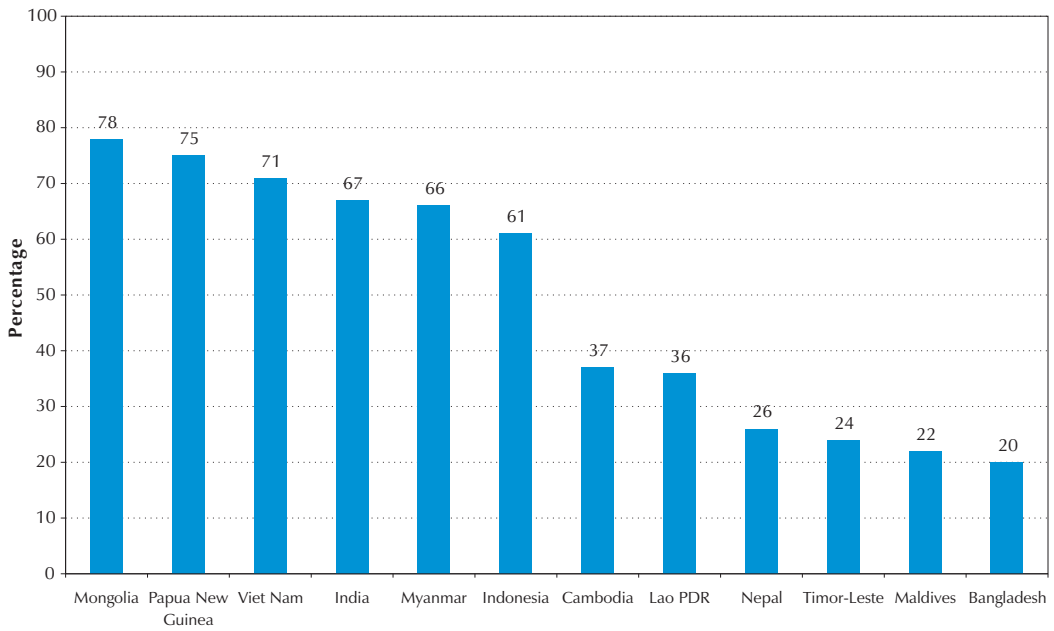
Causes of childhood deaths

Preventable communicable diseases account for over 60% of childhood deaths. Acute respiratory infections, specifically pneumonia and diarrhoeal diseases, are the top two causes of death among children under the age of five in the Asia Pacific Region (Figure 9.3). About 45% of these deaths occur in the first month of life. In 2000, over 99% of these deaths occurred in low-income countries, but at the same time were successfully prevented in economically better off countries, thus demonstrating that they can and should be prevented.[24] Communicable diseases also lead to considerable morbidity, and in some cases, long-term disability.

Acute respiratory infections

Acute respiratory infections account for about one fifth of all child deaths in the Region.[25] The prevalence of symptoms of acute respiratory infection in children under the age of five in countries of the Region is so significant that they are among the most common reasons for child consultation in both primary and referral care facilities.

Fig. 9.4 Percentage of children under age five with suspected pneumonia taken to a health provider



Source: *State of the world's children 2007: women and children: the double dividend of gender equality*. New York, United Nations Children's Fund, 2006.

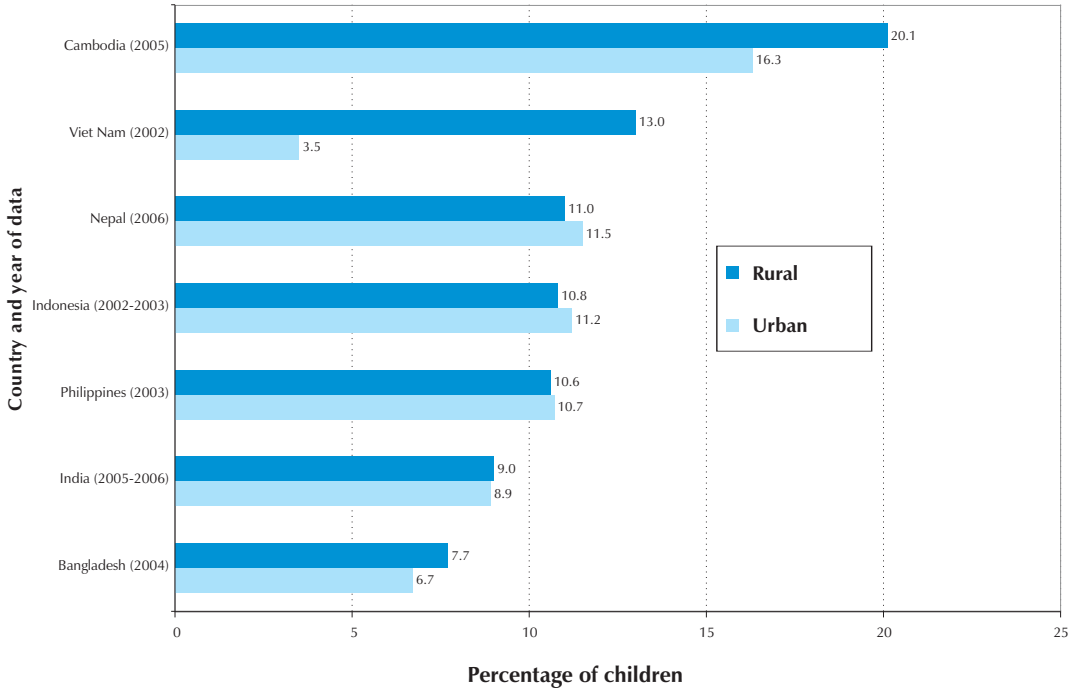
It is well documented that a very large proportion of pneumonia in children under the age of five is due to bacterial infection. An algorithmic approach to the management of acute respiratory infection at the community level is recommended by WHO and the United Nations Children's Fund. Unfortunately, access to public sector health-care facilities for treatment of pneumonia for children remains low in several countries in the Region (Figure 9.4). Data projected in the bar graphs on pneumonia prevalence and care-seeking may have changed for countries that have recently conducted national demographic health surveys. For the sickest children, referral-level care at a district hospital is necessary, and deficiencies in quality in many such health facilities result in unacceptably high case fatality rates from pneumonia and other serious and common illnesses. Lack of oxygen and the timely delivery of basic emergency care are major problems which have been addressed in countries prepared to apply a minimum standard of resources. Most pneumonia deaths are due to *S. pneumoniae* and *H. influenzae*, and vaccines against many strains of these two bacteria are now in widespread use in developed countries, highlighting that new technologies can bring further inequity.

Diarrhoeal diseases

Diarrhoeal diseases in the Region account for 18% of under-five deaths in the post-neonatal age group, and 2.4% of neonatal deaths.[26] In general, diarrhoea is more prevalent in rural than urban children (Figure 9.5). The prevalence of diarrhoea is highest for children aged 6–17 months, consistent with the time period when complementary foods are introduced in the diet.

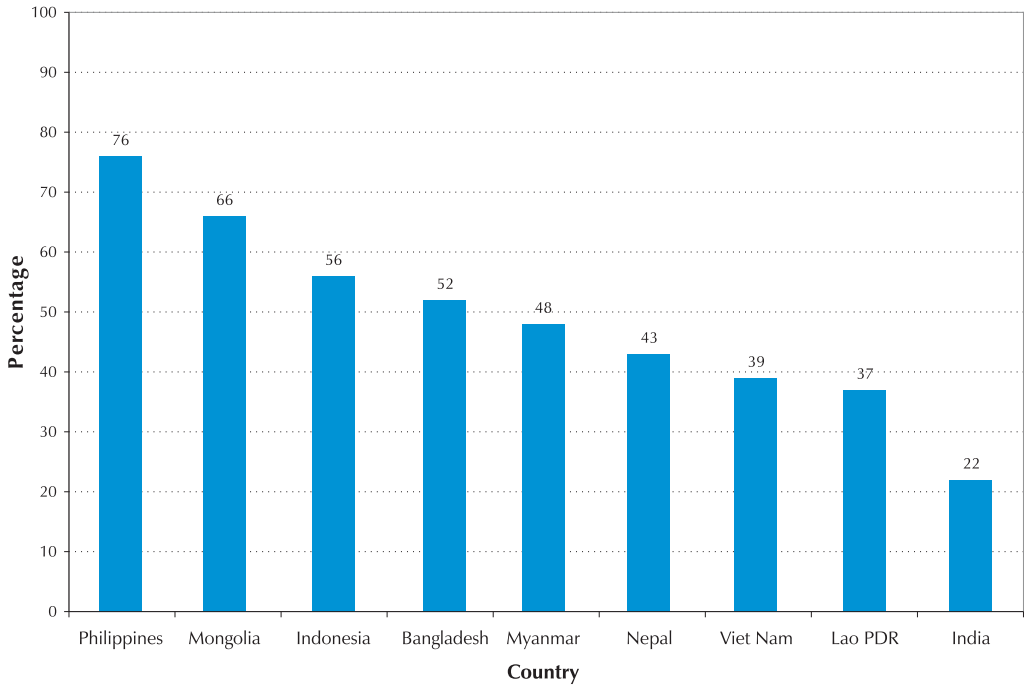
Care-seeking for diarrhoea varies considerably among countries. Universal access to oral rehydration therapy has the potential to avert 15% of all under-five child mortality.[27] Unfortunately, while the use of oral rehydration salts is widely promoted, its use remains unacceptably low in some countries (Figure 9.6). Data for some countries included in the graphs on diarrhoea prevalence and treatment may have changed, based on recently conducted national demographic health surveys.

Fig. 9.5 Percentage of children under age five with diarrhoea in the two weeks preceding the survey, by residence, in selected countries of the Asia Pacific Region



Source: *Demographic and health survey: final reports*. (By country). Measure DHS. Available from: http://www.measuredhs.com/pubs/search/search_results.cfm?Type=5&srchTp=type&newSrch=1

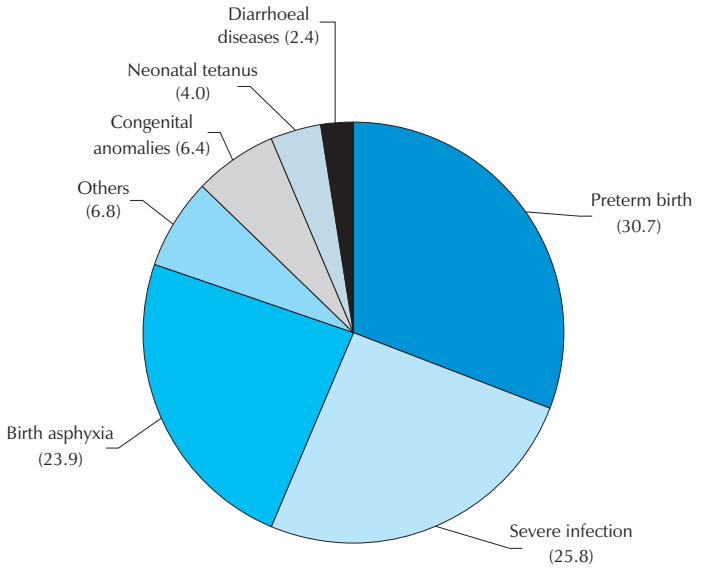
Fig. 9.6 Percentage of children under age five with diarrhoea receiving oral rehydration and continued feeding in selected countries of the Asia Pacific Region, 1998–2005



Source: *State of the world's children 2007: women and children: the double dividend of gender equality*. New York, United Nations Children's Fund, 2006.

Further reductions in childhood deaths and long-term disabilities cannot be achieved without making the health of mothers and newborns a higher priority. It is estimated that reduction of under-five child mortality by two thirds by 2015, as called for by the MDGs, will require a reduction in neonatal mortality of at least 50%.[28]

Fig. 9.7 Percentage distribution of neonatal deaths by cause in the Asia Pacific Region, 2000–2003



Note: Amalgamated WHO estimates for 2000-2003

Source: *The world health report 2005: make every mother and child count*. Geneva, World Health Organization, 2005.

Major causes of neonatal deaths in the Region include preterm births, birth asphyxia and severe infections (Figure 9.7). Severe infections, diarrhoeal diseases and neonatal tetanus underscore the importance of appropriate care of newborns to prevent these problems, as well as proper care once the diseases occur.

In several countries, a large proportion of women deliver babies with no skilled birth attendant, and many more mothers and newborns go without any postnatal care during the most vulnerable days and weeks immediately after birth. The presence of an SBA is crucial for providing essential care, which includes temperature management and early initiation of breastfeeding, as well as identification, management and referral of perinatal conditions that cause morbidity in both mother and child. Not surprisingly, neonatal mortality and stillbirth rates are high in countries with low-skilled birth attendants. Skilled attendance at birth ranges from 13%–100% in countries of the Region[29] (Table 9.7).

Children born to unhealthy mothers are more likely to be low-birth-weight babies and to have difficulty combating illness. They face an environment less able to provide the safe and nurturing conditions necessary for healthy growth and development. Mortality rates are substantially higher in low-birth-weight babies. Some South-East Asian countries record among the world's highest prevalence of low-birth-weight babies. In these countries, almost a quarter of newborn babies are of low birth weight (less than 2500 grams).

Nutritional influences

The importance of nutrition as a foundation for healthy development is often underestimated. Poor nutrition leads to ill-health, which in turn causes further deterioration of nutritional status. These effects are observed most dramatically in infants and young children who carry the brunt of the onset of undernutrition and the highest risks of death and disability associated with it. Over half of all child deaths are associated with undernutrition. However, the children who die represent only a small part of the total disease burden due to nutritional deficiencies. Inadequate breastfeeding and complementary feeding represent huge risks to the health of children who do survive. Vitamin A, iodine, iron and zinc deficiencies remain widespread and are a common cause of excess morbidity and mortality, particularly among young children. The effects of poor nutrition and stunting continue over the child's life, contributing to poor school performance, reduced productivity and impaired intellectual and social development.

Table 9.7 Selected indicators related to newborn health for selected countries and areas of the Asia Pacific Region

Country	Pregnant women who received			Births attended by skilled personnel		Births in health facility		Annual number of live births (thousands) 2004	Stillbirth rate (per 1000 births) 2004	Neonatal mortality rate (per 1000 live births) 2004
	1+ANC visit(%)	4+ANC visit(%)	Year	(%)	Year	(%)	Year			
Australia	…	…	…	100	2003	…	…	249	3	3
Bangladesh	39	11	1999-2000	13	2004	6	1999-2000	3 738	33	36
Bhutan	…	…	…	51	2005	…	…	64	17	30
Cambodia	44	9	2000	44	2005-2006	10	2000	422	44	48
China	…	…	…	83	2004	…	…	17 372	17	18
DPR Korea	98	…	2000	97	2004	…	…	349	20	22
Fiji	…	…	…	99	2002	99	2002	19	9	10
India	65	30	1998-1999	48	2005-2006	34	1998-1999	26 000	35	39
Indonesia	97	81	2002-2003	66	2002-2003	40	2002-2003	4 513	8	17
Japan	…	…	…	100	2004	99.8	2004	1 169	2	1
Kiribati		88	2001	89	2002	76	2002	2	23	25
Lao People's Democratic Republic	44	29	2001	19	2001	12	2000	204	27	30
Malaysia	…	…	…	100	2005	98	2005	549	5	5
Maldives	98	81	2001	70	2001	-	-	10	34	24
Mongolia	…	97	2001	100	2004	99.5	2006	58	18	18
Myanmar	…	76	2001	68	2003	…	…	992	44	49
Nepal	49	15	2001	19	2006	9	2001	786	18	32
Papua New Guinea	…	78	2001	42	2004	35	2005	176	28	32
Philippines	94	70	2003	60	2003	38	2003	2 026	9	15
Republic of Korea	…	…	…	100	2003	99.9	2006	467	2	3
Samoa	…	…	…	100	2004	91	2004	5	13	14
Sri Lanka	…	98	2001	97	2000	…	…	330	8	8
Solomon Islands	…	…	…	85	1999	43 *	2003	15 21	23	
Thailand	…	86	2001	99	2002	…	…	1 015	8	9
Timor-Leste	…	…	…	18	2002	…	…	45	27	29
Tonga	…	…	…	98	2004	98	2004	2	11	12
Viet Nam	70	29	2002	85	2002	79	2002	1 644	23	12

… Data not available

*Clinics only

Sources: *The world health report 2005: make every mother and child count*. Geneva, World Health Organization, 2005.

World health statistics 2007. Geneva, World Health Organization, 2007. Available from: http://www.who.int/healthinfo/statistics/whstatsdownloads/en/index.html

Neonatal and perinatal mortality: country, regional and global estimates. Geneva, World Health Organization, 2006.

Country health information profiles, 2006 revision. Manila, WHO Regional Office for the Western Pacific, 2006.

Country health information profiles, 2007 revision. Manila, WHO Regional Office for the Western Pacific, 2007.

Breastfeeding exclusively for the first six months of life has the potential to avert 13% of all child deaths.[30] Apart from reducing under-five child mortality, breastfeeding confers several other advantages to both mother and child. More effort is needed in the Region to ensure that infants are not denied the benefits of exclusive breastfeeding. Similarly, promotion of appropriate complementary feeding practices needs more attention, since complementary feeding is delayed in a large proportion of infants in several countries, thereby contributing to the high prevalence of undernutrition in children.

In many countries of the Region, the practice of breastfeeding is almost universal. However, many social, religious and other factors impact this practice. In several cultures, pre-lacteal feeds are common and the practice of exclusive breastfeeding up to age six months is not institutionalized. Exclusive breastfeeding up to six months of age ranges from roughly 4% in Thailand to 80% in Kiribati[31] (Table 9.8). Breastfeeding rates have been declining in many countries such as China and Viet Nam despite well-known advantages. Partial responsibility for this decline lies with the advertising and promotion of infant feeding products by companies inside and outside health facilities.

Table 9.8 Selected nutrition indicators for selected countries and areas in the Asia Pacific Region, 1996–2005

Country	% of infants with low birth weight 1998-2005	% of children (1996–2005) who are:		% of under-5 (1996-2005) suffering from			Vitamin A supplementation coverage rate (6–59 months)2004	% of households consuming iodized salt 1998–2005
		Exclusively breastfed (<6 months)	Breastfed with complementary food (6–9 months)	Under-weight (moderate and severe)	Wasting (moderate and severe)	Stunted (moderate and severe)		
Bangladesh	36	36	69	48	13	43	83	70
Bhutan	15	...	...	19	3	40	...	95
Cambodia	11	12	72	45	15	45	72	14
China	4	51	32	8	...	14	...	93
DPR Korea	7	65	31	23	7	37	95	40
Fiji	10	47	...	...	...	...	...	31
India	30	37	44	47	16	46	51	57
Indonesia	9	40	75	28	...	...	73	73
Kiribati	5	80	...	...	...	...	58	...
Lao PDR	14	23	10	40	15	42	48	75
Malaysia	9	29	...	11	...	...	...	...
Maldives	22	10	85	30	13	25	...	44
Mongolia	7	51	55	7	3	20	93	75
Myanmar	15	15	66	32	9	32	96	60
Nepal	21	68	66	48	10	51	97	63
Papua New Guinea	11	59	74	...	...	...	32	...
Philippines	20	34	58	28	6	30	85	56
Singapore	8	...	...	3	2	2	...	...
Solomon Islands	13	65	...	...	...	...	...	...
Sri Lanka	22	53	...	29	14	14	57	94
Thailand	9	4	71	18	5	13	...	63
Timor-Leste	12	31	82	46	12	49	43	72
Vanuatu	6	50	...	...	...	...	...	...
Viet Nam	9	15	...	27	8	31	95	83

... Data not available

Source: *State of the world's children 2007: women and children: the double dividend of gender equality*. New York, United Nations Children's Fund, 2006.

Approaches for improving child health

Improving health-care services in primary and referral care levels

The evidence-based Integrated Management of Childhood Illness (IMCI) strategy seeks to provide holistic, integrated management of the common causes of childhood deaths by improving the clinical assessment and counselling skills of health-care providers, the health-care delivery system, and family and community practices (including care-seeking) for promoting child health. The IMCI strategy offers a simple, affordable and effective set of interventions based on local epidemiology, which not only address the changing causes of child mortality but also provide an opportunity for promoting healthy growth and development.

Of 48 countries and areas in the Asia Pacific Region, 22 are at various stages of IMCI implementation.[32,33] However, implementation remains limited. Recent evidence regarding the general effectiveness, cost-effectiveness and impact of IMCI points to a need for rapidly increasing coverage.

In strengthening and expanding IMCI, countries are emphasizing care of the very young infant; seeking alternative ways for in-service training; integrating the strategy and other public health content in pre-service education in health sciences schools; strengthening capabilities to support appropriate feeding of infants and young children; creating links with the community to promote appropriate behaviour among caregivers and families; and extending integrated care to the referral level.

The focus on primary health care, and more recently on the role of households and communities, has not overlooked the importance of quality improvement in referral care facilities. Deaths in hospitals often occur within 24 hours of admission and many of these in-hospital deaths could be prevented if timely quality care was provided. Lack of organization, essential drugs, basic equipment, oxygen, nutritional support, clinical guidelines and up-to-date training for nurses are limiting factors to quality of care, and result in high case fatality rates for common illnesses in many district hospitals. Many countries are now addressing these problems through WHO's Hospital Care for Children strategy, a programme which extends IMCI to first-referral level hospitals, ensuring consistency in management across all health service levels. Health providers in referral care facilities should be skilled in triage and able to administer emergency treatment, make diagnoses, provide supportive care and monitoring, plan for continued treatment that conforms to evidence-based standards, and provide appropriate follow-up and rehabilitation. This should all occur in a family-friendly environment, within health centres and district hospitals that are valued sections of the community. To encourage community health-care seeking, quality must be improved in many of the Region's countries.

Strengthening the policy and strategy environment

The majority of countries in the Asia Pacific Region are signatories to the United Nations Millennium Declaration, which aims to reduce by 2015 under-five child mortality by two thirds of 1990 levels. The interventions necessary to achieve this goal are well known and include the following: skilled attendance during pregnancy, childbirth, and the immediate postpartum; infant feeding; immunization; case management of diarrhoea, pneumonia and neonatal sepsis; measures to combat and treat malaria; treatment, care and infant feeding counselling; and support for HIV-infected women and their infants. The challenge facing many countries is ensuring equitable access to evidence-based interventions. Achieving this means adopting strategies that provide a continuum of care throughout the life-cycle, including pregnancy, childbirth and childhood on the one hand, and maintaining a continuum of care that spans the home, community, health centre and referral facilities on the other. Resources must be allocated to overcome systemic constraints to scaling up maternal, newborn and child health programmes; and to allow health systems to offer quality services as a core function.

A global deficit of health workers, estimated at over 4.3 million,[34] is a human resources crisis. Human resources for health in low-income countries face three fundamental challenges: chronic under-investment in health systems and in people; migration of health workers away from areas most in need; and HIV/AIDS. Grossly inadequate investment in health has resulted in substandard rural health facilities, shortages of drugs and equipment, inadequate wages and limited incentive for rural service, poorly supported district health services, low morale, closure of nursing colleges, and limited professional development. Large-scale migration of doctors and nurses is occurring from rural to urban areas, from public to private sectors, from poor to rich countries, and away from academic careers in training institutions to better paid employment. In some countries, HIV/AIDS has exacerbated this human resources crisis by taking the lives of doctors and nurses, increasing workloads and patient complexity, and through programmes to provide life-saving antiretroviral therapy (ART); all draining human resources that would otherwise be used to treat childhood diarrhoea, pneumonia or malnutrition. Government and donors are increasingly recognizing that supporting human resources through training, continuing education, career opportunities, and by providing an appropriate work environment and remuneration are essential to address health system development issues related to child survival.

Both the WHO regions in the Asia Pacific have joined hands with governments and other partners to formulate strategy and policy documents on the issue of child health. The WHO/UNICEF Regional Child Survival Strategy advocates universal access to essential child survival interventions delivered through integrated approaches and regular monitoring of progress. Strategies have also been devised to help countries decide what needs to be done to reduce neonatal mortality, provide evidence-based guidance for setting priorities, mobilize resources, and coordinate efforts to improve the mother's health and nutrition and her baby's chances of survival. Operational issues and essential steps to operationalize the strategy for newborn health have also been described.

Many governments and organizations are striving to strengthen the policy and strategy environment for maternal, newborn and child health. Several opportunities for additional funding of IMCI-related programmes are being sought. A few notable examples include the National Neonatal Health Strategy adopted by Nepal; the development of neonatal and child health strategies in Indonesia, Myanmar and Timor-Leste; and the inclusion of evidence-based interventions in large World Bank-funded national programmes in Bangladesh and India. Cambodia has developed a national child survival strategy in collaboration with local and international experts. Papua New Guinea, the Philippines, Solomon Islands and Viet Nam are in the process of doing the same. China reviewed national maternal and child survival strategies and developed an essential package of maternal and child health-care services following the recommendations of the review.

Adolescent health and development

Adolescents aged 10–19 and young people age 10–24 account for up to one quarter and one-third, respectively, of the population in the countries and areas of the Asia Pacific Region (Table 9.9). Investing in their health is vital for social and economic progress. Adolescence is a transition period of rapid physical, social and psychological development, marking a unique point in life when an individual is no longer a child but not yet an adult. This transition poses both challenges and opportunities for sound adolescent and adult health and development. By the time individuals reach the age of 10 and have adolescents they have weathered the hazards of infant and childhood diseases and are considered to be generally healthy. However, many threats to their health and development still exist, which they need to be prepared for and be protected from. For example, while adolescent mortality rates are low, other health issues causing serious and debilitating morbidity affect young people disproportionately, such as sexually transmitted infections, including HIV, accidents and injuries, and mental health disorders.

Table 9.9 Percentage of the population aged 10–24 and 10–19 years in selected countries and areas in the Asia Pacific Region

Country/area	Young people (10–24 years) %	Adolescents (10–19 years) %
Bangladesh	32.0	22.0
Bhutan	33.0	23.7
Cambodia	35.7	24.1
China	24.4	18.8
India	30.0	21.0
Indonesia	28.4	18.9
Japan	15.7	9.8
Lao People's Democratic Republic	32.5	23.4
Kiribati	29.3	21.3
Maldives	34.8	24.7
Myanmar	30.0	20.6
Mongolia	33.0	22.7
Nepal	32.4	23.1
Papua New Guinea	31.9	22.8
Philippines	31.5	22.0
Sri Lanka	26.3	17.0
Thailand	25.0	16.5
Timor-Leste	35.2	24.5
Viet Nam	31.9	21.7

Sources: *Adolescent health at a glance in the South-East Asia Region 2007*. New Delhi, WHO, Regional Office for South-East Asia, 2007.

The world's youth 2000. Washington, DC, Population Reference Bureau, 2000. Available from: http://www.prb.org/pdf/WorldsYouth_Eng.pdf

The Maldives health bulletin 1997. Male, Ministry of Health, 1998.

Demographic tables for the Western Pacific Region 2005-2010. Manila, WHO Regional Office for the Western Pacific, 2005. Available from: http://www.wpro.who.int/publications/Demographic+tables.htm

Adolescents are not a homogeneous group. The health problems that they encounter and the issues affecting them differ considerably from those of children and adults. Very often adolescents focus more on the present and near future than adults, who tend to look to the more distant future. Unlike children, whose environment is often close to home, an adolescent's environment is wider and less controllable. Married adolescents have different health needs compared with unmarried adolescents, as do youths living in urban or rural settings. In child health, the primary focus is on survival; in adolescence it is mainly on development. Adolescents raise questions and concerns about the physical and psychological changes they are experiencing and their changing relationships with family, friends and those in authority. Adolescence is a time of experimentation, risk-taking, exploration and testing new freedoms and boundaries, but it also presents the opportunity for foundations to be laid for a healthy and responsible adulthood. Due to lack of knowledge, information and life skills, or because they live in unsafe or unsupportive environments, vulnerable adolescents may make decisions that lead to serious health problems that can last a lifetime.

Since the International Conference on Population and Development in 1994, many programmes and research studies have been carried out in the Region in an effort to understand and address the health threats that adolescents encounter. Despite a reduction in infectious diseases among adolescents in the last 30 years, many remain exposed to health and development risks due to factors, or determinants, such as poverty, gender-based discrimination, exploitation, war and violence. HIV is a new infectious risk unknown to previous generations. Rapid social and economic gains in many countries have brought problems of youth unemployment, migration, urbanization, globalization, increased accidents and injuries, and in some instances a loss of family connections. These changing conditions have been accompanied by an increase in risk behaviours, and with health consequences such as unsafe sex, substance abuse, smoking, vehicle racing and criminal gang activities. As a result, observations and research data have indicated that among adolescents in the Region the incidence of health and life-threatening conditions appears to be on the rise. These include sexually transmitted infections (including HIV/AIDS), early and unwanted pregnancies, infertility, mental health disorders, disability and reduced learning capacity, and the onset of noncommunicable diseases such as diabetes, cardiovascular disease and obesity later in life.

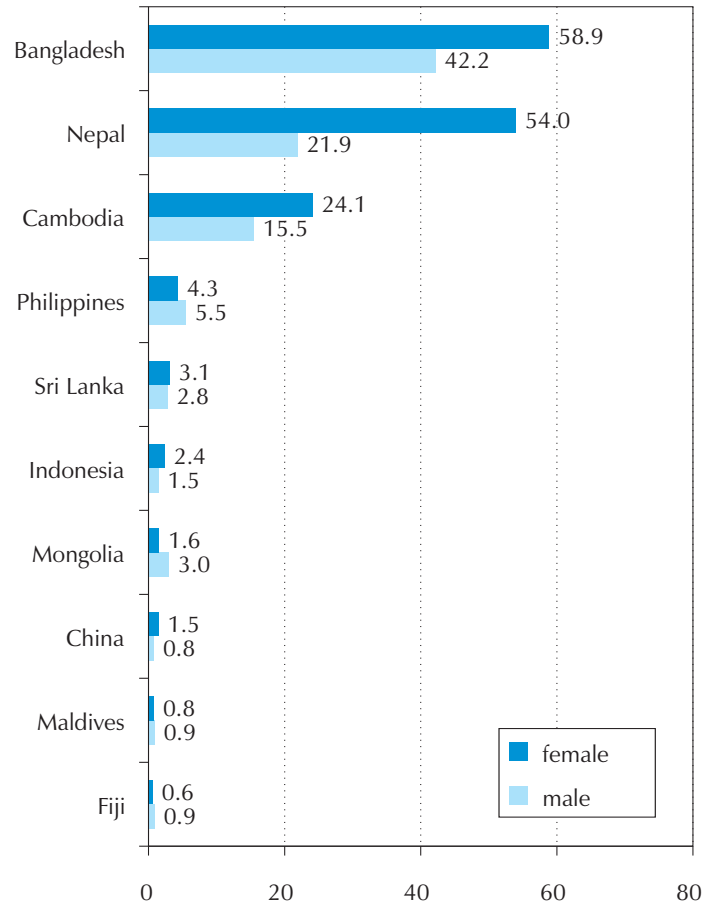
Although raw data on many of these issues relating to adolescents exist, a lack of more detailed data causes serious problems when it comes to understanding the full picture for this population group. A lack of data disaggregated by age and sex poses a challenge to governments and communities when it comes to advocating for adolescent health issues from an evidence-based perspective. Consequently, adolescent health issues are often not properly represented in public health planning. Some countries which have undertaken major national youth surveys in order to gather reliable baseline data now use it to inform policy, guide programming, evaluate future intervention efforts, and provide evidence to advocate for an adolescent and youth health agenda. These country examples could serve to promote better data collection and more effective targeting of policy and planning in the Region.

In this chapter, some of the key health situations and determinants of health for adolescents are described. While not comprehensive, an overview of some of the key issues concerning adolescents and their health in the Region are described together with some possible solutions.

Education

Education plays an important role in determining adolescent health and opportunities. The relationship between levels of education and health is now recognized in many policy and programme applications. The role attributed to schools in developing protective factors which affect quality of life is also now widely recognized. Enrolment rates for younger adolescents in primary school are relatively high in most countries in the Region. However, bearing in mind the positive impact education has on health, the high drop-out rate in the later years of education is cause for concern. Economic factors play a part in this phenomenon as does early marriage. Education is a fundamental right and is important for improving adolescent girls' knowledge of sexual and reproductive health. In addition, female literacy is associated with better health and nutrition, increased child survival, higher age at marriage, and lower fertility; and is a strong contributing factor to child and family development and stability. However, evidence suggests that adolescent girls in some of the countries in the Region are being denied access to education or are having their education curtailed. These gender differentials exist despite favourable policies in many countries that make some level of education compulsory for males and females (Figure 9.8).

Fig. 9.8 **Percentage of adolescents aged 15–24 without education by sex in selected countries in the Asia Pacific Region, 2005**



Source: *EFA global monitoring report 2005: education for all: the quality imperative*. Paris, United Nations Educational, Scientific and Cultural Organization, 2005. Available from: http://portal.unesco.org/education/en/ev.php-URL_ID=35939&URL_DO=DO_TOPIC&URL_SECTION=201.html

Adolescent reproductive health

Adolescence is a critical time for promoting sexual and reproductive health. In many parts of the Region, the age at which adolescents and young people marry is rising. Young people's sexual activity outside of marriage is also increasing. There is also some evidence to show that young people are becoming sexually active at an earlier age. Sexual behaviour in this young age group is often unsafe due to lack of knowledge about sex and relationships, sexuality and reproductive health, and how to practice safe sex. Many adolescents are poorly informed about their bodies and few have access to contraception. Sex is often unplanned in this age group and young women in particular lack negotiation and refusal skills. A recent national study in Viet Nam showed 50% of sexually active young people used no contraception at first sex and 65% used none at their most recent sexual activity.[35] Unsafe sex can also result from alcohol and drug abuse, behaviours that are on the increase in the Region. In many parts of the Region, barriers based on social, cultural and religious grounds restrict access to information and sexual and reproductive health services for adolescents, which add to their vulnerabilities. In many countries, parents have considerable difficulties in discussing sex openly with their children and this lack of dialogue creates confusion among adolescents at a time they are seeking explanations

and information about such issues. Even in areas where sexual and reproductive health services are available adolescents may fail to receive them, especially in countries where policies restrict their access to services such as abortion, contraception (including condoms) and HIV/AIDS or sexually transmitted infections testing and counselling. Judgmental and discriminatory attitudes and lack of confidentiality among health-care providers are barriers to adolescents seeking services, as are inconvenient clinic hours and inappropriate locations.

Unmet needs for family planning

Women who want to stop having children or to postpone pregnancy, but are not using contraceptives, are defined by demographic and health surveys (DHS) as women with an unmet need for family planning. Unmet need does not necessarily mean that family planning services are not available. It may also mean that women lack information, or that the quality of services do not inspire confidence, or that women themselves have little say in the matter. According to DHS reports, unmet need for birth spacing ranges from 6.4% in Indonesia to 33.4% in Nepal. The unmet need for contraception is generally high among young females.

Most of the unmet need among adolescents aged 15–19 is for spacing births, not for limiting child-bearing. In Bangladesh, India and Nepal, this unmet need among younger age groups, i.e. 15–19 years, is higher than in groups aged 20–24. It is felt that the DHS data on unmet need for birth spacing may be of questionable validity, given the pervasive pressure on young, childless wives to bear children.

Age at marriage

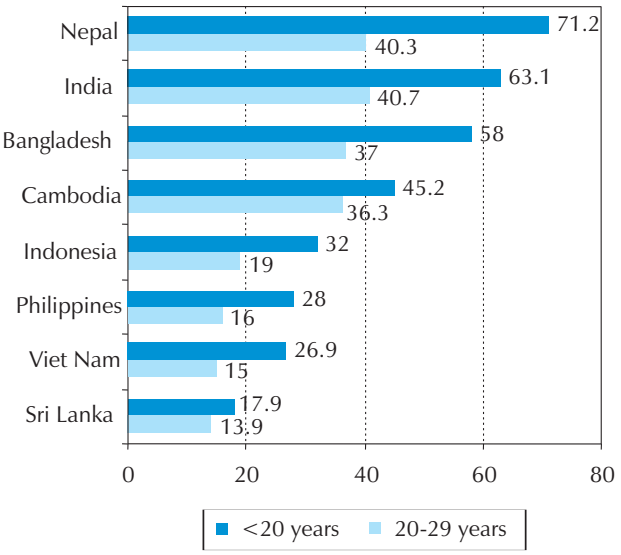
In recognition of the powerful impact of marriage on the quality of life of young people, nearly every country has a legal minimum age of marriage. However, tradition and cultural and religious practices often take precedence, making the effectiveness of laws governing marriage age debatable. In a bid for financial and social benefit, parents in some countries marry off their daughters early. Female age at marriage is of particular interest because, for most in the developing world, it is closely linked to the age they give birth. Moreover, early marriage is associated with limited education, work experience and a premature end to personal growth. Age at marriage is rising in most countries, but early marriage is still common in some.

In countries where females marry while they are still legally children, the men they marry are usually considerably older. Given the magnitude of spousal age differences for married adolescent girls, it is reasonable to assume that many teenage brides have limited capacity to negotiate with their husbands about sex, contraception and child-bearing, as well as other aspects of domestic life. Even in countries with a relatively late age of marriage such as Viet Nam, rural young people marry significantly earlier than their urban counterparts and young men and women from ethnic minority groups marry around 5–6 years earlier than their counterparts.

Adolescent pregnancy puts girls at high risk of spontaneous abortion, premature labour, stillbirths, obstructed labour and related injuries, as well as death. The child of an adolescent girl is at higher risk of infant morbidity and mortality. The incidence of very early child-bearing (i.e. by age 15), while not common, is substantial in some countries such as Bangladesh where one in six women begin child-bearing at age 15. However, significant decreasing trends have been found in adolescent fertility over the period of 14 years preceding recent demographic and health surveys. Results indicate a decline in adolescent (15–19 years) fertility in the Region, of between 15% to 35%. Reasons for these declines may vary from country to country due to such factors as age at marriage or cohabitation, or an increased use of family planning methods.

The proportion of adolescent mothers whose pregnancies are either unplanned or unwanted varies throughout the Region. Both married and unmarried adolescents experience unplanned and unwanted pregnancies and births. Evidence shows that most married adolescent girls in developing countries do not want to bear children or have repeated pregnancies and large families while they are themselves still children.[36] Over one fifth of births to adolescents are unplanned, 20% are mistimed with the child not desired till later, and 0.8% are unwanted, reflecting the obvious need for contraception among young people.[37] Viet Nam, with the lowest proportion of unplanned adolescent pregnancies, allows abortion that is legal, easily accessible and relatively safe. In addition, unmarried young women under 20 account for 5%-10% of total abortions. Viet Nam's low figure of unwanted pregnancy may be partly because abortions are accessible in the early stages.

Fig. 9.9 Neonatal mortality rates by mother's age at birth in selected countries in the Asia Pacific Region, 1998–2004



Sources: *Demographic and health survey: final reports*. (By country). Measure DHS. Available from: http:// www.measuredhs.com/ pubs/search/ search_results.cfm?Type=5&srchTp=type&newSrch=1

Facts about adolescents from the demographic and health survey: statistical tables for program planning : reports and annexes by country. New York, Population Council. Available from: http://www.popcouncil.org/gfd/gfdcountries.html

Early child-bearing in adolescence may have wide-ranging adverse social, economic, psychological and health consequences for mother and child. Evidence shows that neonatal mortality is significantly higher for adolescent mothers than women aged 20–29 (Figure 9.9). Compared to women in their 20s, the risk of dying from pregnancy-related causes is twice as high for adolescents and may be up to five times higher for girls aged 10–14.

Induced abortion and health consequences

Despite legal and cultural restrictions in a number of countries across the Asia Pacific Region, adolescent girls do seek abortions for unwanted pregnancies. Data on incidence of abortions and on morbidity and mortality resulting from unsafe abortions are scarce. However, the limited data available indicate widespread prevalence of unsafe abortions, often during the second trimester or later and in dangerous circumstances, which puts adolescents at high risk of such serious complications as haemorrhage, septicaemia, infertility and even death.

In India, an estimated six million abortions take place each year. Small studies suggest that 1%–10% of abortion seekers are adolescents.[38] Data from the second National Family Health Survey (NFHS-2) show a lifetime induced abortion ratio of 1:1 among married adolescents.[39] Among unmarried abortion seekers, adolescents constitute a disproportionately large percentage. At least 50% of unmarried women seeking abortions are adolescents, many of whom are below the age of 15.[40] Regardless of marital status, almost 75% of adolescent abortion seekers reported post-abortion morbidity.

Data from cities throughout Indonesia showed that abortions performed on females aged 15–24 increased from 9% in 1992 to 35% in 1993.[41] In Thailand, a study revealed that of 13 090 women who had induced abortion, 47% were less than age 25, and of those, 21% were adolescents.[42] Evidence suggests that adolescents, particularly those unmarried, are more likely than older women to seek abortion from untrained providers, to undergo second trimester abortion and to suffer complications.

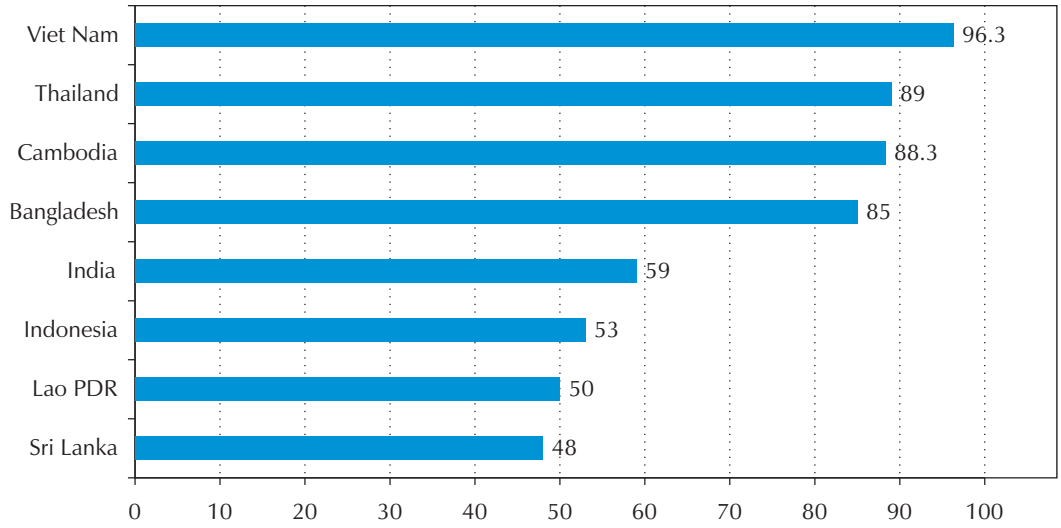
In Bangladesh, abortion services are available only up to the 12th week of pregnancy. Adolescents may not recognize their pregnancy or find resources in time. As a result, many adolescent girls are hospitalized for complications after undergoing an abortion by traditional birth attendants or after attempting induced abortion.

In the Philippines, abortion-related complications are one of the leading causes of hospital admissions.[43] A hospital-based study showed that 36% of those cases are among young women aged 15–24 years (by age 24 nearly 60% of women in the Philippines are married).

In the Lao People's Democratic Republic, a similar study revealed that of 390 cases of abortion-related complications, seven were unmarried adolescents under age 17, and 36 were unmarried students. The highest proportion of induced abortions was among the 20–24 age group. In Viet Nam in 2000, it was estimated that approximately 37% of pregnancies in the 15–24 age group resulted in abortion.[44]

Condoms provide dual protection from unintended pregnancies and the transmission of HIV and other sexually transmitted diseases. In Malaysia, 63% of unmarried adolescents know about condom use.[45] The level of awareness of condoms among married adolescent girls is at least 85% in Bangladesh, Cambodia, Thailand, and Viet Nam (Figure 9.10).

Fig. 9.10 Awareness of condoms among married adolescent girls



Sources: *Demographic and health survey: final reports*. (By country). Measure DHS. Available from: http://www.measuredhs.com/pubs/search/search_results.cfm?Type=5&srchTp=type&newSrch=1

Facts about adolescents from the demographic and health survey: statistical tables for program planning: reports and annexes by country. New York, Population Council. Available from: http://www.popcouncil.org/gfd/gfdcountries.html

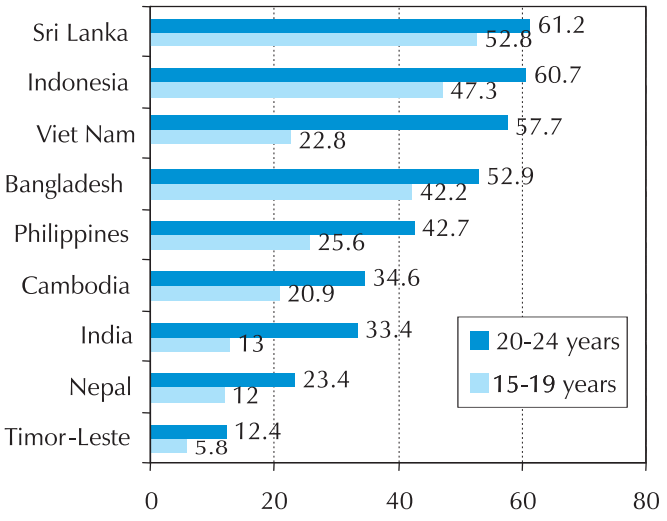
It is important to note that use of condoms by married young people is very low in many countries in the Region. The proportion of young people using condoms to prevent pregnancy may differ from those using condoms with disease prevention as a motive. The motivation of young men for using condoms frequently varies with their partner. With a stable partner or a girlfriend, condoms tend to be used for contraception; but with a casual partner they are used for prevention of HIV and other sexually transmitted infections. Most often, condom use is associated with casual partners.[46] A study of young factory workers in Thailand found that 54% of young men who had their first sexual experience with a sex worker reported using a condom on debut, compared to only 20% who used condoms during their first sexual experience with a partner who was not a sex worker.[47]

A study in India reported that about 52% of unmarried boys never used condoms with regular partners and 56% never used condoms with casual partners, although most of them knew about condoms and how to use them. Among those having sex with multiple partners, none reported consistent condom use with all partners.[48] Another study of unmarried and married men showed that 19% of unmarried men aged 18–19 and 20–24 used a condom during the last non-marital sexual act. In the same study, condom use by married men aged 20–24 was only 6.5%. Among condom users, 61% of men reported pregnancy prevention as the main reason for use.[49]

Contraception

Knowledge of contraception is high among adolescents in countries for which data is available. As is extensively documented, knowledge of a particular method may be insufficient for safe and effective use.[50,51] In India and Nepal, only 8%–12% of currently married adolescents aged 15–19 are using a traditional or modern contraceptive method. In Bangladesh the proportion of married adolescents using contraception rose by 32% between 1993–1994 and 1996–1997. This use was 22% in Indonesia between 1994 and 1997.[52,53,54] In both countries, contraceptive prevalence increased more rapidly among adolescents than in any other age group during this period.[55] The use of contraceptives among married adolescents in India rose from only 7% to 8% between 1992 and 1999.[56] In the Philippines, only 25.6% of current married adolescents aged 15–19 are using any form of contraception, including traditional and modern methods, while in Cambodia only 20.9% of married women aged 15–19 use contraceptives (Figure 9.11). In the Region, very little data are available

Fig. 9.11 Current use of any method of contraception among married young women by age, selected countries in the Asia Pacific Region, 2001–2004



Sources: *Demographic and health survey: final reports*. (By country). Measure DHS. Available from: http://www.measuredhs.com/pubs/search/search_results.cfm?Type=5&srchTp=type&newSrch=1

Facts about adolescents from the demographic and health survey: statistical tables for program planning: reports and annexes by country. New York, Population Council. Available from: http://www.popcouncil.org/gfd/gfdcountries.html

on the contraceptive behaviour of unmarried young people, as information from the DHS is limited to only those married. While many sexually active unmarried girls who are not practising contraception may have an unmet need for family planning, they have much broader needs that are not being met, some of which affect their fertility behaviour.

HIV/AIDS and young people

About half of all people infected with HIV are under the age of 25, and up to 60% of all new infections are among 15–24 year olds.[57] The prevalence of HIV/AIDS among young people varies widely among countries of the Region in number as well as percentage. HIV prevalence is low in Bangladesh, Indonesia and Sri Lanka. Although the HIV prevalence rate is less than 1% (low prevalence) in India, the absolute number in itself is significantly high. Myanmar and Thailand have the highest proportion of infected people: these are the only countries in the region with known HIV prevalence equal or greater than 1% among adults.[58] It is important to note, however, that due to weaknesses in the surveillance systems of many countries in the Region together with a lack of testing services, there is a strong probability that under-reporting of HIV/AIDS in adolescents is common.

From the most accurate information available it is known that since the beginning of the HIV epidemic in the Asia Pacific Region, 43% of reported HIV infections and 17% of reported AIDS cases have occurred in the 13–29 age group.[59] In Port Moresby General Hospital in Papua New Guinea, it was reported that in 2000 0.9% of antenatal women aged 15–24 were HIV positive. By 2005 the rate in this group had increased to 2.6%. In Viet Nam, about half of people living with HIV infection are under the age of 30, with 13–19-year-olds accounting for 9.4% of the total infected population in 2001.[60] The main mode of transmission among young people is sexual. However, countries in the Region with significant HIV transmission through injecting drug use include China, Malaysia and Viet Nam, where this accounts for more than 50% of all HIV infections.[61]

It has been found that while women are more likely than men to be infected with HIV during unprotected vaginal intercourse, prevalence of infection among adolescent girls is strikingly high. Data from India, Myanmar, Sri Lanka and Thailand endorse these findings.

Substance abuse

Healthy development of adolescents and young people is dependent upon several complex factors such as the environment in which they live and the quality of their relationships with families, community and peer groups. If these are positive, then the adolescents usually develop into healthy, responsible adults. Some problems originating in adolescence have lifelong consequences. The use of tobacco, alcohol, drugs and other harmful substances often starts during adolescence and poses a special threat to young people's health. Alcohol and drugs may also impair judgement and increase risk-taking behaviour (dangerous driving, unprotected sex, accidents and injuries, and violence).

A Global Youth Tobacco Survey conducted by WHO in the Asia Pacific Region revealed that a large proportion of adolescents attending school were using tobacco; and although almost half of them had easy access to cigarettes, most wanted to stop smoking. A large number are exposed to passive smoking at home and in public places.

The success of aggressive tobacco advertising targeting adolescents is reflected in the rapidly increasing number of adolescents using tobacco in the Region. In some countries, up to a quarter of boys aged from 15 to 19 years smokes. Data from various sources show that the estimated prevalence of smoking among adolescents in the Region varies from 4.2% to 58% among boys and from 1.3% to 47% among girls.[62] Some adolescents begin smoking as early as age 10.[63]

Excessive alcohol use and drug abuse have been linked to accidents, suicides, violence, unwanted pregnancies and sexually transmitted infections among adolescents. These also affect their psychological, educational and social development and have a negative impact on families. While excessive use of alcohol can place adolescents in risky and harmful situations, young people can often be the victims of adults' alcohol use. Adolescents may be abused or hurt because parents, relatives, friends, neighbours or others are alcohol and/or illicit drug users. The issue of protecting young people from alcohol-related harm is an important focus of alcohol policy.

Drinking by young people, especially young men, is of growing concern throughout the Region. Some countries still have low alcohol consumption among young people, such as in the Marshall Islands, where only 11.4% of youth surveyed were regular drinkers. Of those who had ever finished a drink of alcohol in Viet Nam, 58% of males and 30% of females reported having been drunk at least once. Of the total sample, 39.7% of males and 8.5% of females had been drunk. As relatively few report having been drunk, problem or binge drinking is limited. But the general picture emerging in the Region is of growing and heavier use of alcohol by adolescents. The age of initiation into drinking is getting younger in many countries and binge drinking is on the rise as well. Drinking at increasingly younger ages and binge and problem drinking among youth are of particular concern. In Japan, 9.9% of young people were defined as problem drinkers. In Pacific island countries and areas, binge drinking has become common place.

A survey in Dhaka, Bangladesh, found past-year use of alcohol among students was 8.37% and lifetime use was 13.32%.[64] Other studies in India report alcohol use at 12.7% in high schools, 32.6% in universities and 9.3% to 15.1% among college students.[65]

The one consistent finding in population studies has been very low rates for alcohol use in females. However, a recent study in Viet Nam indicated changing trends as alcohol use by young women is rising. Of respondents aged 14–25, 30% reported trying alcohol. Within this group 28% were drunk on at least one occasion. This drinking pattern is in stark contrast to smoking rates of only 1.3% in the same survey.[66] In north-east India, a study of 13–15 year-old school students showed the prevalence of smoking and drinking was 8.5%–9.6% among boys and 2.9%–7.7% among girls. Such high rates of smoking and drinking in adolescents are alarming.

Drug abuse among adolescents has emerged as a major problem with far-reaching socioeconomic and medical consequences. Injecting drug use has links to infections such as HIV and hepatitis and is now severely affecting many countries, with significant numbers of injecting drug users now found in China, Malaysia and Viet Nam. In Thailand, the 1994 Family and Youth Survey showed that 6% of male adolescents were using drugs. One fifth of injecting drug users in Kathmandu, Nepal, were adolescents. Another Nepalese survey showed that sharing drugs and needles is widespread among injecting drug users, of which 11% were 14 to 19 years old and 34% between ages 20 to 24.[67]

Nutrition

Nutrition is important during adolescence because 20% of total growth in height and 50% of adult weight gain occurs during adolescence. Among the nutritional problems faced by adolescents is anaemia. There is great disparity within the Region, with inequalities in rural and urban areas, as well as between those attending school and those who are not. Irrespective of severity, the anaemia prevalence in the Region is between 12%–90%. Iron deficiency and anaemia are associated with impaired cognitive functioning, lower school achievement and physical work capacity. In addition, anaemia in adolescents can impair the immune response, thus making them more prone to infections.

In females, anaemia can increase the risk of negative reproductive outcomes such as miscarriage, stillbirth, premature birth, low birth weight, perinatal mortality and maternal mortality. Infants born to iron deficient mothers also have a higher prevalence of anaemia in the first six months of life.

Undernutrition among adolescents, with its associated consequences such as stunting and poor academic achievement, is an issue that countries in the Region still need to accept and address. Sources of information are again limited and available literature on sex differentials in nutritional status is inconsistent. The studies on consequences of adolescent undernutrition on reproductive health have shown that undernutrition is responsible for poor pregnancy outcomes, in particular, low birth weight. Stunting is known to be associated with obstructed labour as a result of cephalopelvic disproportion—a problem for younger adolescent girls whose pelvises have not yet reached adult size.

While there is generally an improvement in the nutritional status of adolescents in the Region, there are still many problems which need to be addressed. These include:

- **Undernutrition:** inadequate food supply, especially in poor households, is a major contributing factor to undernutrition. For adolescent girls, gender-based discrimination in distribution of and access to food within the family can be a strong factor.
- **Micronutrient deficiency:** vitamin A deficiency, iodine deficiency disorders and iron deficiency anaemia are common among adolescents in the Region. The adverse effects of these deficiencies include delayed growth spurt, stunted height, delayed/retarded intellectual development, anaemia and increased risks in childbirth.[68]
- **Overweight and obesity:** lifestyle changes related to high-fat diets and low levels of physical activity have resulted in a rising prevalence of overweight and obese adolescents, particularly in urban areas and in some Pacific island countries. Overweight and obesity during adolescence tend to continue into adulthood, increasing the likelihood of a range of health conditions including cardiovascular disease, diabetes and cancer.[69] Management of obesity is much more difficult and more expensive than prevention. Adolescence provides a good opportunity to introduce prevention strategies as it is a time when eating patterns begin to change, independent eating habits are formed, and adolescents tend to engage in sports and other physical activities. Nutrition policies and strategies for adolescents need to be linked to physical activity.

Adolescent health and rights

In order for adolescents to make informed decisions that will help them reach the highest attainable health status they not only need access to health services but also information, skills and understanding. All countries in the Region are signatories to The United Nations Convention on the Rights of the Child, which states that children, including adolescents, have the right to this goal. Involving adolescents and young people in decisions and actions that affect them is also intrinsic to the convention. There are several excellent examples in the Region where adolescent participation has proven effective. Adolescents have successfully played a major role in the design, planning, development, implementation and evaluation of The Pacific Adolescent Reproductive Health Project taking place in nine Pacific island countries.

Adolescent health and policy

Because adolescents appear to be generally healthy, they frequently appear invisible to policy-makers and planners when it comes to addressing their health rights and needs. A stronger focus is needed on the development of policies and strategies that address the sometimes complex issues surrounding

the rights, needs and health of adolescents. Much evidence is now available to show which strategies and interventions are the most effective in responding to adolescent health needs. It may help policy-making bodies to consider the evidence available and incorporate it into policy and strategy development such as was done in Viet Nam. Through a process of consultation and collaboration, the country has now drawn up a National Master Plan on the Protection, Care and Promotion of Adolescent Health and a four-year programme is now in the process of being developed. Policies on adolescent health concerns not only address public health but can also impact other social development issues and principles.

Data and adolescent health

Child health is an established branch of medicine. Adolescent health, on the other hand, tends to be placed between paediatrics and adult care. This means that collecting data on adolescents is often complex. However, accurate, disaggregated and standardized data can be used to support the planning of efficient and informed decisions concerning services and interventions for adolescents. Some good examples where accurate data have influenced policy and strategy development on adolescent health in the Region can be found in the Vietnamese Survey Assessment of Vietnamese Youth and the Young Adults Fertility and Sexuality Survey in the Philippines.

Adolescent health services

The use of services by adolescents is very often linked to how they perceive both the services available and the health-care providers' skills and abilities. Adolescents will seek out services from providers who are welcoming, non-judgemental, flexible and comprehensive. Service providers who respect confidentiality and provide quality services, along with accurate and unbiased information, are also preferred. Good examples of such services can be found in many parts of the Region. In Mongolia for example, United Nations agencies and a number of ministries collaborated in a four-year programme to develop a sustainable process for the provision of comprehensive adolescent friendly health services. Training and development of health-care providers are ongoing and plans are in place for an expansion of services into more provinces.

Phase II of the Reproductive and Child Health Programme initiated by the Ministry of Health and Family Welfare of the Government of India proposes to focus on integrating youth-friendly services into the existing public health system. The National Strategy on Adolescent Sexual and Reproductive Health has been developed. National standards for provision of quality health services to adolescents and an implementation guide to operationalize these standards have been finalized. Training packages for medical officers and auxiliary nurse midwives (ANM) were adapted from a WHO generic package and have been printed and disseminated to all states in India. A range of modules in these training packages address sexual and reproductive health issues with a particular focus on building the capacity of health providers to provide adolescent-friendly health services. Regional- and state- level training workshops have been in progress to build a core of trainers.

A National Adolescent Reproductive Health Strategy has been approved by the Government of Bangladesh which is developing national standards for youth-friendly health services.

The health sector is ideally placed to support partners such as nongovernmental organizations in providing services that are "adolescent and youth friendly", and which encourage adolescents, especially those at most risk, to seek out and use services.

The involvement of other sectors

Influences affecting the health of adolescents, both positive and negative, come from several quarters, but the role of parents, families and the community on issues relating to adolescents are particularly strong. Much can be gained by engaging them as advocates for young people's health, particularly their sexual and reproductive needs.

In 2001, the Department of Health in Thailand launched the "Friend Corner Project" which aims to increase access to reproductive health education and services in friendly and comfortable surroundings. Places where adolescents are more likely to visit, with adequate space or privacy, such as schools or shopping malls, are selected for use. Basic health services, referrals, health and reproductive health information, and counselling are offered to adolescents.

Schools can offer many opportunities to adolescents and young people to expand their knowledge and understanding and to develop attitudes and skills that will help them make informed decisions about their health. Many examples of health promoting school programmes can be found within the Region, including in Hong Kong (China), Papua New Guinea, Singapore and Thailand. The Department of Health in Thailand has adopted the WHO Health Promoting School programme as part of its "Healthy Thailand" campaign since 1998.

The workplace can also support an integrated and comprehensive approach for adolescents and young people in developing their health. The involvement of the workplace, such as in the Philippines, has been influential in providing information, training, education and the integration of young people into a mature adult environment.

Conclusion

Nearly half the world's population is under the age of 25 – approximately 3 billion people – and 70% are in the Asia Pacific Region. The protection and promotion of their health and development are central to the future health of societies. Threats to the health of adolescents are now more likely to be the result of lifestyle as the danger of infectious disease recedes and as countries become wealthier as a result of social and economic development. The emphasis for adolescent health, therefore, is moving from cure to prevention, health promotion and development. Adolescence provides many opportunities for effective policies and programmes to be introduced to improve adolescent health and prevent lifetime chronic disease. For policies and strategies to be effective, they need to be comprehensive in nature and require intersectoral collaboration. A wide range of individuals including public health workers, paediatricians, teachers and institutions have an important role in promoting health among adolescents and in preventing and responding to their health problems.

9.3 Nutritional disorders and prevention

General overview

Although good nutritional status is central to the achievement of most of the eight Millennium Development Goals set by the United Nations, the importance of nutrition as a foundation for healthy development is often underestimated. Poor nutrition leads to ill-health, which in turn contributes to further deterioration in nutritional status. These effects are most dramatically observed in infants and young children, who bear the brunt of malnutrition and suffer the greatest burden, in terms of disability and premature death.

The world health report 2002 showed that 40% of deaths worldwide are due to 10 main risk factors, with seven of them related to nutrition.[70] It is estimated that more than half of all deaths in children under the age of five are attributed to being underweight.[71] In developing countries with high

mortality, being underweight is the greatest risk factor for early death, with micronutrient deficiencies (iron, iodine, vitamin A and zinc) also being major contributors to both mortality and lost years of healthy life. Other health-related behaviours, such as insufficient birth spacing and poor infant feeding practices, are also important risk factors for child malnutrition and mortality. The underlying causes of malnutrition are poverty, unhealthy environments, including inadequate water and sanitation, inequitable access to education, food and health services, and behavioural factors that constrain healthy diets and lifestyles. Malnutrition can also occur when cultural beliefs remain unaltered in the face of changes that affect the availability of traditional food items.

In countries undergoing a demographic and epidemiologic transition, noncommunicable diseases are becoming increasingly important. In the Asia Pacific Region, NCDs already account for over 60% of all mortality. Nutrition-related risk factors, such as high blood pressure, high cholesterol, overweight, low fruit and vegetable intake, and high alcohol and tobacco use, are responsible for most premature mortality and lost years of healthy life.[72] Under- and over-nutrition coexist, especially in rapidly developing countries, and are major health problems, responsible for a double-burden of disease.

Effective solutions exist to address nutritional problems. One of the main challenges for countries in the Region is persuading decision-makers in health, and other sectors involved in food and nutrient availability and consumption, to invest in the prevention of nutritional disorders in the interests of better public health, more efficient public spending and national productivity.

Infant and young child feeding

In 2002, WHO and UNICEF jointly endorsed the Global Strategy for Infant and Young Child Feeding (IYCF) to focus world attention on the impact that feeding practices have on the nutritional status, growth and development, health, and thus the very survival, of infants and young children.[73] The Global Strategy for IYCF renewed commitment to continue joint action consistent with the Baby-Friendly Hospital Initiative, the International Code of Marketing of Breast-milk Substitutes, and the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding.[74] In the scope of the Global Strategy for IYCF, countries are urged to formulate, implement, monitor and evaluate a comprehensive national policy on infant and young child feeding. Several countries have developed a National Plan of Action for IYCF: American Samoa (2003), Cambodia (2002), China (2004), the Philippines (2004) and Tonga (2005). Other countries are in the process of developing IYCF plans.

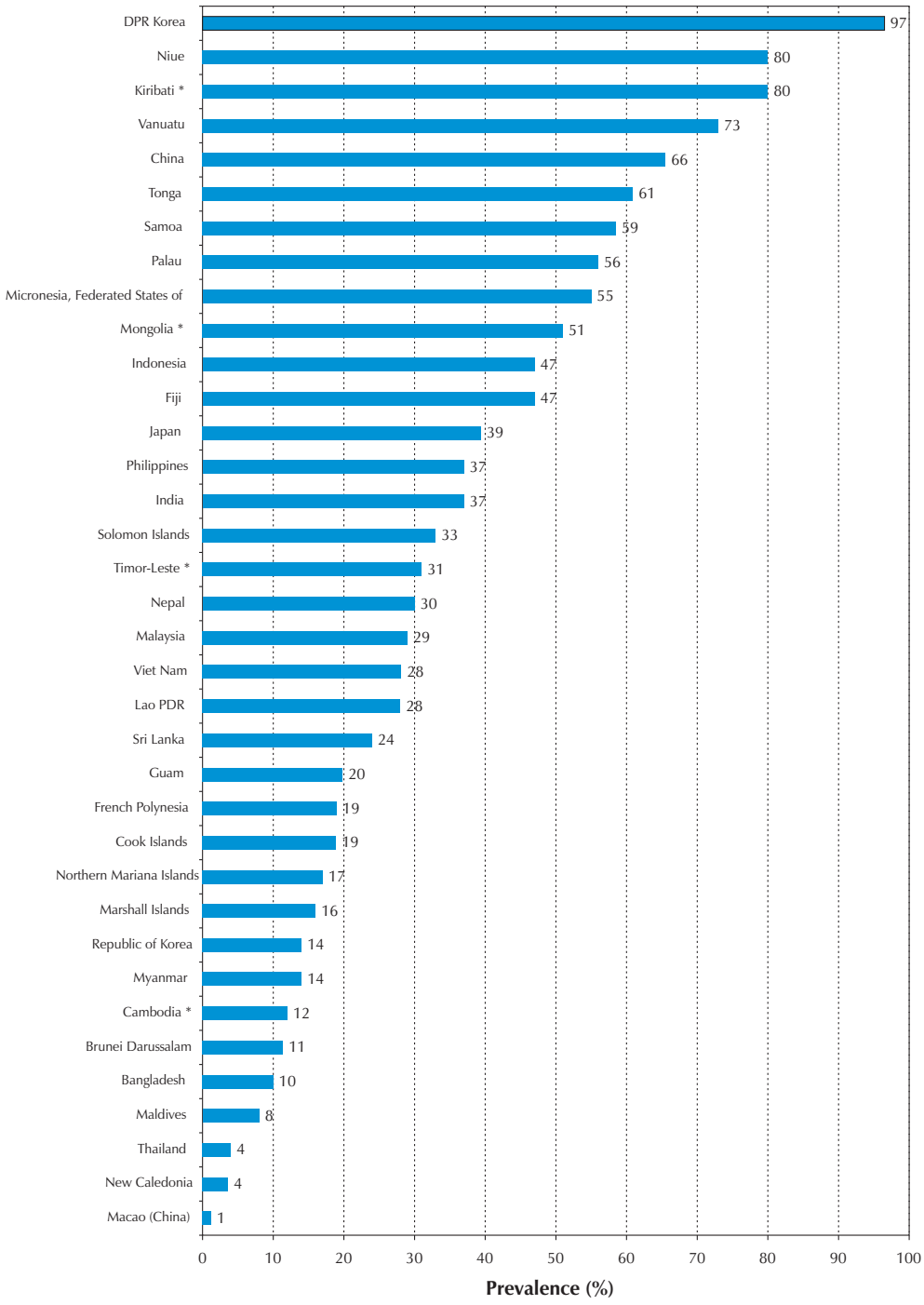
As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.[75] Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to age 2, or beyond.

Asia has the lowest rate of women (15%) who initiate breastfeeding within one hour of birth, compared to 33%–37% in other regions. However, nearly all children up to five months are breastfed, but not necessarily exclusively breastfed.[76] Shorter duration of breastfeeding seems to correlate inversely with the mother's education level. Prolonged breastfeeding (for more than the two years recommended by WHO and UNICEF) has been most common in Asia.

Considerable variation exists in the rates of exclusive breastfeeding for the first six months of life between countries in the Region. Despite the international recommendation of exclusive breastfeeding up to six months, most Asia Pacific Region countries still report rates of exclusive breastfeeding of up to only four months of age. Despite clear definitions, the understanding of "exclusive" breastfeeding can sometimes vary. In some countries, infant feeding surveys report regular prelacteal supplementation ("waiting for the milk to come in") and systematic water supplementation.

Figure 9.12 shows the rates of exclusive breastfeeding up to four months of age. They range from 1.2% in Macao (China) to 96.5% in the Democratic People's Republic of Korea. Despite the well-known advantages of breastfeeding, rates have been declining in many countries.

Fig. 9.12 Prevalence of exclusive breastfeeding (≤ 4 months) in selected Asia Pacific countries and areas



Note: Duration of exclusive breastfeeding for Cambodia, the Philippines and Timor-Leste is six months.

Source: Databases of the WHO Regional Offices for South-East Asia and the Western Pacific.

* *State of the world's children 2007: women and children: the double dividend of gender equality*. New York, United Nations Children's Fund, 2006.

The Baby-Friendly Hospital Initiative, launched in 1991, is the primary intervention strategy for national health systems to protect and promote breastfeeding, since childbirth for most countries takes place in hospitals in the majority of cases. In the Asia Pacific Region, nearly 10 500 hospitals or maternity facilities have been designated baby-friendly. These facilities are located in 15 countries: Australia (17), Bangladesh (250), Bhutan (1), China (6312), the Democratic People's Republic of Korea (1), Fiji (3), India (1250), Indonesia (91), Japan (14), the Lao People's Democratic Republic (9), Malaysia (114), Maldives (5), Mongolia (93), Myanmar (248), Nepal (7), Papua New Guinea (4), the Philippines (1047), the Republic of Korea (11), Sri Lanka (97), Thailand (780), and Viet Nam (45).[77]

The number of baby-friendly hospitals has increased during recent years, for instance in Bangladesh, China, India, Mongolia, Myanmar, Thailand and Viet Nam. However, some "slippage" has occurred. For example, surveys reported violations of the International Code of Marketing of Breast-milk Substitutes— most notably the presence of formula, bottle and teats— or no breastfeeding counselling in some accredited hospitals in China, the Philippines and Viet Nam. The frequent high turnover of hospital staff, which creates the need for continued training of new staff, and the pressure from formula companies have challenged the sustainability of the initiative. Reassessment of hospitals must be done in many countries. Because external evaluation is usually costly, countries need to build strong national evaluation teams. In China, the Ministry of Health plans to make internal evaluation of baby-friendly hospitals compulsory within a given time failing which the baby-friendly designation will be cancelled. Where health system reform is in process, countries should ensure that the Baby-Friendly Hospital Initiative is part of the quality assurance system being established or strengthened.

One of the factors causing the decline in breastfeeding rates is the advertising and promotion of infant feeding products by companies inside and outside health facilities. The International Code of Marketing of Breast-milk Substitutes is considered a minimum requirement to protect healthy infant and young child feeding practices. The Code aims to contribute to the provision of safe and adequate nutrition for infants by protecting and promoting breastfeeding and ensuring the proper use of breast-milk substitutes, when these are necessary, on the basis of adequate information and through appropriate marketing and distribution (article 1). The Code has 11 articles addressing different aspects of marketing and related practices.

The adaptation of the Code to national settings in various countries and areas is in different stages of development. Four countries have translated all of the Code into law (India, Nepal, the Philippines and Sri Lanka) and seven countries have legislated many parts of the Code (but not all) into law (Bangladesh, Cambodia, China, Indonesia, the Lao People's Democratic Republic, Mongolia and Viet Nam). A further 12 countries have some provisions of the Code in place (Brunei Darussalam, Cook Islands, Fiji, French Polynesia, Japan, Kiribati, Maldives, Niue, Palau, Papua New Guinea, the Republic of Korea and Samoa) and three countries have some policy or voluntary regulations on just a few parts of the Code (Bhutan, Malaysia and Timor-Leste).[78]

With more and more women engaged in the workforce, either paid or unpaid, legislation is needed to ensure that mothers are able to exclusively breastfeed their children. The Convention on Maternity Protection No. 183 (2000) proposed a length of maternity leave of a minimum of 14 weeks for all women, including those in atypical forms of dependent work, such as domestic work for wages in private households. Those 14 weeks include six weeks of compulsory postnatal leave at the national level, unless otherwise agreed, and additional leave in case of illness, complications, or risk of complications. Convention No. 183 also has provisions to protect breastfeeding through periodic breaks or a reduction of hours of work in order to breastfeed, which have to be paid.

Most countries in the Region report allowing maternity leave but very few are complying with the provision to allow the full 14 weeks. However, many countries have exactly the same provision for the public and private sector, regardless of the length of maternity leave. Some countries have additional provisions, such as breastfeeding breaks or crèches at the workplace. For instance, in Mongolia a mother can have two breaks of one hour per day to breastfeed her child before age six months and one hour per day when the child is 6–12 months.[79] In Malaysia, the Government has directed the public sector to set up crèches to facilitate breastfeeding at the workplace, and there are tax exemptions for private employers who do this. In Viet Nam, many enterprises have crèches to facilitate breastfeeding after mothers have returned to work. In New Zealand, there is parental leave of 12 months (unpaid except for 12 weeks paid parental leave) for women and men.[80]

Infants are particularly vulnerable during the transition period when complementary feeding begins. Appropriate complementary feeding depends on accurate information and skilled support from the family, community and health-care system. It is often difficult for health workers to discuss with families how best to feed their young children due to confusing and often conflicting information. Inadequate knowledge about appropriate foods and feeding practices is often a greater determinant of undernutrition than lack of food.

There is, therefore, a need to train health workers who are in contact with those who care for young children. There is also a need to disseminate recent information on complementary feeding to health workers and to integrate this information in pre-service training, where feasible. In addition to the WHO/UNICEF Breastfeeding Counselling Course, other training courses have been developed and introduced.[81,82] Health workers from several countries in the Region have been trained and some countries are translating and replicating these training courses nationwide.

Diversified approaches are required to ensure access to foods that will adequately meet the energy and nutrient needs of growing children. For example, use of home- and community-based technologies have been introduced to enhance nutrient density, bioavailability and the micronutrient content of local foods. Low-cost, industrially-processed complementary foods also provide an option for some mothers. Food fortification and universal, or targeted, nutrient supplementation has been introduced in some countries to help to ensure that older infants and young children receive an adequate amount of micronutrients. Examples include the Integrated Child Development Services programme in India and mid-day school feeding programmes in several countries. Most countries in the Asia Pacific Region have programmes to iodize salt and provide iron in various forms to combat micronutrient deficiencies. In most countries, data on complementary feeding are lacking or vague. New indicators for assessing infant and young child feeding practices, including complementary feeding, have been agreed at a consensus meeting in Washington, DC, United States of America, in November 2007.[83]

Undernutrition

Undernutrition can result from consumption of food of insufficient quantity and nutritional quality or both, or an inability to absorb nutrients from food. The major forms of undernutrition worldwide are protein-energy malnutrition (PEM) and micronutrient malnutrition, including iron deficiency anaemia, vitamin A deficiency disorders and iodine deficiency disorders (IDD). According to current global statistics, more than three billion people in the world (about 50%) are malnourished.[84] Among them, around two billion have micronutrient malnutrition, the largest number being in South Asia. [85]

Chronic undernutrition in the Asia Pacific Region is steadily decreasing,[86] although progress is unevenly distributed and undernutrition rates in some countries remain disturbingly high. China, which provides a large proportion of the Western Pacific Region data, has shown rapid progress in

reducing the prevalence of child undernutrition and mortality, due to economic growth. However, as countries reach medium-to-low mortality rates, reductions in undernutrition and mortality become progressively more difficult to achieve[87] as they need to address the poor and marginalized and others who have inadequate access to health services and economic development. In China, further reductions of both undernutrition and infant mortality will require renewed efforts, especially in the less developed western part of the country. Surprisingly, most of the negative consequences of undernutrition (82% of PEM-related deaths) in China are due to its relatively mild form.[88] This has important policy implications.

The latest data on child undernutrition are given in Figures 9.13, 9.14 and 9.15. Approximately half of underweight children worldwide are in South Asia.[89] Generally, the economically least developed countries have the most child undernutrition. Figure 9.13 shows the prevalence of underweight children ranging from 1.4% (Palau) to 48% (Bangladesh). In terms of public health significance, countries are classified as having a low prevalence of underweight if this figure is below 10%; a moderate prevalence if between 10%–19%; a high prevalence if between 20%–29%; and very high prevalence if over 30%.[90]

Stunting, a failure to grow to a normal height, is caused by chronic undernutrition during the formative years of childhood. There are 215 million stunted children worldwide with about two thirds in Asia. Countries are classified as having a low prevalence of chronic undernutrition if this is below 20%, a moderate prevalence if between 20%–29%; a high prevalence if between 30%–39% and very high prevalence if above 40%. [91] As can be seen in Figure 9.14, prevalence ranges from 1.3% (Tonga) to 49.3% (Nepal). A significant public health problem exists in 18 (69%) of the 26 countries listed, and eight countries (31%) have prevalence rates that are very high.

The reported prevalence of wasting (low weight-for-height) among children under the age of five in Asia Pacific Region countries ranges between 0.9% (Samoa and Tonga) to 16% (India). In terms of public health significance, countries are classified as having a low prevalence of weight-for-height children when the proportion of children with low weight for their height is below 5%; a moderate prevalence when it is between 5%–9%; a high prevalence when it is between 10%–14%; and a very high prevalence if it is above 15%.[92] As can be seen from Figures 9.13, 9.14 and 9.15, the majority of Asia Pacific Region countries have a serious child undernutrition problem.

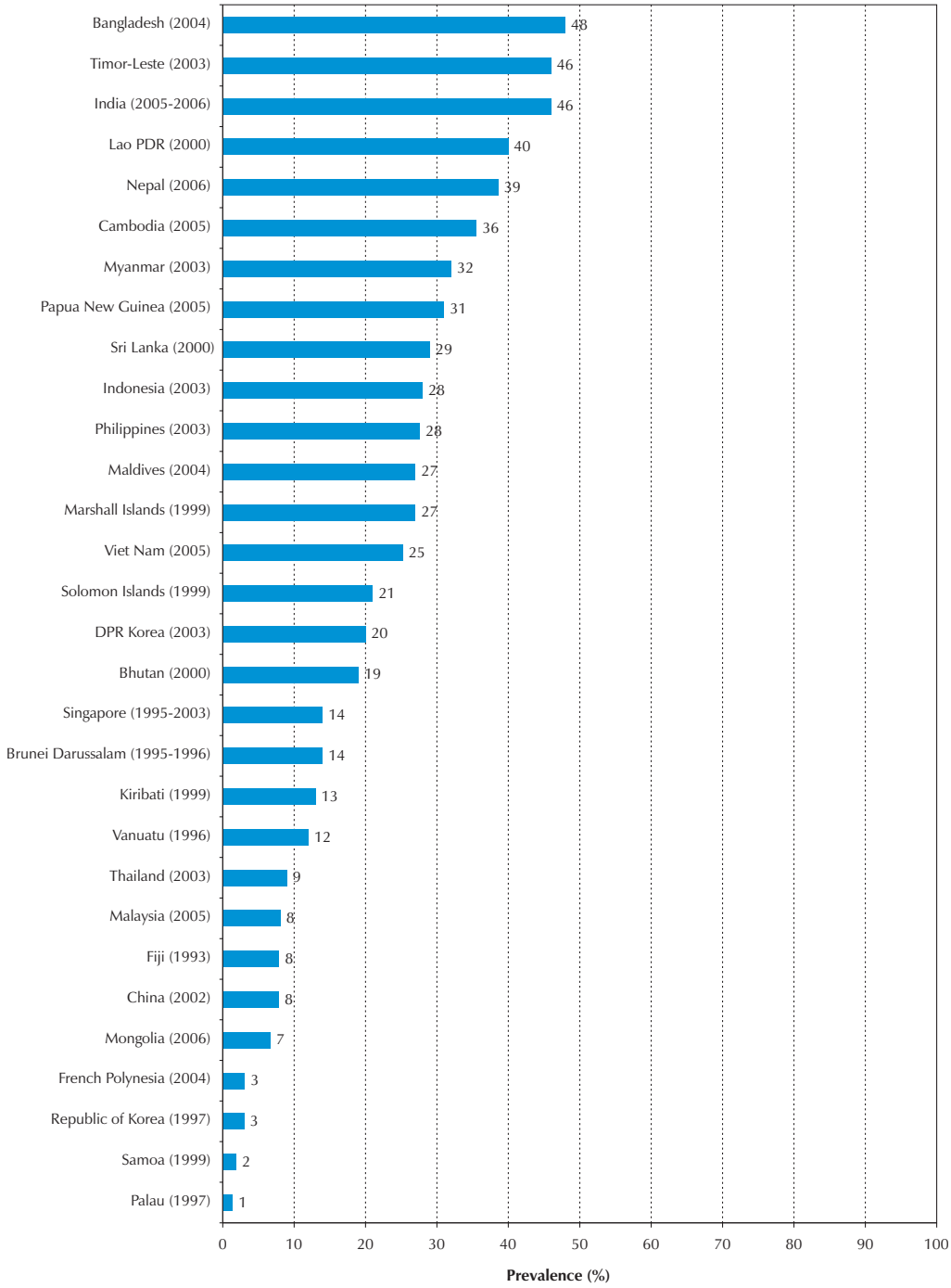
Undernutrition in pregnant women often results in infants born with a low birth weight (<2500 grams). Low birth weight (LBW) greatly increases risk of neonatal death in infants and is an important cause of poor growth and development in later childhood, with its consequences for later life. LBW can be due to a number of factors, including a woman's small size, uterine infections, smoking, low oxygen levels in the blood (due to excessive work or high altitude) and malarial infection. However, when all these factors are equal, the incidence of LBW is higher in economically deprived mothers than in affluent ones.

It should be recognized that for many countries in the Region it is difficult to accurately estimate LBW rates because many births still occur at home. Although professional birth attendants or midwives are frequently present, babies are often not weighed because scales are not available.

Figure 9.16 shows the best estimates of the incidence of LBW for countries in the Region based on recorded births. It can be seen that 10 countries have reported LBW rates greater than 10%. Conversely, some Pacific countries have reported very low prevalence of LBW, but at the same time reported a high prevalence of Large for Gestational Age babies (LGA ≥ 4000 g at birth). For instance, LGA in American Samoa is 4.4%, Cook Islands 13.1% and Tonga 24.5%.[93,94,95] This is likely to be related to the

high prevalence of obesity and diabetes during pregnancy in many of the Pacific island countries and areas and shows the need for more effective interventions to prevent obesity and diabetes, starting before pregnancy.

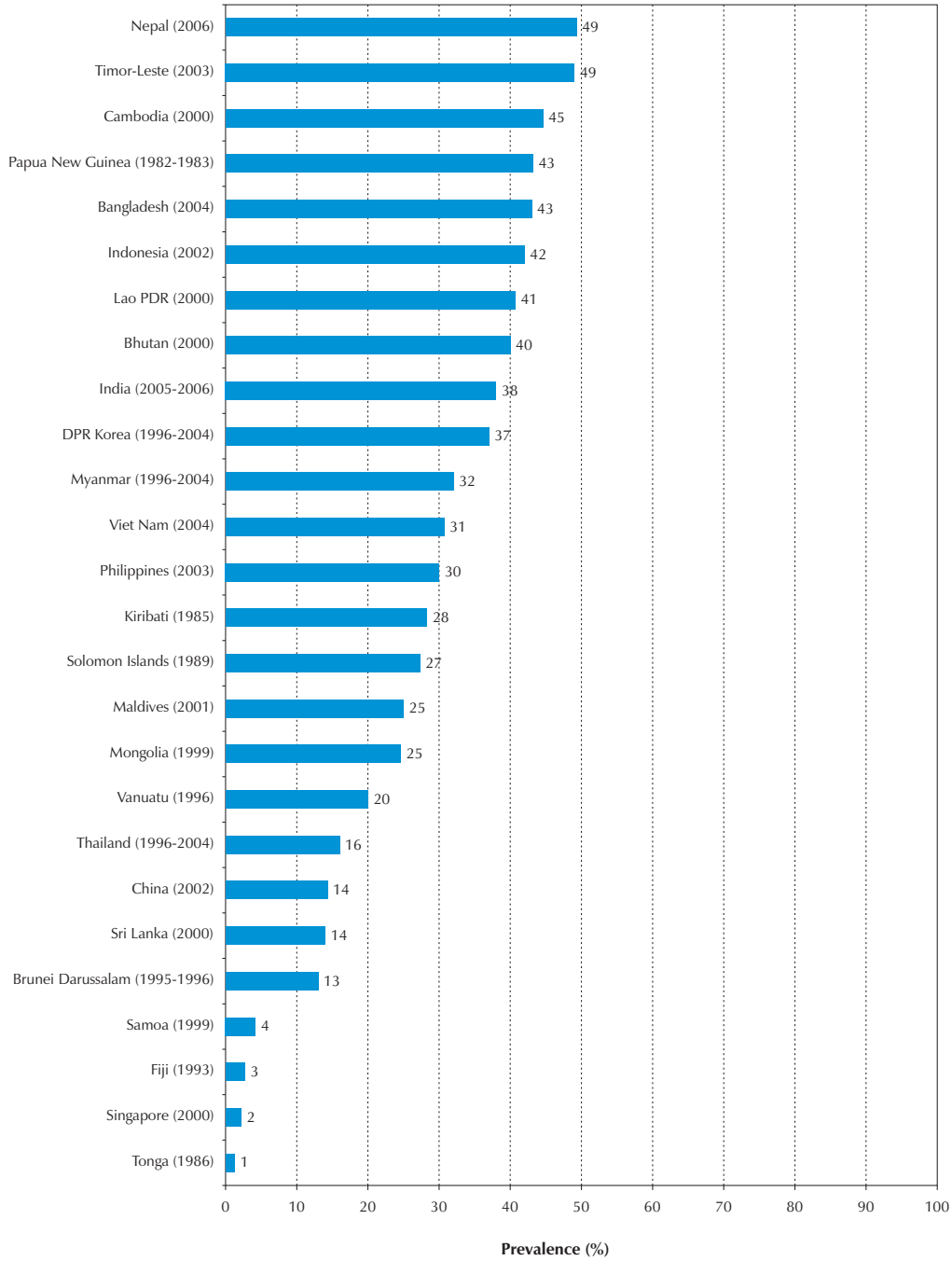
Fig. 9.13 Prevalence of underweight (<2SD) among children less than age 5 in selected Asia Pacific countries and areas



Sources: *Country health information profiles, 2007 revision*. Manila, WHO Regional Office for the Western Pacific, 2007.

Country health profiles. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/EN/Section313.ht

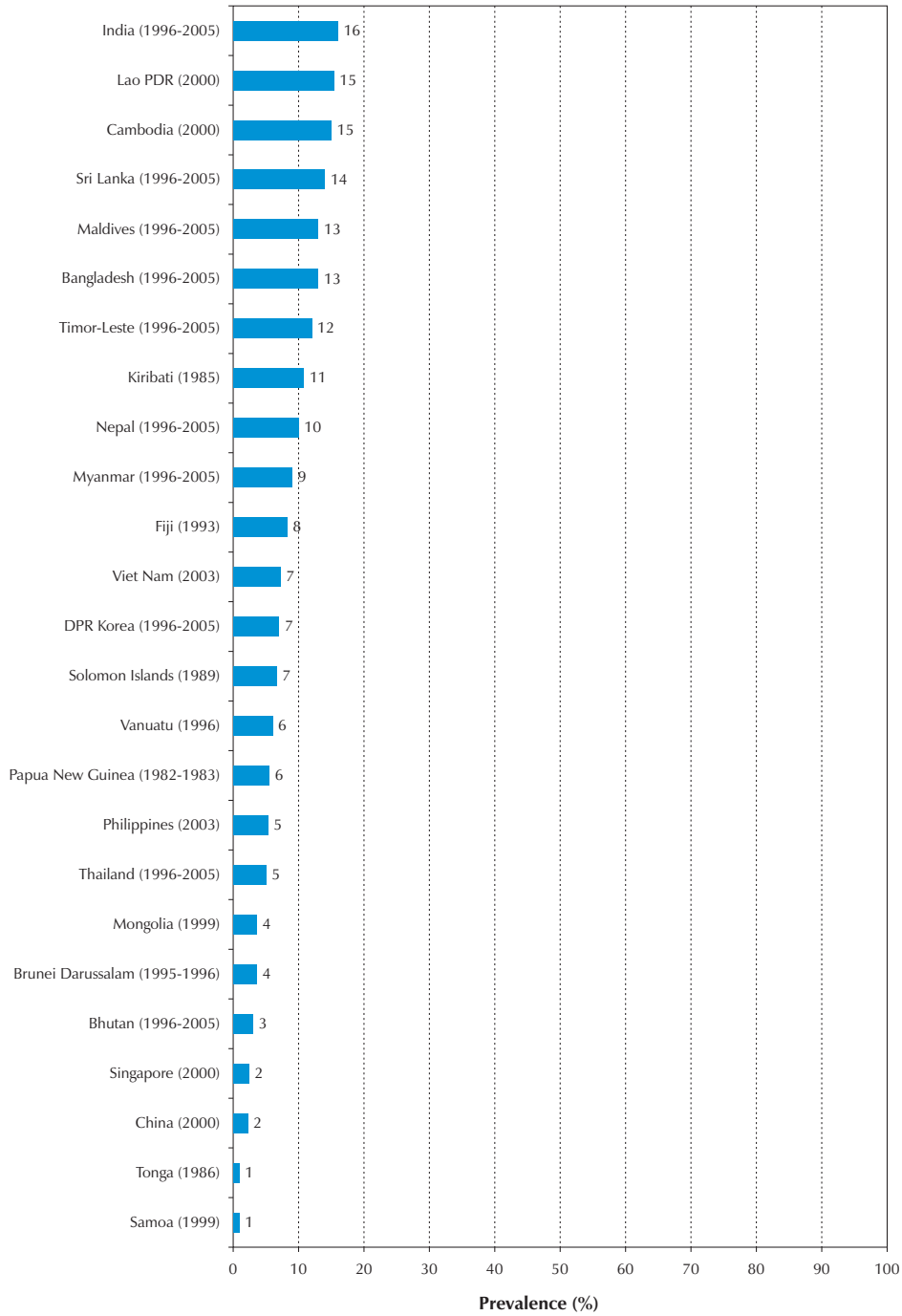
Fig. 9.14 Prevalence of stunting (<2SD) among children less than age 5 in selected Asia Pacific countries and areas



Sources: *Country health information profiles, 2007 revision*. Manila, WHO Regional Office for the Western Pacific, 2007.

Country health profiles. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/EN/Section313.ht

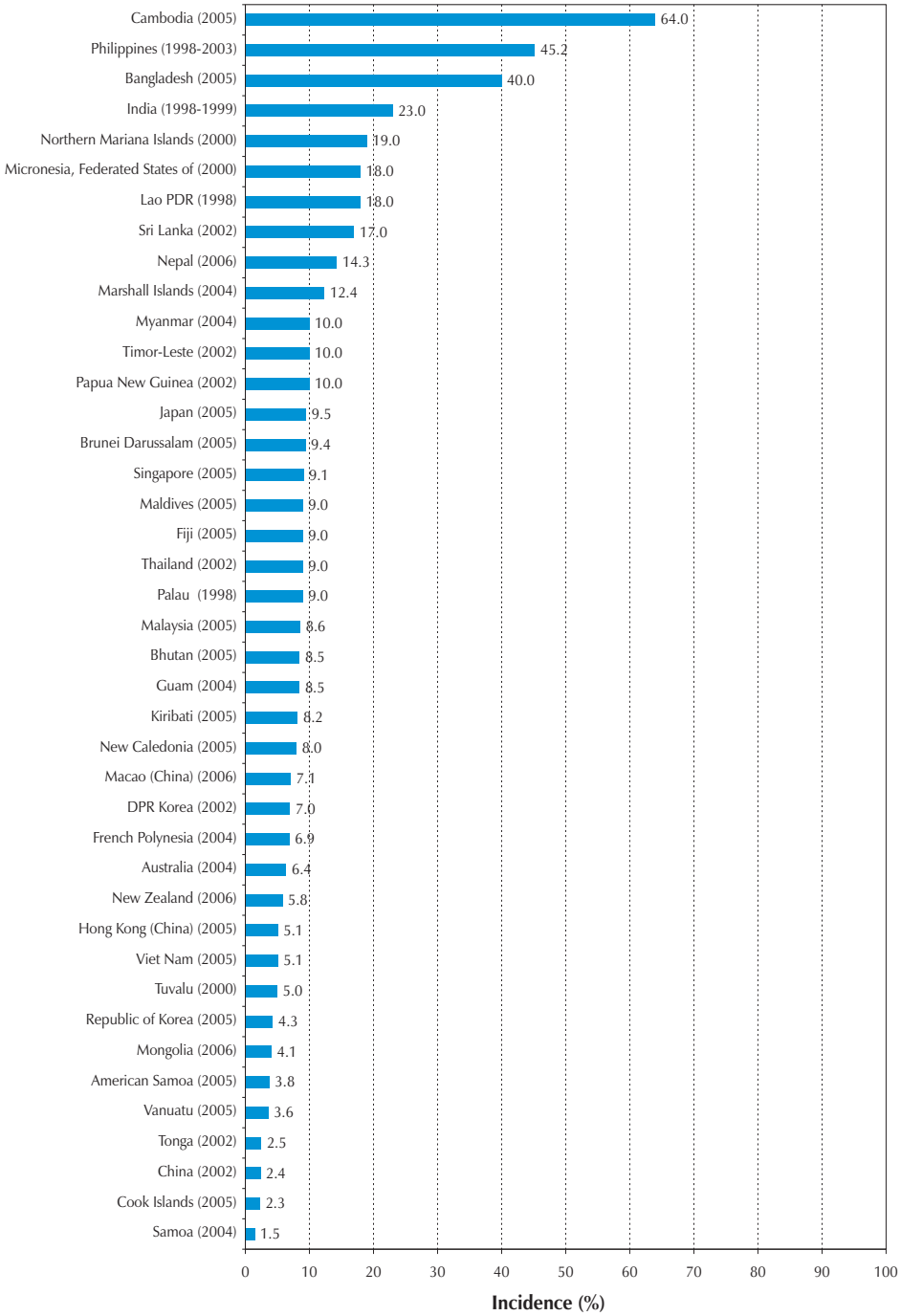
Fig. 9.15 Prevalence of wasting (<2SD) among children less than age 5 in selected Asia Pacific countries and areas



Sources: *Country health information profiles, 2007 revision*. Manila, WHO Regional Office for the Western Pacific, 2007.

Country health profiles. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/EN/Section313.ht

Fig. 9.16 Incidence of low birth weight (<2.5 kg) in selected Asia Pacific countries and areas



Sources: *Country health information profiles, 2007 revision*. Manila, WHO Regional Office for the Western Pacific, 2007.

Country health profiles. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/EN/Section313.ht

The reduction of LBW also forms an important contribution to the Millennium Development Goals for reducing child mortality. Globally, the indicator is a good summary measure of a multifaceted public health problem that includes long-term maternal malnutrition, ill-health, hard work and poor pregnancy health care. The level of LBW in developing countries is more than double that of developed regions.[96] The highest incidence of LBW occurs in the subregion of South-Central Asia where 27% of infants are LBW. [97]

Child undernutrition typically improves as countries develop economically and education levels improve. However, countries that have had the greatest success in reducing child malnutrition are those where economic development has been accompanied by interventions targeted at groups that are at the highest risk for malnutrition. The final section of this chapter describes the multisectoral approach promoted by FAO, WHO, UNICEF and other international agencies for the prevention of malnutrition. With regard to child undernutrition, the first two years of life are crucial, because growth retardation and micronutrient deficiencies that occur at this age can produce irreversible damage to physical and mental development. The key interventions to prevent undernutrition are described in the subsections on infant and young child feeding and on micronutrient deficiencies, and can be summarized as follows: ensure exclusive breastfeeding in the first six months, and continued breastfeeding for two years and beyond, accompanied by appropriate complementary foods as well as supplements when needed.

In addition to this focus on the first two years of life it is very important to improve maternal nutrition and health status so that women will not give birth to babies who are already undernourished, stunted, anaemic or iodine deficient. This requires an emphasis not only on programmes specifically addressing malnutrition but also on those dealing with such issues as education and religion, and the key role of women in society as childbearers and caregivers for the whole family. A life-cycle approach to the prevention of child malnutrition requires interventions to improve nutrition and health in girls from as early an age as possible, and with special emphasis on adolescence, as this is when a major growth spurt occurs, menstruation starts and nutrition requirements greatly increase.

Micronutrient deficiencies

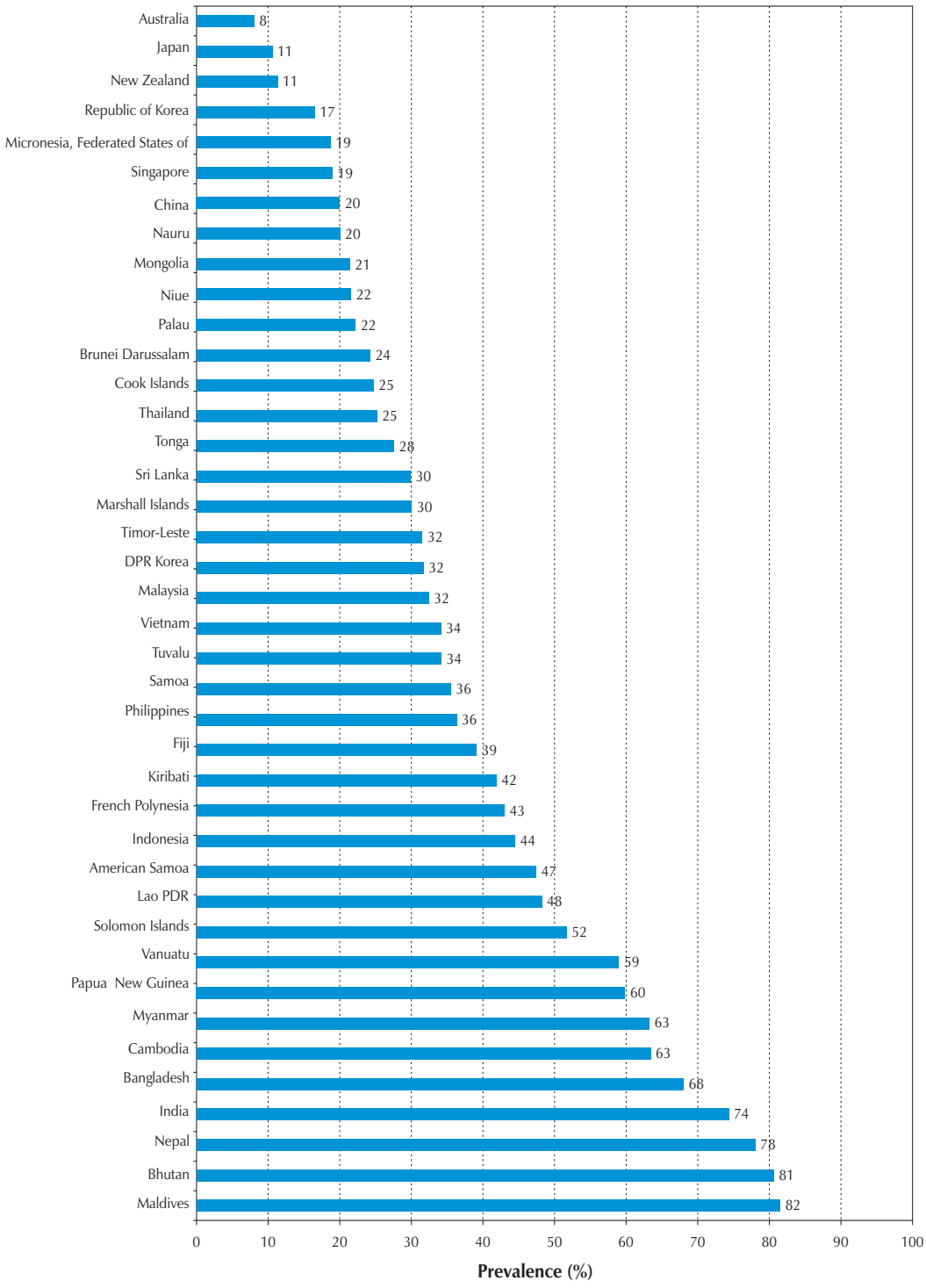
Although there are many micronutients that are essential for good health, the major contributors to micronutrient deficiencies worldwide are iron deficiency anaemia (IDA), iodine deficiency disorders (IDD) and vitamin A deficiency (VAD).

Iron deficiency anaemia

Anaemia affects more than 3.5 billion people in the developing world,[98] stealing vitality from young and old and impairing cognitive development in children. About half of the anaemia prevelance in developing countries is attributed to iron deficiency. Iron deficiency has a massive, but until recently, almost totally unrecognized economic cost. It also adds to the burden on health systems, affects learning and school performance, and reduces adult productivity. Harvard University, WHO and the World Bank have described iron deficiency as having a higher overall cost than any other disease except tuberculosis.[99]

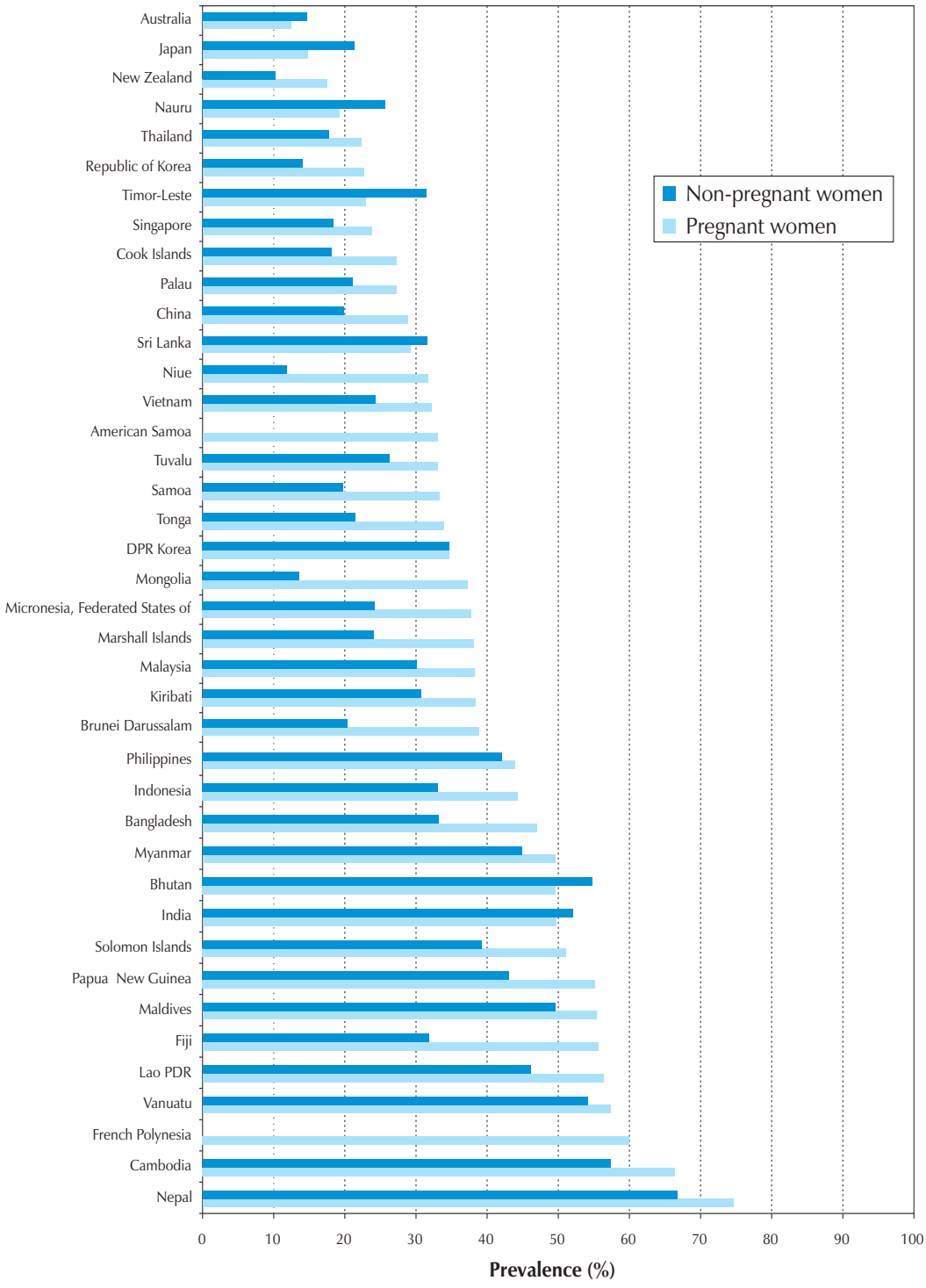
The prevalence of anaemia in preschool children in Asia Pacific Region countries is shown in Figure 9.17. Severity, in terms of public health action, is defined as: mild, below 19.9%; moderate, 20.0% to 39.9%, and severe, above 40.0%.[100] Of the 40 countries and areas listed in Figure 9.17, six have prevalence levels classified as mild, 19 moderate and 15 severe. Similarly, the prevalence for pregnant and non-pregnant women are shown in Figure 9.18. As can be clearly seen in Figure 9.18, the prevalence of anaemia is generally higher in pregnant women. Very few countries have mild prevalence.

Fig. 9.17 Anaemia prevalence (%) for preschool-age children in selected Asia Pacific countries and areas, 1993-2005



Source: *WHO global database on anaemia*. Geneva, World Health Organization. Available from: http://www.who.int/vmnis/anaemia/en/Accessed May 2007.

Fig. 9.18 Anaemia prevalence (%) for women in selected Asia Pacific countries and areas, 1993-2005



Source: *WHO global database on anaemia*. Geneva, World Health Organization. Available from: http://www.who.int/vmnis/anaemia/en/ Accessed May 2007.

The most common treatment to correct iron deficiency anaemia is daily iron supplementation, sometimes combined with folic acid. Aside from treatment, iron deficiency anaemia prevention should be ensured among populations at risk, such as women and children. The high physiological requirement for iron in pregnancy is difficult to meet with most diets. Therefore, pregnant women should routinely receive iron supplementation in almost all contexts. Countries with a prevalence of anaemia in pregnant women of more than 40% should routinely receive iron supplements continued into the postpartum period.[101]

In developing countries, pregnancy anaemia has been addressed by health services for many years through the distribution of free daily iron/folic acid supplements, starting from the first antenatal visit. However, this approach has been ineffective because of late reporting at antenatal clinics; insufficient availability of supplements due to financial and logistical constraints; limited knowledge of the consequences of anaemia in pregnancy and limited skills in communicating this knowledge; unattractive supplements; and low compliance in taking the tablets, partly because of side-effects. A new approach, preventive supplementation with weekly iron/folic acid tablets, was introduced to complement the short-term approach based on daily supplementation during pregnancy. Three pilot projects have been completed in Cambodia, the Philippines and Viet Nam. These countries are now starting to implement this approach on a larger scale, through social marketing and community mobilization.

Children between 6 and 24 months of age particularly suffer from iron deficiency anaemia because they grow very rapidly. Infants are normally born with plenty of iron. However, beyond six months of age, the iron content of milk is not sufficient to meet many infants' requirements and home-made complementary foods are usually low in iron. Infants born with a low birth weight (<2500 g) have fewer iron stores and are at higher risk of deficiency after two months of birth. Where iron fortified complementary foods are not widely and regularly consumed by young children, infants should routinely receive iron supplements in the first year of life. Where the prevalence of anaemia is 40% or more, supplementation should continue through the second year of life.

While dietary improvement is the long-term solution for reducing anaemia prevalence in populations, fortification of staple foods with iron and other micronutrients—such as wheat flour and rice and widely-used condiments, including soy sauce and fish sauce—has been introduced in some countries such as China, Fiji, Mongolia, the Philippines and Viet Nam. Iron fortified common salt has been tried in India. Fortification is an important additional measure, and has the great advantage of not requiring people to change their dietary practices to increase their micronutrient intake. WHO, in partnership with UNICEF, FAO, the Secretariat of the Pacific Community, the International Council for the Control of Iodine Deficiency Disorders, the Flour Fortification Initiative, the Global Health Institute and the Global Alliance for Improved Nutrition, has proposed establishing a food fortification programme for all Pacific island countries and areas. Pacific ministers of health agreed to proceed with the initiative in March 2007.

The avoidance of tea and coffee drinking with meals is a measure which can greatly help increase iron absorption among populations where this is a common practice.

Iodine deficiency disorders

Iodine deficiency disorders (IDD) refers to the wide range of serious adverse effects of iodine deficiency,[102] of which the most well known are visible goitre, a swelling in the neck due to an enlarged thyroid gland, and cretinism, characterized by severe brain damage very early in life. Of great significance are the more subtle degrees of mental impairment, which occur in apparently normal children in iodine-deficient areas. The consequences are pervasive and include poor school

performance, reduced intellectual ability and impaired work capacity. Iodine deficiency has been estimated to be responsible for an average reduction in intelligence quotient (IQ) of the order of 10–15 points, a huge loss in terms of reduced learning and working capacity of individuals and populations. Overall, two billion people have insufficient iodine intake, mostly in South-East Asia, the European and Western Pacific regions.[103]

The main strategy for the control of IDD is universal salt iodization, which ensures iodization of all salt for human and animal consumption. In high-risks areas, where considerable delays in access to iodized salt are likely, iodized oil capsules should be given to children and women of reproductive age.[104]

The two main indicators reported by countries for assessing iodine deficiency are urinary iodine concentration and goitre prevalence. In Asia Pacific countries IDD are widespread, but prevalence is likely to decline as salt iodization spreads. The situation, as reported by the latest available country studies, is depicted in Table 9.10, showing the most recent (although incomplete) data for IDD in school-age children for 22 Asia Pacific countries. Among these are 13 countries where IDD constitutes a significant public health problem, based on a Total Goitre Prevalence (TGP) of 5% or more at the national level.

Unlike anaemia, which is generally widespread across countries, IDD are more likely to be concentrated in remote or mountainous regions. Therefore, national assessments tend to underestimate the seriousness of IDD unless distribution is shown by district. This is the case for the 22 countries listed in Table 9.10. In countries such as Cambodia, the national total goitre rate for children age 8–12 is 12%, but climbs as high as 45% in some areas.[105] In Mongolia, it is 30% in the mountainous western districts.[106] In the Philippines, there has been a dramatic improvement in iodine status between 1998 and 2003; there is now a need for careful monitoring to avoid re-emergence of IDD, and to avoid iodine excess in some cases. In Viet Nam, the latest data from the National IDD Control Committee indicate that IDD has been eliminated. Recently, Australia, New Caledonia and New Zealand have indicated that mild IDD has emerged in parts of the countries and steps have been taken to assess the situation.

As can be seen in Table 9.10, median urinary iodine excretion (UIE) levels in countries in the Region range from 7.1 ug/L in the Lao People's Democratic Republic to 246 ug/L in China. The percentage of the population with UIE levels below 100 ug/L are taken as an indicator for elimination of IDD, and as can be seen in Table 9.10, this ranges from 13.5% in Bhutan to 65.4% in New Zealand.

Most countries where IDD is considered a public health problem have national prevention and control programmes and/or national IDD action plans in place, together with a coordinating body and legislation on salt iodization.

Although most countries have salt for human consumption adequately iodized, only four countries (Bhutan, China, Fiji and Sri Lanka) cover more than 90% of the population at risk. Details are shown in Figure 9.19. Reaching target communities is a problem, especially in countries with large rural, mountainous and remote areas, such as Cambodia, China and India. In general, while iodized salt can be found in main provincial towns, coverage throughout many provinces remains low. Directly related to accessibility is the quality of the iodized salt (level of iodine, packaging) and its price, which in several countries is much higher than that of non-iodized salt. Although legislation is in place, non-iodized salt is still sold in some countries.

Table 9.10 Iodine deficiency disorders in children in selected Asia Pacific countries

Country	Year	School-age children			
		TGP[1]	Urinary iodide (ug/L)		
		(%)	Median	%<100ug/L	CI
Australia	2003–2004	...	104	46.3	43.9–48.7
Bangladesh	1999	16.2	126	42.5	40.3–44.7
Bhutan	1998–2001	14.0	217	13.5	11.8–15.2
Cambodia	1997	17.0	...	...	...
China	2005	6.5	246	15.7	15.0–16.4
DPR Korea	...	...	...	20.4	...
Fiji[2]	1994	48.0	26–137	...	...
French Polynesia[3]	1989–1990	1.6	...	...	...
India	...	4.8	...	30.0	...
Indonesia	2003	11.0	229	16.3	9.1–23.5
Lao PDR	2001	9.0	7.1	...	...
Malaysia[4]	1995	2.2	240	...	...
Maldives	2002	23.7	115	43.1	33.4–52.8
Mongolia	2004–2006	21.4	97	52.8	50.8–54.8
Myanmar	2003–2004	12.0	205	22.3	17.4–27.2
Nepal	2005	40.0	188	27.4	25.9–28.9
New Zealand	2002	...	66	65.4	63.2–67.6
Papua New Guinea[5]	1997	4.6	...	...	...
Philippines	2003	6.9	201	23.8	22.6–25.0
Sri Lanka	2005	14.4	153	30.0	27.9–32.1
Thailand	...	2.2	82.5	57.4	...
Viet Nam[6]	2003	3.6	122	...	...

1 = Total goitre prevalence

2 = Results from surveys of 15 schools. Median UI estimated to be 55.5 ug/L.

3 = Tahiti only

4 = TGP in 2002 and median UI in Sabah only

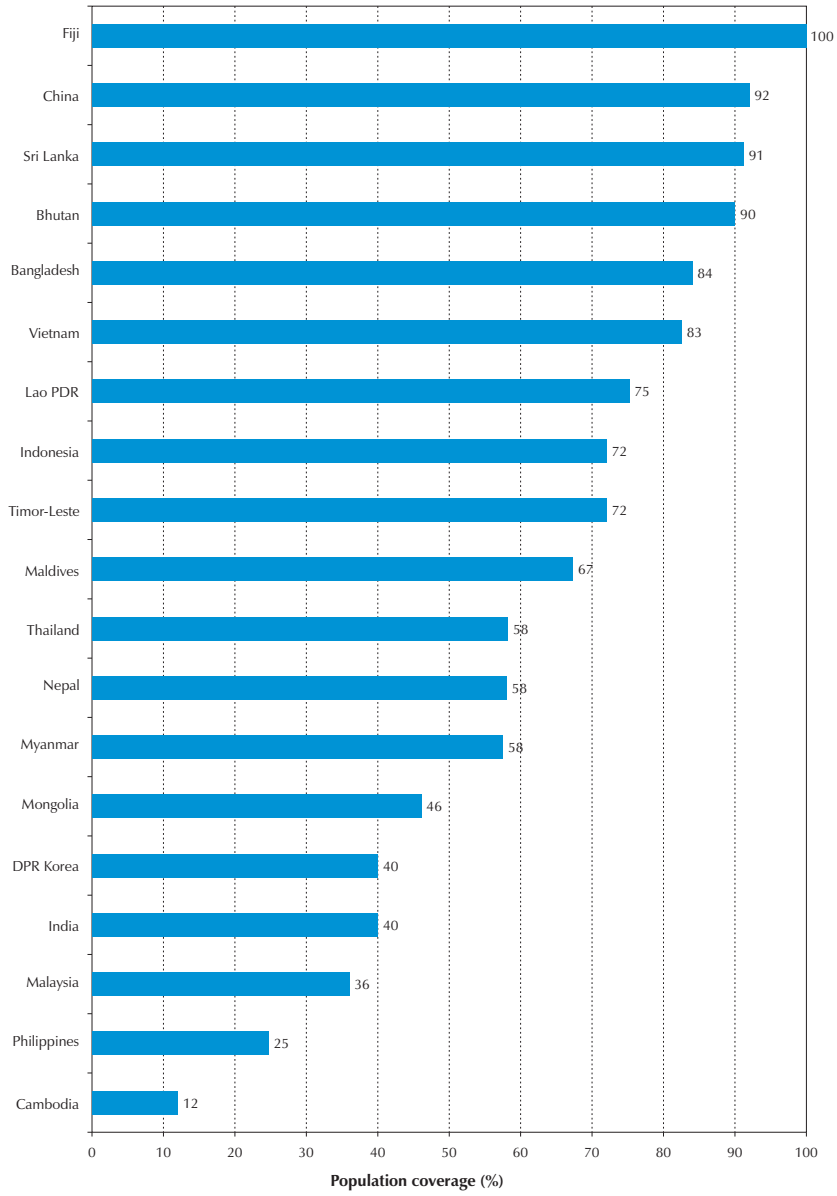
5 = TGP 13.7% in remote mountainous districts

6 = based on latest reports of the National IDD Control Committee (IDD Newsletter, Nov. 2006)

... Data not available

Source: *WHO global database on iodine deficiency*. Geneva, World Health Organization. Available from: http://www.who.int/vmnis/iodine/en/ Accessed May 2007.

Fig. 9.19 Percentage of the population using iodized salt for selected Asia Pacific countries and areas



Sources: *Country health information profiles, 2007 revision*. Manila, WHO Regional Office for the Western Pacific, 2007.

Country health profiles. New Delhi, WHO Regional Office for South-East Asia. Available from: http://www.searo.who.int/EN/Section313.htm.

Databases of the WHO Regional Offices for South-East Asia and the Western Pacific.

Ensuring a readily available supply of adequately iodized salt at an affordable price for the entire population is critical for reducing or eliminating IDD. To achieve this, priority should be given to improving collaboration with the salt industry to ensure continuous high-quality salt iodization. Support is needed for small-scale producers and adequate structures and facilities need to be set up for monitoring both salt iodization and its impact on the iodine status of the population. Improving knowledge among consumers of the benefits of using iodized salt is important in leading consumers to demand iodized salt. In addition, the enforcement of legislation needs to be strengthened.

Vitamin A deficiency

Vitamin A deficiency (VAD) has been recognized for decades as the leading cause of preventable childhood blindness in developing countries. [107] In addition, for children with vitamin A deficiency, the risk of dying from diarrhoea, measles and malaria is increased by 20%–24%. [108] Vitamin A deficiency in children also leads to retarded physical growth and development. In women, VAD may increase the risk of ill-health and of dying during pregnancy and the early postpartum period, and in severe cases may increase the risk of infant death in the first few months of life. Lactating women with VAD produce breast milk that has a low concentration of vitamin A, which is one of the major causes of VAD in young children.[109]

Vitamin A deficiency is mainly caused by inadequate intake of foods rich in vitamin A and pro-vitamin A (beta-carotene). However, frequent episodes of infections (respiratory tract infections and tuberculosis), diarrhoea and worm infestations increase the demand for vitamin A and contribute to vitamin A deficiency, especially when the intake is already insufficient. Infections such as measles increase requirements for vitamin A and subsequently raise the risk of vitamin A deficiency and associated blindness. Women have higher requirements of vitamin A than men due to pregnancies and breastfeeding.

The 1990 World Summit for Children called for the virtual elimination of VAD by the year 2000. This was confirmed at the 1992 International Conference on Nutrition. But with relatively few countries having achieved this goal, the 2002 United Nations Special Session on Children extended the time period to 2010. Criteria have been established to assess vitamin A deficiency by testing children aged between 6 and 71 months (preschoolers) in communities to determine if VAD is a significant public health problem. The conclusion that a public health problem exists should automatically trigger intervention.

There are three indicators used to measure vitamin A deficiency:

(1) VAD: state of inadequate vitamin A status assessed as serum retinol levels <20 μg/dL (0.70μmol/L).

(2) VAD disorders (VADD): physiologic disturbances secondary to VAD such as increased morbidity, mortality due to anaemia and infections.

(3) Xerophthalmia: clinical manifestations of VAD starting with night blindness.[110]

In 1995 it was estimated that VAD affected over two million preschool children in Asia Pacific countries.[111] Table 9.11 shows that 22 countries in the Region have data on VAD. In at least 10 of these countries, VAD is a public health problem with more that 15% of populations with serum retinol concentrations $<0.70\mu$mol/L. In seven countries, more than 1% of preschool children suffered from night blindness. Disaggregated data on pregnant and non-pregnant women are less consistent.

Vitamin A supplements in large-scale experimental studies have been able to achieve approximately a 25% reduction in child mortality,[112] and have reduced maternal mortality in Nepal.[113]

The appropriate intervention strategy for VAD is likely to involve a mix of measures that will result in improved vitamin A status. The composition of the intervention mix may be influenced by the relative level of public health importance assigned to the problem, i.e. mild, moderate or severe. A severe problem usually requires interventions to concurrently address short-term health needs through the use of vitamin A supplements, and long-term permanent solutions to the problem through food-based approaches. A mild problem may be resolved without use of supplements through nutrition and social marketing interventions to increase dietary intake of vitamin A-containing foods by vulnerable groups.[114]

Table 9.11 Indicators of vitamin A deficiency in selected countries and areas in the Asia Pacific Region

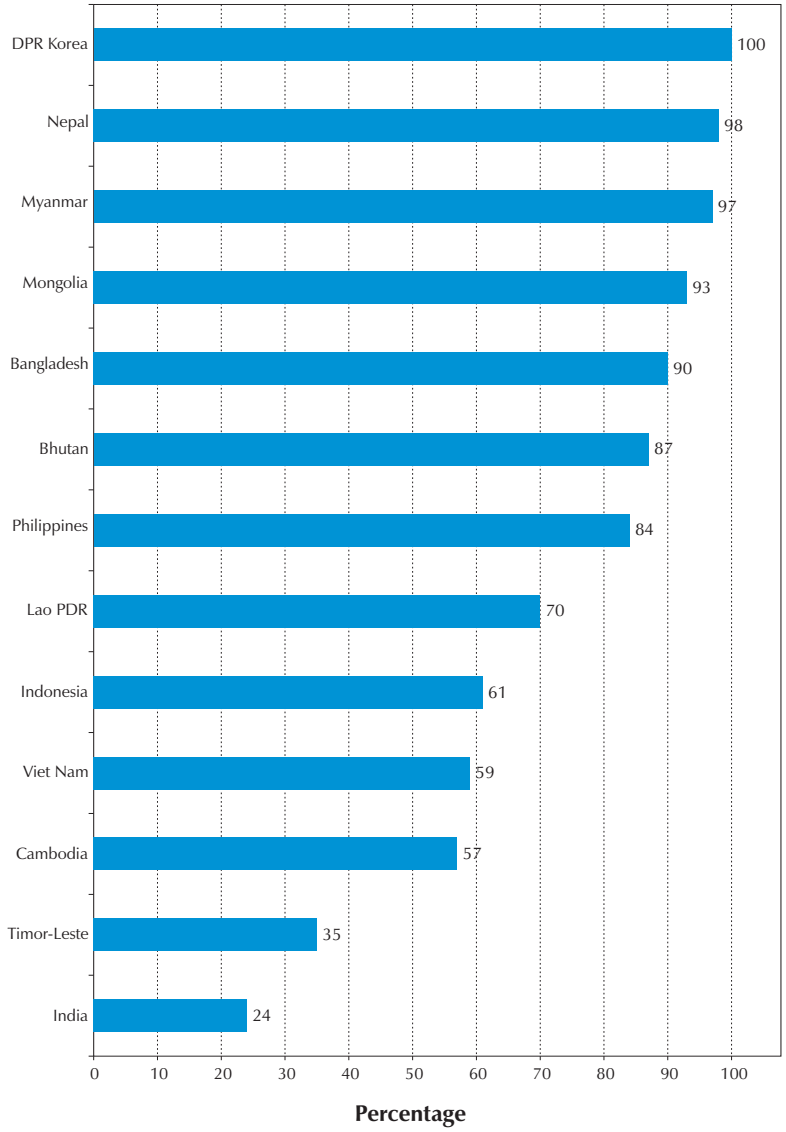
Country	Year	Xerophthalmia		Serum retinol	
		% XN*		% <0.70 μmol/L	
		PSC**	Women	PSC**	Women
Bangladesh	2006–1998	0.04	0.33	21.5	4.8
Bhutan	1985–1988	0.05	11.63		88.2
Cambodia	2000–2005	0.70	1.1-8.0	22.3	...
China[1]	1999–2002	0.14	1.68	11.7	9.3
Cook Islands[2]	1992	0.59	...	...	...
DPR Korea	2004	...	5.70	...	...
India	2000	0.60	12.00	...	...
Indonesia	1992–2003	0.13	1.70	...	...
Kiribati	1989	3.52	...	...	...
Lao PDR	2000	3.10	11.90	44.7	30.9
Malaysia[3]	1999	...	16.00	3.7	...
Maldives	2001	1.20	6.40	9.4	...
Marshall Islands	1994–1995	8.50	...	60.7	...
Micronesia, Federated Sates of[4]	2002	...	...	21.0	56.0
Mongolia	2000–2002	0.90	7.90	19.3	19.3
Myanmar	1994–2005	0.38	1.10	...	...
Nepal	1997–2001	1.20	19.50	32.3	16.6
Papua New Guinea	1998–2000	1.10	...	10.3	...
Philippines[5]	2003	1.30	7.90	40.1	35.0
Sri Lanka	1995–1996	0.80	...	35.3	...
Thailand	2002–2003	...	...	3.7	...
Viet Nam[6]	1994	0.05	0.58	21.9	...

* = night blindness
** = preschool-age children
1 = Xerophthalmia in Tibetan women only
2 = Northern atolls only
3 = Xerophthalmia in preschool-age children in Post Piah in 2002 only
4 = Chuuk state only
5 = Xerophthalmia in school-age children in national survey 1993
6 = PRC taken in school-age children in the northern mountainous zone
... Data not available

Source: *WHO global database on vitamin A deficiency*. Geneva, World Health Organization. Available from: http://www.who.int/vmnis/vitamina/en/ Accessed May 2007

Most countries where vitamin A deficiency is a problem are distributing high doses of the same to children, and in some countries, also to lactating women. Some countries have combined the vitamin A capsule distribution with the often well-established Expanded Immunization Programme (EPI) to ensure a higher coverage of children. The distribution of high-dose vitamin A capsules is the most common strategy to control VAD, although this may not be sustainable in the long run. Figure 9.20 shows the coverage of vitamin A capsule distribution to children less than 6 years receiving at least one dose of vitamin A per year in selected countries in the Region. Children at risk of VAD should receive one vitamin A dose every six months as recommended.[115] However, data on six-monthly supplementation are unavailable.

Fig. 9.20 **Estimates of the percentage of children receiving at least one dose of vitamin A per year for selected countries in the Asia Pacific Region**



Source: *Vitamin and mineral deficiency: a global progress report*. Ottawa, the Micronutrient Initiative and the United Nations Children's Fund, 2006.

Other strategies need greater emphasis; such as improved vitamin A intake and food fortification, especially fortified complementary food products.

Obesity

The prevalence of overweight and obesity is increasing worldwide at an alarming rate, with both developed and developing countries affected. In low-income countries, obesity is more common in middle-aged women, people of higher socioeconomic status and those living in urban communities. In more affluent countries, obesity is not only common among the middle-aged, but is becoming increasingly prevalent among younger adults and children. Furthermore, it tends to be associated with lower socioeconomic status, especially in women, and in some countries, the urban-rural differences are diminished, or even reversed.[116]

The health consequences of obesity are many and varied, ranging from an increased risk of premature death to several non-fatal but debilitating complaints that impact quality of life. Obesity is a major risk factor for NCDs such as diabetes, cardiovascular diseases, which include heart disease, stroke and hypertension, and cancer, and can have various psychosocial consequences. Abdominal obesity is a particular area of concern as it is associated with elevated risks to health in a comparison with more peripheral fat distribution.[117]

Obesity leads to very high costs for societies, as the resulting disabilities and diseases create huge burdens for families and health systems. The experience of developed countries clearly demonstrates that the cost of morbidity and mortality associated with increasing obesity and related NCDs will be overwhelming for developing countries. The direct medical costs of obesity, for example, in the United States of America alone are estimated at 7% of total health-care costs, or US$ 40 billion.[118]

Figure 9.21 shows the prevalence of obesity by sex in selected countries and areas in the Asia Pacific Region. Caution should be used when making comparisons, as some countries use different cut-off points for classifying obesity and sort data by various age groups. Most data on overweight and obesity are provided separately for women and men. Despite variations in cut-off points and age range, the highest prevalence rates are found in Pacific island countries and areas. The prevention and treatment of obesity in the Pacific countries and areas is made difficult by the traditional cultural notion that obesity is a sign of wealth and power. While this perception has remained largely unchanged over the years, living and eating habits have been dramatically transformed, making it much easier to become obese and embody this traditional status symbol.

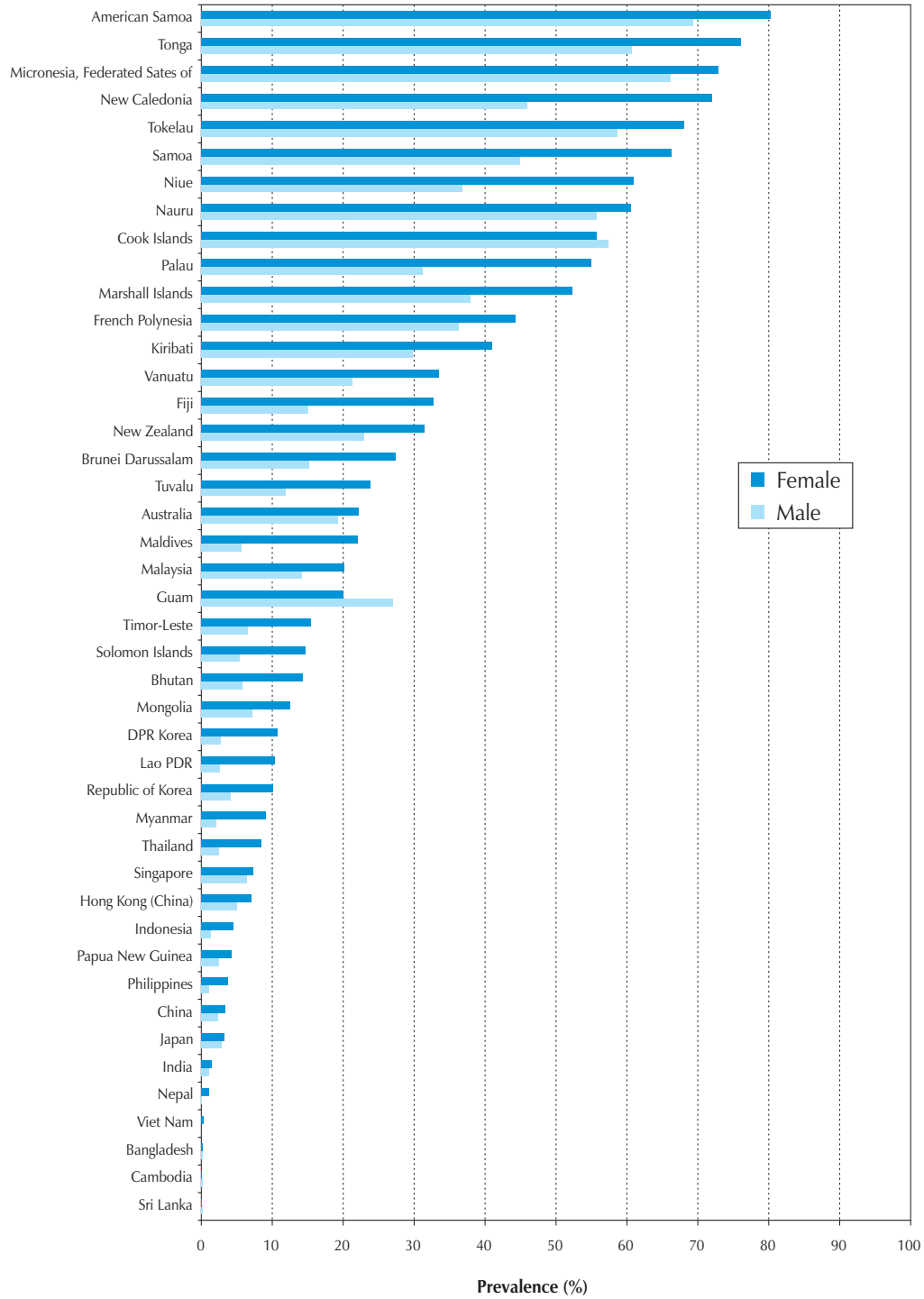
To successfully prevent and reduce the prevalence of obesity in societies, a multisectoral approach is needed to identify and change the main obesogenous factors in people's lives that contribute to high fat, energy dense diets and sedentary lifestyles. Obesity prevention and control strategies should then be focused on increasing awareness of these factors among decision-makers, health professionals and the general public, and lead them to plan and implement interventions that will create more favourable environments for healthier diets and lifestyles.

The prevention of obesity in infants and young children should be considered as high priority. For infants and young children the main preventive strategies are: the promotion of exclusive breastfeeding; avoiding the use of added sugars and starches when feeding formula; instructing mothers to accept their child's ability to regulate energy intake rather than feeding until the plate is empty; and assuring the appropriate micronutrient intake needed to promote optimal linear growth. For children and adolescents prevention of obesity implies the need to promote an active lifestyle; limit television viewing; promote the intake of fruits and vegetables; restrict the intake of energy-dense, micronutrient-poor foods (e.g. packaged snacks); and restrict the intake of sugars-sweetened soft drinks. Additional measures include modifying the environment to enhance physical activity in schools and communities, creating more opportunities for family interaction (e.g. eating family meals), limiting the exposure of young children to heavy marketing practices of energy-dense, micronutrient-poor foods, and providing the necessary information and skills to make healthy food choices.[119]

As a global recommendation, a total of one hour per day of moderate-intensity activity—such as walking on most days of the week—is probably needed to maintain a healthy body weight, particularly for people with sedentary occupations.

Overweight and obesity during childhood are among the major risk factors for the development of obesity in adulthood, with approximately 30% of obese children becoming obese adults. [120] Childhood obesity affects health, resulting in lowered fitness, increased blood pressure and adverse blood lipid levels. In addition to the immediate health effects, being obese in adolescence increases the risk of adult morbidity and mortality 50 years later, independent of the effects on adult obesity. Obesity causes a dramatic increase in diabetes and other diseases, adding millions of dollars to health-care costs.

Fig. 9.21 Prevalence of adult obesity by sex in selected countries and areas in the Asia Pacific Region



Source: *WHO global infobase: data for saving lives*. Geneva, World Health Organization. Available from: http://www.who.int/ncd_surveillance/infobase/web/InfoBasePolicyMaker/reports/Reporter.aspx?id=1

Incidence of overweight among children is a growing concern in countries in the Region. Two trends can be seen: increasing obesity rates with increasing age, and rising obesity rates as time passes. These trends were reported by countries such as American Samoa, Australia, Brunei Darussalam, China, Cook Islands, Fiji, French Polynesia, Guam, Hong Kong (China) and Niue. That list is probably incomplete because not all countries have reports on obesity, especially among children.

The prevalence of overweight, including obesity, for children below the age of five across South-East Asia shows that the prevalence varies from 0.2% in Nepal to 4.0% in Indonesia. Myanmar shows the highest prevalence of 7.7% indicating an alarming increase in the double burden of malnutrition.

Overweight is reported by some countries in under-five children and sometimes in schoolchildren as well. As overweight and obesity among children is a relatively new concern, much work remains to be done in terms of effective interventions. WHO headquarters has recently developed new anthropometric reference values for normal growth in schoolchildren, including adolescents. Promising approaches are being developed for the promotion of healthy diets and lifestyles in schools. A national school health programme in Singapore has halted the increase in the obesity rate in schoolchildren and already achieved a sustained reduction in prevalence over several years. A pilot project in China has shown it is possible to significantly reduce obesity prevalence in children within two years. It should be noted that many countries are experiencing this economic and epidemiological transition and face the double burden of underweight and overweight among children as well as adults, especially in women.

National nutrition plans and programmes

The World Declaration and Plan of Action for Nutrition was adopted by 159 countries at the FAO/WHO International Conference on Nutrition in Rome in 1992. WHO Member States adopted the plan and committed to preparing and/or improving their own National Plans of Action for Nutrition (NPAN) based on the principles and strategies enunciated. Since then, and with active support and advice from WHO, the great majority of countries in the Asia Pacific Region have NPANs.

The nine action areas of NPANs are fully inclusive and cover everything from dietary guidelines and food guides to food supply and safety issues, as can be seen below.

(1) Incorporating nutrition objectives, considerations and components into development policies and programmes.

(2) Improving household food security.

(3) Protecting consumers through improved food quality and safety.

(4) Preventing and managing infectious diseases.

(5) Promoting breastfeeding.

(6) Caring for the socioeconomically deprived and nutritionally vulnerable.

(7) Preventing and controlling specific micronutrient deficiencies.

(8) Promoting appropriate diets and healthy lifestyles.

(9) Assessing, analyzing and monitoring nutrition situations.

Improving nutritional health is a major priority of countries in the Region. Many countries are constantly updating and improving their NPANs and many have been evaluated by WHO at national and regional meetings. A WHO training course to support planning, implementation and monitoring/evaluation of NPANs has been conducted for four consecutive years in the Pacific, with multisectoral teams of four to five participants per country and from four to five countries per year.

In 2004 the Fifty-seventh World Health Assembly endorsed the WHO Global Strategy on Diet, Physical Activity and Health (DPAS). The overall goal of DPAS is to promote and protect health by reducing disease and death related to unhealthy diet and physical inactivity; and countries are encouraged to develop specific national strategies on diet and physical activity, either as part of NPANs or other health policies or plans (e.g. NCD prevention and control plans). One of WHO's roles is to monitor and evaluate the effectiveness of national diet and physical activity policies and programmes.

The next challenge is to develop a standardized approach to reducing or eliminating undernutrition. Innovative and systematic analyses of country data is required to find suitable approaches that fit national needs. These approaches may include or consider the following:

- **Data**: National nutritional surveillance should be understood as a major operational approach for population-based applications, including targeting interventions and assessing their effectiveness, as well as research on the determinants and consequences of undernutrition. Decision-makers need to identify at-risk geographical areas and socioeconomic population groups and target them with health and development programmes.
- **Comprehensive approach**: Nutrition interventions are essential to achieve other goals, such as child survival and maternal mortality reduction. Therefore, mechanisms to integrate nutrition into related policies and plans of action should be sought. Countries are urged to develop NPANs and other plans on infant and child health.
- **Political leadership and commitment**: Since nutrition is a crosscutting area, it is crucial to coordinate nutrition interventions at a high political level to ensure their effective integration into other programmes, and harmonize implementation. Nutrition programmes have been successful under the leadership of high-profile individuals.
- **Targeting children under the age of 3**: Interventions should focus on children up to age of three, when growth faltering mainly occurs. The greatest impact can be expected when all children in populations at risk are targeted and not merely those individuals below a specific cut-off point.[121] A focus on complementary feeding, combined with continued attention to the protection, promotion and support of breastfeeding, remains a key component.
- **Targeting the poor**: Continued reduction in mortality will require improved targeting of selective interventions for nutritional improvement to marginal populations.
- **Targeting women**: Special efforts should be made to improve the situation of women as primary child carers, with particular attention to health and nutrition throughout their life-cycle.
- **Community-based programmes:** Efforts to reduce child undernutrition should be based on experience gained from successful nutrition programmes. A distinguishing feature of such programmes has been the involvement of communities in the identification of problems, and in interventions to resolve them.

9.4 Social and health care for older persons

Improved social and economic conditions in many Asia Pacific countries, and technological advances in the diagnosis and treatment of diseases, raised the median life expectancy in the Region in 2003 to an estimated 68 years for both sexes (70 for females and 66 for males), although there remains a significant variation by gender between countries.[122]

With the increasing trend of smaller families separated from elderly relatives through rapid urbanization and the demographic shift toward ageing populations, policy initiatives are required to improve community-based care services to counter the loss of caregiving by family members. Other issues affecting older persons that need to be addressed are employment and income support, marginalization in urban environments, and the development of gender-specific programmes and services for the increasing proportion of older females.

Industrialized countries have developed relatively comprehensive health-care policies and programmes for older persons, including community-based and residential services. The lessons learnt by these countries in dealing with larger ageing populations are being applied in middle-income, rapidly developing countries.

National policies, legislation and initiatives

In a number of countries and areas such as Australia, Bhutan, India, Japan, Maldives, New Zealand, Thailand, and now Hong Kong (China) and Singapore, programmes for the health of older persons are well established. There are government-endorsed national strategies on ageing and a package of services and benefits that address the needs of healthy, infirm, sick and disabled elderly alike. Australia, for example, developed the National Strategy for an Ageing Australia to respond to the diverse needs of older people and the challenges of future demographic changes. Several national coordinating mechanisms are in place to implement national strategy, including the National Advisory Committee on Ageing. The Home and Community Care Programme aims to provide a range of basic support and services to enhance people's independence in the community and avoid premature or inappropriate admission to long-term residential care. The Aged Care Act was enacted in 1997 and has subsequently provided reforms, such as the restructuring of the residential aged care system and improving access and care for those financially disadvantaged.

Countries such as Bangladesh, Cambodia, Malaysia, Maldives and Mongolia have national polices for the care of older persons. Cambodia, for instance, established a national policy on health care for the elderly and disabled in 1999 to improve the welfare of the older persons and disabled people; provide training for health and other relevant personnel; promote healthy ageing; and provide special care for older people in the community. In Malaysia, the National Policy on Ageing was adopted by the government in 1996, and the National Elderly Health Council was established under the Ministry of Health in 1997 to examine policies pertaining to the health of older persons. Countries like China, Macao (China), the Republic of Korea, Sri Lanka and Viet Nam provide medical, health and social care for the aged. Countries and areas such as India, Thailand and those in the Pacific (American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, French Polynesia, Guam and Palau) have made provisions in their constitution for the protection of older persons.

In addition, Brunei Darussalam, Bhutan, Nepal and the Philippines have incorporated the care of older persons in their national health plans, while in the Democratic People's Republic of Korea and Myanmar, care of older persons is reflected in the general health-care system. Other countries are at various stages of formulating their programmes and developing health services for older persons.

Social and health-care services

A lack of policies for older persons does not preclude provision of services, as these are often part of general government welfare services for all disadvantaged groups in the country. In all countries, the care of older people is primarily a family responsibility. In countries where there are rudimentary services for the aged, their care rests totally on the family, except for health care delivered through the public sector health system.

Social and health care for older people is provided by governments in all countries through ministries of health and the national agencies that are responsible for welfare services. The level and extent of care for older persons ranges from basic health, medical and social support to fully subsidized comprehensive care, depending on the per capita income of the country. Countries with higher per capita income provide more comprehensive care as compared to those countries with lesser per capita income. Australia, Brunei Darussalam, Hong Kong (China), Japan, New Zealand, the Republic of Korea and Singapore provide a broad range of comprehensive subsidized care. In Japan, the family is still the major caregiver for the older people, although this role is being undermined due to most adult members of the family working away from home. In 2000 Japan started the elderly care insurance programme with a subsidy from the government. The programme includes medical, rehabilitation and nursing services, use of day-care facilities, home-based care and transportation.

Welfare, and to lesser extent health care, are also provided by nongovernmental organizations and private sectors in countries such as Australia, Bangladesh, Bhutan, Fiji, India, Japan, Malaysia, Myanmar, Nepal, New Zealand, the Republic of Korea, Singapore and Thailand. Community and private sector organizations provide various community-based social and health services for older persons in Singapore. The operational budgets of charitable organizations providing services for older persons are subsidized by government. Community-based services include day rehabilitation centres for the infirm or ill and facilities such as home medical care, nursing and help services.

Future

There are already over 335 million people over the age of 60 in the Asia Pacific Region and their proportion (Figure 9.22) and number (Figure 9.23) are rising steadily. Data now being consolidated shows a rapid growth in the number of people aged 80 and over, who are generally the heaviest users of health and social care.

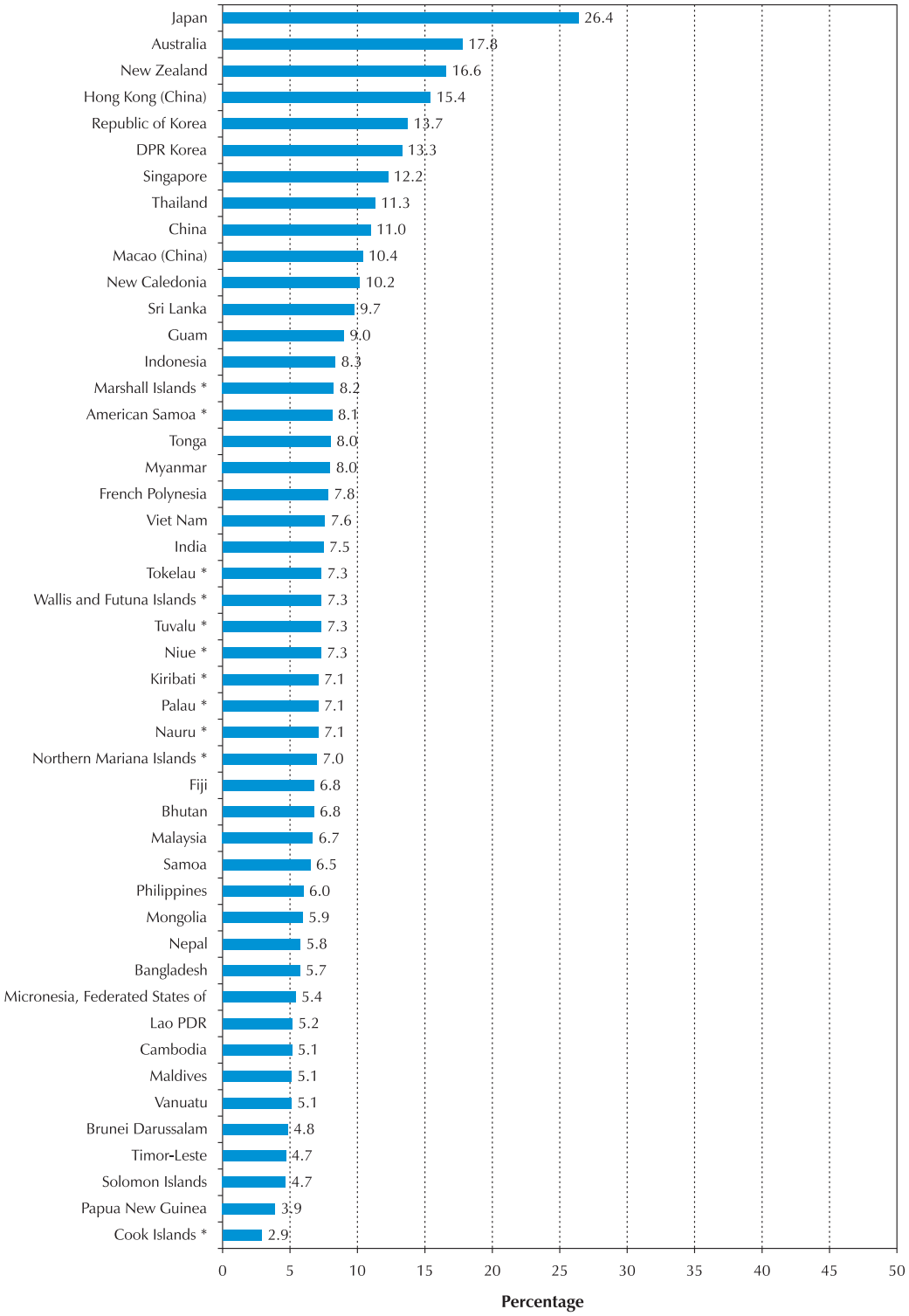
Mechanisms are necessary to continually review and share information regarding policies, services and actions being taken by countries and local authorities to protect and promote the health and welfare of older persons. A multisectoral approach is required to address the needs and concerns of older persons, including the collaboration of local communities, nongovernmental organizations and the private sector, to mobilize resources and deliver services.

There is wide, evidence-based agreement that pragmatic and appropriate policy is needed to promote community-based care for older persons which:

- seeks to promote optimal health, functional capacity and quality of life;
- provides timely preventive, curative, rehabilitative and chronic care services coordinated through a strong primary health-care system;
- incorporates social support and health services;
- is coordinated with institutional care;
- allows equitable access to essential services regardless of income; and
- is provided by an adequate number of well-trained service providers.

For countries to measure the appropriateness and effectiveness of their social and health-care responses for the growing number of older persons, a regionwide criteria needs to be established that sets out policy, action and desired outcomes.

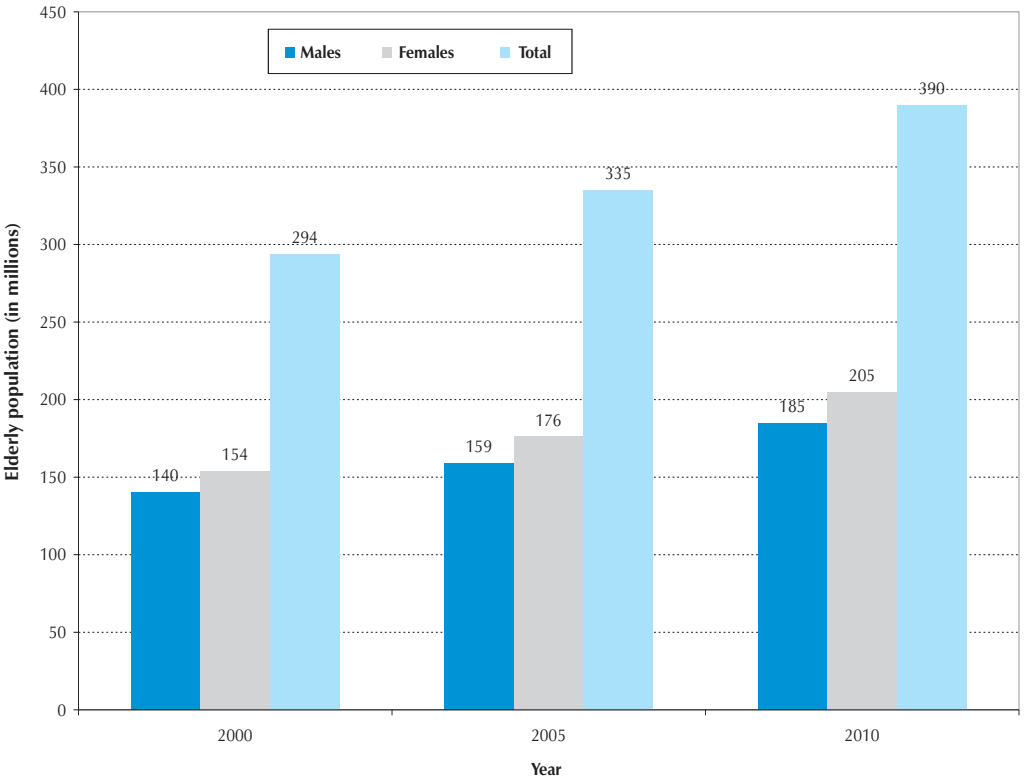
Fig. 9.22 Proportion of the population over 60 years in selected countries and areas of the Asia Pacific Region, 2005



Source: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

* Data were sourced from *Demographic tables: 2000-2005*. Manila, WHO Regional Office for the Western Pacific, 2002.

Fig. 9.23 Rising trend in elderly population (60 years and above) in the Asia Pacific Region



12 Pacific island countries/areas: American Samoa, Cook Islands, Kiribati, Marshall Islands, Nauru, Niue, Northern Mariana Islands, Palau, Pitcairn Islands, Tokelau, Tuvalu, Wallis and Futuna.

Sources: *World population prospects: the 2006 revision.* New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available from: http://www.un.org/esa/population/publications/wpp2006/wpp2006.htm

Populations for 12 Pacific islands for 2000 were sourced from *Demographic tables: 2000-2005*. Manila, WHO Regional Office for the Western Pacific, 2002.

Populations for 12 Pacific island countries/areas for 2005 and 2010 were sourced from *Demographic tables for the Western Pacific Region 2005-2010*. Manila, WHO Regional Office for the Western Pacific, 2005. Available from: http://www.wpro.who.int/publications/Demographic+tables.htm

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Section C

Health Systems Development

10

Health systems

Introduction

Health systems consist of organizations, people and actions whose primary intent is to promote, restore or maintain health.[1] This includes efforts to influence both determinants of health, and direct health-improving activities. A health action is any effort in personal health care, public health services, or intersectoral initiatives which has the primary purpose of improving health.[2]

A health system is a functional network of health-care providers, including public sector and privately-run services, which range from traditional healers to the most technologically advanced hospitals. It also includes payers (households, insurer, and donors), managers and regulators*. Ideally, all parts of the system act together in an organized way to meet the individual and community health needs of a given population. Nearly everyone, healthy or ill, comes in contact with a health system at some time. Health systems have a responsibility not just to improve people's health but also to protect them against the financial cost of illness and treat them with dignity.

Countries in the Asia Pacific Region range from very poor to very rich, from free-market to centrally planned economies, from the least to the most highly industrialized. Some have populations in hundreds of millions while others measure only in the thousands; some have predominantly young populations while others are aging rapidly. With this great diversity, it is not surprising to find different levels of development in national health systems in the countries and areas of the Region. Available resources vary widely, as do the "outputs" of health systems, and the health and life expectancy of populations.

* Health systems are different from "health sectors", which technically are the parts of a national economy that provide health-related goods and services to which economic value can be attributed. In ordinary use the two terms are almost interchangeable, especially when discussing health sector/system reforms. If a health system is defined narrowly (e.g. as the public health-care system), the health sector would include more providers and services. Conversely, a health system could have important non-economically valued functions.

Still, every health system has the same basic functions of stewardship, financing, resources creation (e.g. human resources, medical products and technologies, and information), and delivery of services. It is rare that there is no room for improvement.

The health systems of different countries depend significantly on many factors, including:

(1) the level of economic development per capita of gross domestic product (GDP);

(2) income distribution profile;

(3) total health-care expenditure per capita, public health expenditure per capita and the relative mix of public and private expenditure;

(4) availability and spatial distribution of medical and paramedical service providers, and the degree of public and private provision;

(5) the geophysical features of the country and their relationship to logistical issues; and

(6) the priority given to this sector under the country's social policy, particularly the degree of risk pooling and social solidarity.

10.1 Health systems development in the Asia Pacific Region

Health systems are shaped by local norms and social policies, demographics, education, and the financial and human resources available. In many industrialized countries in the Region, most health-care is provided by urban hospitals and private clinics staffed by qualified practitioners and supported by the latest technology. Countries that are still mainly agrarian rely more on small rural health facilities, supported by secondary hospitals in local urban areas, and a few tertiary hospitals in bigger cities. Many countries have aspects of both situations. Private providers play a major role in most countries in the Region. Pharmacies, small private clinics and traditional healers are favoured by many poor patients for reasons of cost and convenience, and many hospitals are privately owned and operated for profit. This dependence on private providers exists even though quality is not always assured because of inadequate regulatory capacity. Protection from impoverishing health expenditures is not in place due to inadequate risk pooling, and the poor and vulnerable may be excluded from health care because of inadequate social solidarity mechanisms.

Ministries of health establish overall health policies, regulate the health sector, and interact with other government sectors such as finance and public safety. Responsibility for essential public health functions may be shared between central and local governments. Governments are significant financers and providers of care, although involvement varies considerably between countries in the Region. External donors play important roles in less developed countries of the Region through financial support, technical support and advice on policy development.

Some health systems were organized by unevenly consolidating distributed dispensaries, vaccinators and sanitary inspectors into small health facilities and posts covering specific villages and surrounding areas. Existing missionary hospitals were sometimes complemented by newer government district hospitals supplied with trained medical and nursing staff and some diagnostic facilities. The diversity of health systems in the Region makes sweeping generalizations impossible, and each country must analyse and plan its own system based on core principles.

The initial pace of health improvement in the latter half of the 20th century was both visible and impressive, but momentum was lost in the 1970s. Awareness of the need to reduce morbidity and mortality among large, frequently neglected rural populations led to articulation of the primary health-care (PHC) strategy. The Health For All 2000 Alma-Ata Declaration of 1978 aimed to reorient health systems towards PHC, and more effectively deploy limited resources for health with the involvement of local communities. The effectiveness of PHC was improved by such technologies as oral rehydration therapy, vaccine cold chains and integrated treatment protocols based on essential drugs. Cadres of multipurpose health workers working closely with communities were part of this approach, with some countries emulating the "barefoot doctors" of China by training village health workers, supported by local health centres.

External assistance to developing countries for health increased in the 1970s as donors such as the World Bank and the Asian Development Bank (ADB) found that large infrastructure projects alone did not contribute as much to overall development without concurrent progress in the social sectors. The need to simultaneously limit rapid population growth and reduce child mortality focused assistance on maternal and child health and family planning programmes. While the motives and methods of some of these programmes were sometimes criticized, they provided a great deal of support for PHC development in many countries in the Region as they became integrated into national health services.

Sound evidence based on local conditions should guide the development of health systems. However, by the 1980s international financial institutions and aid donors appeared to control the agenda and emphasis was placed on structural adjustment. Highly indebted countries needing continued access to the support of international financial institutions were pressured to introduce fiscal reforms that often included reducing public and health expenditures. A frequent reform was to limit public employment and redeploy existing health staff to serve in rural areas, although the actual success of such redeployment was doubtful. Unfortunately, just as PHC was to be implemented in the post-Alma-Ata Declaration environment, funds available for the health sector decreased. Health sector reforms, meant to increase the efficiency and effectiveness of health systems, were designed to counter the effects of spending cuts and thus caused PHC to be seen as health care "on the cheap" for poor people rather than an overarching philosophy for a holistic, sustainable health sector based on a set of core principles. Donor pressures for health sector reform were sometimes overwhelming.[3] Only countries less dependent on foreign aid, such as China, Brunei Darussalam, Malaysia, Thailand and Singapore, had the relative luxury of developing their own health sectors as they saw fit.

A reform frequently encouraged by donors was the introduction of user fees, or "cost sharing", for government health services, a measure intended to reduce inequity and increase the amount of funds available. Although many people are willing and able to pay, particularly for drugs, user fees lead to exclusion of the poor and introduce their own set of distortions. Many countries have demonstrated that patients will pay for a large amount of the medicine they consume, but this has also revealed that financing health-care systems by the sale of drugs can lead to problems of inappropriate and irrational drug use. For hospital care, research shows that the poor are deterred if high out-of-pocket payments are required at the time of service. The difficulty of creating exemptions for the poor was underestimated, and this led to wider acceptance of the need for prepayment systems and risk-pooling. Prepayment systems include social insurance, tax-based systems, private insurance, voluntary risk-pooling and the use of donor funds, or some combination of these based on the local situation.

Box 10.1: The Bamako Initiative

Originating in Africa in 1987, the Bamako Initiative (BI) was a model for some Asian countries, including the Lao People's Democratic Republic, which established community-level revolving drug funds to mobilize resources for PHC. In addition, BI-type revolving drug funds have been implemented in Myanmar, Viet Nam, in some districts in Cambodia, within the Community Drug Programme in Nepal and at the community, or *barangay,* level in parts of the Philippines. Early critics of BI predicted that health systems could become dependent on revenues from the sale of drugs, leading to irrational drug use. This is believed to be true in the case of the Lao People's Democratic Republic.

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An expanded role for the private sector became a health sector reform theme of the 1990s which was related to the difficulty of financing and providing all needed health services in the public sector. This reflected the influence of supply-side economics among donors; for example, the belief that free markets and competition improve the welfare of all. Public resources could be reallocated for greater overall impact, and government health services would provide cost-effective "packages" of essential services. Critics noted that this approach sanctioned a two-tier system in which the wealthy used high-quality private provider, while the public sector served as a safety net for the poor. Since health-care markets are far from perfectly efficient, the growth of the private sector required better regulatory systems than usually existed. Even if provision is highly privatized, the government cannot abscond from its position of stewardship of the health sector, especially regarding services for the poor and underserved. Governments have had difficulties in ensuring that subsidies aimed at the poor actually help those most in need. Middle- and high-income earners frequently benefit more from public money for health than those at the lower end of the economic spectrum.

The late 1990s witnessed global efforts to alleviate poverty by shifting the direction of development and better coordinating donor assistance. The report of the Commission on Macroeconomics and Health established by WHO compiled much of the evidence that has focused policy-makers and donors on the health, social and environmental burdens of the poor. At the same time, following the Millennium Declaration, countries agreed to pursue the Millennium Development Goals (three of which focus on health) and to develop poverty reduction strategies, which are now generally giving more attention to the health sector. The recent work of the Commission on Social Determinants of Health has encouraged countries and regional health partners to address the social factors leading to ill-health and focus on health inequalities.

10.2 Health systems infrastructure

Most countries in the Asia Pacific Region rely on a mix of general and specialized hospitals and smaller facilities such as primary health centres that are part of the public sector. The majority of hospital beds are in general hospitals. China and India have by far the most district-level referral hospitals and

primary health centres in the Region. Indonesia, Thailand and Viet Nam also rely heavily on lower-level health facilities. However, uncoordinated decentralization can result in overlapping functions and inefficiency.

The number of hospital beds per thousand population is often used as a proxy indicator of availability of health services, but this can be misleading when used to gauge actual access to services, particularly for the poor and disadvantaged in health systems with user fees. Not surprisingly, the most developed countries in the Region have more beds per capita than poorer and less developed countries. Wealthier countries also tend to have more private sector health facilities and a wider variety of facilities to meet specialized needs, such as for older persons and disabled.

While India has only 0.90 beds per 1000 population, China's ratio of 2.2 beds per 1000 population is the second highest among developing countries in the Region.[4,5] Small island nations tend to have higher than average ratios due to their dispersed populations. Due to variations in how countries define hospital beds and what services are provided in hospitals, caution must be exercised in comparing hospital bed ratios between different countries. Utilization rates of beds, and the services provided in those beds, may offer a more accurate comparison.

It does appear that some countries have relatively poor access to hospital inpatient care while being more adequately resourced at the PHC level. Bhutan, Cambodia, the Lao People's Democratic Republic, Malaysia, Papua New Guinea, and Thailand rely heavily on primary health care facilities to compensate for relatively few hospital beds, as do several island nations. Again, there is a wide variation in the functionality of primary health-care facilities across the Region, making intercountry comparisons difficult.

Conceptually, the service centres of a health system need to be decentralized to make them accessible and provide equity in service delivery to the citizenry. The structure adopted for each country, inter alia, depends on: the historical legacy of the health system; the geophysical features of the country; other logistical features such as transport linkages; and distribution of trained health workers.

In a country consisting of several islands, the health system has unique features. These islands must be serviced largely by the public health system, because very few private health service providers are able to create a viable private practice from a small number of widely dispersed patients. Some examples of high public funding support to the health systems of islands in the Region are Cook Islands, the Marshall Islands, the Federated States of Micronesia, Nauru, Palau, Solomon Islands and Tuvalu.[6] The striking exception to this is Singapore, an island state functioning as a global commercial and financial hub. The wealth of individuals and state is sufficient to ensure that a well-resourced medical facility is likely to be available a few streets away and reliance on public service facilities is relatively less. For less well-endowed island nations, the public health facilities catering to an accessible cluster of islands is forced to engage service providers who are capable of independently providing at least primary health-care services. With increasing application of information technology, the telemedicine mode of providing medical services will likely play an increasing role. For medical conditions requiring a specialist and inpatient secondary and tertiary care services, the reliance is on airlifting patients to well-equipped central service centres despite the prohibitive cost involved.

For larger countries, including multi-island nations such as the Philippines, the health system requires a multi-tiered organizational structure. The centralization of health service facilities, except in countries that are very small, results in limited access for the dispersed citizenry. A review of the position in the countries of the Asia Pacific Region reveals that many countries such as China, India and Indonesia have a three-tiered organizational structure for delivery of primary health care.

It is a paradoxical feature of this Region that in some countries, although health services for most people are relatively weak, a few health facilities are state-of-the-art, and the skills of clinical specialists are of the highest quality available anywhere, e.g. India and Thailand. These countries have become promising locations for what is now called "medical tourism". Patients from developed countries, where health systems are over-crowded or prohibitively expensive, can obtain world class medical services in these developing countries at economical rates. This provides a promising window of opportunity for commercializing health services, but this is not without negative features. It may create what is called the "twin-track" health system, state-of-the-art facilities for foreign patients and substandard ones for local citizens. It is not yet clear whether medical tourism is beneficial or harmful to the medical services of ordinary citizens. Countries that encourage medical tourism must be willing to use regulatory mechanisms to ensure that this does not lead to escalation of general health costs, or harm services to nationals. Potentially abusive practices, such as organ transplantation, require particularly close monitoring.

10.3 Governance, health policy and legislation

Governance

Governments have a clear role to play in the health sector, even in the most privatized systems, which includes issues of equity, efficiency, quality and cost control. There is a growing global awareness that when a national health system aims for universal health coverage, the responsibility for service delivery may have to be shared between the public and private sectors. Any public sector organization trying to discharge this burden by independently delivering health-care services is at risk of becoming too large and unwieldy. However, the public sector could be required to deliver services on a reasonably large scale to provide a counterpoise to the private sector, and to ensure services for the poor and underserved.

In many cases, remote and logistically difficult areas would continue to depend on public services as private for-profit services are not likely to operate in these areas. The promotive and preventive components of health care, often referred to as public goods, can only be provided by the public sector unless clear incentives are given to the private sector to do so. The share of the public sector's service delivery is particularly critical in smaller, less affluent island countries and areas of the Region. The Pacific island countries and areas in the Region have a scattered target population of about 9 million, making a large role for the public sector almost inevitable.

For the physically large and highly populated countries of the Region, the private sector's role in service delivery becomes significant. However, the health sector is known to be prone to the so-called market failure where a free market cannot be expected to regulate itself. The health sector is a market situation where the user has very little knowledge of the technical requirement for services, what a reasonable price for the service is, and the quality of services eventually rendered; while the provider has limited knowledge about the health status of the individual. The state, in its role of governance, faces a paramount responsibility. To ensure that the health system functions in the best interest of the beneficiaries, with a large portion of service delivery undertaken by the private sector, the state needs

to establish and operate an appropriate framework of statutory controls. Generally speaking, most developing countries have relatively weak statutory provisions to regulate health services, and in many cases where statutory provisions exist the enforcement is weak.

A major challenge for health systems is containing costs and obtaining maximum health outcomes for the funds available. For most developing countries, spiralling drug costs are a threat to sustainability. For a struggling developing country trying to achieve universal health coverage, it is imperative that primary health care be based on a list of essential drugs from the generic domain which deal with the commonest conditions that contribute to the burden of disease in that particular country.

There are multiple other issues in cost control and efficiency, including medical technology, health workforce, referral patterns, and the mix of community and institutional services. Increasing efficiency requires an overview of the entire system. A few countries, mainly more highly developed economies such as Australia, New Zealand, the Republic of Korea and Singapore, have stronger statutory frameworks from which some lessons can be learnt.

Health policy

Having clear, rational and comprehensive health policies brings health care closer to the centre of national development efforts, which are increasingly focused on reducing poverty. Changes in how governments interpret their roles have implications for policy development and for globally-driven health programmes. The policy environment frequently includes nongovernmental organizations (NGOs) and the private for-profit sector as stakeholders in health and health care. Governments must be accountable to the people who are the intended beneficiaries of health services, and to those providing funding. Countries with limited resources for health must manage them carefully to ensure effective outcomes.

Policy-makers need a broad understanding of what outcomes are expected from a health system. *The world health report 2000* has articulated these as:

(1) improved health outcomes in both absolute terms and in relation to different socioeconomic groups;

(2) responsiveness to the desires and needs of the population;

(3) financial protection from catastrophic expenditure; and

(4) efficiency, so that the maximum health gain from available resources is obtained.[7]

Conceptually, narrowing health gaps is an important policy goal that facilitates target-setting and implies raising the health of the poor and vulnerable at a rate outstripping that of the wider population. This focuses attention on the fact that overall gains in health can occur at the cost of persistent and even widening inequalities between socioeconomic groups and areas and provides clear criteria for monitoring and evaluation. An effective pro-equity policy is one which achieves both an absolute and a relative improvement in the health of the poor and vulnerable, or an improvement in their social conditions or in the prevalence of risk factors.

In the Asia Pacific Region health policy development is actively supported by research at academic institutions, government think tanks and, increasingly, by NGOs and consumer groups. Health impact assessments can help gauge the health consequences of public policies.[8] Countries such as Thailand have recently started to implement health impact assessments.

Box 10.2: Government's role in the health sector

The most critical considerations in good governance in the health sector and a government's commitment to the health of its citizens are:

- Is the government placing appropriate priority on health, relative to its means?
- Is the government focusing its resources on public goods and essential public health functions?
- Is the government employing cost-effective health interventions, so that limited health resources go furthest toward improved health outcomes?
- Is the government protecting the poor and other vulnerable populations from catastrophic losses?

Source: Becker L, Pickett J, Levine R. *Measuring commitment to health: Global Health Indicators Working Group Report*. Washington, DC, Center for Global Development, August 2006.

Health competes for public financing with other social and economic sectors, and in many countries the defence budget is also a major competitor. Once the health budget is fixed, policy decisions are needed to establish the balance among subsectors, especially how resources are allocated between hospital care and primary care, urban and rural health services, basic care for many and high-technology care that benefits a few—in effect which communities benefit most or least from public funds. Unless public policy is explicit on a pro-poor focus, public subsidies may actually benefit the better off more than the poor.

Legislation

Once health policy has been established and widely agreed on, it has a more lasting impact if enacted as national laws and acts, with secondary regulations and by-laws that grant authority for actions and rights. Although it is important to consider using a range of approaches to ensure appropriate types of behaviour that protect and promote the health of individuals and populations, well-designed legislation can play an effective and important role. Health legislation that supports policies promoting good health can range from legislation establishing and regulating the provision of health services to laws related to the environment, food, vehicles, buildings and occupational health. Healthy public policy (public policy that promotes health) certainly extends beyond the health sector, which must be involved in a multisectoral fashion. Actions may vary, depending on the socioeconomic and political framework of each country or population subgroup.

However, except for countries with well-established parliamentary systems, the capacity of many Asia Pacific Region health ministries to generate legislative proposals is not enough, particularly in the case of the smaller Pacific island nations. The enactment process is generally lengthy and often there is reliance on ministerial decrees that may not necessarily harmonize with those of other ministries, creating severe challenges for intersectoral health issues and actual implementation. Lack of access to and knowledge of existing laws inhibits their development and enforcement in many places.

In developing or amending legislation each government has a responsibility to ensure that, where compliance with the law is needed, an appropriate range of options and mechanisms for enforcement are included in the relevant legislation, and that sufficient resources are allocated to achieve that enforcement. In addition to basic public health laws, core regulatory functions need to be strengthened in many countries to improve the quality and safety of the services that people receive. Governments have a key role in planning and regulating activities of the private sector and the health workforce, and must be prepared to stand up to professional groups when their interests are in conflict with those of the public. Effective and

fair enforcement of public health law is a critical component of every government's responsibility to improve and protect the public health of all citizens. Laws and decrees are frequently not enforced due to inadequate regulatory capacity. If legislation is not enforced, its value is greatly decreased. There are many examples of laws being ignored because no action is taken in cases of noncompliance.[9]

10.4 Equitable access and decentralization

Equitable access

Many countries in the Region face formidable problems in developing equity in health and access to health services. With large variations between and within countries in how these issues are handled, each country must examine its own system and decide individually how best to proceed. However, recurring themes in the Region and country-specific examples provide guidance.

Poor, vulnerable and socially excluded groups, in general, have a higher burden of disease while at the same time, they frequently have lower access and lower utilization of health-care services, both curative and preventive. This is sometimes referred to as the inverse care law, where the availability of good medical care tends to vary inversely with the need for medical care in the population served.[10] There are multiple barriers to health equity and equitable health-care access. These include financial, geographical and sociocultural barriers, such as gender, class and ethnicity, as well as the lack of system responsiveness to the needs of the poor, vulnerable and socially excluded. Examples from Indonesia, India and Thailand confirm that those in the lowest quintile of income utilize services less than those in higher income quintiles, and that those in rural areas also receive less care, both publicly provided and privately provided. China attained a fairly high degree of health equity and access in the 1970s and was frequently presented as a model for achieving good health outcomes at low cost,[11] but with health system modernization in the post-reform period, health equity has been adversely affected.[12]

When health systems are highly dependent on user fees from households (out-of-pocket payments), financial barriers arise at the time of service, particularly in countries where risk pooling and pre-payment schemes are not organized. The direct costs of health care deter health-seeking behaviour, as do indirect costs such as transportation and food, and lost income while waiting for care or for family members seeking care. In India, for example, 83% of health-care expenditure is paid for by households at the time of service. The Asia Pacific Region has the highest percentage of out-of-pocket support for health systems among any WHO region in the world.[13]

Geographical barriers include the concentration of health facilities and health workers in urban areas, or in areas close to adequate transportation. Even where roads and transport are adequate, health workers and health facilities tend to congregate in urban, higher-income settings where there are more opportunities for career advancement or raising health worker income levels. The remoteness of some areas remains a barrier, even in well-funded systems, and the cost of supplying such populations with adequate care can be expensive. Rural and urban differences in health care are well documented in many countries in the Region.[14,15,16]

Another barrier is social exclusion, which can be based on ethnicity, gender, sexual orientation or other social factors. Minority groups frequently have language and cultural differences from the majority population, including health workers. Such differences serve as disincentives or barriers which keep them from seeking and receiving adequate care, or in receiving care in harmony with their traditional beliefs. Gender is a determinant of access to care in many settings, with women and girls receiving less, or more delayed, care in many settings. In addition, the gender differences in population in several countries in the Region may be partially attributable to differential rates of health care, in addition to the well-known issue of sex selective abortion.

Even where health facilities are available, there is often a lack of responsiveness of the health system in areas where a high proportion of the client population come from the poor and underserved. Issues include inconvenient working hours, rude or abusive health workers, more frequent stock-outs of core medicines, and missing or malfunctioning equipment. Voices of complaint from the poor and underprivileged are less likely to be heard or to receive a response from the authorities.

Inequities in both access and utilization of health services and in health outcomes exist in most countries of the Region. The assumption that economic development and modernization of the health sector will automatically lead to improved access and equity is false; therefore, issues of equity and access require explicit planning.

Decentralization

Decentralization in many countries in the Region, and varying political, economic, geographical and demographic situations, has led to large differences in how national responsibilities for health are allocated. These range from highly centralized and controlled systems in countries such as the Philippines, Thailand and Viet Nam, where there is dependence on local governments to organize services, to highly decentralized systems that depend to a large extent on privatized providers of care, such as in India and Singapore. Whichever system be utilized, the central government must retain its stewardship role for health services even if implementing responsibility is decentralized. Many countries are still working out the respective roles of various levels of government, particularly where decentralization is relatively recent. Experience has shown that it may take years, or even decades, for systems to adjust to decentralization. The equalization of health resources between rich and poor regions within countries has been a particularly difficult issue in many decentralized countries, with richer regions frequently having fewer health needs but more health resources. If a country opts for decentralization, equalization formulas for resources must be found; and the central health sector should strive to implement that policy and learn how to be a support service to the decentralized implementers of health services.

Box 10.3: Decentralization

Decentralization has usually taken three forms. The first involves the devolution of authority and responsibility from central to local government agencies. For example, provincial or district governments are responsible for health and other social sectors in Bhutan, India, Indonesia, Myanmar, Nepal, Papua New Guinea, the Philippines, Sri Lanka, and Thailand.

The second process involves deconcentration of functions from higher to lower levels for managing financial resources, deploying human resources and managing health facilities.

The third process entails delegation of responsibility and functions from central government units to autonomous or specialized government agencies, such as institutes for health research and training, national nutrition centres and institutes of policy studies.

Decentralization has also meant the transfer of functions from government (public responsibility) to NGOs and private for-profit enterprises.

Source: Than Sein U. Health sector reform: issues and opportunities. World Health Organization Regional Office for South-East Asia. *Regional Health Forum*, 2006, Volume 4, Chapter 4.

10.5 Primary health care and the health system

Keeping PHC and universal access on the health system development agenda is one approach for increasing both equity and efficiency. In countries with effective health-care networks that have largely resolved problems of access, PHC is today mainly seen as a level of care. In low-resource countries where there are still significant access challenges, the PHC concept is a system-wide strategy for development with emphasis on the right to health care, social justice and reducing inequality. There are several common obstacles to scaling up PHC in the Asia Pacific Region and some examples include, but are not restricted to the following:[17]

- levels of public funding are too low to provide basic public health services (Cambodia and Nepal);
- allocation of public funding is skewed to tertiary hospitals and better-off areas (China, Nepal and Viet Nam);
- shortage of qualified health workers (Cambodia and Nepal);
- health workers are unwilling to work in rural and poorer communities (most countries);
- overemphasis on the role of doctors within the health system, leading to an over-qualified skill mix (Bangladesh, Mongolia and Nepal);
- physical inaccessibility to services (Indonesia, Mongolia, Nepal and the Pacific island countries);
- aid is a significant funding source for health, but is not well coordinated and may also be short-term or unpredictable (Bangladesh, Cambodia and Nepal);
- social and gender issues (Regionwide); and
- quality of health professional education (most countries).

Community involvement and self-reliance is a basic underlying principle of the primary health care approach as enshrined in the Alma-Ata Declaration.[18] Community involvement is proposed as a strategy to counter the failure of past rural health systems development strategies which did not actively develop skills and encourage initiative, resulting in services that could not be sustained by local knowledge and resources.[19] Engagement and commitment by local communities can contribute in many ways to health improvement. By identifying, mobilizing and committing their own resources (and advocating more effectively for outside resources), communities build an enhanced sense of collective purpose and solidarity and improve their capacity for self-help. Small, action-oriented, local initiatives can be both effective and efficient. The healthy settings initiatives in the Asia Pacific Region, such as Healthy Cities and Healthy Islands, draw on this approach.

There is a long history of community involvement in health[20] in the Region. However, most people live in rural areas where roads, irrigation, electricity, schools and employment are often higher priorities than health services. To raise the priority of health, community involvement in health can be integrated into overall community development programmes, consistent with the intersectoral principles of the PHC approach.[21] There are known preconditions for successful community involvement: strong political commitment, capabilities of the communities for self-directed development, availability of a basic health structure and coverage, and strong bureaucratic support.

10.6 Public and private health services

In the last two decades of the 20th century neoliberal economic philosophy has held that health systems should be reformed through privatization. However, evidence from the Asia Pacific Region and other parts of the globe shows that in developed countries and developing countries having good quality health systems, the aggregate share of public health expenditure is a key, though not the sole, determinant of the quality of the health system.

Developed countries typically allocate a larger percentage of their GDP to health expenditure. This, to an extent, is to be expected, as they have a larger amount of available resources and can afford to spend more on sophisticated health services. However, what is striking is that even developed countries, with a free market model of development, continue to provide high levels of public funding to their health systems. Even in the United States of America, with one of the most market-oriented systems in the world, 40% of health expenditure comes from the government.[22] While the developed countries are examining alternative options for service delivery to achieve greater efficiency, and alternative models of financing, they do not appear to be reducing the overall contribution of public resources to the health system.

Developing countries in the Region, particularly in South-East Asia, incur a health expenditure which is relatively low as a share of the total economy or a share of public expenditure. Although WHO has never made an official recommendation on desired expenditure levels for health, WHO documents since 1981 have used a 5% of GDP figure as an indicator for health-care expenditure that should be monitored. This indicator, according to Savedoff, has evolved into being referred to as a recommendation by other authors, although there is no recommendation based in any formal WHO document.[23] That said, out of the 48 countries and areas in the Region, as many as 20 have a total health expenditure below even this modest level of 5%, and of the 11 countries in the WHO South-East Asia Region, only India, Maldives, Nepal and Timor-Leste reach this level. Also, since the aggregate GDP of developing countries is smaller, the monetary resources available in these countries for a given share of GDP is much lower. The lower per capita availability of monetary resources in the developing countries will have its inevitable impact on the quality of the health system. WHO's Commission on Macroeconomics and Health has estimated the cost of a minimal package of health services to be US$ 34.[24] With the low current base of health sector allocations in many countries, the effort of funding the minimum package poses a huge challenge, making compromises inevitable.

Ideally, basic health-care requirements would be uniform for people everywhere, and not directly linked to the level of economic development within countries. In reality, the amount of spending on health tends to increase in both absolute terms and in percentage of the total economy as national wealth increases, which is sometimes defined as a luxury expenditure. If developing countries wish to provide services equivalent to richer nations, they would have to allocate even higher percentages of their national wealth than richer countries, exactly the opposite of what occurs now. An absolute increase in health-care funding is needed, but it must be combined with increased efficiency.

Public health expenditure as a percentage of GDP is high in most of the developed countries in the Asia Pacific Region as it is in other parts of the developed world. There are only a handful of developed countries where public health expenditure is less than 5%, and in most countries it is well above that. The percentage of public health expenditure for most low- and middle-income developing countries is small. As a reference, the average global figure of public health expenditure for such countries is 2.8% of GDP.[25] By comparison, the public health expenditure in most South-East Asian countries is much lower.

A comparison of the public health expenditure in different countries of the Asia Pacific Region with developed countries indicates that the role of the state in financing national health systems is very weak in many of the countries in the Region. In as many as 15 developing countries in the Region, the public contribution to total health expenditure is less than half of the total.

The reason why public health expenditure is a significant component of a quality health system in any country, including developed market economies, is that the preventive and promotive services required in a balanced health system are public goods which can only be delivered by a public health system. It is the preventive and promotive initiatives that reduce disease burden and minimize the requirement for the more expensive curative services. Curative services, to a very large extent, provide a "back-stop" for the failures of these initiatives.

Global statistics consistently lead to the conclusion that total health expenditure as a percentage of GDP does not by itself determine the quality of the health system. The breakdown between public and private expenditure significantly determines the composition of the services provided under the health system. Public health expenditure almost exclusively provides the preventive and promotive inputs as well as curative services for the poor and vulnerable in countries where there is a strong social safety net. In addition, public health expenditure is concentrated on a wide span delivery of primary health-care services. On the other hand, private health expenditure provides all categories of curative services—primary, secondary and tertiary—but its coverage is generally urban-centric and concentrated in areas where income levels are high and social infrastructure is well-developed. Many contributory features of the health system, including the share of total health expenditure, determine its quality.

Several countries in the Region receive multilateral or bilateral donor funds to support their health systems. There is a wide range of variation in the degree of dependence on donor resources for the health sector across the Region, ranging from levels as low as 0.1% in China and Malaysia to the Lao People's Democratic Republic and Cambodia, where donors provide the majority of the public budget in health.[26] It is generally perceived that excessive dependence on external funding makes a country's health system vulnerable. External funding may vary widely over time, depending on geopolitical factors, thereby subjecting the domestic health system to large budgetary fluctuations. It is often asserted that national health priorities become distorted under donor influence, whether it is a grant or loan.

External assistance has supported the health systems of the developing countries of the Region since the 1970s. The fiscal reforms introduced by international financial institutions, usually as a response to fiscal crises, required reduction of public expenditure, with the social sector often being the first to be reduced. The reforms recommended by the multilateral agencies were expected to compensate through efficiency gains for the funding cuts imposed on the health sector budget. This expectation did not materialize in most developing countries. As a result, health expenditure did not rise fast enough to ensure that health systems acquired or maintained a critical mass to make a discernible impact. Countries less dependent on external aid, particularly aid from international financial institutions, such as Brunei Darussalam, China, Malaysia and Singapore, may have been able to follow independent policies regardless of the prevailing policy of these institutions.

An interpretation of evidence from the Region and elsewhere is that the state's contribution to total national health expenditure should be a significant share to achieve a minimal health system quality. Without such balance in funding, inputs to health systems are at risk of becoming excessively tilted towards biomedical care and health services for the more economically advantaged, at the cost of the preventive and promotive inputs that play a large role in moderating the basic disease burden.

Primary health care, which by definition includes promotive and preventive inputs, in addition to curative initiatives is the most cost-effective of the three categories of services. It is widely accepted that about 90% of medical conditions can be appropriately treated at the primary level. Attention of health system planners was focused on this category of initiatives after the Health For All by 2000 Alma-Ata Declaration of 1978. This realignment of approach in the health system, through efficient deployment of limited resources on essential services and by reliance on community partnerships, contributed significantly to improvement in access to health services.

However, recent trends across the world have revealed an undesirable shift of expenditure toward the tertiary sector, and also to some extent to the secondary sector, at the cost of the primary sector. With rapid scientific advancement, new clinical testing procedures and sophisticated diagnostic equipment has flooded the market. The adoption of such innovations, while relevant in specific medical situations, is unduly driven by commercial forces, as distinct from medical requirements. The requirement of a strong primary sector is particularly important in resource constrained settings or in the small island countries that have geographical problems in providing services, but a strong primary sector is necessary for an effective and efficient health system in all settings. Developing countries in the Region allocate a varying share of resources to the primary sector, but there is a growing tendency to shift resources away from the primary sector. Against this backdrop, the question arises as to what is the appropriate share of resources for the primary sector.

Health care of any category – preventive, promotive or curative – requires an appropriate mix of services according to circumstances. Services may consist of preventive initiatives through the supply of public goods; promotive initiatives to bring about a desirable behavioural change; clinical observation of the sick by trained professionals; clinical laboratory investigations; and invasive and non-invasive investigations using sophisticated diagnostic hardware. Depending on the severity and the complexity of the condition, there should be a rational move from the simpler methods and procedures to the more expensive and technically sophisticated ones. Conceptually, the patient should move through referral from primary services to secondary services, and then, if required, to tertiary services. The health systems of many countries have difficulties in finding the most efficient balance of generalist and specialist providers, primary and referral facilities, and preventive, promotive and curative care.

The increasing reliance on high-cost procedures and tests has created a resource problem in several countries of the Region. This increase is sometimes scientifically justified, but supplier induced demand for economic gain also plays a role. Thailand has a health system that places substantial reliance on modern medical technology. As a result, health costs have risen at a much faster rate than even their fast-growing economy. Per capita health expenditure showed an average growth rate of 8.2% against an average GDP growth rate of 5.8% in the period 1980–2000.[27] Indonesia was hit initially by rising health-care costs and then by the South-East Asian financial crisis. Per capita public health expenditure in 1997–1998 and 1998–1999 respectively fell by 2.9% and 6.6%.[28] The greater emphasis on secondary and tertiary care expenditure at the cost of primary and secondary care expenditure was also experienced by India. In the period 1985–2000, expenditure in the primary and secondary sectors in India rose by 50% as compared to 100% in the tertiary sectors.[29]

The Republic of Korea's health insurance system is known to be under severe resource strain on account of rising costs. China has also experienced rapidly escalating health costs in the post-reforms period, rising by 12% per year in the 1990s, compared to a significantly lower economic growth rate in the same period.[30] With the introduction of economic reforms the health service cooperatives disintegrated, and health service delivery was provided increasingly by private doctor's clinics, with greater reliance on high-tech procedures and expensive curative regimens. All of these developments resulted in larger allocations to the secondary and tertiary sectors at the cost of the primary sector. Rising costs are not only threatening the stability of health systems in parts of the Region but also in much of the world.

10.7 Globalization, trade and health

Once deemed the preserve of industrialized nations, chronic diseases such as obesity, diabetes, mental ill-health and alcohol- and tobacco-related illness are now worldwide problems. The dramatic increase in the incidence of HIV/AIDS and tuberculosis in some countries, and the emergence of avian influenza in the Asia Pacific Region, pose major international health threats. Narcotics, unhealthy lifestyles and chemical and biological pollutants cross borders as easily as infectious diseases.

Expanding trade has been a central component of increasing connectedness among countries of the Asia Pacific Region, and has affected health in several ways. Rules set out in international trade agreements have impacted health policies and regulations. This has caused apprehension, since trade rules are not specifically designed for the health sector and trade agreements are often negotiated without inputs from health policy-makers and experts.

The adoption by the Fifty-eighth World Health Assembly of the revised International Health Regulations (2005) provides the legal framework for mandating countries to link and coordinate through a universal system of surveillance networks. While novel environmental threats and outbreak-prone diseases have been increasingly identified during the past three decades, new influences have appeared more recently, driven by real or perceived threats of bio-terrorism and disruption of the global economy.

At the national level, health policy-makers are increasingly interested in the two-way connection between trade and health, particularly for emerging public health issues such as avian influenza. In the Asia Pacific Region, 24 countries and areas are members of the World Trade Organization (WTO) (Table 10.1). Six of them are Least Developed Countries (LDCs) with special rights under WTO rules. An Interregional Workshop on Trade and Health, held in October 2004, assisted countries to identify issues critical to public health relevant to WTO membership, and to develop clear plans of action.

There are three main WTO agreements that affect health and health policies:

(1) The General Agreement on Trade in Services (GATS), the first multilateral agreement dealing with trade in services, entered into force in 1995. While many countries have not yet made commitments in health or health-related services, this may change since ongoing and future WTO negotiations are aimed at further liberalization of trade in services. Even if commitments have been made with regard to health services, the GATS Agreement leaves countries considerable flexibility to manage trade in health services in ways that are consistent with national health policy objectives. Ministries of health face challenges of accurately assessing the risks and opportunities of trade in health services, and identifying policy measures that can be used to ensure quality and accessibility.

(2) The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) requires WTO Members to comply with certain minimum standards for protecting and enforcing intellectual property rights. Awareness of the importance of intellectual property rights (notably patents) with regard to access to medicines has increased among ministries of health in countries of the Region. Health authorities may find it difficult to keep up with the evolving and intricate developments in this area, which fall outside the scope of their normal area of work and responsibility (also see Chapter 11.4 Essential Medicines).

(3) The Agreement on Sanitary and Phytosanitary Measures (SPS) was negotiated in response to concerns that countries might use non-tariff barriers to protect domestic agricultural sectors, such as using human, animal or plant health as an excuse to restrict trade. Such measures could negate benefits from reduced tariffs and subsidies obtained in trade negotiations. Poorly developed food safety policies, legislation and plans of action, as well as a lack of inspection, food safety training, and surveillance and monitoring have, at times, hindered the ability of the food production and processing systems to provide a safe supply of food for domestic consumers.

There remain significant challenges for many countries in the Region to create or strengthen regulatory systems required to guide health services trade in the desired direction, and the development of standards necessary to ensure quality and protect consumer and patient safety. The provision of services across borders (related to "e-health") is particularly relevant for many small Pacific island countries.

Even in the absence of a clear legal and regulatory framework, distance education within countries, such as online training courses offered by universities or training institutions, is increasing, limited only by the availability of appropriate technology. Some countries are emerging as important players in this field such as India where companies are providing medical transcription services to hospitals in the United States of America. India is also increasingly using telemedicine services within the country.

Patients seeking treatment abroad are common in small countries such as Bhutan, Maldives and those in the Pacific, where certain specialized medical services are not available domestically. It is also taking place in Indonesia, where a specialized foreign medical institution may be closer than a comparable domestic hospital. Meanwhile, private hospitals in India, Malaysia, Singapore and Thailand are actively seeking to attract foreign patients. By providing services of good quality at prices significantly lower than those in more developed nations, these countries have seen a steady increase in the number of patients from abroad.

Box 10.4: General Agreement on Trade in Services modes of supply

GATS identifies and distinguishes four ways (modes) in which services can be supplied:

Mode 1: Cross-border supply, mainly through telecommunication, e.g. e-commerce. In the medical field this can include telemedicine, telediagnosis and outsourcing of medical transcription services.

Mode 2: Movement of consumers, e.g. tourism, or patients travelling abroad to seek medical treatment.

Mode 3: Commercial presence, through the establishment of a branch or subsidiary, e.g. foreign investors setting up hospitals or clinics.

Mode 4: Supply of services through movement of persons, e.g. employment of foreign nurses and doctors.

The commercial presence in the hospital sector, while still relatively small, is increasing in several countries. Investment is coming from outside Asia, and hospital corporations in India, Singapore and Thailand are also investing in neighbouring countries. Foreign investors are also active in health insurance. An issue of concern related to foreign investment in this sector is whether these private hospitals and insurers will primarily target only patients who can afford to pay high rates.

International trade, population migration, changes in living conditions and in production, marketing, and the availability of consumer goods are revolutionizing the human environment. While such changes have improved the health and economic status of many people in developing countries, risk behaviours have also emerged that adversely affect maternal, child and adolescent health.

The regulatory control of dietary fat to fight obesity is an important issue in countries in the Pacific. Domestic measures to address obesity problems may include measures affecting trade in obesity-causing foods, thereby requiring consideration of the Agreement on Agriculture and the Technical Barriers to Trade (TBT). There is a need to increase understanding of these WTO agreements and how to take advantage of their special and differential provisions. Being better informed would help guide policy decisions and assist in selecting appropriate regulatory approaches.

Table 10.1 World Trade Organization membership in the Asia Pacific Region

	WTO member	Least Developed Countries
Australia	yes	no
Bangladesh	yes	yes
Bhutan	acceding	yes
Brunei Darussalam	yes	no
Cambodia	yes	yes
China	yes	no
Cook Islands	no	no
Democratic People's Republic of Korea	no	no
Fiji	yes	no
India	yes	no
Indonesia	yes	no
Japan	yes	no
Kiribati	no	yes
Lao People's Democratic Republic	acceding	yes
Malaysia	yes	no
Maldives	yes	yes
Marshall Islands	no	no
Micronesia, Federated States of	no	no
Mongolia	yes	no
Myanmar	yes	yes
Nauru	no	no
Nepal	yes	yes
New Zealand	yes	no
Niue	no	no
Palau	no	no
Papua New Guinea	yes	no
Philippines	yes	no
Republic of Korea	yes	no
Samoa	acceding	yes
Singapore	yes	no
Solomon Islands	yes	yes
Sri Lanka	yes	no
Thailand	yes	no
Timor-Leste	no	yes
Tonga	yes	no
Tuvalu	no	yes
Vanuatu	acceding	yes
Viet Nam	yes	no

Note: The accession of Vanuatu has been approved by the WTO membership but is awaiting ratification at the national level (as of June 2008).

Sources: *Members and observers*. Washington DC, World Trade Organization. Available from: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

List of Least Developed Countries. New York, United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing Countries. Available from: http://www.un.org/special-rep/ohrlls/ldc/list.htm

10.8 Key issues and challenges in health systems

Modern health systems in the Region arose only recently and most are still in a stage of continuous development, although almost all health systems around the world are being challenged to keep pace with accelerating change. Health systems are most successful where curative providers are linked closely with preventive activities, and inputs are focused on the needs of the communities they serve and on achieving established health targets. A certain basic level of funding is necessary, but health system performance also depends on overall health system functioning. The goal of health systems development is to improve the organization, vision, management, governance and efficiency of systems; and to use appropriate information, training, communication, and policy formulation for attaining health outcome targets.

Health system weaknesses constitute a key constraint to progress in many technical programme areas. The early years of the 21st century have seen large increases in health-care spending for disease control programmes, particularly in using external donor support in lesser developed countries. This increased spending has not always been followed by proportional gains in health outcomes. Weak health systems have been an obstacle to the effective use of increased funds. Strong and robust health systems are a prerequisite for sustained health gains and consequently, there has been renewed interest for health systems strengthening initiatives at the national and international levels. International partnerships, such as the Global Fund to Fight Aids, TB and Malaria (GFATM) and the Global Alliance for Vaccines and Immunizations (GAVI), have demonstrated an interest in health systems strengthening.

The problems encountered by policy-makers in relation to health systems development vary from country to country. Notwithstanding differences between them, countries in the Asia Pacific Region share common challenges:

(1) **Poor and inequitable health outcomes**: The ultimate goal of national health systems is the attainment by all people of the highest possible level of health. Although life expectancy has risen and overall infant mortality has declined in the Region, some countries still have unacceptably high maternal mortality and infant mortality levels. Health outcomes in the Region are also unequally distributed. The poor, less educated, marginalized and rural populations have lower life expectancy and higher infant mortality rates than the non-poor. Biases in service provision and service access rooted in ethnic, gender and class discrimination contribute to these poor health outcomes.

(2) **Lack of access to care**: Over recent decades, primary health-care facilities and district hospitals have been established to increase health service coverage. Millions of health personnel and volunteers have been trained and deployed. Unfortunately, large segments of the population have not benefited from these developments. The poor, those who live in rural and remote areas, and other vulnerable groups still have limited access to quality health care. Social, economic, gender, ethnic and geographical barriers prevent them from utilizing health care when needed. It is estimated that 25% to 30% of the Region's population lacks access to essential preventive and curative health care.[31]

(3) **Lack of quality, continuity and integrated services**: Ensuring appropriate quality of care, including patient safety, is a challenge in most countries in the Region. Many countries face problems created by implementing multiple vertical programmes, which can lead to duplication, diversion of resources, and disruption of other programmes due to competition for staff time and limited resources, and by distractions caused by poorly coordinated activities.[32] Verticality itself is not a problem, and in some situations it is the best way to achieve positive health outcomes. The difficulty arises when individual programmes and

activities are implemented without regard to the overall capacity of health systems or other competing demands on health systems. Providing adequate continuity of care for newborns and people living with HIV/AIDS, for example, remains a major challenge.

(4) **Poor responsiveness to clients' needs and demands**: Responsiveness is a measure of performance with regard to non-health aspects of the health system; and focuses on how well the health system meets peoples' expectations of how they should be treated by health-care providers when interacting in a personal and non-personal way with public health services.[33] This includes respect for people (i.e. dignity, confidentiality and freedom to participate in choices about one's own health), and client orientation (prompt attention, amenities of adequate quality, access to social support networks, and the ability to choose a provider). The lack of responsiveness of health systems to peoples' needs and demands can be inferred from such indicators as underutilization of free services provided by government health facilities. The condition of physical infrastructure and patient autonomy in decision-making are two key concerns in the quality of ambulatory care services.[34] There is growing evidence that many people feel increasingly alienated from their health systems, even in countries that have good health outcomes. Patients' rights movements are a response to this. In the Asia Pacific Region, WHO has launched the People-Centred Health-care initiative in 2007, which aims in part to address this problem.[35]

Country actions to improve the performance of health systems range from small-scale adjustments in specific subsystems to complex reforms of the financing, organization and management of entire health systems. The evidence base for cost-effective interventions is increasing, and a wide range of initiatives and strategies can be called on to improve the functioning of the health system leading to better health through improved access and coverage, higher quality and increased efficiency and effectiveness.

10.9 A framework for health systems strengthening

Health systems are complex and denying this complexity and concentrating on only one aspect of the system may yield short-term results, but often creates distortions of the overall system and threatens the sustainability of gains already made. There are many ways to analyse health systems, but one way is to look at the desired goals or outcomes of the system. Another is to examine the building blocks or inputs that go into achieving the desired outcomes.

The WHO Secretariat adopted a framework for action for health systems strengthening in 2007. The framework, entitled *Everybody's business: strengthening health systems to improve health outcomes,*[36] builds on earlier work of WHO, particularly *The world health report 2000 – Health systems: improving performance.*[37] Both reports recognize that there are four overall goals or outcomes that are expected from a health system:

(1) Improved health, both in the level of health and equity in health.

(2) Responsiveness of the health system to the desires and needs of people.

(3) Social and financial risk protection from health expenditure.

(4) Improved efficiency, namely that full value is received for the resources invested in health.

The WHO framework then goes on to identify six building blocks for a health system. The six building blocks identified in this framework are:

(1) Health service delivery—safe, quality personal and non-personal health interventions.

(2) Health workforce—sufficient numbers and mix of competent staff, who are fairly distributed, responsive and productive.

(3) Health information systems—production, analysis, dissemination and use of reliable and timely information.

(4) Medical products and technology—high-quality, safe, efficacious, cost-effective and scientifically sound.

(5) Health financing—adequate in amount, ensuring that there is access to needed services, and raised in ways that protect people from financial catastrophe and impoverishment.

(6) Leadership and governance—ensuring strategic and policy frameworks combined with oversight, working with partners, regulation and accountability.

Individual health systems can be analysed using a variety of categories. The important principle is that the health system must be looked at in totality. Working on only one aspect of a system, while ignoring the rest, is likely to cause distortions and inefficiencies or even damage health systems, thereby worsening health outcomes.

Different modes and priorities for care are required to cope with changing disease patterns. For example, treatment of chronic noncommunicable diseases (NCDs) can be expensive and involving laboratory procedures and drugs, the costs of which must be covered either by the government, individuals, or third-party insurers. While aging cannot be prevented, many NCDs, such as diabetes and hypertension can now be prevented or mitigated as effectively as most communicable diseases. Failing to address chronic conditions, such as hypertension and diabetes or even HIV, in a holistic manner early in the progression of a disease can actually increase long-term care costs to the health system and households, and increases the amount of human suffering and pain.

Multisectoral approaches are increasingly needed to effectively combat certain communicable disease threats. HIV/AIDS prevention and control requires collaboration of the health, labour, construction, transportation, migration and police sectors, as well as social research institutions and blood banks. The need for international coordination became evident in the Region with the severe acute respiratory syndrome crisis and the current avian influenza threat, which has also brought the agriculture and veterinary sector into the picture. In many countries, health-related sectors, such as agriculture, education, industry and trade and communications, are beginning to work together and take the health consequences of their decisions into account when formulating policies.

Alternatives to strictly public provision for increasing the coverage of good quality health services should not be overlooked. However, the increasing role of the private sector in the Region has led to more focus on profitable curative services and the relative neglect of preventive and public health programmes. It has also led to increasing dependence on user fees at the time of service to finance health systems, which risks excluding the poor and impoverishing families due to medical expenses, and aggravating the long-standing problem of concentrating services in urban areas where financial profit is more likely. Regulation and guidance appear to be needed to maintain an adequate level of preventive services. Thailand, for example, has encouraged a multiplicity of providers and mechanisms, which still requires public sector involvement and financing. A mixed economy exists in most lower-income countries, and a combination of mechanisms can use the strengths of different types of

providers to maximize public benefits. In the short term, strategies should focus on influencing health-seeking behaviour to promote initial consultation with public providers, and bringing first-line curative services closer to the people by linking these to regular outreach activities.

Box 10.5: Using private sector capacity

Some Asia Pacific Region countries have built successfully on private sector capacity in order to improve health service access and coverage:

Contracting out health service delivery in Bangladesh, Cambodia and India. Social marketing of commodities and social franchising of specific services, e.g. a USAID-supported project in Indonesia has piloted a franchise for village midwives called Bidan Delima or the Red Seed Midwife.

Other social marketing programmes in the Region include the subsidized sale of impregnated bednets in malaria-endemic areas, and the sale of condoms targeted to limit the spread of HIV/AIDS, such as the Sutra project to promote condom use in Indonesia.

The delivery of specific services to groups which governments find hard to reach, e.g. funding NGOs to provide services for injecting drug users in Bangladesh, and providing a continuum of care to HIV/AIDS patients in Cambodia.

Source: Walford V, *et al.* Future policy choices for the health sector in Asia. Asia 2015 Conference, 2006 Available at: http://www.asia2015conference.org/pdfs/Walford.pdf

While low-income countries are still struggling to raise sufficient resources for essential health care, countries in the middle-income group that can deliver basic health services are turning their attention to issues of universal health coverage, financial protection and health system efficiency. Ambulatory care in the developed (high-income) countries in the Region is provided largely by the private sector, although to a large degree it is still publicly financed in most countries. Differences emerge in the hospital sector: the hospital sectors of Hong Kong (China) and Singapore are both largely public, while hospitals are largely private in large social insurance systems such as those of Japan and the Republic of Korea. In terms of the private-public mix, these systems span a wide range of ownership and financing combinations.

10.10 Better coordination of aid funds

Several countries in the Region have a high level of external aid dependence in health, with external sources making up more than 50% of the total government expenditure. Bangladesh, Cambodia, the Democratic People's Republic of Korea, the Lao People's Democratic Republic, Nepal, Solomon Islands and Timor-Leste are examples of such a case. With such a large share of government health funding from aid, coordination becomes crucial to avoid duplication of effort, and ensure that national priorities and strategies are implemented rather than the preferences of donors.

External funding, especially through large global health partnerships, can create distortions or imbalances in the overall allocation of resources and may lead to a pattern of allocation which local policy-makers would not have chosen.[38] An alternative approach, which the major donors have adopted in relatively few instances, is to shift their financing from specific sectors and programmes to general budgetary support. The proliferation of different global initiatives also creates the potential for them to weaken rather than strengthen health systems, especially when each initiative competes for scarce

human resources.[39] The Paris Declaration on Aid Harmonization and Alignment was endorsed by the Organisation for Economic Cooperation and Development and calls for improved practice in providing aid so as to mitigate some of the adverse effects of external aid in all sectors.[†]

The Sector-Wide Approach (SWAp) in health is one method of improved aid coordination, harmonization and alignment. Defining a method of working between government and development partners, SWAp is a mechanism for coordinating support to public expenditure programmes and for improving the efficiency and effectiveness with which resources are used in the sector. In the Region, several countries such as Bangladesh, Cambodia, Papua New Guinea and Solomon Islands are at various stages of SWAps in the health sector. It is clear that a SWAp must be adjusted to the conditions of each individual country. Other countries, such as the Lao People's Democratic Republic and Viet Nam, are developing alternative coordination mechanisms.[40]

Box 10.6: Mechanisms to improve aid management

Some Asia Pacific countries have introduced mechanisms to improve the way that aid is managed in health to encourage coherent support to health sector development:

In Papua New Guinea the Health Services Improvement Programme (HSIP) focuses budget support on agreed priorities within the National Health Plan. Its financing mechanisms are essentially a SWAp based on a single, accountable government-managed mechanism to hold and disburse pooled donor funds. It closely resembles the government financial system in its expenditure procedures and accounting and, in theory, is integrated with national and provincial planning and budgeting.

Bangladesh introduced sector-wide management (SWIM) in 1999, based on the Health and Population Sector Plan. All of the health donors supported these both through earmarked support and pooled funding.

Cambodia developed a Health Sector Strategy and encourages partners to follow it, also using sector-wide management in which funds provided by the Asian Development Bank, the World Bank, United Nations Population Fund (UNFPA) and Department for International Development (DFID) are pooled to strengthen the highly fragmented health sector, while at the same time keeping direct donor oversight in the allocation of funds.

Nepal is in the second year of implementing its Health Sector Programme based on a sector-wide approach.

An action plan for harmonization and coordination was agreed among European Union donors for Viet Nam. There has been enhanced cooperation among European Union donors in education, private sector development and health. As a first case of harmonization, European Union countries have started to work on integrating the funding of tuberculosis programmes.

Sources: Tough choices: investing in health for development. Experiences from national follow-up to the Commission on Macroeconomics and Health. Geneva, World Health Organization, 2006: Annex A.

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[†] The Paris Declaration, endorsed on 2 March 2005, is an international agreement to which over 100 ministers, heads of agencies and other senior officials adhered and committed their countries and organizations to continue to increase efforts in harmonization, alignment and managing aid for results. www.oecd.org/document/18/0,2340,en_2649_3236398_35401554_1_1_1_1,00.html - 27k

First and foremost, a SWAp explicitly mandates the ministry of health with the leadership of health development efforts. The defining characteristics of a SWAp are: all significant funding for the sector supports a single policy, plan and expenditure programme; government provides leadership for the programme; common implementation and management approaches, such as joint missions and joint reporting requirements, are applied across the sector by all partners to a varying extent, depending on the individual arrangements in a particular country; and budget support and pooling of funds can be part of a SWAp.

Summary

Health systems encompass all organizations, institutions and resources devoted to producing health actions in specific environments. The Asia Pacific Region has wide diversity in political and economic systems, and that diversity is reflected in its health systems. Health systems vary from having a high degree of both public financing and public provision to systems that are highly dependent on both private financing and private provision of services.

No matter what mix of public and private financing and provision of health systems is present in a country, the government still has a strong role to play in the leadership and governance of the sector, sometimes called stewardship. The government in particular has a strong responsibility to see that public goods in the health system are delivered and that those people most vulnerable, namely the poor and underserved, are included in service delivery. An issue in many countries is the relatively high percentage of health services that are paid by households through user fees at the time of service. User fees at the time of service are deterring people from accessing needed services, and at the same time putting them at risk for impoverishment if they do use services. Where donor funding is an important part of the health-care system, coordination mechanisms become particularly important. The increasing influences of globalization and trade on health have added complexity to governance issues as governance issues often transcend borders.

Weak health systems are an obstacle to improved health outcomes in many countries and there is a need to strengthen them throughout the Region. Experience has shown that health systems must be analyzed holistically, by looking at the entire health system and not just one part. Working on one part, while neglecting others, can lead to distortions which can have an adverse effect on health outcomes. There are many challenges and no simple solutions, but frameworks for strengthening health systems are being developed and their use should be encouraged.

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11

Health resources

Introduction

Delivery of public health care is a complex undertaking requiring well-functioning systems, diverse skills, and many other resources. This chapter provides information on the most critical health system support functions in the Asia Pacific Region, including advances and constraints.

Health workforce size and the distribution of skills, quality, gender and location rarely keep up with national demands for care. The average health worker density among the 37 countries and areas of the WHO Western Pacific Region has reached 5.8 workers per 1000 population, but is critically low at 4.3 per 1000 in the 11 countries of WHO's South-East Asia Region.[1] In view of chronic shortages, health workforce expansion requires political leadership, adequate financing and comprehensive country-specific plans.

Safe blood supplies and reliable clinical laboratories are necessary to carry out public health functions. There is a high level of voluntary non-remunerated blood donations, and universal screening for HIV and hepatitis B. Laboratory support for disease surveillance and outbreak investigations for common endemic diseases is available in most of the Region. There is increasing reliance on the power of networks for monitoring and reporting communicable diseases and for public health laboratory services.

How a health system is financed can affect its performance and health outcomes. Many countries in the Region have low investment in health from public sources and high spending on health through out-of-pocket payments. Evidence suggests that it is difficult to attain health policy objectives relating to equity, access and coverage, when private payments predominate. The main goals of health financing reforms in the Region are increasing public health investments, improving access to essential health services and providing adequate financial protection through various forms of prepayment schemes, such as social health insurance, which should include a "safety net" for the poor.

National medicines policies are frameworks in the pharmaceutical sector that help meet priority health care needs, but these are not implemented consistently in the Region. Traditional medicine is also an important element of health care in many communities. Access, affordability, quality and irrational use remain problems for both allopathic and traditional medicines.

Although these supporting systems have disparate aims and actions, they present common challenges for leaders. Better, evidence-based policies are needed to garner more support from governments and partners. Training, motivation, and coordination are commonly noted as deficient. Quality, safety and efficacy can be improved everywhere, whether for drugs, training, blood safety or laboratory work. The limited resources that are available must be used more efficiently, using evidence- and performance-based management to guide development.

11.1 Human resources for health

Importance of the health workforce

The importance of human resources for health (HRH)[i] for improving health system performance, for scaling up health interventions, and for achieving the health-related Millennium Development Goals (MDG) is self evident, and has been identified as such in many country evaluations.[2,3] The skill mix and numbers of health workers determine the type and range of individual and public health interventions that can be provided. The density of workers in a population impacts the effectiveness of health-related MDG interventions. For example, the prospects for achieving 80% coverage of measles immunization and skilled attendance at birth are greatly enhanced when worker density exceeds 2.5 workers per 1000 population.[4] But the fewest health workers are usually found where health needs are greatest, the so-called "inverse care law of human resources for health".

Public spending on the health workforce, including wages, salaries and allowances accounts for between 35% and 45% of government health expenditure in the Asia Pacific Region.[5] Despite the large sums spent, and the acknowledged importance for producing good health and confronting health crises, support for human resources for health ranks low on the health policy agenda of many national governments and international agencies.[6]

In the future, health workers will experience profound changes in their work shaped by powerful forces. Population ageing will alter the pattern of health-care demand, and epidemiological transitions will impose heavier burdens of chronic diseases, even as new threats emerge. The course of the HIV/AIDS epidemic will powerfully influence these transitions, including its triple threat of an increased workload for health workers, exposure to the perceived threat of infection and a lowering of morale. The demand for health care will increase in the future because of demographic, technological and epidemiological changes. Many countries forecast significantly increased requirements of health workers in the future because of these changes and demands.

Issues and challenges

In the Asia Pacific Region, health workforce situations vary greatly between and within countries due to factors such as economic, social and political contexts, and countries face many health workforce challenges. The types and seriousness of problems vary, such as in the workforce demand, its response

[i] The term "human resources for health" refers to the stock of all individuals in the formal and informal health sector engaged in actions whose primary intent is to protect, promote and improve population health.

to population and service needs, workforce supply (size, distribution, retention and training), and workforce governance and management. Ensuring the numerical and geographical balance of the various categories of health workers, the relevance of training and technical skills and the efficient skill mix of the health workforce are challenges for most countries and depend on good personnel management, appropriate career structures, effective staff supervision and development, presence of adequate support and good working conditions.

Overall workforce shortages

An overall shortage of health workers is the basic and most critical problem in the Asia Pacific Region. Reasons for this include, among other things, insufficient numbers of health workers due to under-investment in education and training; losses from the existing workforce; lack of effective coordination between key partners such as the health, education and employment sectors and development partners; poor workforce planning; and the out-migration of health professionals.

Countries with low supply rates tend to have absolute supply problems, such as in Pacific island countries and areas, where external migration has made the situation worse and left some countries at a crisis level. External migration of health professionals, especially doctors and nurses, is also a major problem for countries such as Bangladesh, India, Nepal, the Philippines and Sri Lanka.

There are also variations in the structure of health service providers within countries. For instance, greater numbers of physicians than nurses or midwives were registered in Bangladesh, India, Mongolia and Myanmar, while in Bhutan, Maldives and Nepal, community health workers represent a high proportion of all health service providers. Health worker densities in the South-East Asia and the Western Pacific Regions, the two WHO regions that make up the Asia Pacific Region, were 4.3 workers per 1000 population and 5.8 workers per 1000 population, respectively.

No country's health workforce will ever be sufficient in any setting to meet all potential demands for care. Each country should ideally create and maintain an effective workforce size that is appropriate and relevant to its own specific needs. Some developing countries have health worker densities below 3 per 1000 population, and will need to double or triple their current number of health workers if they are to maintain health gains and make good progress towards the health-related MDGs. Strong political commitment and development partner support, structural changes and increased resources are all vital in this effort.

Skill and distribution imbalances

As shown in Table 11.1, nearly all countries suffer from skill imbalances within and between occupational groups, creating inefficiencies and low capacity for meeting local needs and changing circumstances. In some, the skill mix greatly depends on medical doctors and specialists, with Bangladesh, China, India and Mongolia actually having more doctors than nurses. Conversely, Australia, New Zealand and Pacific island countries and areas have shortages of doctors in important fields, such as emergency medicine and intensive care, anaesthetics, mental health and psychiatry, and orthopaedics. Indonesia and Sri Lanka report shortages of health professionals capable of treating chronic and emerging diseases. Many countries lacked the expertise in epidemiology, infection control and other specialties to deal with the emergence of severe acute respiratory syndrome (SARS) and the continuing threat of avian influenza. Others, such as India, do not have a separate career structure in public health.

In most countries, the health workforce is strongly gender-biased. Females tend to dominate nursing and allied health professions, while males dominate medical professions and senior health

Table 11.1 Health worker densities per 1000 population in the Asia Pacific Region

Country	Physicians	Nurses	Midwives	Dentists	Pharmacists	Other health workers
American Samoa	0.78	2.03	0.02	0.24	0.03	...
Australia	2.47	9.71	...	1.10	0.72	...
Bangladesh	0.26	0.14	0.18	0.02	0.06	...
Bhutan	0.05	0.14	0.08	0.02	0.03	0.86
Brunei Darussalam	1.01	2.67	1.21	0.14	0.27	...
Cambodia	0.16	0.61	0.23	0.02	0.04	...
China	1.06	1.05	0.03	0.11	0.28	...
Cook Islands	0.78	2.72	0.17	0.56	0.11	...
DPR Korea	3.29	3.85	0.27	0.37	0.60	...
Fiji	0.34	1.96	...	0.04	0.07	...
French Polynesia	1.78	3.59	1.58	0.41	0.40	...
Guam	1.11	4.34	...	0.20	0.38	...
Hong Kong (China)	1.65	5.09	0.70	0.28	0.23	...
India	0.60	0.80	0.47	0.06	0.56	...
Indonesia	0.13	0.62	0.20	0.03	0.03	1.20
Japan	1.98	7.79	0.19	0.71	1.21	...
Kiribati	0.30	2.36	...	0.05	0.05	...
Lao PDR	0.59	1.03	...	0.04	...	...
Macao (China)	2.20	2.33	...	0.33	...	...
Malaysia	0.70	1.35	0.34	0.09	0.10	...
Maldives	0.92	2.70	...	0.04	0.73	...
Marshall Islands	0.47	2.98	...	0.08	0.04	...
Micronesia, Federated States of	0.60	3.83	0.07	0.13	...	...
Mongolia	2.63	3.13	0.24	0.13	0.43	...
Myanmar	0.36	0.38	0.60	0.03	0.00	2.10
Nauru	0.50	4.80	0.20	0.10	0.50	...
Nepal	0.21	0.22	0.24	0.01	0.01	...
New Caledonia	2.20	5.22	0.38	0.58	0.45	...
New Zealand	2.37	8.16	0.56	0.68	0.92	...
Niue	1.50	5.50	1.00	1.00	0.50	...
Northern Mariana Is.	0.45	1.78	0.20	0.04	0.06	...
Palau	1.11	1.44	0.06	0.11	0.06	...
Papua New Guinea	0.05	0.53	...	0.02	...	...
Philippines	0.58	1.69	0.45	0.11	0.03	...
Republic of Korea	1.57	1.75	0.19	0.34	1.08	...
Samoa	0.70	2.02	0.02	0.18	0.03	...
Singapore	1.40	4.24	...	0.26	0.28	...
Solomon Islands	0.13	0.80	0.05	0.06	0.07	...
Sri Lanka	0.55	1.58	0.16	0.06	0.06	...
Thailand	0.37	2.82	0.01	0.17	0.25	...
Timor-Leste	0.10	1.79	0.40	0.05	0.02	2.34
Tokelau	2.00	6.67	2.00	2.00	0.00	...
Tonga	0.34	3.16	0.19	0.32	0.17	...
Tuvalu	0.55	2.64	0.91	0.18	0.09	...
Vanuatu	0.14	1.45	0.23	...	...	...
Viet Nam	0.53	0.56	0.19	...	0.08	...
Wallis and Futuna	0.74	...	0.34	0.27	...	...

Notes: "Other health workers" includes public and environmental health workers, community health workers, laboratory technicians, and health management and support workers.
... Data not available

Sources: *The world health report 2006: working together for health*. Geneva, World Health Organization, 2006. *Country health information profiles: 2006 revision.* Manila, WHO Regional Office for the Western Pacific, 2006.

management and leadership, but this is changing. In Mongolia more than 70% of medical students are women, and in many countries the proportion of females in management and leadership positions is increasing. Other issues that compound skill imbalances include an ageing health workforce and inappropriate use of skills. For example, in some countries, doctors perform duties and tasks that are normally done by nurses elsewhere, and doctors are even retraining to qualify for better paid nursing jobs overseas.

Optimal skill mix depends on national conditions and contexts, and varies from system to system. Changing the skill mix of the health workforce is one option for increasing the efficiency of a health system. The challenge for many countries is how to maximize the effectiveness of a limited workforce and, in view of resource and structural limitations, revamp health plans for a workforce that more closely reflects the health needs of their populations. Evidence-based decisions on the usual demands from health-care providers can be a useful basis for suggesting an optimal skills mix for various levels.

The problem of distribution is often geographical imbalance, biased towards urban and affluent areas. For example, in Cambodia, 85% of the population reside in rural areas, yet only 13% of government health professionals work there. In Nepal, only 20% of rural physician posts are filled, compared with 96% in urban areas. Existing shortages of various types of health-care providers are made worse by poor governance and a reluctance or inability to enforce decisions.

For a variety of reasons, health professionals often do not choose to work in remote or very poor rural areas. The private sector also siphons off qualified health workers from the public sector in many countries, and unplanned health worker migration compounds the situation. Achieving equitable health worker distribution is often difficult and can require strategic actions within and beyond the health sector, such as structural and economic changes, to increase revenues and health resources and provide better working environments and incentives.

Working conditions and performance

Common issues and challenges that seriously affect workforce retention, morale and performance include excessive workloads with poor remuneration and high-risk working conditions, or both; lack of incentives and limited career advancement opportunities; lack of proper equipment and supplies; workplace injuries; violence and abuse; poorly defined job descriptions; inadequate supervision and support; and inappropriate rules and regulations. Ineffective performance management results in poor utilization of skills and inhibits flexible deployment of staff. Nearly all countries need to improve work environments by scaling up good practices to strengthen the management of existing resources, assure adequate supplies and facilities, and create monetary and non-financial incentives to retain and motivate health workers.

Education and training

The training of health workers and managers is an indispensable part of health development and has received large investments in the Region from national governments, agencies and development partners. However, much of the potential return on this investment has not been realized. Some of the problems found are:

- variable quality and standards of education and training;
- mismatch of output numbers and training outcomes with health service requirements;

- curricula not adequately focused on primary care and prevention, and not flexible enough for changing health needs and circumstances;
- limitations in the education sector's capacity, inadequate and poorly coordinated in-service education, lack of links to career development pathways; and
- poor links between service needs, in-service education and performance evaluations.

Box 11.1: Health worker productivity and compensation

Health outcomes did not improve significantly when Cambodia's health system was re-established after years of conflict, in part because there was low utilization of the new health services. The poor quality of services was due in large part to low pay and productivity of health workers. The wage burden in the national health budget was only 22% of total costs (versus 35%–45% in the Region). Salaries were far less than the cost of living for a family, and health workers often asked for unofficial payments from patients, worked few hours and conducted private practices.

A series of pilot projects introduced new management approaches, improved drug supplies and provided higher compensation packages, including performance incentives. In addition to reducing out-of-pocket costs to patients, an evaluation of the projects showed that utilization increased when unofficial payments were eliminated and health workers received enough to support their families. Utilization increased approximately in proportion to their total compensation. Because of the low starting level, the total cost of a relatively large increase in compensation was affordable to the government, and a certain amount came from official patient fees.

Another study based on interviews with public sector health workers found that for their current compensation, they were willing to work only four hours a day, and to work eight hours they would need five times their base income. Alternatively, they would work eight hours for three times their base income, if they were allowed to retain a private practice. Alternative non-monetary incentives such as training opportunities had little appeal.

Source: Fabricant S. *MDGs and PRS: estimating costs of increased utilization of health services by the poor*. Phnom Penh, Office of the WHO Representative in Cambodia, March 2006 (unpublished document).

The capacity for education and training varies across countries in the Region, from a total lack of training institutions in some small island countries to sufficient and rapidly expanding programmes to meet increasing demand. The quality and standards of curricula, licensing and registration systems also vary within and between countries. Competition between the health and education sectors and increased privatization of education and training have resulted in declining entrance requirements and standards of education. Lack of appropriately trained educators and educational resources, as well as poor learning and teaching methodologies, further compromise the quality of education, as do inappropriate curricula, often drawn from situations at different levels of health care development.

A fundamental weakness in most countries is ineffective coordination among partners. Different organizations are often responsible for training and health services, i.e. ministries of education and health, which rarely collaborate in the planning and production of human resources for health. Educational institutions often established curricula independently, resulting in inappropriate curricula for actual health needs. In some cases health workers are trained primarily to meet the demands of global labour markets, disregarding local or national needs and social accountability. Mushrooming private medical and other health professional schools of questionable quality, without concern for national needs, is a major problem in some countries. Continuing and in-service education and training opportunities, intended to keep professionals abreast of developments in medical knowledge and technology, are very limited in most countries.

Workforce information, planning and management

Existing information systems mostly fail to provide reliable and accurate information on human resources for health. Incomplete data on the health workforce, inadequate evidence, and lack of trained and experienced personnel make effective planning, policy development and training operations more difficult. Health-care reforms shift focus from direct government provision of personal health services to a public health role and often require health workers to assume new functions; this includes human resources managers, who need specific information and competencies to successfully manage these changes. Few trained personnel are involved in workforce planning in most countries, so the loss of a competent officer can result in a dramatic reduction in planning and management capacity. Some countries have no focal point for national workforce data and statistics.

Absence of appropriate human resources policies is partly responsible for imbalances in the workforce, skill-mix inefficiencies, varying competencies and ineffective human resources management. Workforce planning is too often undertaken to avert immediate crisis situations, rather than to anticipate new health needs, services and technologies, and it also tends to be an ad hoc activity separate from the budget and management cycles. Problems sometimes include ill-defined categories of workers, professions and jobs, and a focus on individual professions at a time when health-care is becoming increasingly multidisciplinary.

Limited attention is often given to human resources management, with policy-makers more often concerned with high personnel costs and size of the workforce, rather than improving personnel motivation, workplace practices and conditions, and performance monitoring. There is a need to standardize conditions of employment within the framework of public service, including recruitment and promotion based on merit, appropriate utilization of staff classifications, grading of posts, and salary increments and career pathways.

Development partners and donor input into human resources for health are mostly fragmented and uncoordinated. A common obstacle to sustaining human resources for health development is that aid commitments are often short-term and unreliable. Recruitment ceilings intended to limit public expenditures constrain scaling up human resources for health in low-income countries. The challenge for these countries is to convince partners to invest part of the resources and funding for specific health interventions on human resources development, as it is crucial to the successful implementation of any intervention. Credible information and evidence are needed to advocate for investments in health workers as supporting national development.

Response to challenges

Addressing health workforce challenges by developing country-oriented workforce policies and a framework for action requires high-level political commitment, long-term vision, structural and fiscal changes, and the active participation of stakeholders. Different situations and circumstances call for different strategies and actions to address key workforce issues. Some issues require regional and international cooperation for sharing knowledge and best practices and managing the internal and external migration of health workers.

Too many countries focus health workforce development almost entirely on clinical care requirements and leave the augmentation of public health teams to an unspecified “later date”.

Country and regional level responses

Country-level actions include:

- generating good evidence and knowledge to formulate human resources policies, strategies and a regulatory framework;
- improving the quality and relevance of health worker education and training;
- increasing production, recruitment and retention of workers;
- managing for performance; and
- building networks and partnerships (country action alliances) to support government health sector leadership with high-level political support.

Some countries have established a national authority to oversee human resources for health policy, strategy development and partner coordination (usually an advisory, regulatory, or ministerial committee), but others have dedicated only a small unit in the health ministry, or have none at all.

Dedicated leadership and good management support the development of a motivated and efficient workforce, which increases workforce retention. Several initiatives in the Asia Pacific Region are

Box 11.2: A vision for health workforce direction: Australia

Recognizing the need to set strategic directions to guide national policy, planning and investments in its health workforce in the next decade, as well as meet workforce challenges proactively and ensure coordinated and collective actions among stakeholders, Australian health ministers have endorsed the implementation of a landmark national health workforce strategic framework and a national workforce plan. The vision is encapsulated in the strategic framework: "Australia will have a sustainable health workforce that is knowledgeable, skilled and adaptable. The workforce will be distributed to achieve equitable health outcomes, suitably trained and competent. The workforce will be valued and able to work within a supportive environment and culture. It will provide safe, quality, preventative, curative and supportive care that is population and health consumer-focused and capable of meeting the health needs of the Australian community".

The framework's vision will be achieved through specified actions and outcomes based on seven principles:

- ensuring and sustaining adequate supply;
- workforce distribution that optimizes access to health care and meets the health needs of all Australians;
- creating health environments in which people want to work;
- ensuring the health workforce is always skilled and competent;
- optimal use of skills and workforce adaptability;
- recognizing that health workforce policy and planning must be informed by the best available evidence and linked to the broader health system; and
- recognizing that health workforce policy involves all stakeholders working collaboratively with a commitment to the vision, principles and strategies outlined in the framework.

The framework enables stakeholders to work with much more cohesion and ensures that actions are better coordinated across jurisdictions, service settings, professional groups and all sectors. The national action plan is the basis for implementing the strategic framework and is to be supplemented by a range of national, state and territory action plans and health workforce initiatives. Monitoring and evaluation of the framework and action plan is carried out by the Australian Health Workforce Officials' Committee.

Source: National Health Workforce Strategic Framework. Canberra, Department of Health and Ageing, 2004.

strengthening human resources management in health planning, policy formulation and evaluation. The International Council of Nurses (ICN) Leadership for Change Programme in China, Mongolia, Papua New Guinea , Viet Nam and some Pacific island countries and areas targets senior nurses and midwives to develop skills for addressing difficult service issues, revising and standardizing curricula, developing human resources policies, raising nursing care documentation standards and delineating continuing education requirements.

The Pacific Regional Leadership and Management Consortium[ii] was formed to equip mid-level health managers with the knowledge and skills to provide effective management and leadership, through interdisciplinary training oriented to health services management and public health, and linked to the services to be delivered. Institutional strengthening, optimal resource utilization and sustainability are addressed in a subregional leadership and management development programme at the University of Guam and the National University of Samoa. This regional competency-based training initiative is aimed at meeting the needs of the subregion's health systems, and uses participatory and mentored learning culminating in a post-graduate certificate.

Public health education has received significant attention since the Regional Conference on Public Health in South-East Asia in 1999 and its "Calcutta Declaration". The Regional South-East Asia Public Health Education Institute's network, based in Thailand's Mahidol University, has been active in promoting public health education. The objectives include strengthening curricular relevance, quality improvement, research and promoting leadership in public health. This network assists in the upgrading of curricula, strengthening teaching faculties, supporting new schools of public health and developing accreditation policies. The South-East Asia Public Health Initiative offers support for strengthening public health education, developing new schools of public health and facilitating a network of public health schools. The University of Colombo Postgraduate Institute of Medicine in Sri Lanka has initiated a network of postgraduate medical education for seven countries of the South Asian Association for Regional Cooperation (SAARC).

Parallel to the Human Resources for Health Observatory Initiative in the Pan American Health Organization, the Asia-Pacific Action Alliance for Human Resources for Health (AAAH) was established in June 2005 and now comprises 15 countries. Key priority actions for the AAAH are advocacy for human resources for health at national and regional levels, sharing knowledge about management and best practices, supporting capacity-building for human resources for health planning and management, coordination of technical support based on member requests and convening technical meetings. In addition, countries such as China, Nepal and the Philippines have embarked on developing country-specific human resources for health datasets for their health information and management systems.

Various tools and guidelines for human resources for health planning and performance management are now available. A simple planning tool has been developed, using as inputs the number of trained workers, attrition rates and preferred ratios, and provides the user with information to plan staffing requirements, levels (surplus or deficit) and costs over specified periods. This was used to plan the nursing workforce in Brunei Darussalam and the Philippines, for doctors in Vanuatu, medical assistants in the Lao People's Democratic Republic and geriatricians in one Australian state. Requiring only a few hours of training, it does not replace more sophisticated systems, but it does provide planners with a

[ii] Established in 2002, the Consortium comprises several Pacific island countries' health ministries, WHO, the Secretariat of the Pacific Community (SPC), the New Zealand Agency for International Development, the United States Centers for Disease Control and Prevention, Curtin University (Australia), the University of the South Pacific (Fiji) and the Fiji School of Medicine, the University of Guam, the National University of Samoa (NUS) and Auckland University. The SPC serves as the secretariat of the Consortium.

Box 11.3: The Philippines: an integrated approach to human resources for health development and management and health sector reforms

Recognizing that quality health services are only as good as the people who deliver the service, the Philippines takes an integrated approach to human resources for health development and management systems that supports the objectives of the national health sector reform agenda and a "culture of competence" in its workforce, including health leaders and managers in the various areas and levels of the health system.

The five components of the integrated approach and their respective outcomes include:

(1) a competency-based job analysis (job evaluation policies, guidelines and tools; competency-based job descriptions; and models of health facility organizational structure with functions and staffing patterns);

(2) a career development management system (individual career planning, career path charting, succession planning and retention planning; developing standards for core and functional competencies; and proficiency assessment tools);

(3) a human resources for health information system (collection of core data at all levels of the system, data encoding, designing models, software and information system at various facilities, with links to networks, and user manuals);

(4) human resources for a health master plan, with resource requirements and monitoring and evaluation at various stages of the master plan for 5, 10 and 15 years; and

(5) a capacity enhancement programme for human resources for health managers.

Source: National Human Resources for Health Strategic Framework. Manila, Department of Health, 2006.

user-friendly "what if" tool. Another health service planning toolkit was designed to aid nurses and midwives to be advocates for human resources and to influence policy-making. It contains modules on problem identification, stakeholder analysis, understanding contextual factors and environment, decision-making and change processes, and monitoring and evaluation.[7]

In some areas with shortages of doctors, or with only basic health facilities and such limited resources that the skills of clinicians and specialists cannot be fully used, other trained cadres such as medical assistants, assistant doctors and nurse practitioners have been officially assigned clinical duties and responsibilities. This has been done in Fiji (nurse practitioners and medical assistants), Kiribati (medical assistants), Mongolia (family practitioners) and Samoa (nurse practitioners and managers). This strategy is particularly successful when backed up by an effective referral system for patients needing care beyond the practitioner's competencies. However, consumer demand for specialist care, patients bypassing frontline providers and professional protectionism are challenges for such initiatives. Innovative educational and training schemes for doctors and mid-level health practitioners to serve in rural and remote communities have been piloted in some areas.

Efforts to scale up human resources for health capacity to address epidemiological and demographic trends have been hampered by limited resources and lack of commitment and coordination, particularly affecting support for additional health staff positions. Efforts to mobilize donor resources for human resources for health generally have had limited success, but more development partners are now supporting interventions out of concern about the global workforce crisis and emerging disease threats. Strong country leadership coupled with flexibility of donors to let countries lead and coordinate resources are needed to avoid duplication and achieve good and sustainable outcomes.

Box 11.4: Appropriate skill mix at the primary care level: the experience of small countries

Fiji: The impact of nurse practitioners in the remote areas of Fiji is considered positive, and they play key roles in providing health care to rural and remote communities. In health centres they assess and manage acute and chronic illnesses, manage health centre activities, conduct health screenings and community education sessions, make field visits to surrounding villages and settlements, perform minor surgical procedures and deliver babies. They can prescribe medications using national protocols for treating common medical complaints. A survey found that communities were satisfied by their relationships with nurse practitioners.

Samoa: Due to a shortage of doctors, particularly in rural areas, nurses and other frontline primary health care-level workers were often providing care beyond the scope of their training. Community leaders strongly voiced a need for nursing personnel at the village level. A nursing strategic plan based on a primary health care model was developed, focused on the development and sustainability of an appropriate nursing and midwifery skill mix to meet projected health needs. This includes an advanced nursing diploma programme to enhance the skills in clinical assessment, decision-making and management of experienced nurses so they can function as clinical nurse consultants; a new bachelor's degree programme in nursing and the establishment of post-basic diploma programmes in primary health care, midwifery, mental health care and intensive care nursing; and a Nursing Practice Act which regulates administration of medicines and other treatment by nurses and midwives. Nurses, midwives, nurse consultants and nurse managers are well utilized in community-based and hospital-based services in outlying districts, and the integrated provision of nursing services is seen as an effective and efficient way to deliver health services to rural and remote communities.

Timor-Leste: Nurses and midwives are the only health staff at health centres and health posts. At each health centre approximately five nurses or midwives provide all care at the subdistrict level. In the subdistrict there are also satellite health posts staffed with one or two nurses or midwives. They provide essential services including maternal and child health, general consultations, and community activities (health promotion, school health, community volunteers, environmental health, outreach/mobile clinics, and coordination with nongovernmental organizations). In many health centres nurses also provide mental health and dental services and ongoing management of patients with chronic conditions such as leprosy, TB and epilepsy. The Clinical Nurse Practitioner course is a six-month intensive practical adult learning programme developed to meet the priority needs of the subdistricts. After the completion or implementation of a Strategic Master Plan for Health Services, Timor-Leste will have a scope of work and skill mix required for health care providers at the primary health care level.

Sources: Stearman G. *Mission report (Samoa, 28 June – 2 July 1999)*. Manila, WHO Regional Office for the Western Pacific, 1999 (MR/1999/0601).

Mid-level and nurse practitioners in the Pacific: models and Issues. Manila, WHO Regional Office for the Western Pacific, 2001.

The work of WHO in the Western Pacific Region: 1 July 2000 – 30 June 2001. Manila, WHO Regional Office for the Western Pacific, 2001.

National Health Workforce Strategic Plan 2005-2015. Ministry of Health, Democratic Republic of Timor-Leste.

There have been some success stories in the Asia Pacific Region, as in China, where over 1500 nurses have been trained through the HIV/AIDS Nursing Leadership Initiative[iii] , a multi-partner project aimed at strengthening the capacity of nurses to effectively respond to the health needs of patients, family members and communities affected by HIV/AIDS. It is expected that these nurses and midwives will conduct training courses in their own countries.

[iii] The project began in 2002 as a collaborative undertaking by the Ministry of Health and selected university schools of nursing, the China Nurses Association, the Catholic Medical Mission Board, the Maryknoll China Service Project, University of Illinois (Chicago) College of Nursing, the Hong Kong AIDS Foundation and WHO.

Other actions countries have taken to improve education and training for an adequately skilled health workforce include:

- increasing student intakes to training courses and setting up additional health-training institutions;
- revising, adapting or developing new curricula to suit changing population health needs and epidemiological and demographic transitions;
- quality improvement and assurance for basic and in-service training through application of defined standards and training outcomes, accreditation, licensure and regulation;
- promoting and maintaining collaboration and cooperation between health services and health-training institutions through advisory committees and dialogue meetings;
- enhancing professional development though self-learning, distance learning and in-service training programmes, and utilizing interactive and outcome-based learning and teaching modalities;
- balancing workforce education and training in terms of skill mix, gender and sociocultural aspects, including training of multidisciplinary teams; and
- regulating and overseeing health workforce education and training to enhance outcomes, control costs, and ensure quality and standards of practice.

Box 11.5: The Pacific Open Learning Health Net (POLHN): an innovative e-learning initiative

The Pacific Open Learning Health Net (POLHN) initiative is aimed at meeting the continuing education needs of health professionals in Pacific island countries and areas while they remain in their jobs, minimizing staff shortages and costly overseas training. Internet-equipped learning centres in 10 Pacific countries enable health personnel to be trained in basic information technology and computer skills so they can access electronic health information or take online and distance learning courses. Courses specifically designed to meet training needs of health personnel were developed and delivered via an interactive website (www.polhn.com) or on CD-ROM. Local trainer/mentors support course participants where needed. Self-directed learning modules in print and CD-ROM are distributed for use in countries without learning centres or if access to the learning centres is difficult. The Commonwealth of Learning maintains a primary site for the POLHN at http://www.colfinder.org/wolhn to facilitate easy access to relevant international publications and literature.

Some 25 health courses on subjects such as blood safety, HIV/AIDS, diabetes, radiology, health informatics, communications and counselling have been conducted through the learning centres, benefiting more than 500 health professionals from 2002 to 2006. POLHN has been a success according to an external evaluation conducted in 2004. There was a strong interest among the participating countries to contribute to its long-term sustainability as the courses are deemed appropriate and useful, there was a desire for more accredited courses, and it contributed to the retention of workers.

Source: Pacific Open Learning Health Net (POLHN) website. See: http://www.pohln.wpro.who.int

Future directions

Country-based and country-led actions

Human resources for health strategic planning guides leaders and stakeholders in planning human resources for health investments, managing for performance, developing enabling policies, and building capacity for research, training and practice. Monitoring results during the process of building national

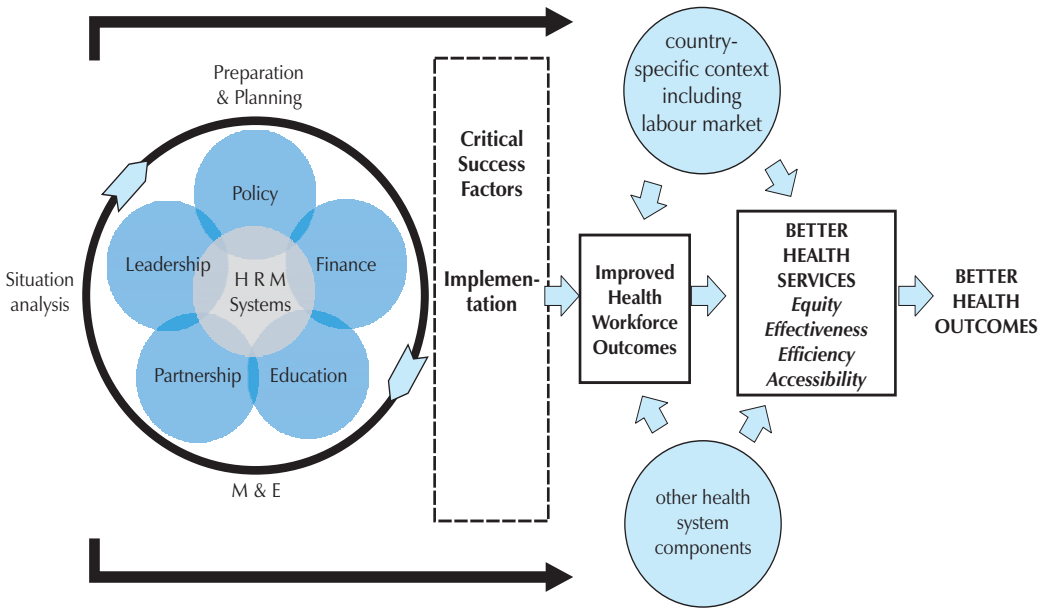
capacity will help make mid-course corrections. Good data are essential to inform and guide such efforts. A strong action coalition linking all stakeholders with an interest in health workforce development is conducive to human resources for health development.

A tool for developing an effective and sustainable health workforce is available (Figure 11.1).

In Mongolia, for example, a meeting of human resources for health partners was convened in November 2006 to mobilize commitment and support from national political leaders, government ministries, provincial governors, development partners and several United Nations agencies for the implementation of the human resources development strategic actions of the Health Sector Strategic Master Plan (2006–2015). The Government and the partners agreed to the establishment of a high-level coordinating body with a permanent secretariat in the Ministry of Health and a working group to facilitate implementation of the national human resources for health strategic plan.

There is increasing appreciation in Asia Pacific Region of the importance of building partnerships between the education and health sectors. Such partnerships facilitate the dual goals of ensuring both the participation of health personnel in design and implementation of national health policies and reforms, and the relevance of health professional education to country needs.

Fig. 11.1 Human resources for health action framework for an effective and sustainable workforce



Notes: HRM is human resource management. M & E is monitoring and evaluation.

Source: Global Health Workforce Alliance. *HRH Action Framework*. More information available from: http://www.capacityproject.org/framework/

Cross-cutting health skills for key categories of health professionals should be emphasized. The health and education sectors should work together towards achieving coverage, motivation and competence for better management of the health workforce for better performance, with emphasis on:

- **coverage strategies** that promote adequate numbers, appropriate skill mixes and outreach to vulnerable populations;

- **motivation strategies** that focus on adequate remuneration, a positive work environment, opportunities for career development and supportive health systems, recognizing that managing the health workforce can be "win-win" with benefits for all parties; and
- **competencies** that can be advanced through training in appropriate attitudes and skills, creating conditions for continuous learning, and cultivating leadership, entrepreneurship, and innovation.

Countries should strengthen national data, information, analysis and research on the health workforce. Well-designed studies of the health workforce will help understand the nature of the workforce, including its size, composition, current functioning, skills, availability, adequacy of its training, training needs and the appropriate roles of the workforce. The studies will also help show how the workforce can be strengthened to support new approaches to priority health problems.

Regional- and global- level actions

At the regional levels, with support from relevant international partners, the following key actions should be considered:

- Advocacy for increased investments in human resources for health by development partners as being crucial to national development. This may require changes in donor policies in favour of health system and human resources for health strengthening and allowing greater support to country-led programmes.
- Increased technical support as well as flexible financial support for country health system and human resources for health development.
- Supporting countries to overcome the macroeconomic and structural constraints that affect workforce supply, demand, performance and distribution.
- Sharing of better human resources for health intelligence and best practices through national and regional Observatories on Human Resources for Health and Alliances such as the Asia Pacific Action Alliance on Human Resources for Health (AAAH).
- Twinning approaches for education.
- Regional migration policies.
- Investment plans in education infrastructure.

11.2 Health laboratories and blood safety

Blood transfusion services

Blood transfusion services in the Asia Pacific Region range from efficient, well-organized services based on voluntary non-remunerated blood donors in developed countries to those in the least developed countries that lack resources, function poorly, have inadequate safety and quality monitoring, and are heavily dependent on paid donors.

Approximately 30 million units of blood are collected every year in the Region, a figure steadily increasing as countries such as China improve voluntary non-remunerated blood donations, which grew from 45% in 2000 to 91.3% in 2004.[8] In some areas of the Region, nongovernmental organizations have played a key role in promoting voluntary non-remunerated blood donations.

Collection only from voluntary non-remunerated blood donors in low-risk populations is now recognized as an important element for the safety, quality, availability and accessibility of blood transfusions. Many countries now celebrate World Blood Donor Day and national blood programme managers have been trained in Bangladesh, Bhutan, China, Indonesia, India, Myanmar, Nepal, the Philippines, Sri Lanka, Viet Nam and most Pacific island countries. A core group of national and provincial facilitators has been formed in China to meet the goal set by the Ministry of Health of phasing out paid donations for the clinical use of blood by 2008.

More than 90% of blood collection in China, Nepal and Thailand are from voluntary non-remunerated donors and the rate is 100% in Australia, Brunei Darussalam, the Democratic People's Republic of Korea, French Polynesia, Japan, Hong Kong (China), Macao (China), Malaysia, New Caledonia, New Zealand, the Republic of Korea and Singapore.[9,10] Paid blood donations still exist in Bangladesh, China, the Marshall Islands, the Philippines and Viet Nam.

Screening donated blood for HIV and hepatitis B is universal, but the quality of screening needs improvement. This is critical because of the large number of carriers of HIV (7.4 million)[11], hepatitis B (240 million)[12,13] and hepatitis C (94.5 million)[14] in the Region.

Even though component separation greatly increases the utility of every unit of blood, many countries continue to use whole blood for therapeutic purposes due to a lack of awareness by clinicians and inadequate blood component production facilities.

Box 11.6: Blood transfusion safety

WHO recommends the following integrated strategies for blood transfusion safety:

- establishment of a well-organized, nationally coordinated blood transfusion service that can provide adequate and timely supplies of safe blood for all patients in need;
- collection of blood only from voluntary unpaid blood donors at low risk of acquiring transfusion-transmissible infections, and stringent blood donor selection criteria;
- testing of all donated blood for transfusion-transmissible infections, blood groups and compatibility;
- production of blood components to maximize the use of donated blood and enable the provision of therapeutic support for patients with special transfusion requirements;
- appropriate clinical use of blood and the use of alternatives, where possible, to minimize unnecessary transfusions;
- safe transfusion practice at the bedside; and
- comprehensive quality system covering the entire transfusion process, from donor recruitment to the follow-up of recipients of transfusion.

Source: *Blood transfusion safety*. Geneva, World Health Organization. Available from: http://www.who.int/bloodsafety/en/

Australia, Cambodia, China, Fiji, India, Japan, the Lao People's Democratic Republic, Malaysia, Nepal, New Caledonia, New Zealand, Palau, the Philippines, the Republic of Korea, Samoa, Singapore, Solomon Islands, Thailand and Vanuatu already have national blood policies. Bangladesh, Bhutan, Brunei Darussalam, Maldives, Sri Lanka and Viet Nam have developed national blood policies and plans to implement them.

With donor help, Bangladesh, the Democratic People's Republic of Korea, the Philippines, Sri Lanka and Viet Nam have begun strengthening and coordinating blood transfusion services. Viet Nam

has established a management unit for the implementation of a Regional Blood Transfusion Centres Project. Sri Lanka has completely reorganized its national blood transfusion services with assistance from the Japan Bank for International Cooperation. A central blood bank in Timor-Leste was developed with WHO support and now services a large part of the country.

Regional external quality assessment schemes for blood grouping and screening of infectious markers have been initiated, along with regular monitoring of the quality of laboratory services and the provision of technical support for their improvement. The WHO Collaborating Centre for Training in Transfusion Medicine in Bangkok, Thailand, provides training and acts as a resource centre for strengthening systems quality.

The rational use of blood by clinicians is recognized as a critical issue that requires greater attention. In the Asia Pacific Region, unnecessary transfusions are frequent, with large variations in transfusion practices among and within countries. There is a lack of systematic data to reflect the full magnitude of the problem. The irrational use of blood has an adverse impact on safe supply, especially in developing countries. Training workshops to combat this have been conducted in Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Fiji, India, Indonesia, the Lao People's Democratic Republic, Macao (China), Malaysia, Mongolia, Myanmar, the Philippines, Sri Lanka and Viet Nam. Participants in these workshops come from ministries of health, blood transfusion services, hospitals and relevant professional bodies.

Recognizing the importance of quality in blood transfusion services, many countries have responded to the 2001 WHO Initiative on Quality Management. More than 150 quality managers who were trained under this initiative receive ongoing technical support from WHO collaborating centres.

A plan was developed in China to strengthen capacity and quality management at the Liaoning Provincial Blood Centre and develop it into a central testing centre for all provincial blood services. This pilot project serves as a model for further consolidation of blood service operations in China.

The judiciary and the Ministry of Health and Family Welfare in India joined forces to mandate a system of compulsory registration of all blood banks and ensure that services meet defined quality standards.

Problems and constraints

Uncoordinated, fragmented blood services that are neither efficient nor cost-effective[15] still operate in many developing countries in the Region, constrained by inadequate supervision, lack of quality management and staff training.

Technological advances are being adopted by some countries but widespread irrational transfusion and a lack of programmes to recruit and retain voluntary unpaid blood donors from low-risk populations hamper the delivery of safe blood in adequate quantity. Poor systems quality, equipment maintenance, weak supply chains and ineffective management of scarce resources further compound problems.

Lack of knowledge about the benefits of blood components among prescribers has led to a situation where blood centres are unwilling to establish production facilities. Inadequate resources, a low priority given to safe blood programmes and the remote location of places such as Bhutan, islands in Indonesia and Maldives, Pacific island countries and Timor-Leste, pose further challenges to ensuring the availability of and access to safe blood.

Health laboratories

Laboratory support for disease surveillance and outbreak investigations is available in almost all countries of the Asia Pacific Region for common endemic diseases, including cholera, dengue fever, Japanese encephalitis, malaria and viral hepatitis, with the Lao People's Democratic Republic, some Pacific island countries and Timor-Leste as the exceptions. Networks supporting these functions in Asia Pacific countries are usually coordinated by designated national public health laboratories, which often deploy services during emergencies. A mobile public health laboratory was established in Aceh, Indonesia, to provide critical support to disease surveillance in tsunami-affected areas.

Antimicrobial resistance patterns of 26 common bacterial species are now monitored through a network of 14 focal laboratories. [iv,16] National antimicrobial resistance surveillance networks operate in India and Thailand. The Gonococcal Antimicrobial Surveillance Programme is an ongoing regionwide susceptibility surveillance project which has been publishing data annually since 1992.

In the Region, 21 countries participate in the Global Influenza Laboratories Network through their respective national influenza centres.[17] Of the four international influenza reference laboratories located in Australia, Japan and Hong Kong (China), two are WHO collaborating centres. An online information-sharing tool is also maintained by the Global Influenza Laboratories Network.

Tuberculosis (TB) is a re-emerging health threat in the Asia Pacific Region. To deal with growing multidrug resistance, 18 countries and areas[v] participate in the Global Network for Surveillance of Drug Resistance in Tuberculosis.[18,19] Laboratory performance is maintained through the use of standard methods and a quality assurance programme, which relies on a network of seven supra-national TB reference laboratories.[vi,20] Although many countries are establishing or rehabilitating laboratories and training staff at the district level to support expansion of the directly observed treatment, short-course (DOTS) programme, regional capacity to diagnose TB drug resistance remains inadequate and the level of country preparedness necessary to mount an effective response to drug-resistant TB needs improvement.

With surveillance as a key component in the strategy to eradicate poliomyelitis, the Region has 29 laboratories with a focus on the disease and membership in the global network of poliomyelitis laboratories.[21,22] The Enterovirus Research Centre in Mumbai, India, is the Region's Global Specialized Laboratory for poliomyelitis. Similarly, 36 laboratories have formed a network to combat measles. China maintains 31 provincial poliomyelitis and measles laboratories and 331 prefecture-level measles laboratories.[23,24] A formal system for annual accreditation of the poliomyelitis and measles laboratory networks ensures that the laboratories in the regional laboratory network maintain WHO standards.[vii]

A subregional laboratory network to monitor and report communicable diseases in Pacific island countries and areas also established an integrated epidemiological surveillance system to provide public health laboratory services for six initial target diseases (cholera, dengue, influenza, leptospirosis, measles and typhoid) through existing public health laboratories in Fiji, French Polynesia, Guam and

[iv] In Australia, Brunei Darussalam, China, Fiji, Hong Kong (China), Japan, Republic of Korea, Malaysia, New Zealand, the Philippines, Singapore, Tonga and Viet Nam.

[v] Australia, Cambodia, China, Fiji, Hong Kong (China), Republic of Korea, India, Japan, Macao (China), Malaysia, Mongolia, Nepal, New Zealand, the Philippines, Singapore, Thailand, Vanuatu and Viet Nam.

[vi] Queensland Mycobacterium Reference Laboratory and Institute of Medical and Veterinary Sciences (Australia); Korean Institute of Tuberculosis, (Republic of Korea); TB Reference Laboratory, Department of Health, Hong Kong (China); Research Institute of Tuberculosis (Japan); National TB Reference Laboratory Center Tuberculosis Cluster (Thailand) and the TB Research Centre (India).

[vii] Victoria Infectious Diseases Reference Laboratory (VIDRL), Melbourne, Australia; National Institute of Infectious Disease (NIID), Tokyo, Japan; and China CDC, Beijing, China, are the Regional Reference Laboratories (RRLs) for both the polio and measles laboratory networks.

New Caledonia. These laboratories are supported by reference laboratories in the Pacific Rim countries. There are 22 countries and areas participating in the Global Salmonella Surveillance Network.[viii, 25]

The importance of the appropriate organization and management of clinical laboratory services is being increasingly recognized by national authorities. A tool for rapid situation analysis and draft standards for clinical laboratories based on relevant International Organization for Standardization (ISO) standards was reviewed and finalized in a workshop held in Manila in October 2003. Cambodia, China, Mongolia, and Viet Nam are establishing more effective and efficient clinical laboratory systems, including strengthening management and coordination at the national level.

Capacity for quality assurance in health laboratories is improving in the Region. Many countries have national standards and are aspiring to obtain ISO certification. Accordingly, training courses are being conducted to create awareness and build the capacity for quality assurance within countries. Distance learning programmes improve the knowledge and skills of workers in various areas of laboratory technology. A quality assurance system for Pacific island countries is available through WHO's Pacific Open Learning Health Network.

In Malaysia, Myanmar, Nepal, Sri Lanka and Thailand, national laboratories organize external quality assessment schemes for periodic assessment of the quality of public health and clinical laboratories in their networks. Similar schemes in India and Indonesia operate at the subnational level. Pacific island countries have introduced external quality assessment schemes and a network for individual clinical laboratories that contribute to quality improvement.

Problems and constraints

Public health laboratories in the Region require strengthening for efficient disease surveillance and management of outbreaks, which are still often not diagnosed in a timely manner. The capacity of public health systems for diagnosing new and emerging infectious diseases is limited. While national networks of public health laboratories are operational in almost all countries, their effectiveness is limited by the exclusion of academic and research institutes, and private and veterinary laboratories. Efforts are under way in India to include the private sector under the Integrated Disease Surveillance Programme.

Modern laboratory services are inadequate in most developing countries in the Region, especially for virology and molecular biological studies. The low priority given to public health laboratories has impeded modernization and the unavailability of diagnostic reagents for emerging and unusual infectious diseases (avian influenza, Nipah virus, SARS and undiagnosed encephalitis are recent examples) has sometimes hampered the early and accurate diagnosis of outbreaks. Samples for diagnosis or confirmation of uncommon and atypical disease presentations sometimes must be sent to laboratories outside the Region. Encouragement and support are needed for the indigenous development and production of reagents for diseases with epidemic potential and for the integration of quality assurance methods. Although infrastructure exists for HIV diagnosis in all countries, the expansion of laboratory support for monitoring antiretroviral therapy in high-burden countries is a priority.

[viii] The countries participating in the Global Salmonella Surveillance Network and the numbers of laboratories are: Australia (13), Cambodia (4), China (59), French Polynesia (1), India (7), Indonesia (6), Japan (10), Republic of Korea (9), the Lao People's Democratic Republic (4), Malaysia (10), Maldives (1), Mongolia (3), Myanmar (4), New Caledonia (1), New Zealand (3), Nepal (5), Papua New Guinea (2), the Philippines (15), Singapore (2), Sri Lanka (6), Thailand (42), Viet Nam (12).

The long-term benefit of investing in the quality of clinical laboratories is not fully recognized in many countries. Many laboratories lack internal quality control or do not participate in external quality assessment schemes. Laboratory services are often not coordinated and there are few examples of tertiary laboratories taking scientific and technical responsibility for intermediate or district laboratories. There is significant inequity between urban and rural laboratory services in most countries in the Region.[26]

Regulation of clinical laboratories in developing countries is very weak or non-existent. Few countries have laboratory accreditation systems and in countries where laboratories are licensed, quality is usually not a criteria. With the rapid increase of private laboratories in countries in economic transition, there is an urgent need to develop an appropriate regulatory system to ensure the quality and functionality of laboratory services.

Other problems that need to be addressed include the lack of national laboratory policies, non-existent national focal points for laboratory services development in most countries, and inadequate recognition and motivation of laboratory staff.

11.3 Health financing

How health systems are organized and financed is a key determinant of access to and utilization of health services and consequently affects the health of the population. Health care financing has become a major focus of health sector reform in many countries. A response to mounting pressure on limited health resources due to epidemiologic and demographic transitions, these reforms also address poverty reduction and the health problems of disadvantaged groups. In many countries, chronic and "lifestyle" diseases are rising in lockstep with the growth of aging populations, creating a double burden on health care resources. Increasing public demand and the adoption of new, expensive medical technologies are further adding to the strain.

The two main objectives of health financing, equal access to essential health services and protecting individuals from catastrophic health-care costs, require mobilizing adequate and sustainable resources, as well as national regulatory and management capacity.[27] When goods and services are inefficiently allocated, or market forces do not serve perceived public interest, market failure occurs, a situation adversely affecting health care and requiring some level of government intervention.[28,29]

Over 53% of the global population (equivalent to 3.4 billion people) live in the Asia Pacific Region,[30] where half of all countries are classified as least developed, or low-income.[31] In such countries as Bangladesh, Cambodia, the Lao People's Democratic Republic, Myanmar and Nepal, the high proportion of people living below the poverty level, and their poor health status, have raised the concern of leaders for sectoral reforms to improve access to health services and provide financial risk protection to the poor.

Financing systems are fragmented, and because of low levels of insurance, the poor are not adequately protected. In most developing countries in the Region, too many people are forced to make out-of-pocket (OOP) payments to finance health care.[32] The Fifty-eighth World Health Assembly in May 2005 adopted a consensus resolution on sustainable health financing, universal coverage and social health insurance. The resolution endorses the principle of prepayment: pooling financial resources and risks across a large population group to achieve financial-risk protection and avoid "catastrophic"

expenditure and impoverishment of individuals as a result of seeking care. This is made workable through purchasing cost-effective health interventions.[33]

This section describes the achievement of human development among these countries, followed by analysis of levels and sources of financing, equity considerations, identification of major issues, and key actions recommended to increase social protection for the poor and reach universal coverage.

Human and economic achievement

Health and human development indicators for 29 countries in the Region, drawn from the United Nations Development Programme (UNDP)[34] and WHO[35] databases, are shown in Table 11.2. The data highlight large differences in the Region and suggest important relationships between indicators.

The Human Development Index is a composite of indicators representing life expectancy, economic status, education and adult literacy. The most developed countries in the Region have an index nearly twice as great as the least developed. Real gross domestic product (GDP) per capita (adjusted for purchasing power) ranges from nearly US$ 30 000 in Australia and Japan to well under US$ 2000 in five countries, a ratio of about 15:1. Most of the Region's population live in large countries with a real per capita GDP of under US$ 5000.

Wealthier countries have higher expenditures on health, both in absolute terms and in the percentage of their GDP spent on health. The relationship to national income holds true for total public health spending, but private spending varies widely and is high in countries such as Cambodia, China, India and Nepal, where public spending on health care is low. Total spending on health ranged from 12% of GDP in Cambodia to 2.2% in Myanmar. Total health expenditure per capita varies from US$ 2699 purchasing power parity (PPP) in Australia to barely US$ 30 in Myanmar.

Available data for the Region are not complete enough to show that inequitable distribution of income adversely affects health status. There are many exceptions in the Region, but the best health outcomes are in wealthy countries that have low wealth inequality, with outcomes among the poor almost universally far worse. In some environments, money does appear to buy health, or at least more health care. In six out of seven countries for which data was available, the wealthiest income quintile accessed a skilled birth attendant more often (up to five times more) than the poorest quintile, which also had infant and child mortality rates two to three times higher. In rural areas of Cambodia, for example, wealthier households spent two to three times as much per sickness episode as the poorest and had much better health indicators. Infant and child mortality among the poorest households was three times higher than for the wealthiest.[36]

The health status gap between rich and poor must be addressed if countries are to achieve the Millennium Development Goals (MDGs) because child and maternal mortality are major health-related MDGs.

Health-care financing in the Asia Pacific Region

Countries in the Region rely on a mixture of health-care financing sources, including government budgets, social insurance, external funding, private health insurance and out-of-pocket (OOP) payments. The level of total health spending is relatively low compared with the Region's GDP. In 2002, average total health expenditure was 5.8% of GDP, among the lowest of any Region,[37] and half that of the Organisation for Economic Co-operation and Development (OECD) countries.

Table 11.2 Income and health indicators, selected Asia Pacific countries, 2002-2003 data

Country	GDP per capita PPP US$	Health expenditure per capita in PPP US$	Health expenditures as % of GDP			Life expectancy at birth (years) 2003	Infant mortality (per 1000 live births)	% births with skilled health workers
			Public	Private	Total			
Australia	29 632	2 699	6.5	3.0	9.5	81	5.0	100
Japan	27 967	2 133	6.5	1.4	7.9	82	3.0	100
New Zealand	22 582	1 857	6.6	1.9	8.5	79	5.3	100
Singapore	24 481	1 105	1.3	3.0	4.3	80	2.2	100
Korea, Republic of	17 971	982	2.6	2.4	5.0	76	6.2	100
Brunei Darussalam	...	653	2.7	0.8	3.5	77	8.3	99
Tonga	6 992	292	5.1	1.8	6.9	71	9.8	92
Malaysia	9 512	349	2.0	1.8	3.8	72	6.2	97
Thailand	7 595	321	3.1	1.3	4.4	70	21.5	99
Samoa	5 854	238	4.7	1.5	6.2	68	19.3	100
Philippines	4 321	153	1.1	1.8	2.9	68	29.0	60
China	5 003	261	2.0	3.8	5.8	71	30.0	97
Fiji	5 880	240	2.7	1.5	4.2	68	17.8	100
Sri Lanka	3 778	131	1.8	1.9	3.7	71	15.4	97
Maldives	...	307	5.1	0.7	5.8	65	14.0	70
Viet Nam	2 490	148	1.5	3.7	5.2	71	26.0	85
Indonesia	3 361	110	1.2	2.0	3.2	67	35.0	68
Mongolia	1 850	128	4.6	2.0	6.6	65	23.5	99
Vanuatu	2 944	121	2.8	1.0	3.8	68	27.0	89
India	2 892	96	1.3	4.8	6.1	62	68.0	43
Solomon Islands	1 753	83	4.5	0.3	4.8	70	66.0	85
Myanmar	...	30	0.4	1.8	2.2	59	59.8	56
Cambodia	2 078	192	2.1	9.9	12.0	54	95.0	32
Lao PDR	1 759	49	1.5	1.4	2.9	59	82.2	19
Bhutan	...	76	4.1	0.4	4.5	63	60.5	24
Nepal	1 420	64	1.4	3.8	5.2	61	64.2	11
Papua New Guinea	2 619	136	3.8	0.5	4.3	60	64.0	53
Bangladesh	1 770	54	0.8	2.3	3.1	63	51.0	14
Timor-Leste	...	195	6.2	3.5	9.7	58	70 - 95	24

PPP - Purchasing power parity. ...Data not available.

Source: *Human development report 2005: international cooperation at a crossroads: aid, trade and security in an unequal world*. New York, United Nations Development Programme, 2008.

The world health report 2005: make every mother and child count. Geneva, World Health Organization, 2005.

Of 48 countries and areas in the Asia Pacific Region, 18 spend less than the modest level[38] of 5% of GDP on health. These 18 countries contain 651 million people, out of a total of 3.41 billion in the Region.[39] Bangladesh, Indonesia, Myanmar and the Philippines are countries in the low-spending group with large populations and below-average health outcomes, while Malaysia, Singapore and Thailand also spend less than 5%, but have relatively good health outcomes. China and India spend 5.8% and 6.1% of GDP respectively. By comparison, Australia spent 9.5% of GDP on health in 2003.[40]

The Commission for Macroeconomics and Health[41] estimates that to achieve relevant MDGs a minimum government expenditure of US$ 34 per person per year is required to provide an essential package of public health interventions. Governments currently spending less than US$ 34 include 14 of the 48 countries and areas in the Region, with a total population of 1.72 billion people, or 51.3% of the Region's entire population. Ten are low-income countries (Bangladesh, Cambodia, India, the Lao People's Democratic Republic, Mongolia, Myanmar, Nepal, Papua New Guinea, Solomon Islands and Viet Nam) and four are lower middle-income countries (Bhutan, Indonesia, the Philippines, and Sri Lanka).[42]

Especially in countries where government expenditure on health is low, private OOP spending plays a large role. Cambodia has very high average total expenditure (12% of GDP) but poor health outcomes, in part because most of the total is from private spending on care that is often ineffective. The Lao People's Democratic Republic has similar health outcomes as Cambodia but much lower average total expenditure due to low private spending.

Governments play a relatively small role in financing health care, with average total expenditure in such countries as Myanmar (10.6%), India (17.6%), Viet Nam (22.6%), Cambodia (24.5%), Nepal (26.7%), Bangladesh (28.6%), and Singapore (34.7%).[43] Moreover, the share of government spending on health has been decreasing over the last decade in many countries.[44] While there are many exceptions in the Region, low government expenditure relative to private OOP is more common in low-income countries, while high government percentages predominate in industrialized countries.

If it is understood that social insurance is funded through taxation (i.e. a progressive payroll tax), then low OOP spending in industrialized countries is associated with the prevalence of social insurance systems, and also with long experience of policies that promote equity of health care. The correspondingly high percentage of OOP payments in less developed and poorer countries reflects the fact that health care is a necessity that people are willing to pay for when it is not supplied by government, even when it creates great financial hardship and means foregoing other necessities.

While health sector reforms in many countries have not been in place long enough to demonstrate longitudinal changes, intercountry comparisons[45] suggest that the most equitable health outcomes in the Region are in countries that have higher health expenditures, taxation-based financing and social health insurance.

Impact of out-of-pocket payments on households

The cost to individuals and households of accessing health services includes time and travel costs, in addition to any payments for consultation, procedures and medicines required at the time of service. Thus even "free" health care costs patients some money and loss of income. In the 1970s and 1980s, many developing countries became financially unable to provide free care. International financial institutions recommended that countries introduce user fees to share the costs of providing services to patients. Proponents believed that these fees would provide revenue to improve the quality of health services and expand coverage, and that user fees could reduce inappropriate demand for health services.[46]

A few well-managed user fee projects have improved the quality of services utilized by the poor, and have reduced OOP expenditures by eliminating the unofficial payments often asked by poorly paid providers. However, most experience with user fees has been unsatisfactory. They create barriers to essential health services with public health implications, do not raise significant revenue[47] and fail to protect the poor from unaffordable costs through exemptions.[48] For example, in the Lao People's

Democratic Republic, user charges have been actively implemented since 1995. The positive impact of a user charge for drugs is the capacity of health centres and district hospitals to ensure the availability of essential medicines throughout the year. However, there is no budget to subsidize the poor, and health-care providers have an incentive to overprescribe and charge for medicines in order to maintain services.[49,50]

The major objections to user fees are on equity grounds, especially that the poor could not afford the fees and would not be able to access necessary health services when needed.[51,52,53] The problems of identifying the poor for exemption from user fees have rarely been solved, and there is often no budget allocation to subsidize those who cannot pay. For this and other reasons of equity, WHO and others now recommend moving away from user charges to a prepayment method[54] of financing health care.

Currently, direct out-of-pocket expenditure is a very large source of health-care financing in the Region, and in many countries it is the largest source.[55] Out-of-pocket payment at the time of service can result in catastrophic payments when households spend a significant fraction of their net income on health care. Some households are pushed into poverty by borrowing and selling assets, and others give up needed care.

Data from 59 countries[56] reveal a strong correlation between OOP and the incidence of catastrophic health expenditure. An increase of 1% in the proportion of total health expenditures from OOP is associated with an average increase of 2.2% in the proportion of households experiencing catastrophic payments. In the Asia Pacific Region, 10.5% of households in Viet Nam and 5% in Cambodia experienced catastrophic health-care events. Among industrialized countries, the Republic of Korea has the highest incidence, and most other developing countries have a lower incidence (Table 11.3).

Table 11.3 Proportion of households with catastrophic health expenditure

Selected Asia Pacific countries	Percentage of households experiencing catastrophic OOP*
Viet Nam	10.45
Cambodia	5.02
Republic of Korea	1.73
Indonesia	1.26
Sri Lanka	1.25
Bangladesh	1.21
Thailand	0.80
Philippines	0.78

* Defined here as the incidence of household payments for health services exceeding 40% of net income after subsistence needs have been met.

Source: Xu K, *et al*. Household catastrophic health expenditure: a multi-country analysis. *Lancet*, 2003, 362: 111-117.

Equity in financing health care

The poor are low consumers of publicly-provided health care because they suffer from problems of information and access, including inability to pay costs of travel and treatment. A recent study[57] of equity in health-care financing in nine Asian countries and three areas of China found that the poorest quintile (20% of households) accounted for only 5% to 10% of health-care visits. In terms of benefit incidence by the poor, Hong Kong (China) was the most pro-poor with 38.7% of public subsidy going to the lowest quintile. This refers to the relative consumption of public subsidies—for example, to operate facilities in poor areas, or to provide specific services and fee payments for exempted patients. In Malaysia, the poorest quintile also receive more than 20% of the total subsidy, and in Sri Lanka and Thailand the poorest quintile's share of the total subsidy was close to 20%. This means that even

though the poor do not use their fair share of services, what they do use is fairly subsidized by public funds in those countries, i.e. the public subsidy is pro-poor.

In the other countries and provinces (except Bangladesh), the poorest 20% of individuals receive significantly less than 20% of the public health subsidy. The share going to the poorest 20% of individuals is lowest in Nepal (7%), followed by two Chinese provinces (8% and 10%). In these locations and in Bangladesh, India and Indonesia, the richest quintile receives more than 30% of the total subsidy.

The pro-rich distribution of public health-care subsidies in most developing countries is avoidable. Malaysia, Sri Lanka, Thailand and Viet Nam have achieved pro-poor public health spending by limiting user fees, or effectively protecting the poor from them, by building a wide geographic network of health facilities and ensuring that hospital care (which absorbs most spending) is sufficiently targeted at the poor.

When discussing equity, it is important to highlight issues of gender and the poorest of the poor. Women face more severe financial barriers to access to services relative to men. Though active in household-level economically productive activities, they have less bargaining power within the household and weaker access than men to control of household financial and non-financial resources. These factors add to limits placed on their physical mobility.

The poorest households are particularly challenged, often bearing the double burden of income poverty and sociocultural barriers. They also face language barriers, poor coverage of services in areas of ethnic minorities, a different and sometimes incompatible understanding of health, ill-health and healing practices, all of which hinder their use of modern services.

Key health financing issues

Key health issues requiring attention are shown in Figure 11.2, which summarizes the interrelated problems of financing health care in low-income countries, and provides a conceptual approach to address them by policy change and implementation. This section highlights three major challenges for health financing that especially impact the least developed countries and the low- and middle-income countries (LMICs) in the Region. It will be shown that these problems can be solved, to a large extent, by a transition to prepayment and social health insurance (SHI).

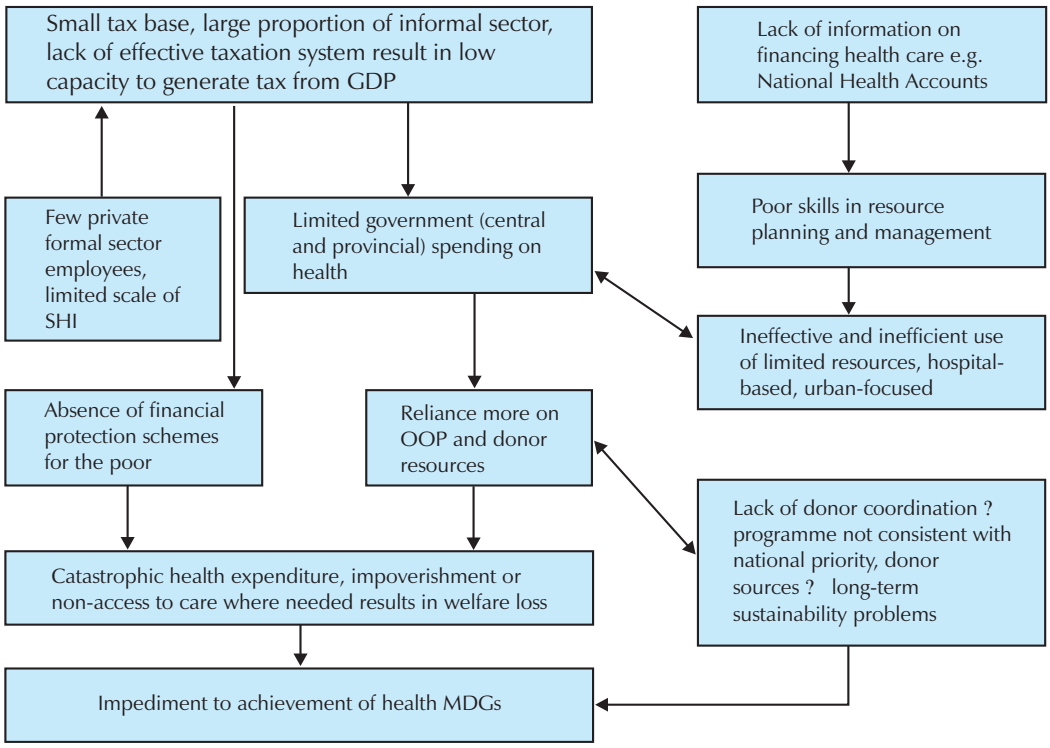
Inadequate and uneven public spending on health

There are two complementary causes of inadequate public spending on health: limited capacity of governments in low-income countries to generate revenue from the economy, and lack of political will to make greater investments in health.

The economies of developing countries rely on agriculture and informal sectors, with formal employment only in relatively small sections, such as the civil service. This results in a small tax base and limited capacity to generate revenue from the economy, with resultant limited government spending on health. In some countries, such as India and the Philippines, state and local authorities assume regional financial responsibility for health. When tax equalization between rich and poor states or provinces does not function well, the health care in poorer areas is relatively neglected due to inadequate resources.

There is low capacity in low-income countries to generate tax revenues for public spending: 8.86% (of GDP) in China, 8.11% in Bangladesh, 7.39% in Bhutan, 10.16% in India[58] and 11.3% average for South Asia.[59] Government spending overall in China has grown rapidly from 17.7% of GDP

Fig. 11.2 Interrelated problems of health care financing in resource-poor settings



Source: WHO Regional Offices for South-East Asia and the Western Pacific

in 1995 to 27.4% in 2003, but is still well below the OECD average of 44.5%. Total government spending on health tends to be lower in provinces with a high proportion of rural poor, and less related to provincial GDP per capita. [60] In contrast, government revenues in Australia and New Zealand were 26% and 37% of GDP respectively, and OECD countries derive taxes of over 30% of GDP.[61] Low ratios of tax to GDP in poorer countries and small GDPs result in low levels of government revenue and low government investment in health (Table 11.2).

Political will and responsiveness to demands for better health care sometimes follow a period of rapid economic development and/or from threats of social instability. Development partners recommend that China increase spending on health, especially to benefit the poor. A recent joint United Nations Children's Fund/Government of China report [62] proposes that government health spending relative to GDP should be more than doubled, from 0.8% in 2004 to 2%. It argues that this level should be easy to achieve as government revenues are rapidly rising, and this has apparently met with political acceptance. In India, the coalition Government's Common Minimum Programme calls for public spending for health to increase to at least 2%–3% of GDP over the next five years, from the current 0.9%.[63]

Lack of effective social protection for the poor

Failure of social protection for the poor in low-income countries is caused by government fiscal constraints, ineffective means testing and low capacity to implement official exemption policies. Most governments

have good intentions regarding financial protection for the poor, but in practice limited fiscal flexibility due to competing public sectors leads to inadequate budget allocations for subsidizing health care for the poor. In most systems with user fees, government health services are required to exempt the poor and other disadvantaged groups. For reasons mentioned previously, exemptions are rarely implemented effectively. The following are examples of success and problems with social protection in the Region:

- The Malaysian health system has achieved remarkably high and equitable health status at relatively low cost. The system is fair in the sense that no one is excluded from receiving care on the basis of ability to pay. The government has also encouraged the expansion of private or privately managed care in several ways. The challenge is to ensure that the highly equitable nature of the system is maintained, even with such reforms.
- To attain equitable provision and use of health services requires active compensation, usually by a public subsidy, for the disadvantages the poor experience in access. An analysis of the Thai free health-care programme found that the scheme did not adequately subsidize the poor, and non-poor received a disproportionate subsidy which enabled many to enjoy free medical care.[64]
- In Indonesia in 2005, the government implemented its commitment to increase access to health services by low-income groups with a programme subsidizing social health insurance contributions, known as Askeskin.[65] This programme responds to the legal obligation of the government prescribed by the National Social Security Law. The programme is a significant step in social protection for the poor, covering approximately 60 million low-income families nationwide.
- To finance the (sponsored) component of the Philippine Health Insurance Corporation (PhilHealth) plan, by which the poor are given free care, annual premiums of US$ 21.8 per person are paid by both national / local governments. The programme has suffered from intermittent political interest, especially when politicians purchased insurance cards for the poor as part of their election campaigns but failed to provide continuing support, resulting in a substantial drop in membership a year after the election.[66]
- Health Equity Funds pilot projects were undertaken in Cambodia as alternative financing mechanisms and were intended to remove financial barriers in accessing health services by the poor.[67] They have been supported mainly by donors and nongovernmental agencies as a country-specific poverty reduction strategy contributing to the achievement of MDGs.

Although such poverty-focused programmes are useful, it is important to ensure their long-term sustainability by linking them to existing health financing arrangements, such as social health insurance, where feasible. Otherwise, isolated and fragmented social protection measures tend to have limited effect and problems in scaling up, unless they are linked to a comprehensive health financing package.

Making more efficient use of limited resources

Whatever the mode of financing and level of spending on health, efficient use of public health resources is necessary to achieve better health outcomes. There is usually scope to improve utilization and efficiency in health systems so that more health benefit is gained from available resources. This requires optimal allocation between geographical areas, levels of services, and between inputs (e.g. between staff, drugs and other inputs). Increasing salaries to a "living wage" can have a significant positive impact on services, as seen in Cambodia when district services were contracted out.[68] It requires good organization and management of services to improve technical efficiency by minimizing the cost of achieving a desired result, and often better use can be made of the private sector.

Box 11.7: Resource allocation strategies in selected countries

Several countries in the Region have strategies to reallocate resources in favour of those with less access to services, and in favour of interventions that have the most impact on health. Reducing funding for services used by better-off groups is not easy, and demand for funding hospitals is strong. Bangladesh increased the share of the health budget allocated to the Essential Services Package from 45% to over 65% in four years. In Thailand, there has been a shift in public funding and health workers in favour of rural services and provinces. In China, there is a policy to provide additional funding to the poorer provinces.

Source: Walford V, *et al. Future policy choices for the health sector in Asia*. Paper presented at Asia 2015—promoting growth, ending poverty. London, 2006. Available from: www.asia2015conference.org

The fact that some countries attain better levels of service coverage with lower levels of expenditure is an important reminder that health system inefficiency is a critical and often neglected issue. India and Sri Lanka spend similar amounts (approximately US$ 30 per capita total health expenditure) but India's health indicators are poor compared with Sri Lanka's. Cambodia and Viet Nam spend similar amounts, but health outcomes are significantly better in Viet Nam. Disease prevention and health promotion are the most cost-effective kinds of health intervention, and most countries in the Asia Pacific Region have well-developed public health functions that promote overall efficiency of resource use.

Possible reforms

Comprehensive review of health-care financing and National Health Accounts

Without hard evidence on the current situation of health-care finance in the Region, it is not possible to identify or monitor the progress or drawbacks of health-care financing reforms. There is a need to thoroughly review resource levels, sources of financing and types of health care purchased. National Health Accounts (NHA) are a tool developed by the OECD[69] and WHO for tracking health-care resources.

The NHA is now widely accepted as a standard measure for presenting and monitoring the situation of health-care financing in each country. It depicts how much was spent on which services by what type of providers, and gives a baseline for evaluating the impact of proposed or recently implemented health finance reforms.

To increase the usefulness of NHA for policy-makers, its use should be appropriate to the health priorities of each country. In countries in the Region where HIV/AIDS is an important problem, national HIV/AIDS accounts show how public and private resources are used for caring for HIV/AIDS patients and prevention programmes.

Comprehensive, reliable and accurate information on health-care financing is currently quite limited. Only 15 countries in the Region are using NHA[70] and large gaps exist between countries in terms of data availability, comparability, data sources and collection methods, and use for policy formulation. Priority groups cannot be disaggregated from available data to better target policy, notably by income or by women within poor households.

Baseline information on the size of the population (and their dependants) engaged in formal and informal sector employment, and covered by different insurance and social protection schemes, is

needed to monitor the effectiveness of social protection policies. This information can help reach consensus on health-financing policy options and strategies best suited for each country.

Expanded use of prepayment schemes and social health insurance

The most important goal of health financing in the Asia Pacific Region is for health systems to be funded by prepaid and equitable sources of finance, such as social health insurance (SHI) contributions and progressive general taxation. Such financing sources pool risks and provide health services according to need, rather than ability to pay. Governments in wealthier countries have SHI contributions available for investment in health, as well as more resources derived from general taxation.

Health insurance funds, by their nature, promote solidarity and support among the covered population by risk-pooling – the healthy supporting the sick, high-wage earners supporting low-wage counterparts. Since the health funds are a public entity, their policies can be formulated to support government health policy goals.

There is no single financing model that suits every country. Most developing countries in the Region use mixes of tax funding, SHI, community-based health insurance (CBHI) and voluntary private insurance. The level of health system development, social context and political support are key determinants of success in the transition from OOP financing to prepayment-based health financing. The Region has substantial experience with various models of SHI and tax-subsidized health insurance (Table 11.4).

Except for Japan, Taiwan (China), and the Republic of Korea, SHI now provides a minor part of health-care financing in the Region. China, the Lao People's Democratic Republic, Mongolia, the Philippines, Thailand and Viet Nam have introduced some form of SHI, but face the challenge of extending coverage to the informal sector (and for China, migrants), which includes most of the economically active population in these countries.

Voluntary private insurance largely covers the wealthier urban population who can afford premiums. In general, it forms a small part of the health insurance market in developing countries.

Community insurance and prepayment schemes have been tried in developing countries where relatively few people are employed in the formal sector and most work in farming, small trading or as self-employed craftsmen. Simple prepayment schemes are useful when it is difficult for people to pay for health services during some periods of the year, as is normal in agricultural communities. They are organized at a local level for ease of management and because people tend to have more confidence in local officials than those in a distant capital.

Community based health insurance has been piloted at three locations in the Lao People's Democratic Republic since 2003. It is a voluntary scheme targeted at the informal sector and managed at the district level by a committee representing district administration, the local health facility and scheme members. Prepayment, risk-pooling and capitation payment are the major operational principles of CBHI in the Lao People's Democratic Republic. Between 30% and 40% of households in each catchment area are covered. Members are protected against unpredictable health expenditure and have increased their utilization of health services. Other examples of successful community health insurance in the Region are the Self-Employed Women's Association (SEWA) in India, Dana Sehat in Indonesia and small community financing schemes in the Philippines.

Table 11.4 Social health insurance and tax-funded health insurance in selected countries in the Asia Pacific Region

Country/scheme	First Law/ Decree	Year started	Current estimated coverage	Comments
Australia Medicare (c)	1972	1975	Universal	▪ All citizens and legal residents are eligible. Family as the unit of coverage.
China Urban worker basic insurance (c) Rural Cooperative Medical Systems (new) (v)	1998 2003	2000 2003	10% of total population	▪ Not yet law. Implementation in stages by region. Limited to urban workers only, mainly in public sector. ▪ Individual coverage in rural and urban schemes. Mainly covers catastrophic illness, low reimbursement rates.
India ESIS (c) CGHS (o) CBHI schemes (v)	1948 1954 1950s	... ...	20% of total population	▪ Family members covered but scheme excludes higher-salaried workers, and small enterprises. ▪ Very different arrangements by location, occupation and benefits.
Indonesia ASKES Jamsostek (c) CBHI (v)	1968 1991	1968 1992	20% of total population	▪ Families covered. ▪ Small enterprises excluded. Dependants limited to two children. ▪ Very different schemes.
Japan Workers Community Elderly	1922 1938 1999	1927 1957 2000	Universal coverage (from 1961)	▪ Extension in stages by population group. ▪ Family coverage.
Republic of Korea National scheme merging existing schemes (c)	1976	1977	Universal coverage	▪ Gradual extensions to different occupational sectors, family coverage.
Lao PDR CSS (c) SSO (c) CBHI (v)	1989 2000 2002	1989 2001 2002-2004	5% of total population	▪ All have family coverage. ▪ Reimbursement very limited by fund capacity. ▪ Still limited to capital city. ▪ Controlled extension of pilot projects.
Mongolia National scheme (c) (g)	1993	1994	78% of total population	▪ Initial universal coverage dropped, new systems will register self-employed.
The Philippines PhilHealth (c) (g) CBHI (v)	1994	1995	55% of total population	▪ PhilHealth National Health Insurance Program combines previous systems.
Singapore Medisave (c) Medishield (o) Medifund (g)	1983 1989 1992	1984 1990 1993	Universal coverage	▪ Three layers enable universal coverage for hospital-based benefits, with low cost public primary health care.
Taiwan (China) NHI (c)		1995	97%	▪ Incorporated existing schemes for workers and added coverage of informal sector e.g. students.
Thailand SSS (c) CSMBS (g) Universal Coverage initiative (g)	1990 2002	1991 2001	10% 10% 76% (Total 96%)	▪ Dependents not covered. ▪ Dependents covered in non-contributory scheme. ▪ Rest of the population, completing universal access.
Viet Nam VSS (c) VSS (v) VSS-CBHI (v) HCFP (Scheme for the poor) (g)	1992 1993 2002 2002	1992 1994 2003 2003	9.6 % 6.5 % 0.4 % 17.7 % Total 34.2 %	▪ Dependents not covered. ▪ Predominantly students. ▪ Informal sector. ▪ Acceleration of government programme to subsidize health insurance for the low income populations, including family members.

... *Data not available*

Note: (c)-compulsory, (v)-voluntary, (g)-government funded programme, (o)-individual can opt out.
CBHI – Community-based Health Insurance; CGHS – Central Government Health Scheme; CSMBS – Civil Servants Medical Benefit Scheme; CSS – Civil Servant Scheme; ESIS – Employees' State Insurance Scheme; HCFP – Health Care Fund for the Poor; NHI – National Health Insurance; SSO – Social Security Office; SSS – Social Security Scheme; VSS – Viet Nam Social Security System

Source: *Social health insurance: selected case studies from Asia and the Pacific*. New Delhi, WHO Regional Office for South-East Asia; Manila, WHO Regional Office for the Western Pacific, 2005.

Community financing is characterized by three principles: community cooperation, self-reliance, and prepayment. Community members pay a contribution in advance, either in cash or in kind, to a community-organized entity and receive a benefit package of health care. When members are in need, the community entity provides preventive care, primary health care and drugs. The schemes reduce the risk that a person or household will delay seeking treatment when illness occurs due to an inability to pay. Concerns are raised over the limited proportion of the population that can be covered by community-based health insurance (CBHI). Its voluntary nature leads to adverse selection and high treatment costs, problems of geographical access by the poor in remote areas and weak administrative capacity.[71] These factors can adversely affect CBHI schemes, their long-term sustainability and ability to cover a significant proportion of the population.

In most SHI systems employers and employees share the contribution burden equally. Age and health risk do not determine the amount of the premium, nor is it necessarily adjusted for the number of dependents covered. Younger, healthier workers subsidize older, less healthy workers by using less health care, but they tend to pay less into the fund since premiums are a percentage of earnings. This system of funding has the great advantage that contributions can be easily collected and inflows are as reliable as the overall economy. Compulsory membership spreads costs and risks over a large population with predictable financial flows.

Challenges in implementing prepayment and social health insurance

Cost containment

Inefficiency and cost containment are two major concerns of SHI. Cost-effective purchasing and contracting services from public and private health-care providers have a long-term impact on financial sustainability of insurance schemes. Different provider payment methods send different signals to providers as incentives for conserving health-care resources (Table 11.5).

Fee-for-service provider payments can lead to overutilization of health resources and "provider-induced demand", as seen in pharmaceutical use in China, Viet Nam[72] and other countries. Insurance schemes with fee-for-service provider payment sometimes have introduced copayments by beneficiaries, both to reduce their costs and as a brake on demand. Copayments have been shown to reduce total health expenditures by reducing utilization, with little adverse effect on the health of insured members, who can also be effectively protected from catastrophic costs by spending ceilings.[73]

Most schemes in the Region, such as SEWA in India, PhilHealth in the Philippines, Korean Health Insurance, Vietnam Health Insurance and China's new Cooperative Medical Scheme (NCMS) all use a fee-for-service reimbursement model, with either deductibles, copayment and a ceiling on total reimbursement. As a result, user copayments account for almost half of total medical bills in the Philippines and the Republic of Korea.[74]

Insurance agencies in these countries have a great opportunity, through their collective and bulk purchasing power, to improve resource use by introducing provider payment methods signalling better efficiency. Viet Nam is considering introducing capitation, the Philippines implemented capitation for the indigent programme, and Japan and the Republic of Korea are developing Diagnostic Related Group (DRG) systems. The Thai Social Health Insurance has used capitation for provider payments beneficiaries since 1991. The recent universal coverage scheme also applies capitation for ambulatory care and preventive health services, as well as global budgets, with a DRG system for hospitalization.

Table 11.5 Provider payment methods and expected level of production

Payment method	Over or under-production of health care	Main design remedy (alongside monitoring activities)
Fee-for-service	Over	Combine with budgets, adjust fees when specified level exceeded.
Daily payment (for inpatient care)	Over	Reduce daily payment as length of stay increases.
Case payment (Diagnostic Related Group)	Over	Ensure diagnostic groups are clearly defined.
Capitation	Under	Integrated referral systems.
Budgets	Under	Strict budgets not based on historical allocations,integrated referral systems.
Salaries	Under	Ensure salaries are performance-related.

Source: Carrin G, James C. *Reaching universal coverage via social health insurance: key design features in the transition period*. Geneva, World Health Organization, 2004 (Discussion paper no.2).

Any new insurance scheme should take into account proven, effective purchasing mechanisms, but experience in the Region shows that when changing from fee-for-service to a closed-ended payment mechanism, such as capitation, global budgets and DRG can be strongly resisted, especially by profit-oriented private providers. The Republic of Korea found that if reimbursement of providers is too low or narrow, they attempt to regain revenue from patients directly through "cost-shifting", from insured services with regulated prices to providing uninsured services with unregulated prices.[75] Other countries should draw lessons from these experiences.

Achieving universal coverage

WHO advocates universal coverage because it is equitable, promotes efficient use of resources and makes possible more rapid achievement of health objectives. The goal of universal coverage is to develop health systems that guarantee access to services of adequate quality, regardless of a person's income, health or social status.[76,77]

Near-universal coverage has been achieved by Australia, Brunei Darussalam, Hong Kong (China), Japan, Malaysia, New Zealand, the Republic of Korea, Singapore, Taiwan (China) and Thailand through a mixture of various health financing mechanisms. In the remaining countries in the Region, the transition from OOP financing to universal coverage could occur in stages[78] as follows:

Stage 1. Absence of financial protection, with out-of-pocket spending for most health-care expenses.

Stage 2. An intermediate (temporary, transitional) stage of coverage, where a mix of cooperative and enterprise-based health insurance and other private insurance covers the informal sector, and specific employed groups are covered by new SHI-type plans, and limited tax-based financing for a safety net.

Stage 3. Universal coverage through SHI for most of the population, and a mix of other insurance and tax-based financing to cover the remainder.

Different groups require different strategies for increasing coverage:

- For the formal employment sector, an effective policy is to rapidly extend coverage of SHI to include small private sector firms. Non-working spouses and children of employees should be covered, possibly with premium adjustments for more dependants.
- For the poor, membership can be made available in the same SHI-type scheme as for the non-poor, with premiums paid from a fund established by some combination of central and local government and donor support. Full or partial payment of fees retrospectively is another option, as is done by Health Equity Funds in Cambodia (100% donor-funded at present). The decision whether to cover user fees or purchase health insurance cards for the poor is made at the fund management level in Viet Nam's Health Care Fund for the Poor. Effective means testing is necessary to target poor households and avoid subsidizing the non-poor. Where means testing does not work well, tax-funded quality primary care services should be accessible by the poor with inpatient care costs financed through a safety-net system to reimburse hospitals.
- For the non-poor informal sector, a temporary strategy is to introduce voluntary CBHI to extend coverage in rural and urban areas. While acknowledging the weakness of voluntary insurance schemes, this approach builds health system capacity to work with insurance funds.

Based on different capacities of governments to pay for health care, two alternative strategies for financing health care for the informal sector are possible.[79] The first approach is through social health insurance contributions, applying a flat premium rate or several bands. The costs and administrative complexity and difficulty of premium collection from the informal sector are disadvantages of this strategy.

A second approach to rapidly achieve universal coverage is to finance services for the informal sector through general tax funding, as is done in the Thai universal coverage scheme. Criticisms refer to the long-term capacity to fund the scheme, and to the unfair public subsidy to the non-poor in the informal sector. However, analysis of benefit incidence showed that public subsidies were pro-poor, as the top quintiles opt out and use private health care.[80] The universal coverage scheme uses capitation contracts to help long-term cost containment, and projections of government expenditures show it is sustainable, even in a scenario of economic difficulties.[81]

Women dominate the informal sector in the Asia Pacific Region. Insurance coverage of the informal sector, where most women are employed, is a key health financing challenge. Also, when formal sector health insurance coverage does not extend to family members, women are particularly disadvantaged since their share of formal sector labour force participation is lower than that of men. In some systems, elderly parents without personal income and residing in the same household as the insured workers are also covered as dependents. In some countries SHI does not cover the non-working spouse, child dependants and other family members.

If there are multiple schemes in use, it is most efficient to harmonize benefit packages and the level of public subsidies as well as payment of health-care providers. Under multiple systems, providers have shifted costs to gain higher reimbursements. A "single-payer" system prevents this from occurring.[82]

Thailand has taken a piecemeal approach by gradually extending the coverage of SHI while developing a targeted health insurance scheme for the poor, older persons, disabled and children. By 2002, the entire population was covered by one of the three public insurance schemes: the Civil Servant Medical Benefit Scheme, SHI, and the Universal Coverage Scheme for the rest of population.

Within the mandate to achieve universal coverage by 2012, the Philippine's PhilHealth is offering health insurance coverage to workers in the informal economy (some 20 million workers—most of the employed population). In 2003, PhilHealth launched the PhilHealth Organized Group Interface, an innovative approach to reach out to workers in the informal economy through microcredit cooperatives, which act as marketing and premium collection agents for health insurance.

Singapore has had the unique experience of financing health with medical savings accounts (MSAs). The system combines universal MSAs with supplementary programmes to protect the poor. Results have been impressive, with low costs, universal coverage, excellent health outcomes, and full consumer choice of providers and quality of care. A unique mix of features differentiates Singapore's health financing system from most other government-funded or national health insurance programmes:

- By providing incentives to save and to avoid unnecessary use of medical services, MSAs encourage individuals to take responsibility for their own health-care needs as they belong to the individual, accumulate over a lifetime and can be used at the individual's discretion.
- To address the risk of catastrophic illness, MSAs are complemented with catastrophic insurance—Medishield and ElderShield, which provide some basic insurance coverage for long-term care. Premiums are kept low because catastrophic events and payouts are relatively rare. People can pay their Medishield and ElderShield premiums from their MSAs.
- To assist the poor, the unemployed and older persons, the government provides targeted subsidies through Medifund and "top-ups" of Medisave and Medishield funds. It also provides direct subsidies to public hospitals to ensure that basic services are available and affordable for all.

Singapore's advantages, such as a high national savings rate, high levels of education and income, and a relatively young population, have helped restrain demand for health care and allowed the build-up of Medisave balances, fund subsidies, and enabled copayments to fund a large share of spending.

A recent evaluation of the China New Cooperative Medical Scheme found that it increased overall outpatient and inpatient utilization by 20% to 30% with no significant effects on average OOP spending. For the poorest decile, the scheme increased average OOP spending, but reduced the incidence of catastrophic health spending, and had no impact on utilization.[83]

Conclusions

In the Asia Pacific Region, the main health financing problems are scarcity of financial resources in low-income countries, inequitable distribution of public subsidies for health and incomplete protection against catastrophic health-care expenditures. Effective reforms should address three key issues: mobilizing more resources, using limited resources more efficiently and providing risk protection for the poor. A gradual approach for attaining universal coverage of prepaid health insurance has been outlined here, and the experience of several countries described. The use of National Health Accounts makes it possible to identify key issues in financing health care, followed up by a policy forum among stakeholders to serve as a platform to reach consensus on reform directions and possible action.

11.4 Essential medicines

Medicines are a critical component of health-care services and access to them is regarded by many as a human rights issue. Since the concept of essential drugs was introduced in the late 1970s, substantial improvements in access to medicines have been achieved in many parts of the world. Selected with due regard to public health relevance, evidence on efficacy and safety and comparative cost-effectiveness, essential medicines fulfil priority health-care needs. Access to essential medicines worldwide has become an important international agenda, as reflected in the United Nations Millennium Development Goals, but much of the Asia Pacific Region's population is still denied regular access to these lifesaving drugs.

Improving access to essential medicines: an unfinished agenda

Major causes of morbidity and mortality in many developing countries, such as malaria, tuberculosis, pneumonia and acute diarrhoea, can be treated with a relatively short subset from the national essential medicines list. But essential medicines save lives and improve health only if they are widely available and affordable, of good quality and properly utilized. Poor access and their irrational use remain critical problems in many countries and areas in the Region, but efforts to correct this have been intensified in recent years. The Regional Strategy for Improving Access to Essential Medicines 2005–2010[84] was developed through a consultative process with experts from WHO, regional countries and areas, and partner organizations. The strategy identifies issues and challenges and defines strategies and actions in eight main technical areas as follows:

- Rational selection
- Rational use
- Affordable prices
- Access to medicines, trade globalization and the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement
- Sustainable financing
- Supply and management systems
- Quality: substandard and counterfeit products
- Monitoring and evaluation

These elements are derived from the WHO Medicines Strategy and have been adopted by many countries and areas in the Region. The strategy requires the implementation of national medicines policies and existing tools and guidelines, such as essential medicines lists, treatment guidelines and formularies. How it is implemented depends on specific health-care systems, taking into account national priorities, resources and the legislative and administrative environment. Most countries and areas in the Region have developed their own national workplans and have taken at least some of the recommended actions.

The regional strategy complements the Global WHO Medicines Strategy which guides work in pharmaceuticals and focuses on:

- developing, implementing and monitoring national medicines policies based on the essential medicines concept;

- access, including equitable financing, affordability, and delivery of essential medicines;
- quality and safety of medicines by strengthening regulatory and quality assurance standards;
- rational use, promoting therapeutically sound and cost-effective use of medicines by health workers and consumers.

National medicines policies: development, implementation, monitoring and evaluation

Essential medicines offer a simple and cost-effective answer to many health problems. However, in most developing countries there are still constraints to accessibility and affordability of medicines; problems related to quality, including proliferation of substandard, counterfeit and fake products; and improper usage by providers and consumers. The potential benefits of essential medicines are jeopardized by these problems.

Multiple and complex factors underlie these problems, which require systematic and comprehensive efforts to resolve. A national medicines policy serves as a framework to guide a multi-pronged programme of action. It defines goals and objectives, and provides direction and guidance for strategies and actions in the pharmaceutical sector. National medicines policies are integral to national health policies. Some two thirds of countries and areas in the Asia Pacific Region have developed national medicines policies and are implementing at least some elements of them.

Despite existing national medicine policies, access and affordability, quality and irrational use remain widespread problems in the Region, partly because it is easier to articulate a complex policy than implement it. Furthermore, the health sector is sometimes wrongly perceived by governments as contributing less to national development than the pharmaceutical industry. When conflict arises between the concept of medicines as an economic product, as opposed to a tool for health, the latter often loses out.

While all countries and areas in the Region have leaders committed to improving this situation, the efforts and resources applied to implementing policies are usually insufficient. National medicines policy is often seen as a matter for either the pharmaceutical or health sector, instead of a unified intersectoral issue. It is vital to identify strengths and weaknesses when governments implement policy, but the process is compromised because actions taken to achieve goals are infrequently monitored and outcomes rarely evaluated.

Selection

Endorsed by over 120 countries and called the most important public health concept in medicines, the essential medicines concept celebrated its 30th anniversary in 2007. The method for selecting medicines for the WHO Model Essential Medicines List has been refined over the years. Recent modifications to the selection criteria, as exemplified by inclusion of expensive antiretroviral drugs because of their cost-effectiveness, provide a model list more finely attuned to public health requirements.

Countries can develop their national lists by adapting the selections on the model list to their own particular needs. Judging by the prevalence of national essential medicines lists in the Asia Pacific Region, this has been an extremely successful initiative, but the modified criteria for selection are not yet widely used by countries and areas in the Asia Pacific Region.

The national essential medicines lists have disseminated the essential medicines concept in a symbolic way but their effect on improving public health has been far less than anticipated. The concept and the list are widely accepted by health decision-makers; however, not all public sectors follow them at the implementation level, and since the private sector is large (larger than even the public sector in many countries), the overall effect of essential medicines on the totality of health care is limited. Individual private providers can prescribe and sell medicines ranging from those that are effective to others of doubtful therapeutic efficacy. The vagaries of the medicines market and the effect of promotion are well-known antagonists of rational and appropriate use of medicines.

Deficient support for drug information has been a serious obstacle. The use of essential medicines is as important as the selection, meaning that there should be appropriate, unbiased, independent information available for using carefully selected products. Few countries in the Region provide funding in their medicines budget to produce information that could have a great impact on rational use of the medicines supplied—an example of concentrating on the "hardware" and ignoring the "software".

While not using essential medicines lists as such in public policy, most developed countries in the Region have strong regulations and control governing the choice and price of medicines available to their citizens. Australia, for example, has regulations and reimbursement policies that implement the principles of the essential medicines concept.

Box 11.8: The Australian Pharmaceutical Benefit Scheme

The formulary committee of the Australian Pharmaceutical Benefit Scheme reviews and decides whether any particular medicine can be listed for reimbursement in the scheme. The review is based mostly on evidence of cost-effectiveness and this has resulted in enormous savings to the health care system. Prior to listing in the scheme, a medicine must be assessed by the Australian Drug Evaluation Committee. If this committee recommends that the medicine should be available for sale in Australia, a sponsor, usually a drug manufacturer, applies to the Pharmaceutical Benefits Advisory Committee for listing in the scheme.

Source: Rickard M. *Pharmaceutical benefits scheme: options for cost control*. Canberra, Parliament of Australia, Parliamentary Library (Current issues brief no. 12, 2001-2002). Available from: http://www.aph.gov.au/library/pubs/cib/2001-02/02cib12.htm

Rational use: improving quality care and access

Use of medicines in ways that are medically ineffective, unsafe or economically inefficient jeopardizes the quality of health care and wastes public and private resources for health. Access to useful essential medicines is reduced when limited resources are wasted. Inappropriate use and overuse of antimicrobials, overuse and unsafe use of injectable products, and multiple prescribing are widespread problems in both developed and developing countries and have many public health consequences, including the emergence of drug-resistant strains.

In many parts of the Region, an increasing incidence of antimicrobial resistance is having dramatic consequences on the outcome and the cost of treatment of major infectious diseases. It is largely the result of the irrational use and uncontrolled distribution of antimicrobial products. Discovery of new antimicrobials against resistant strains may not keep up with the rapid emergence of resistance to existing antimicrobials, and new medicines are more costly for patients and health systems. Appropriate usage and distribution can help contain antimicrobial resistance and preserve the effectiveness of currently available medicines.

Irrational medicines use by providers and consumers is common in many parts of the world, including the Asia Pacific Region. A lack of knowledge and information on medicines among providers and consumers, excessive medicine promotion and misinformation, poor monitoring and supervision of medicine distribution and usage, and insufficient financing mechanisms means poor purchasing decisions are made by ill-informed consumers. This is largely due to the failure of health systems to make continuing medical education a priority and to keep registration updated.

The full potential of regulatory measures has not been realized. Inclusion of the generic name of a drug in labelling and packaging is required by law in most countries and is often adhered to by the pharmaceutical companies. This should enable the consumer to identify the same drug among the myriad brand names and choose the least expensive formulation, but this is not stressed in information to patients. Information about the benefits and need for promoting generic prescriptions is also not communicated to pharmacists, who play a key role in providing medicines to customers.

Effective interventions to deal with this public health problem are known, and include the following components:

- A multidisciplinary national body to coordinate medicines use policies
- Clinical guidelines
- National essential medicines list and formulary list
- Drugs and therapeutics committees in hospitals and at regional levels (province or district)
- Problem-based pharmacotherapy training in undergraduate education of health workers
- In-service continuing education
- Supervision and monitoring or audit system of medicines usage
- Independent medicines information
- Consumer education and empowerment
- Incentives and disincentives for rational and irrational use of medicines
- Enforcement of regulations
- Sufficient public expenditures on essential medicines

However, the irrational use of medicines is a complex issue and involves many participants. Continuous interventions and monitoring should be integrated into an ongoing health system development process, and include training, managerial and regulatory changes, and incentives for rational use practices. Operational research is useful in identifying drug use problems and specific interventions, and testing their effectiveness prior to wide implementation.

In Cambodia, integrated monitoring and supervision of medicine supply, management and rational use has been implemented with a positive impact in public health facilities. In Cambodia, Indonesia and the Lao People's Democratic Republic, a focused rational use intervention involving monitoring, training and planning has been implemented in health facilities. This small group training intervention, using a problem-solving approach, is implemented in health facilities with periodic meetings and indicators for measuring improvement.

Consumer education and empowerment are necessary for promoting rational use of medicines. Information about medicines should be available to consumers and be consistent with adequate labelling and proper instructions for over-the-counter medicines, regulation and monitoring of advertisements, and targeted public education campaigns. Many forms of consumer education have

been used in the Region utilizing mass media. An innovative approach by a community grassroots organization, employing small group discussions, active learning, and problem-solving product information leaflets, has been effective in improving the rational use of over-the-counter medicines in Indonesia.[85]

Affordable prices

When medicines are physically available, affordable prices make it possible for many people to have access to them. In some countries, prices of essential medicines are high in relation to local purchasing power. The market mechanism should lower the prices of off-patent medicines through competition, but it often does not work as it should. Information is power in the marketplace, and for medicines, sellers invariably have better information than consumers. Generic prescribing and dispensing are not widely practiced, with branded and patented products dominating many market segments. Where quality-assured generic drugs exist in the market, a generics substitution policy should be instituted that encourages or requires generic substitution of the lowest-priced generic product when a brand name product is prescribed. This is the practice in most states of the United States of America.

The problem of medicine affordability is complex and many factors play interlinked roles. For example, the absence of effective drug quality regulation weakens confidence in generics and encourages prescribers and consumers to use brand names. A lack of public financing (such as social insurance), asymmetrical knowledge and reliance on out-of-pocket payments reduce the power of consumers. Some countries in the Region are proactively trying to regulate medicine prices, but supply chain mark-ups are not transparent and evasions are possible due to "transfer pricing" by manufacturers.

Regulation of medicine prices in the private sector varies widely across the Region, ranging from no regulation to set prices for essential medicines. Depending on the amount of competition, price controls may or may not be effective in reducing medicine prices, when compared to a free market. Commercial considerations are not satisfactory grounds for regulating pricing as they may provide perverse distribution incentives. For example, a drug that is expensive to produce but has little health relevance might attract manufacturers because it is more profitable than an essential medicine that is cheaper to produce.

Access, trade globalization, and the World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights

National patent laws give patented and branded products market exclusivity, which is sometimes effectively monopoly power. An option for many developing countries is to allow cheaper equivalents of those medicines to be produced under the internationally agreed "TRIPS-compliant safeguards". The World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) makes it obligatory for member countries to apply uniform standards for patent protection for new medicines. This makes production, distribution and sales of generic versions of patented medicines in countries and areas where patent protection exists only possible under certain safeguard provisions which include the following:

(1) Least developed countries can delay implementation of the TRIPS agreement for pharmaceuticals until January 2016. Production and supply of generic equivalent of patented medicines are still possible if there is no patent legislation in place;

(2) Price negotiation of patented medicines with the patent holder producers, for countries wanting to purchase those medicines, not using compulsory licensing;

(3) Negotiation of voluntary licenses between local manufacturers and patent holders for the production of generic equivalents of the patented medicines;

(4) Local production of generic equivalents of patented medicines for countries with manufacturing capacity, through granting compulsory licenses to the local producer;

(5) Importation of generic equivalent of patented medicines for countries without manufacturing capacity, through restricted export from countries producing generic equivalents of patented medicines under compulsory licensing (decision of WTO August 2003);

(6) If a significant price difference on identical products exists between the country and others, parallel importation is an option allowing a product marketed in other countries to be purchased and imported at a price cheaper than the domestic market.

Member countries should incorporate these safeguards into national patent legislation if they want to use them to make medicines more accessible.

As WTO member countries move to full implementation of the TRIPS agreement, it is probable that the supply of generic equivalents of some patented but essential products will have a strong impact. India, currently the major manufacturer and supplier of generic antiretroviral medicines, amended its patent laws to comply with the WTO TRIPS agreement as of January 2005.

Most countries having TRIPS-compliant safeguard provisions in their laws have not yet taken full advantage of the flexibility in TRIPS. The Government of Malaysia in 2003 granted a "government use" license to a domestic company to import generic equivalents of patented products for public non-commercial use, including antiretroviral medicines from India. This was the first successful example of compulsory licensing by an Asia Pacific Region country to make prices of medicines more affordable. The decision was taken after price negotiation could not achieve a satisfactory outcome. Indonesia and Thailand have used the same mechanism to make certain antiretroviral medicines more affordable and accessible.

Options for fair financing of medicines

Ideally, medicines would be available on the basis of need rather than ability to pay. The essential medicines list makes medicines more affordable, but equitable financing is crucial for attaining this fundamental requirement to achieve the right to health care. Very few countries in the Region have achieved equity, and most that have are from the developed world.

Most countries and areas in the Region recognize the principle of equity in access to medicines and many have attempted, through various means, to ensure the principle in their health-care system. But health care is a demand that can never be satisfied. Ever-increasing costs in the developed world, despite a healthier population, demonstrate this. For this reason, regulation is needed to maintain the financial viability of a health-care system and within it, the cost of medicines. Some countries, such as Bhutan and Sri Lanka, have attempted to provide medicines at their public sector facilities free of charge. This approach can have significant impacts on health, but at some point the increasing financial burden may become impossible for governments to bear.

In countries where there is little control on prescribing in the public sector, shortages of essential medicines inevitably result because funding is limited. Some countries have adopted measures requiring copayments from patients. The amount of copayment can be a serious barrier to access if it is high, but if it is too low it will not recover enough to assure drug supplies after the costs of administration are subtracted. These systems can also introduce incentives for over-prescribing if the copayments are based on the cost of drugs.

Box 11.9: The Bamako Initiative in the Asia Pacific Region

Originating in Africa in 1987, the Bamako Initiative (BI) was a model for some Asian countries including the Lao People's Democratic Republic, which established community-level revolving drug funds to mobilize resources for primary health care. In addition, BI-type revolving drug funds have been implemented in some districts in Cambodia, in Myanmar, at the barangay level in parts of the Philippines, and in Viet Nam. Early critics of BI predicted that health systems could become dependent on revenues from the sale of drugs, creating a tendency to irrational drug use. This is believed to be true in the Lao People's Democratic Republic.

Sources: Tran TT, *et al*. Establishment of drug chests at commune health stations in Viet Nam, Bamako initiative. *Southeast Asian journal of tropical medicine and public health*, 1998, vol. 29,(3): 628-635.
Hospital costing study. Vientiane, Ministry of Health Planning and Budgeting Department and WHO, 2004.
Bigdeli M, Ketsouvannasane B, Shuey DA. *Do village revolving funds improve access and rational use of drugs in Laos?* Vientiane, Ministry of Health and WHO, 2004. Available from: http://mednet3.who.int/icium/icium2004/resources/ppt/AC008.ppt

Most models that enable fair health financing are based on universal social insurance in which the state is the regulator and promoter and sometimes the main health provider. Few universal insurance schemes exist in the Region's developing countries, but there is coverage in several countries of indigents, school-age children, war veterans and some other identifiable groups. Some countries with existing insurance schemes for government employees are considering ways to extend membership to informally employed workers and farmers. Even in these situations, some copayments may be required, so systems must be underpinned with measures that ensure cost-effective prescribing.

Whatever systems of financing are used, the private sector cannot be ignored, which in the Asia Pacific Region is a significant provider of health care, especially of medicines. In an ideal world, the health benefits of drugs would serve as the basis for pricing, but now faith is placed in the expansion of insurance systems to control costs. However, even insurance systems do not consistently eliminate perverse incentives. In Japan, for example, as reimbursements to hospitals for consultations and procedures have been reduced, inpatient drug charges have filled a gap to become a major source of hospital revenues. For this reason some countries have tried to break the linkages between prescribing and ownership of pharmacies by hospitals and doctors.

Local production

Promoting and sustaining local capacity for manufacturing quality pharmaceuticals can improve reliable access to medicines. Many countries in the Region lack the capacity to meet their pharmaceutical requirements with local production. Some least developed countries rely totally on imports, others on both national production and importation, but there is great need to increase local manufacturing capacity to meet national requirements. Some countries, including Indonesia, Sri Lanka, Thailand and Viet Nam, have established state-owned drug manufacturing units and concessions to increase production of essential medicines.

Local production of essential medicines in the Region is supported by WHO through technical assistance for good manufacturing practice (GMP), advising on the use of TRIPS-compliant safeguards to produce generic versions of patented medicines and support to regulatory authorities to ensure the quality of local production. The WHO prequalification scheme (which included some manufacturers of generic antiretroviral medicines) helps countries choose suppliers and products of good quality, safety, and efficacy.

Incentives for promoting local production of quality medicines was the subject of a recent Asia Pacific Region meeting, which included participants from regulatory, trade, patent, research and development, production, and insurance sectors. Also discussed were areas of possible cooperation in production of antiretroviral medicines and other essential medicines in the Region.

Ensuring supplies and good management

Problems of access and availability of medicines in developing countries in the Region are very often due to weaknesses in supply management systems. Effective drug supply management ensures that the right medicines are available at the right time and in correct quantities, at reasonable prices, and with recognized standards of quality. The best national pharmaceutical systems efficiently select, procure, and manage storage and distribution of medicines and other supplies. Common challenges in the supply of medicines are:

- Public sector planning, monitoring and management information systems for procurement are inadequate, often due to insufficient trained staff.
- Wastage of stocks occurs at different levels due to inadequate stock management.
- Procurement is not always based on essential medicines, and needs are projected inaccurately.
- Poor information on prices and sources of good quality medicines leads to higher cost and lower quality products.
- In some countries decentralization of the procurement system reduces savings from bulk procurement, resulting in higher prices and/or restricted supply. Different programmes and organizations use various methods and standards for procurement of essential medicines and do not coordinate with one another.
- Transportation and distribution of medicines in geographically difficult and remote areas can result in long lead times and deterioration of quality.

In the Asia Pacific Region, good procurement practices are supported by a WHO/Australian Agency for International Development (AusAID) collaborative project to promote good governance and ethical practices in the pharmaceutical sector. WHO also advises on monitoring and supervision of medicines supply management and on rational use in health facilities. In Cambodia, integrated monitoring and supervision of drug management and usage in health facilities has been sustained and implemented over the years with support from WHO and other donors.

Quality assurance and regulation

Active monitoring is necessary to ensure that pharmaceutical products are fit for their intended use, comply with the requirements of their marketing authorization and do not expose consumers to risks. Adverse clinical events, suggesting problems with product quality, safety and efficacy, should be reported and steps taken to identify and correct problems.

Unfortunately non-compliance with international standards such as GMP results in substandard drugs being manufactured, distributed and used. Regulatory authorities in many countries do not have sufficient capacity to thoroughly inspect establishments and register medicines, and breaches that are found are sometimes not followed up by action. Legislation on registration, inspection of establishments, GMP, licensing, regulation of pharmacies and advertisement and promotion of drugs, are still lacking or incomplete, or are poorly implemented, especially in small island countries. Medicine regulatory authorities are often lacking in resources, regulatory functions are distributed among different organizations and linkages between them are weak. WHO provides support to several countries to strengthen drug regulatory systems and legislation, improve national pharmaceutical quality control laboratories and conduct training in GMP.

Combating counterfeit medicines: the silent killer

There are counterfeit medicines circulating in the Asia Pacific Region which contain insufficient quantities of active ingredients or none at all, and are sometimes contaminated with toxic substances, thus jeopardizing treatment and public health outcomes, and wasting money. The production and sale of these dangerous products have recently increased sharply in the Region, and include medicines for such life-threatening illnesses as malaria, and chronic diseases such as diabetes and cardiovascular diseases.

A counterfeit form of artesunate, a first-line life-saving antimalarial drug, was found circulating in Mekong countries in the late 1990s. Surveys conducted in 1999 and 2000 showed that approximately 38% of artesunate products in shops were fake,[86] a figure that rose to 53% by 2004.

Absent or weak national medicines regulatory authority, poor cooperation among various stakeholders, inadequate enforcement of laws and regulations, and a lack of public awareness all contributed to the proliferation of counterfeit medicines and the number of unlicensed drug outlets. Intensified surveillance of counterfeit medicines in Mongolia and the Philippines in 2005 revealed that the increase in counterfeit medicines not only involved unlicensed outlets but also licensed drug sellers.

In 1988 WHO was requested by Member States to initiate a programme for the prevention and detection of production, distribution and smuggling of counterfeit medicines. The World Health Assembly resolved in 1994 to support national efforts to combat counterfeit medicines. Subsequent joint WHO projects on counterfeit drugs include collaborative projects with AusAID on Combating Counterfeit Medicines in Greater Mekong countries and the Rapid Alert System (RAS).[87] The latter was necessary because counterfeit medicines are often distributed across national boundaries, and there was an absence of effective mechanisms for alerting other countries when they are detected. The objectives of the Rapid Alert System are to:

(1) Encourage government, nongovernmental and international organizations to report through this system when counterfeit medicine is detected;

(2) Minimize adverse impacts of counterfeit medicine through rapid dissemination of information and timely action by relevant authorities;

(3) Distribute alert notifications in a timely manner;

(4) Advocate intensified surveillance of counterfeit medicine in high-risk areas and premises, such as markets, rural areas and unlicensed outlets;

(5) Stimulate rapid follow-up action on the reported cases through interactive communication;

(6) Encourage public warnings about counterfeit medicines by authorities;

(7) Monitor actions taken by countries, including investigation and removal of counterfeit medicines from the distribution system.

In 2006, WHO launched the International Medical Products Anti-Counterfeiting Task Force. Primarily aimed at building coordinated international collaboration and networks for combating counterfeit medicines, the task force included major worldwide anti-counterfeiting partners. The task force has working groups on legislative and regulatory infrastructure, implementation, enforcement, technology and communication.

Promoting ethical practices and good governance

The pharmaceutical sector is susceptible to unethical practices other than counterfeiting, such as conflicts of interest and non-transparency in registration, selection and procurement. Poorly defined and documented processes and limited institutional checks can compromise regulatory systems. The enormous size of the market (about US$ 500 billion[ix,88] in audited sales in 2006), and economic interests contribute to vulnerability in national pharmaceutical systems.

Strengthening regulatory systems and improving efficiency of registration, selection and procurement can inhibit unethical practices, and is a step toward the goal of better access to essential medicines. Promotion of ethical practices and promoting transparency and good governance also strengthen the technical aspect of the pharmaceutical system.

In the Asia Pacific Region, a project by WHO and partners promotes ethical practices in registration, selection and procurement. The project involves the assessment of registration, selection and procurement practices using a standardized methodology, and the development of an ethical framework and its advocacy and implementation. Initiated in the Lao People's Democratic Republic, Malaysia, the Philippines and Thailand, the project was later expanded to Cambodia, Mongolia and Papua New Guinea. The objective of the initiative is to minimize the vulnerability of pharmaceutical sectors to unethical practices and corruption.

Equitable access to essential medicines is unfinished business for national governments and the international community. The effort, will and collaboration of international organizations, governments, industry and professional organizations are vital to solving the problems of pharmaceutical equity and resources.

11.5 Traditional medicines

Traditional medicine comprises all non-Western or modern medical (allopathic) knowledge, skills and practices used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illnesses. These systems are based on theories, beliefs and experiences indigenous to different cultures, whether or not they are explicable in modern "scientific" terms. The terms complementary, alternative and non-conventional medicine are sometimes used interchangeably with traditional medicine.

Despite a limited base of scientific information, millions of people consider traditional medicine effective for a wide range of infirmities, from self-limiting to life-threatening illnesses. It is used for both acute and chronic diseases, and to improve the quality of life, especially of older persons and those suffering from pain and chronic conditions.

[ix] Approximately 90% of the US$ 500 billion is in industrialized countries, leaving "only" US$ 50 billion in sales to the developing world.

Traditional medicine has had significant impact on modern medicine and pharmaceuticals. The traditional herbal remedy *Artemisia annua*, used in China for about 2000 years, is effective against drug-resistant malaria and is now the basis of life-saving, first-line treatment for severe malaria in several countries in the Asia Pacific Region. In addition, some 25% of modern medicines are based on substances in plants originally used traditionally including digitalis, morphine, quinine, vincristine and shikimic acid, which is used for making oseltamivir, a medicine for avian influenza treatment.

Acupuncture has been proven effective in relieving post-operative and dental pain, and for nausea resulting from chemotherapy and during pregnancy, with very few unwanted side effects. It is also useful for alleviating anxiety, panic disorders and insomnia. Yoga can reduce asthmatic attacks, and Tai Chi techniques can help older persons reduce their fear of falls.

Traditional medicines in the Asia Pacific Region

The major systems of medicine practised in the Region are listed in Table 11.6.

Table 11.6 Traditional systems of medicine in the Asia Pacific Region

Country	Principal Traditional Medicine/Complementary Medicine Systems
Australia	Traditional Chinese Medicine, Chiropractic
Bangladesh	Unani, Ayurveda
Bhutan	Traditional Bhutanese Medicine
Cambodia	Traditional Cambodian Medicine
China	Traditional Chinese Medicine
DPR Korea	Koryo Medicine
India	AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy) and traditional Tibetan Medicine
Indonesia	Jamu
Japan	Kampo Medicine
Lao PDR	Traditional Lao Medicine
Malaysia	Traditional Chinese Medicine, Ayurveda, Traditional Malay Medicine, Complementary Medicine, Homeopathy
Maldives	Dhivehibeys
Mongolia	Traditional Mongolian Medicine
Myanmar	Traditional Myanmar Medicine
Nepal	Ayurveda
New Zealand	Rongoa Maori Medicine, Traditional Chinese Medicine
Republic of Korea	Traditional Korean Medicine
Singapore	Traditional Chinese Medicine, Ayurveda
Sri Lanka	Sri Lanka Indigenous Medicine
Thailand	Traditional Thai Medicine
Viet Nam	Traditional Vietnamese Medicine

Source: WHO Regional Offices for South-East Asia and the Western Pacific

Traditional or alternate systems are widely accepted in developed as well as developing countries, by people in both urban and rural areas. In urban communities, the use of traditional medicine is mainly by choice, while in rural communities it is by tradition, belief and social acceptance. Furthermore, traditional practitioners and remedies are readily available, accessible and affordable even to those in areas where the modern system of Western medicine has a limited presence. Payment is often based on the barter system, which is convenient and preferable to people in rural areas.

Traditional medicine is part of many national health systems in the Region, provided in parallel with modern medicine in both public and private sectors.[89] Even though modern medicine is the foundation of most health care in the Region, traditional systems are very much in use and are a major element of health care in many communities. Some countries have extensive networks of traditional medicine services, with both inpatient and outpatient facilities and support for national traditional medicine programmes.

Expenditure on traditional medicine is growing rapidly. Due to its popularity and relatively low costs, some countries promote traditional medicine in order to increase access to health care. These countries are investing in policy formulation, research, standardization, regulation and quality control, human resources development, and the integration of traditional medicine services into national health systems. In Malaysia, an estimated US$ 500 million is spent annually on traditional health care, compared to about US$ 300 million on modern medicine.[90] In Australia, annual complementary and alternative medicine expenditure is estimated at US$ 80 million.

As the economic and trade value of the knowledge of traditional medicine and medicinal plants increases, concerns have arisen that the benefits should be fairly and equitably shared. Developing appropriate policies for traditional medicine intellectual property rights has proven difficult. Patent rights for traditional medicine products and knowledge could encourage the promotion and development of traditional medicine, but could also impinge on access to health care by the poor.

Protecting traditional medicine knowledge from exploitation

Some countries have adopted measures protecting traditional medicine and knowledge. Thailand has a comprehensive regime for the protection and promotion of traditional medicine through the Thai Traditional Medicine Intelligence Act. In order to protect its traditional knowledge from patenting, India has developed the Traditional Knowledge Digital Library that contains traditional knowledge on Ayurveda and Unani. It contains 65 000 Ayurvedic formulations and 70 000 for Unani in English, French, German, Japanese and Spanish, totalling more than 30 million pages.

Demand for herbal medicines has grown tremendously in recent years, with annual sales estimated to be more than US$ 60 billion, and annual growth of 5%–15%. In some countries, a large percentage of traditional medicinal plants is being lost due to deforestation and over-exploitation for export earnings. India, Myanmar and the Republic of Korea have taken steps to reverse this trend by establishing and promoting new plantations and gardens, and creating legislation for controlling the export of medicinal plants and products of herbal origin. The problems of conserving the biodiversity of medicinal plants have been discussed internationally, but there is still no consensus on the best way of protecting traditional knowledge.[91,92]

WHO has assisted countries of the Asia Pacific Region in four main areas of traditional medicine development.

(1) **Policy.** Integrating traditional medicine with national health systems by developing and implementing national traditional medicine policies and programmes.

(2) **Safety, efficacy and quality.** Promoting safety, efficacy and quality of traditional medicine by expanding the knowledge base for traditional medicine and by improving regulatory and quality assurance standards.

(3) **Access**. Increasing the availability and affordability of traditional medicine, with an emphasis on access for underserved populations.

(4) **Rational use**. Promoting therapeutically sound use of appropriate traditional medicine by providers and consumers.

Progress in national activities

Several countries in the Asia Pacific Region have established national policies and are currently implementing activities in traditional and complementary medicine.[93,94]

Australia

The Australian Government has given grants to traditional medicine practitioner associations to assist them in developing accreditation standards and regulatory schemes, and tax incentives to encourage participation. The Government of the state of Victoria passed legislation and is implementing a regulatory system for practitioners of traditional Chinese medicine (TCM). Australia also set up a Queen's Commission to look into chiropractic activities and, subsequent to a favourable report, legalized independent chiropractic practice.

Bangladesh

The national Drug Regulatory Authority has been strengthened through the training of drug administration officers in the quality control of traditional and homeopathic medicines.

Bhutan

The training capacity of the Institute of Traditional Medicine has been strengthened. Traditional doctors and health workers are given refresher training to improve traditional medical service delivery.

China

The State Administration of Traditional Chinese Medicine, established in 1988, is a relatively independent government agency under the Ministry of Health, with the overall responsibility of developing and regulating TCM activities. In 1997 the Government reiterated that it attaches equal importance to TCM and modern medicine, and TCM has similar status in Hong Kong (China), where the Chinese Medicine Ordinance enacted in 1999 regulates the registration of TCM practitioners, the licensing of traders in Chinese medicine, the registration of proprietary Chinese medicine and other related matters.

The Government of China has paid significant attention to TCM since the founding of the state, and the constitution makes specific reference to the need to develop both modern and traditional Chinese medicines. Traditional and modern medical systems are integrated at every level of health care. In 2004 there were 2973 TCM hospitals with 301 178 beds and 433 819 licensed TCM doctors

and assistant doctors. Most general hospitals also have TCM departments. A TCM educational network has been formed that is similar to other medical education systems, including apprenticeship. Concurrently, traditional medicine from minority groups such as Mongolians and Tibetans has been further revived and enhanced. By the end of 2004, there were 196 minority medicine hospitals with a total of 11 687 professional staff.

The Democratic People's Republic of Korea

Standardization and clinical evaluation of traditional medicine and human resources for preparation of traditional drugs have been strengthened. National guidelines for the use of traditional medicines have been developed.

India

The Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) falls under the Ministry of Health and Family Welfare. These systems of medicine are being strengthened by the improvement and upgrading of standards of education in undergraduate and postgraduate teaching; including AYUSH as part of the national health-care delivery system; promoting AYUSH practices through education, communication, documentation and dissemination of information; compiling an evidence base on efficacy, safety and standardization of drugs; and creating pharmacopoeia standards.

Standardization and quality assurance of Ayurvedic remedies has been emphasized through workshops with practical, hands-on training. Ten laboratories for AYUSH are being strengthened to provide accurate analysis of traditional remedies. Training has been carried out in research methodologies, quality assurance and drug standardization. Traditional medicine programmes in tribal areas are being strengthened with supplies for effective delivery of health services. Rare manuscripts, textbooks and documents are being revised, translated and published. In addition, several important private sector corporate houses are playing an important role in standardization and quality control of traditional remedies.

Indonesia

The drug regulatory authority is being strengthened to monitor the safety and efficacy of traditional medicines by developing training workshops and testing analytical methods and tools.

Japan

Although Japan has no national policy or government unit for traditional medicine, social health insurance covers 148 traditional medicine formulas. Japanese expert groups are actively involved in WHO projects on traditional medicine standardization.

The Lao People's Democratic Republic

Traditional medicine treatments are being integrated into the health system. Complementary and alternative treatment guidelines have been revised and added to the national standard treatment guidelines.

Malaysia

The Herbal Medicine Research Centre within the Institute for Medical Research has developed a herbal medicine database, the Compendium of Medicinal Plants Used in Malaysia, which listed

2002 plants, the parts used and reported medicinal claims. The Institute for Medical Research is also in the process of developing a centralized electronic portal that consists of comprehensive, up-to-date and validated information on integrated medicine called the Global Information Hub on Integrated Medicine (Glob*in*Med). The web portal (http://www.globinmed.com/IMRContent/default.aspx) was officially launched in July 2007.

Mongolia

Traditional medicine is popular and plays a prominent role in the health-care system, with some 1235 drugs and bio-preparations registered for use. State policy on the development of Mongolian traditional medicine was approved by parliament in 1999, including strategies to develop traditional medicine hospitals and traditional medicine manpower, and to produce safe medicinal drugs. A national advisory council on traditional medicine was established in 2000.

Myanmar

Traditional medicine is being developed in a systematic and coordinated manner by producing medicines of assured quality, improving herbal gardens, strengthening the University of Traditional Medicine, and training human resources in research and development.

Nepal

The quality of Ayurvedic health care is being improved through the promotion of the proper use of traditional remedies by providers and consumers. Operational guidelines for all levels of government health care are being developed, with standard treatment protocols for selected priority disease conditions and guidelines for monitoring quality of care. The supply of traditional remedies is being improved. Traditional health-care providers are trained in the rational use of traditional medicines. A list of essential Ayurvedic medicines is to be printed and disseminated.

New Zealand

Standards for traditional Maori healing were released by the Ministry of Health in June 1999. These emphasize the role of Rongoa Maori in New Zealand's health sector and provide national standards of practice for traditional healing. Recent legislation established an expert committee to evaluate complementary health care and provide continuing information and advice.

The Republic of Korea

The national medical law of 1952 recognizes both modern and traditional medicine. There are now 11 oriental medical colleges that run six-year courses. Each college has an affiliated oriental medical teaching hospital. Further specialization requires a one-year internship plus a three-year residency and qualifying examination. The Korean Herbal Pharmacopoeia was established in 1984, and includes detailed quality control test procedures. The National Health Insurance Corporation has covered traditional medicine since 1987. Traditional medicine doctors began to serve at public health centres in 1988. A traditional medicine bureau was established in the Ministry of Health and Welfare in 1996, and legislation for the development of Korean traditional medicine was passed in 2003. The first five-year comprehensive plan for promotion of traditional Korean medicine started in 2005 and includes a programme of research and development.

Singapore

New regulations were developed in 1998 requiring documentation, labelling and quality control of Chinese proprietary medicines, and this regulatory framework was fully implemented by 2001. Importers, wholesalers, manufacturers and re-packagers of Chinese proprietary medicines must be licensed by the Health Sciences Authority, and products have to undergo pre-marketing assessment before they can be sold in Singapore. The Traditional Chinese Medicine Practitioners Act was passed by parliament in November 2000, providing for registration of all TCM practitioners, and a Traditional Chinese Medicine Practitioners Board was formed in 2001. The Ministry of Health established a Traditional Medicine Unit in November 2005. The Ethical Code and Ethical Guidelines for Traditional Chinese Medicine Practitioners were published by the board in January 2006.

Sri Lanka

Training programmes have been organized on the rational use of traditional medicine for homeopathic practitioners and in *panchakarma* therapy of Ayurveda. Quality assurance in the production and standardization of traditional medicine is being strengthened.

Thailand

The Government is committed to the promotion of Thai Traditional and Alternative Medicine (TTAM). The Ministry of Health's Department for Development of Thai Traditional and Alternative Medicine was established in 2002 to support the use of herbal medicines at public health facilities. The department establishes and promotes standards for TTAM and promotes its integration into the national health-care system.

Viet Nam

Traditional medicine is integrated into both primary and secondary health care. Explicit government policies and special agencies regulate traditional and complementary practices and herbal medicines, research, formal course work and practitioner associations. There is a legal and regulatory infrastructure, with updated legislation on registration and inspection of herbal medicines, and a licensing system to control traditional medicine practices. The official national policy document for traditional medicine has been approved recently by the Government. Viet Nam's policy on traditional medicine is based on a statement by Ho Chi Minh in 1955 that Viet Nam should "inherit valuable experiences from traditional medicine and at the same time study the possibility of combining traditional medicine with modern medicine in order to establish our own medicine". The 1980 constitution calls for the integration of traditional and modern medicine.[95]

Problems and constraints

Considerable progress has been made in the Asia Pacific Region in the recognition, integration and regulation of traditional medicine. However, the Region still faces many challenges, which can be grouped under the four categories adapted from the WHO Traditional Medicine Strategy.[96] These are presented in Table 11.7.

Table 11.7 Challenges in the development of traditional medicine in the Asia Pacific Region

Category	Challenges
National policy and regulatory frameworks	Lack of official recognition of traditional medicine and providers
	Traditional medicine not integrated into the national health-care system
	Lack of regulation and legal mechanisms
	Inequitable distribution of benefits derived from indigenous traditional medicine knowledge and products
	Inadequate allocation of resources for traditional medicine development and capacity-building
Safety, efficacy and quality research	Lack of research methodology and inadequate support for developing an evidence base for traditional medicine therapies and products
	Lack of international and national standards for ensuring safety, efficacy and quality control of traditional medicine therapies and products
	Lack of adequate regulation and registration of herbal medicines
	Lack of registration of traditional medicine providers
	Lack of evidence-based clinical trials on efficacy of traditional cures
Access	Lack of data about access and affordability
	Lack of official recognition of the role of traditional medicine providers in national health systems
	Poor cooperation between traditional medicine providers and modern practitioners
	Unsustainable use of medicinal plant resources
Rational use	Lack of training for traditional medicine providers and modern practitioners
	Lack of communication between traditional medicine and modern practitioners and between modern practitioners and consumers
	Lack of information for the public on the proper use of traditional medicine

Source: *WHO Traditional Medicine Strategy 2002-2005*. Geneva, World Health Organization, 2002.

Future perspectives

A large proportion of the Asia Pacific population uses some form of traditional medicine. With a rich heritage of traditional medicine in the Region, it is a resource that can be effectively used in primary health care. Political support has increased as the vital role that traditional systems of medicine play in contributing to overall health systems development is recognized.[97,98]

Countries in the Region are developing and enhancing health research efforts, human resources development, the exchange of information and intercountry collaboration in traditional systems of medicine, and are establishing appropriate standards.

Measures are being taken to protect, preserve and improve medical knowledge and medicinal plant resources for the sustainable development of traditional systems of medicine, including formulating policies on the protection and conservation of indigenous health resources.

Importance should continue to be given to ensuring the safety, efficacy and quality of traditional medicines by developing appropriate national norms and standards. Continuous promotion of public awareness about effective traditional remedies and practices will increase safe and rational use of traditional medicine.

Collaborative research should be pursued by experts, students and other health professionals on evidence-based practices in traditional medicine. Partnerships between relevant organizations will help develop the exchange of research information, regulatory standards and intellectual property, as well as the conservation of biodiversity.

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12

Public health functions

Introduction

Governments have a responsibility to ensure that essential public health functions perform effectively. Lists and definitions of key public health functions have been developed by various international and regional organizations. This chapter discusses five other important public health functions: health promotion through social participation and empowerment; disease surveillance and response; emergency and humanitarian action; health research; and national health information systems. Other essential functions, including the strategic management of health systems, development of policies for population health gain, and regulation and enforcement to protect public health, have been covered in Chapter 10 (Health systems), while human resources development for health and the promotion of equitable access are discussed in Chapter 11 (Health resources). Quality improvement for health services, another essential function, is mentioned here in the context of health information systems as well as in the two preceding chapters.

The global threat of communicable diseases, as described in Chapter 7 (Priority communicable diseases), highlights the need for better collaboration across and within national boundaries. Ministries of health play a central role in public health, but many functions are broader than the health sector alone. Successful health promotion through health-promoting schools and healthy settings projects requires collaboration with other ministries and agencies, academic institutions, and community organizations. Disease and outbreak surveillance is now a global imperative, with electronic media increasingly being used as an element of response and impact mitigation. Disaster and emergency preparedness requires the participation of many sectors and all levels of officials, policy-makers and workers in the field.

Health research plays a crucial role in improving health and health equity by developing and evaluating operational interventions and by informing decision-making. With a rapid expansion in knowledge about good health policy and open sharing of information, research has become international in scope. A functional health information system presents opportunities to build management capacity in decentralized health systems, and challenges decision-makers at all levels to make effective use of the benefits these systems provide.

12.1 Health promotion

Health promotion is a key public health function that creates opportunities for people to make healthier choices in their day-to-day lives, increase their influence and control over the settings and environments that determine their health, and build healthier communities and societies. It requires a comprehensive approach that includes strengthening the skills and capabilities of individuals, empowering communities and groups, and advocating for health and health-related sector policies and actions directed towards changing social, environmental and economic conditions.

Offering intervention models to enhance health and prevent disease through the development of sustainable healthy settings and environments, health promotion is embedded in health systems and encompasses the work of other sectors and various disciplines. Key actions include support for healthy public policy across the whole of government ("health in all policies"), social mobilization, advocacy and health education.

Health promotion programmes underpin population-based approaches to public health by ensuring the participation of people, and such programmes are typically designed to address needs at different developmental or situational stages throughout the life-cycle. Interventions may target children, adolescents and people of reproductive age, older persons, vulnerable groups, or those at risk due to unhealthy lifestyles. Initiatives may include modifying individual behaviour, environments, settings, situations or social structures that contribute to poor health. Health promotion approaches may be used to address risk factors for specific diseases such as access to water and sanitation, unhealthy diets, sedentary lifestyles, unsafe sexual practices, abuse of harmful substances such as alcohol and illicit drugs, and tobacco use. Health promotion principles are also applied to interventions that require the protection of health as a human right and tackle broad determinants of health such as poverty, powerlessness and unfair health opportunities due to social exclusion and discrimination.

Recently, there has been a major effort to recognize and confront the changing context for promoting health in a globalized world with reference to persistent poverty, increasing inequalities within and between countries, new patterns of consumption and communication, commercialization, global climate change and urbanization.

National health promotion policies, legislation and financing

Health promotion is now a national public health priority in many countries in the Asia Pacific Region. Thailand hosted a consultation on developing health promotion strategies in December 2004, and also in August 2005 the 6th Global Conference on Health Promotion, which yielded the Bangkok Charter on Promoting Health in a Globalized World. In 2006, health promotion in the Region's countries was taken up at WHO Regional Committee meetings as a follow-up to the commitments of the 6th Global Conference on Health Promotion.

Several policy and institutional arrangements reflect a new appreciation of the importance of health promotion at the national level. Japan, the Republic of Korea, Sri Lanka and Thailand have national health promotion policy frameworks. Malaysia and Papua New Guinea have draft legislation under consideration. Bangladesh, Bhutan, Cook Islands, Hong Kong (China), India, Indonesia, Malaysia, Maldives, Myanmar, Nepal, Singapore, Sri Lanka and Thailand conduct national health promotion campaigns using mass media to reduce risk-taking behaviour. These campaigns are usually collaborative efforts between NGOs and the private sector.

There has also been heightened awareness of the value of health promotion in relation to development. Development goals, such as poverty reduction, universal primary education, gender equity and empowerment of women, child survival, maternal health, communicable disease control and environmental sustainability for health, all require an expanded and equitable application of health promotion through whole-of-government approaches, social mobilization, advocacy and national health education. Health promotion is also linked to reducing the Region's heavy burden of noncommunicable and chronic disease, injury prevention and mental health problems.

The issue of equity in the promotion of health is crucial. Unless all people benefit from health promotion the Millennium Development Goals will not be achieved.

Financing health promotion is a critical challenge for countries in the Region. In the absence of sustainable financing, health promotion coverage may be insufficient and support for national health and disease prevention targets will be inadequate. Individual healthy lifestyle campaigns are effective in raising awareness, but multiple strategies, methods and interventions are needed to bring about lasting changes in social norms and behaviour. The physical, social and environmental modifications necessary to support sustained behaviour change can be costly, but evidence clearly shows that investments in health promotion and disease prevention significantly reduce the costs of long-term care for chronic illness or disability and contribute to health maintenance and improved population health.

Health promotion financing is inextricably linked to health promotion infrastructure. Most countries have health promotion units within their health ministries, but despite the new appreciation of the value of public health and the international recognition of the crucial role of health promotion in primary health care and in addressing multiple determinants of health, these units continue to primarily focus on narrow approaches to health promotion that overemphasize personal responsibility, especially with respect to lifestyle change. Unless capacity is built for these units to deal with the underlying social and environmental causes of ill-health and advocate for whole-of-government approaches to the promotion of health, activities will continue to be limited to the development of educational materials, posters, media ads and annual campaigns that cannot generate sustainable changes to the factors that create ill-health and encourage unhealthy choices in the first place. Without this paradigm shift, health promotion units will not attract the expertise needed to design, develop and implement population-wide strategies and mobilize a corresponding increase in financial resources.

The financial basis for adequate investment in health promotion is weak and ad hoc in many countries.[1] Several countries, including Bangladesh, Cambodia, China, Fiji, India, Indonesia, Nepal, the Philippines and Sri Lanka, now have or are in the process of reforming health promotion infrastructure and financing, by developing or proposing multisectoral councils, statutory bodies, centres, semi-government entities or foundations for health promotion that have greater flexibility in addressing the broad determinants of health and the ability to generate funds from multiple sources.

The use of taxation on tobacco and alcohol to fund public foundations serves the dual purpose of modifying access to potentially harmful products and generating resources to promote health. This is becoming a popular way to finance health promotion activities. Australia, India, Mongolia, Nepal, the Philippines, the Republic of Korea and Thailand use tobacco tax revenues to fund national and local health promotion programmes. Through this mechanism support for NGOs, communities and private sector partnerships is enhanced. In the Republic of Korea, funds from the health promotion foundation support local governments and stakeholders undertaking Healthy Cities initiatives.

A 2% tax on tobacco and alcohol is dedicated to health promotion in Thailand, and in Vanuatu road safety violation fines as well as tobacco and alcohol taxes are used for this purpose. Successful models of using multiple and multi-level sources of funds for the promotion of health are found in Australia, French Polynesia, Malaysia, Mongolia, Nepal, New Zealand, the Republic of Korea, Singapore and Tonga. In these countries, funds may come from a combination of national and state budgets, external support, the private sector, communities, local governments and "sin taxes".

In Malaysia and Tonga, successful legislation established health promotion funding mechanisms with other government sources. Malaysia's Health Promotion Board is now operational and Tonga is in the process of defining its fund management structure. Legislation for tobacco taxation is also being proposed in Papua New Guinea.

Capacity mapping

In 2005, 26 Asia Pacific Region countries participated in trials of a new methodology to map capacity in health promotion. The methodology assesses strengths and gaps in different dimensions of health promotion: national policies and plans, expertise, collaborative mechanisms, programme delivery, partnerships among stakeholders, professional development, information systems, and financing of health promotion activities. Results can be plotted to obtain a visual representation of strengths and weaknesses.

Results were presented at the 6th Global Conference on Health Promotion in 2005. These showed that policy and planning and intersectoral coordination within governments were well advanced in the Region. Under-capacity was noted in the areas of professional development, information systems and the adequacy and stability of financing. Based on the trial's results, the tool was refined in 2006 and revalidated in Brunei Darussalam, Nepal, Papua New Guinea, the Philippines, Sri Lanka and Thailand. With the final tool and users' guide, countries can conduct capacity mapping at central, provincial and district levels.

Health promotion leadership development

There is a high unmet demand for health promotion skills and leadership for related regional and country public health programmes. Initiated in 2003, ProLead is a health promotion leadership development programme that has already trained 37 leaders from 13 countries. These leaders consist of national programme managers for health promotion, directors and deputy directors in ministries of health, health advocates, leaders from the finance sector, local government officials, media practitioners and tobacco control focal points. ProLead was specifically organized to meet the need for leaders with the vision of reforming infrastructure and financing for health promotion in support of national health goals and objectives. The training programme emphasizes leadership skills development, working in teams and "learning by doing" through an applied project that considers strategic issues related to infrastructure, financing and systems development. Good governance is also stressed in the programme.

Box 12.1: Initiatives for healthier lifestyles and environments

The focus among Asia Pacific Region countries in the promotion of healthy lifestyles has been on reducing the risk factors associated with premature death and illness due to noncommunicable diseases (NCD) and modifying the social and physical environments for health. Health promotion is an integral part of the NCD prevention and control programme, imparting content and skills related to behaviour change. Major efforts have been undertaken to integrate health promotion with communicable and noncommunicable disease control, address new threats to health and the unfinished agenda of improving maternal and child health, water and sanitation, and alleviating poverty.

Sri Lanka has conducted a sociobehavioural study to examine factors contributing to malnutrition. Case studies on the efficacy of school health promotion activities, including healthy lifestyles, have been conducted in Bhutan, the Democratic People's Republic of Korea, India, Indonesia, Nepal and Timor-Leste. Concerted efforts have been made to address issues related to health equity and social determinants of health in Bangladesh, India, Indonesia, Maldives, Nepal, Sri Lanka and Thailand in order to influence health promotion policies and legislation. Ultimately, healthy lifestyle campaigns advocate the provision of recreation areas, adequate water, sanitation and hygiene, security, inclusiveness and affordability.

Four primary government entities provide health promotion expertise in Malaysia: the Health Education and Communication Centre in the Ministry of Health, the Department of Public Health, the National Institute of Health Promotion and a Health Promotion Board established in 2006 by special legislation. The momentum for establishing a viable Health Promotion Board was created by active participation in ProLead, a health promotion leadership training programme. The current focus of the Health Education and Communication Centre is to go beyond traditional health education activities, such as materials development and patient education, to broader aspects of health promotion. The Health Education and Communication Centre is responsible for annual national health education campaigns and collaborates on projects with other Ministry of Health divisions such as Disease Control, Family Health Development, Food Quality Control and Dental Health.

Started in 1991 by the Ministry of Health, Malaysia, the Healthy Lifestyle Campaign aims to increase public awareness and knowledge about diseases arising from unhealthy lifestyles and encourage health promoting practices and lifestyles. Each year the campaign has a different theme, which can be disease-orientated or focused on specific behaviours. Since 2002, the overall theme of campaigns has been "be healthy for life", with an emphasis on four health behaviours related to major population risk factors: healthy eating, exercise and physical activity, not smoking and managing stress. *Source:* Malaysian Health Promotion Board Act 2006 (Act 651).

ProLead was initiated, developed and designed in the Asia Pacific Region. In its first phase, curriculum development involved academic partners and experts from Australia, Fiji, Malaysia, the Philippines and Thailand. The first round of participants in the pilot course were from China, Fiji, Malaysia, Mongolia, the Philippines and Tonga.

In the second phase, ProLead was expanded globally in partnership with the WHO Centre for Health Development, Kobe, Japan (WHO Kobe Centre), with participants from several countries including India, Indonesia, Japan, Malaysia, the Republic of Korea, Thailand and Viet Nam. In both phases, the training programme emphasized innovation and the reform of infrastructure and policy and financing of health promotion at national and local levels.

Since then, the ProLead training design has been adapted by WHO Kobe Centre for capacity-building of social determinants of health in urban settings through the Healthy Urbanization Project, which involves city-level sites in Suzhou City (China), Bangalore (India) and Kobe (Japan).

In 2006, an evaluation team reviewed the content and structure of ProLead and developed a supportive website. The core principles of ProLead course offerings were found to be sound and relevant to the needs the Region. Several options were considered for future offerings of ProLead to broaden access, assure sustainability, lower cost per student, update the curriculum, and promote the use of appropriate educational technologies.

In 2007 concurrent sessions of ProLead Plus—an updated version of the curriculum that includes a distance learning component—were conducted, with 42 leaders from 12 countries in the Region accessing knowledge simultaneously. Residential meetings were combined with distance learning technologies offered by the University of the Philippines (Open University) and the Pacific Open Learning Health Network. The curriculum content was structured and updated in line with core health promotion competencies. Credentials for course completion were arranged through partnerships with universities and academic institutions. Country-level projects of the ProLead Plus teams cover healthy settings, health promotion infrastructure and financing, advocacy and social mobilization.

Some of the Region's countries have emphasized building the capabilities of academic institutions and civil organizations to reorient training institutions, specially faculty and curriculum, in an effort to move away from narrow health education approaches and embrace broader, population health-oriented concepts and strategies that highlight multisectoral collaboration and partnerships.

The relevance of health education is still widely recognized in countries such as India, Sri Lanka and Thailand, where training workshops are conducted for the faculty of institutions offering a diploma in health education.

Healthy settings

A setting is a place where people live, work, learn and play. A healthy settings approach embraces an ecological perspective of the relationship between human beings and the environment, and a holistic view of the determinants of health in the daily lives of people. It requires intersectoral efforts to identify priority health problems in a given locality and develop integrated, sustainable responses to create supportive environments and multiple interventions suited to local needs and conditions.

The healthy settings approach encourages the participation of stakeholders outside of the health sector, such as those involved in the environment, education, labour, urban planning, economic development, transport, housing, public works, public security and safety. Settings can include towns, villages, schools, workplaces and markets. Guidelines for implementing healthy cities, healthy workplaces, health-promoting schools and healthy markets have been developed by WHO, other international organizations, academic institutions and national governments.

Healthy Cities

Starting in the Region's industrialized countries in the late 1980s, the Healthy Cities approach was adapted by developing countries in the mid-1990s to address health concerns in urban development projects by involving other sectors (industry, transport, labour, education, commerce and trade, municipal utilities and services, and urban planning), as well as NGOs, the private sector and the community.

Healthy Cities activities tackle a range of issues affecting health and quality of life, such as urban infrastructure and services, natural and industrial emergencies, lifestyles, social problems, ageing and demographic changes, road safety, and support and rehabilitation for the disabled.

The Healthy Cities approach also offers a good entry point to address social determinants or "the causes behind the causes" of ill-health in general and in urban settings. In 2005, following the establishment of the WHO Commission on Social Determinants of Health, countries in the Region have been actively engaged in strengthening work on social determinants of health through knowledge networks, civil society initiatives and country focus activities. India and Sri Lanka have taken steps to address social determinants in various settings. Sri Lanka, for example, established a working group on social determinants of health in February 2007. In Bangalore, India, a model project was developed with a focus on social determinants of health in the urban setting as a collaborative project with the WHO Kobe Centre. A regional consultation on social determinants of health was hosted by Sri Lanka.

Bangladesh, India, Indonesia, Myanmar and Sri Lanka established Healthy Cities projects that involved city mayors and local municipalities with the aim of providing services such as water, sanitation and hygiene, security, health services and other amenities.

Box 12.2: Cities in the Region compete for Healthy City awards for:

- integrating diet and physical activity in urban planning
- health promotion investment planning
- making cities safe through emergency preparedness planning and response
- tobacco/smoke-free cities
- community-based rehabilitation
- financial protection of the poor
- mother-friendly initiative
- pro-poor or equity enhancing initiative
- building drug-free communities
- gender-based violence
- breast feeding promotion and protection
- financing health promotion.

Source: Secretariat of the Alliance for Healthy Cities and WHO Regional Office for the Western Pacific. Available from http://www.wpro.who.int/media_centre/press_releases/pr_20061028.htm

The growing interest in the Healthy Cities and related initiatives stems from several factors including changing political environments that encourage decentralization of health systems; globalization coupled with rapid and unplanned urbanization; and greater appreciation of the role of local government leaders in health and development. It has become apparent that these changes warrant improvements in the exchange of information, a deeper understanding of the role of governance in health, the sharing of innovative solutions to health problems, and the effective use of available human and institutional resources at the municipal level.

An international network, the Alliance for Healthy Cities, was inaugurated in October 2004 with a vision of "building cities and communities of peace, where all citizens live in harmony, committed to sustainable development, respectful of diversity, and reaching for the highest possible quality of life and equitable distribution of health, by promoting and protecting health in all settings". The alliance provides a venue for sharing experiences and helping mayors and other local leaders to put health on city development agendas. To encourage the participation of cities, awards and recognition for good practices and projects are provided on a regular basis (Table 12.1).

A course for Healthy Settings Coordinators was developed in early 2007 and delivered to participants from Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka and Thailand in November of the same year. The course emphasized building the capacity of local government officers.

Table 12.1 Members of the Alliance for Healthy Cities

Country	Number of full members (local governments)	Number of associate members (NGOs, academic institutions, national coordinators)
Australia	3	5
Cambodia	1	-
China, including Hong Kong and Macao	20	7
Japan	7	1
Malaysia	1	2
Mongolia	1	-
Republic of Korea	26	2
Philippines	9	1
Singapore	-	1
Viet Nam	1	-
Total	**69**	**19**

Source: Alliance for Healthy Cities. Available from: http://www.alliance-healthycities.com

Health-promoting schools

The health-promoting schools approach provides a context and ethos for all members of school communities to work together to promote, protect and maintain the health of students, staff, parents and the community. A health-promoting school incorporates formal and informal curricula in health, creates a safe and healthy school environment, provides appropriate health services, and involves the family and wider community in efforts to promote health. Health policies, physical environments, social environments, community relationships, personal health skills and health services are essential elements of a health-promoting school.

Health-promoting schools have been developed in most countries of the Region, with programmes at varying stages of development. The initial stage of development involves the introduction of the concept and practice to the Ministry of Health and/or the Ministry of Education and implementation of pilot projects. The second stage is based on experience gained from the pilot projects to develop national guidelines and other materials and establish a national coordination mechanism. The coordinator uses the materials to introduce the concept and practices to other schools. Health-promoting schools can then be established as a formal programme by national policy and legislation. There are many variations to this process, depending on country circumstances and leadership. Table 12.2 shows the approximate stages of development of health-promoting schools in the Region as assessed in 2002.

Table 12.2 Approximate stages of development of health-promoting schools for selected countries in the Region, 2002

Stage of development of health-promoting schools	Country or area
Developmental stage: • Orientation received through attendance at WHO or other related agency's workshops and seminars • Concept introduced to the Ministry of Health and/or the Ministry of Education • Pilot projects identified and implemented at selected schools	• American Samoa • Brunei Darussalam • Cook Islands • Micronesia, Federated States of • Niue • Republic of Korea • Tokelau • Tuvalu
Standardization stage: • National guidelines developed based on WHO guidelines on health-promoting schools • Other documents/materials (e.g. case documentation on pilot projects, information brochures) prepared and disseminated through seminars and workshops • National coordinating mechanism established and a coordinator identified	• Cambodia • French Polynesia • Japan • Kiribati • Lao People's Democratic Republic • Marshall Islands • Mongolia • Nauru • Northern Mariana Islands • Palau • Philippines • Solomon Islands • Tonga • Vanuatu • Viet Nam
Expansion and institutionalization stage: • Health-promoting schools introduced to schools in other localities • Teacher training and study tours organized • System of monitoring the progress of developing health-promoting schools organized • Budget for the programme developed • Health-promoting schools included as a formal programme by national policy and legislation	• Australia • China • Fiji • Hong Kong (China) • Malaysia • New Zealand • Papua New Guinea • Samoa • Singapore

Note: Stages or categories are under review and are subject to revision

Source: *Profiles of health-promoting schools in the Western Pacific Region*. Manila, WHO Regional Office for the Western Pacific, 2002 (unpublished document currently being updated for publication in 2007 under the new title *Health-promoting schools in the Western Pacific: progress by country*).

In December 2006, 16 countries in the Region participated in a school health promotion consultation in Bangkok, Thailand. The main objective was to review strategies and techniques and reach a consensus on the Ministry of Education taking a leadership role in all school health promotion activities. As part of the follow-up, Bhutan, the Democratic People's Republic of Korea, India, Indonesia, Maldives and Timor-Leste began documenting case studies. Countries also participated in several global activities, such as the initiative to collect behavioural data on the health and lifestyles of pupils and the Technical Global Meeting on School Health Promotion held in June 2007 in Vancouver, Canada.

A technical working group is now updating the Regional Health Promoting Schools Guidelines that were first developed in 1995. Activities implemented, lessons learnt and the substantial evidence gained worldwide since 1995 will inform the update. Seven countries were selected from the Region to present a case study of their Health-Promoting Schools Programme at the Technical Meeting on Building School Partnerships for Health, Education Achievements and Development, 5–8 June 2007, before the World Conference of the International Union for Health Promotion and Education that resulted in a call for action to guide the work of countries.

A regional registry of health-promoting schools is being developed so that schools can access each other's materials and share lessons learnt. The environmental, behavioural and contextual challenges addressed in health-promoting schools include the provision of water and sanitation facilities, improvement of hygiene behaviour, deworming, micronutrient supplementation, food safety practice, control of tobacco and other substance abuse, mental health, road safety, education on HIV/AIDS, and other risk factors affecting young people.

The Urbani School Health Kit, developed and pilot-tested in the Philippines, is an innovative teaching health resource that offers an integrated package of materials to support health education and health promotion activities in schools.* The Kit exemplifies the principles of health-promoting schools by fostering learning, and engages health and education officials, teachers, students, parents, health-providers and community leaders in making schools healthy places.

Box 12.3: Urbani School Health Kit

The Urbani School Health Kit encourages teachers to be champions of health promotion, start with a positive inquiring and caring attitude, and find out about the most important health problems in the community. They become role models for health promotion, advocate for the creation of supportive environment in schools that encourage children to make healthy choices, and develop creative ways to help children understand the importance of healthy living and taking action to improve their own health. Teachers are encouraged to have at least one health promotion lesson every day, and these can be effectively linked to topics covered in the basic curriculum. The kit showcases important health issues, health activities and resource materials for a healthy school programme, focusing on six key issues:

- improving personal hygiene,
- improving oral health,
- preventing worm infections,
- improving diet and nutrition,
- saying no to tobacco, and
- keeping the environment clean and healthy.

Source: *Urbani School Health Kit*. A joint project of the University of the Philippines (Open University) and the WHO Regional Office for the Western Pacific, 2006.

* The Kit was named after the late Dr Carlo Urbani, an expert in the control of parasitic diseases. He developed the concept that schools could be provided with a kit to assist teachers to educate children about prevention of health problems and to implement appropriate interventions. He was the first person in WHO to identify an unusual form of pneumonia in Hanoi, Viet Nam, later named severe acute respiratory disease syndrome (SARS). His efforts prevented many cases from spreading, especially among hospital staff. However, it was during this work that he himself contracted SARS and died.

Healthy workplaces

A healthy workplace provides the physical, psychological, social and organizational conditions to protect and promote the health and safety of workers, employers and the community. In a healthy workplace, managers and workers have greater control over their own health and become more energetic, positive and contented. In return, the workforce is more stable, committed and productive. Fundamental to a healthy workplace is the need to protect individuals within and outside the workplace from harm due to a potentially hazardous, stressful or degraded work environment. Work styles conducive to health and good health practices can be supported through health promotion. Countries promoting healthy workplaces include Bangladesh, China, Fiji, India, Indonesia, Malaysia, Mongolia, Papua New Guinea, the Philippines, the Republic of Korea, Singapore, Sri Lanka, Thailand and Viet Nam.

Box 12.4: Evaluation of healthy workplaces in Viet Nam

In both Hue and Haiphong cities, 15 small and medium enterprises implemented healthy workplaces projects in 2000. The projects carried out a needs assessment and developed and implemented action plans. Results were evaluated at the end of the first year and the main findings were:

- Unsatisfactory working conditions included excess heat, high noise levels, high dust concentrations, exposure to toxic gases, poor health services and lack of medical examinations.
- The majority of employers received training on occupational health and safety regulations, which led to improvements in conditions in some workplaces.
- Most employers did not maintain occupational health and safety records.
- Smoking was highly prevalent among workers (46% in Hue and 30% in Haiphong).
- A total of 90% of workers were willing to participate in health promotion programmes.

Action plans included training courses for managers on occupational health and safety regulations; environmental improvement programmes; improvements in working conditions; establishment of health corners containing a first-aid kit and print materials on occupational health and health promotion; and a monitoring system to track changes in the working environment and quality of health care.

The following are changes made after the introduction of healthy workplaces:

- All enterprises involved designated an occupational health and safety person, and maintained monthly occupational health and safety reports.
- All enterprises improved water supply to good or satisfactory conditions, most toilets and washing facilities had improved conditions, and most enterprises had clean mess halls and kitchens and adequate garbage disposal facilities.
- Almost all workers participated in the training course on occupational health and safety, first aid, and fire and explosion protection, and read the books and manuals in the health corner.
- Almost all workers participated in workplace-based health promotion activities, and 65% of smokers quit smoking.
- Changes to improve working conditions included installation of heat insulation, better ventilation, measures to reduce noise and improve lighting, provision of personal protective clothing, control measures for dust and toxic gases, and additional equipment to lift heavy loads.
- All enterprises implemented environmental monitoring and the number of workers who underwent health examination was greatly increased.

Source: *Evaluation of a 1-year implementation of the regional guidelines for healthy workplaces in small- and medium-scale enterprises in Ngo Quyen district, Haiphong city and Hue city.* Manila, WHO Regional Office for the Western Pacific, 2001. Available at http://www.wpro.who.int/NR/rdonlyres/CA83FD39-94C7-4C1F-A330-59D1F071EA60/0/1yearevalvietnam.pdf

Health-promoting schools and workplaces programmes are relevant and cost-effective ways to implement and achieve the objectives of the Global Strategy for Diet and Physical Activity and national strategies for preventing NCDs, as well as helping populations prepare for health emergencies. Workplaces, health centres and hospitals are prioritized throughout the Region as readily accessible entry points for promoting health, preventing disease and improving the quality of life.

Healthy marketplaces

A healthy marketplace is one that continually improves its physical and social environment and empowers the market community to keep their market safe and clean. This requires participatory processes and the joint commitment of all stakeholders. The overall aim of a healthy marketplace programme is to promote the health and safety of vendors and customers in a sustainable manner, by not only focusing on hygiene and sanitation but also on the physical, mental and social well-being of the community. Cambodia, China, Indonesia, the Lao People's Democratic Republic, Malaysia, Mongolia, Papua New Guinea, the Philippines, Thailand and Viet Nam all have healthy market initiatives.

The marketplace is a centre of social and economic activity in communities across the Region. Unfortunately, it can also be a hub for the rapid spread of diseases, including foodborne diseases and zoonoses, such as highly pathogenic avian influenza. As a consequence, healthy marketplaces are key sites for action to reduce the risk of diseases to communities. WHO published and disseminated the guidelines *Healthy marketplaces in the Western Pacific: guiding future action* and the FAO/OIE/WHO *Stop the spread: measures to stop the spread of highly pathogenic bird flu at its source*.[2,3]

Health settings are relevant to addressing emerging and re-emerging viral outbreaks. Countries in the Asia Pacific Region have used health promotion principles to reduce the transmission of avian influenza from poultry to humans. Sociobehavioural research has been undertaken to close the gap between knowledge and practice among target populations. Improvements in information dissemination, public education and health education have been pursued within settings. Healthy market initiatives were undertaken in target areas where avian influenza outbreaks among poultry were reported, namely Cambodia, Hong Kong (China), India, Indonesia, Myanmar, the Philippines, Thailand and Viet Nam.

The Bangkok Charter and the future of health promotion

More than two decades have passed since the adoption of the Ottawa Charter on Health Promotion in 1986. This was followed by a series of global and regional commitments to health promotion, most recently (in 2005) the Bangkok Charter for Health Promotion in a Globalized World.[4] Health promotion itself has evolved during this period, with improved principles and methodologies relevant to analysing underlying social and structural determinants of health, reducing risk factors for disease, preventing and controlling diseases, and working across health-related sectors.

While these developments in health promotion were taking place, circumstances were also changing rapidly. The Framework Convention on Tobacco Control has come into force and a Global Strategy on Diet, Physical Exercise and Health was adopted by the World Health Assembly. The Commission on Social Determinants of Health will issue a final report in 2008, and a coordinated approach to the reduction of alcohol-related harm is being planned. Significant funding for disease control programmes under the Global Fund for AIDS, Tuberculosis and Malaria has changed the practice of public health in many developing countries.[5]

Box 12.5: Healthy marketplace in Marikina City, Philippines

Foodborne diseases are associated with such high-risk practices as poor cleaning and sanitation, failure to separate raw and ready-to-eat food, inadequate cooking of food, keeping food at unsafe temperatures and using unsafe raw materials and water in food preparation. The municipal authorities in Marikina City recognized the importance of these issues and initiated a programme of activities for the main market, based on a model that links food safety improvements to poverty alleviation. The model makes microcredit available to vendors after satisfactory completion of training in food safety, food production and entrepreneurship, and also links improvements in safe food handling by vendors to consumer knowledge about choosing food for safety.

In carrying out the programme of work, the municipal authorities conducted a hazard analysis of stalls selling ready-to-eat food in the marketplace. The analysis involved market vendors themselves in monitoring the temperature of their food, taught them to identify high-risk food and ingredients, and raised their awareness of the need to control the temperature of their cooked food. The authorities also found a need to improve ventilation in that area of the marketplace and took action to achieve this, and to provide better hand-washing facilities for the food handlers. Those vendors who received training were offered loans to improve their stalls, with an emphasis on improvements that would better ensure food safety.

Source: Anon. *A report on the implementation and results of a food safety program (hazard monitoring project) in Marikina City, Philippines.* Marikina City, Marikina Health Department, 2004.

Box 12.6: Avian influenza and healthy marketplaces

Markets have been implicated in outbreaks of avian influenza. In the 1997 epidemic of bird flu in Hong Kong (China), some 20% of live poultry in markets were infected. One in eight traders in Viet Nam admitted they sold infected poultry during the 2004 epidemic. Animals are frequently slaughtered on the market premises and the infection can be spread from waste parts of infected birds.

Viet Nam has implemented measures to contain the spread of bird flu in markets. The healthy marketplaces approach has been applied in Thai Binh and Quang Ninh provinces, with training courses for more than 400 persons. Information on food safety and avian flu prevention was disseminated through market loudspeakers, leaflets and billboards. Poultry slaughtering areas were isolated from other areas of the markets and hygiene and cleaning facilities improved in poultry-selling areas and elsewhere. Protective clothing was provided to poultry sellers and refrigerators were installed in some poultry counters. Market management boards initiated a programme of inspection and monitoring to enforce regulations.

Sources: *Stop the spread: measures to stop the spread of highly pathogenic bird flu at its source.* Manila, WHO Regional Office for the Western Pacific, 2005.

Kiyu A. *Report on food safety in Viet Nam*. Manila, WHO Regional Office for the Western Pacific, 2005 (MR/2005/0747).

Recommendations from the 6th Global Conference on Health Promotion in August 2005 in Bangkok highlighted the importance of partnerships and making the promotion of health central to the global development agenda, and a core responsibility of all levels of government, a key focus of communities and civil society, as well as a requirement for good corporate practice. Strong political action, broad participation and sustained advocacy are required to take these recommendations forward.

Countries in the WHO South-East Asia Region have been involved in the implementation of the four commitments contained in the Bangkok Charter for Health Promotion. The first initiative for the Region was to develop the Regional Strategy for Health Promotion, which was later debated during the Fifty-ninth session of the Regional Committee in Dhaka, Bangladesh, in 2006. Further, the Region also participated in global meetings seeking to establish the benchmarks for monitoring the implementation of the four commitments contained in the Bangkok Charter. Representatives from the WHO South-East Asia Region participated in two global meetings organized by WHO headquarters to establish the benchmarks and indicators, held in Oman (Jordan) and New Delhi (India).

Box 12.7: Five action areas of the Bangkok Charter:

- Advocacy for health based on human rights and solidarity.
- Investment in sustainable policies, actions and infrastructure to address determinants of health.
- Building capacity for policy development, leadership, health promotion practice, knowledge transfer and research and health literacy.
- Provision of regulation and legislation to ensure a high level of protection from harm and enable equal opportunity for health and well-being for all people.
- Building partnerships and alliances with public, private, nongovernmental and international organizations, and civil society to create sustainable actions.

Source: *The Bangkok charter for health promotion in a globalized world.* Geneva, World Health Organization, 2006: 10.

The stage is now set for health promotion to multiply and scale up partnerships for effective action and outcomes at local, regional and global levels. The participation of many sectors, such as communities, policy-makers, private and commercial interests, the academic and research community, civic groups and NGOs, is critical for keeping health promotion on the development agenda. Strengthening partnerships for action in health promotion is a high priority. Health promotion can provide a strategic contribution to the attainment of the Millennium Development Goals by working toward universal access to information, empowering and engaging communities, deepening the commitment to health as a human right, and confronting the social and political determinants that bring about ill-health in the first place. Capacity-building, training, networking, leadership development and alliances will continue to be key mechanisms for expanding the scope of health promotion and building more equitable and sustainable environments to achieve the twin goals of health and development.

12.2 Communicable disease surveillance and response

Emerging and epidemic-prone diseases pose a significant public health threat in the Asia Pacific Region. Outbreaks of deadly new diseases include Nipah virus, severe acute respiratory syndrome and highly pathogenic human avian influenza A (H5N1), with the latter two causing regional and international public health emergencies. Meanwhile, outbreaks of epidemic-prone diseases such as meningococcal disease, cholera and typhoid fever continue to occur.

Surveillance and early detection

Surveillance consists of the systematic ongoing collection, collation and analysis of data for public health action, and the timely dissemination of information for assessment and public health response.[6] Strong routine surveillance systems for epidemic-prone diseases and new emerging diseases enhance the capacity to detect unusual outbreaks.

Most countries in the Region now have disease surveillance systems, but some are not fully established and many of them do not function well as early warning systems. Due to delays in reporting and the lack of capacity for rapid data analysis, such systems cannot always provide warning signals of potential public health threats that require immediate investigation and control measures. Traditional disease-based surveillance systems generally do not detect and report public health events caused by unknown diseases, and reduce the capacity to detect emerging, outbreak-prone diseases in a timely manner. In most countries and areas of the Region, there are no formally established, event-based surveillance systems in place to detect unusual or unexpected public health events. To meet the core capacity requirements under the recently revised International Health Regulations (2005), also known as IHR (2005), event-based surveillance needs to be strengthened or developed in each country.

Many countries and areas in the Region are not well prepared to rapidly respond to infectious disease outbreaks because understaffed public health workforces have limited training and there is inadequate laboratory capacity for timely and accurate diagnosis. Laboratory support is an essential component of an effective communicable disease surveillance programme, yet some laboratories in the Region lack adequate facilities, resources and training for workers in laboratory techniques. Also, laboratory quality assurance programmes and standardized biosafety procedures are vital to ensure the accuracy of data obtained and the safety of workers.

Infection control

Infection control refers to the policies, procedures and activities which prevent or minimize the risk of transmission of infectious diseases. The emergence of life-threatening infections such as SARS has highlighted the need for efficient infection control activities in health-care settings and training for health-care workers for prevention of transmission of pathogens. The important components of the infection control programme are basic measures such as standard precautions, education and training of health-care workers, protection of health-care workers, identification of hazards and minimizing risks, effective work procedures, surveillance and monitoring, and participation in outbreak investigation.[7,8]

Another important issue related to infection control is the containment of antimicrobial resistance. Patterns of antimicrobial resistance have been monitored since 1991 through a regional surveillance programme.[9] Focal laboratories in 13 countries participate in the programme, and maintain data on

22 common bacteria species that cause significant public health problems. The system should be expanded and revised to monitor existing levels and emerging antibiotic resistance in the Region more effectively, and to link this with evidence-based containment strategies. WHO is working to facilitate a common strategy for surveillance and containment.

Communication and information

Disease outbreaks are inevitable and often unpredictable events. Full and honest communication with the public, media and other stakeholders about disease threats and outbreaks is now seen as a key element of response and impact mitigation. Lessons from SARS are being applied to avian influenza and are applicable to other potential public health threats. During the SARS outbreak, electronic media made it possible to rapidly disseminate news, scientific advances, information and safety messages. This was an important shift in the relationship between the electronic media and public health activities. Comprehensive information, tailored according to need, can now be shared easily with a wide range of audiences. It is estimated that about 65% of initial news about infectious disease events comes from informal sources, including press reports and the Internet.[10]

Communication activities should be based on scientific principles, with an emphasis on accuracy, transparency, timeliness and consistency. Effective communication builds trust and confidence, raises awareness and guides the public, health-care workers and other groups in responding appropriately to outbreak situations and complying with public health measures requiring behaviour change. *The WHO outbreak communication guidelines* (December 2005) highlighted best practices for outbreak communications.[11]

Regional and international collaboration

The SARS outbreak was a reminder that communicable diseases can spread rapidly across borders, thus making international collaboration and prompt, transparent information sharing critical to control disease spread. Transparency is not only required in reporting of public health events of possible international or national concern but also when evaluating current resources and future needs. IHR (2005) represent a major step forward in regional and international collaboration and collective actions to prevent the spread of diseases.

WHO has now established its global disease surveillance, alert and response systems to detect, verify, assess and respond to outbreaks and public health events of international concern. Since 2003, WHO has been strengthening regional response capacity in the Asia Pacific Region through closer collaboration with the Global Outbreak Alert and Response Network and increasing regional participation in the network. WHO also works with regional partners in the animal health sector to respond to the threat of emerging zoonotic diseases. Regional and international collaboration and coordination is needed to further support disease surveillance, alert and response systems.

Asia Pacific Strategy for Emerging Diseases

In responding to these issues and addressing the need for long-term capacity-building, WHO developed a regional strategy known as the Asia Pacific Strategy for Emerging Diseases (APSED) to confront the challenges of emerging infectious diseases.[12] The strategy serves as a roadmap and provides guidance and direction for the countries and areas in the Region to improve their readiness and capacity to effectively prevent, detect and respond to emerging diseases. The core capacity requirements for surveillance and response under the IHR (2005) have been incorporated in the APSED.

APSED implementation mechanisms have been developed for sustainable technical collaboration within the Region, including the establishment of the Asia Pacific Technical Advisory Group on Emerging Infectious Diseases. This adivsory group held its first meeting in July 2006 to review and endorse a five-year workplan for implementing APSED. The workplan establishes regional goals for minimum capacity-building in the Region and identifies five priority programme areas of work—surveillance and response, laboratory capacity, zoonoses, infection control and risk communication. Since September 2006, a number of countries have conducted capacity assessments and developed national plans of action for emerging diseases.

Resources mobilization and coordination

Various international technical agencies and WHO play key roles in mobilizing international cooperation and support in many areas of communicable disease control. These include enhanced capacity and technical cooperation in emerging zoonoses, risk analysis and management, laboratory biosafety, infection control, logistics, risk communication, and other specialty areas.

With the recent outpouring of funding and technical assistance from donor organizations in response to avian influenza and the threat of potential pandemic influenza, a critical role for WHO and other United Nations agencies is to avoid duplication of effort and ensure harmonization.

Conclusion

Countries in the Region, at the epicentre of recent SARS and avian influenza outbreaks, still have shortcomings in surveillance, early warning and response systems. Not only the Region but the world must remain vigilant against emerging infectious diseases that have proven remarkably resilient and have the potential to kill and sicken millions.

12.3 Emergency and humanitarian action

Background

The Asia Pacific Region is home to the world's tallest mountains, great rivers and ecologically fragile islands. In many countries of the Region this rich natural diversity also brings the threat of disaster from landslides, floods, heat waves, cyclones, volcanic eruptions, earthquakes and tsunamis.

Added to disasters generated by nature are man-made catastrophes caused by industrial accidents, such as the Bhopal gas tragedy in India in 1984. From Australia to China, mine explosions and the release of toxic chemicals are a Region-wide problem.

In the last ten years, the Asia Pacific Region experienced the greatest number of natural (1339) and technological (1282) disasters, fully 44% of the world total. An estimated 700 000 people died in these events—78% of worldwide deaths due to disasters. This was largely due to the tsunami of 2004, which killed 224 495 people and accounted for 90% of the death toll of that year.[13] The worst natural disaster in recent history, it affected six countries in the Region. In 2006, landslides caused loss of life in the Philippines, and an earthquake near Yogyakarta, Indonesia, killed more than 6000, injured almost 100 000 and displaced between 200 000 and 650 000.[14]

More recently, a cyclone hit Myanmar in May 2008 causing a reported 100 000 deaths. Weeks later, an earthquake measuring 8.0 on the Richter scale struck China's Sichuan province killing more than 60 000 and displacing millions of people.

Disasters force displaced people into crowded camps with limited facilities and set the stage for the rapid spread of communicable diseases, such as acute respiratory infections and waterborne diseases, which cause further loss of life unless detected and contained early.

Hazards, emergencies and disasters

A hazard is any event with the potential to disrupt, damage or harm communities. An emergency is a state in which normal procedures are suspended and extraordinary measures are taken to minimize the impact of a hazard. Emergencies may be on account of floods, typhoons, tsunamis, landslides and earthquakes, or from technological hazards including industrial fires and coal mine explosions.

Disruption to a community is defined as a disaster when it results in large-scale human, material, economic or environmental losses far exceeding the capacity to cope. Frequently, emergencies lead to disasters only because they are badly managed. A major breakdown of law and order in a region, society or country that creates a humanitarian crisis, such as civil conflict or foreign aggression, is referred to as a complex emergency.

Preparedness and response

Adequate international and national preparedness and risk reduction measures can avert disasters, which are particularly devastating to the developing nations of the Region. For example, the Maldives had just been removed from the list of least-developed nations when the tsunami of 2004 struck. The widespread damage left in its wake put the nation back on the list.

Disaster reduction is integral to development and should be a key element of national strategies for meeting the Millennium Development Goals. Countries responding effectively to unexpected disasters resume development activities far faster than those without systems and mechanisms for risk reduction or preparedness. Compared to the previous five years, disasters doubled between 2000 and 2004 in countries with a low human development index, increased by 57% in those with a medium human development index, and rose by only 20% in high human development index countries.[15] This demonstrates the importance of investing in risk reduction measures as a critical component of development.

To reduce the risk of disaster countries must be prepared at national, provincial and community levels and everyone, from senior government officials and policy-makers to health workers and individuals in the field, should be involved. Lessons learnt following the 2004 tsunami were discussed at various international meetings to identify crucial gaps in public health systems. Problems were found at all levels, including policy and legislation, human resources management, public awareness, and operational and coordination mechanisms. Although each country has unique needs depending on their geographical, political, social and economic status, common standards, institutional procedures and mechanisms are required, much like the safety rules and regulations that every office should follow to ensure employees in the building are safe.

Capacity-building in this regard has been a focus for countries in the Asia Pacific Region. In 2001 the WHO Regional Offices for the Western Pacific and South-East Asia collaborated with the Asian Disaster Preparedness Center (ADPC) to develop the Public Health and Emergency Management in

Asia and the Pacific (PHEMAP), an international training programme designed for government policy-makers and managers. Using evidence-based criteria, the training curriculum focuses on various public health needs in emergencies and develops specific competencies and skills for emergency managers, particularly those in the health sector. Over the past five years, PHEMAP has produced some 150 graduates, most of them actively conducting national PHEMAP courses for local personnel in such countries as China, the Philippines, Sri Lanka and Viet Nam.

Maintaining standards in disaster and risk management is important. At a conference on Health Aspects of Emergency Preparedness and Response in November 2004 in Bangkok, 12 benchmarks were identified which took into account the experiences of various countries in different types of disasters. These 12 benchmarks are the essential elements needed by every country to be well prepared and able to respond to any disaster. The benchmarks are as follows:

(1) Legal framework, functioning coordination mechanisms and an organizational structure in place for health emergency preparedness and response at all levels, involving all stakeholders.

(2) Regularly updated disaster preparedness and emergency management plan for the health sector and standard operating procedures in place (emergency directory and national coordination focal point).

(3) Emergency financial, physical and regular human resources allocation and accountability procedures established (including national budget).

(4) Rules of engagement, including conduct, for external humanitarian agencies, based on needs established.

(5) Community plan for mitigation, preparedness and response developed, based on risk identification and participatory vulnerability assessment, and backed by a higher level of capacity.

(6) Community-based response and preparedness capacity developed, supported with training and regular simulation and mock drills.

(7) Local capacity for emergency provision of essential services and supplies developed, such as shelters, safe drinking-water, food and communications.

(8) Advocacy and awareness developed through education, information management and communication before, during and after the event.

(9) Capacity to identify risks and assess vulnerability established at all levels.

(10) Human resources capabilities continuously updated and maintained.

(11) Health facilities built or modified to withstand expected risks.

(12) Early warning and surveillance systems established for identifying health concerns.

Few countries in the Region have all measures in place to meet all the benchmarks. Legal frameworks and disaster preparedness plans are still being developed in some countries, for example, Bhutan and the Maldives, but other countries such as India, with a long history and experience with various disasters, already have these plans and resource allocation mechanisms in place.

As communities are usually the first affected in an emergency, they must be self-reliant in responding, as lifelines and access to the rest of the world are often cut off. More effort is needed to make sure that communities are aware of potential hazards and have the capacity to respond to emergencies effectively.

WHO assists countries in preparing disaster-resilient health systems through long-term emergency preparedness measures and by helping to set up early warning disease surveillance systems. The Organization also provided assistance in responding to such disasters as the earthquake in Yogyakarta, Indonesia, and landslides in the Philippines. In collaboration with local health authorities, WHO provides training to health workers in mental health and psychosocial support, and maternal and child health. WHO guidelines for emergencies have been used successfully in many disasters.

Issues and challenges

One of the biggest challenges in disaster management is incorporating coordinated and efficient emergency preparedness and response mechanisms between different levels of health administrations. To be effective, disaster management plans must involve every level of administration, particularly districts and local communities. There should be sufficient flexibility within plans for autonomous decision-making and resource allocation at various levels in order to respond appropriately and immediately to a disaster.

Ensuring that communities are engaged in the process of developing emergency preparedness and response efforts is a key issue. Without community awareness and involvement, no disaster preparedness plan can be effective. Following the 2004 tsunami in Aceh, Indonesia, a mass measles immunization campaign was planned. It was a daunting task, as the WHO official responsible calculated that more than 50 000 children in the Aceh Besar district would have to be immunized in five days. The head of the District Health Office mobilized more than 210 health workers for the campaign, more than 90% of them women.[16] With their support and professionalism, and good planning, 92% of the district's children were immunized within five days, thus highlighting the importance of trained community personnel during disaster response.[17]

Similarly, in Thailand, government-trained village health volunteers such as teachers, religious leaders and other members of the community played a crucial role in response efforts following the 2004 tsunami.

In the past, annual flooding in Bangladesh caused tremendous loss of life, often due to cholera and other waterborne diseases. A massive community awareness and advocacy programme was launched to inform people what to do in the wake of flooding, such as taking oral rehydration salts. In 2004, floods in Bangladesh affected 25% of the population in 42 of 64 districts. Economic losses were huge, but due to the prior information campaign the health impact was minimal, with only 0.08% of patients dying from diarrhoea, and deaths due to acute respiratory infection limited to 0.7%.[18]

Increasing urbanization and urban migration in developing countries is another great challenge to emergency preparedness and response. As poverty-stricken villagers move to cities in search of a better life, crowded, unplanned and often illegal slums arise. This increases the risk of technologically induced disasters. A short circuit in an exposed electrical wire, for example, can start a fire and destroy an entire slum in minutes. The worst sufferers of the Bhopal gas tragedy were nearby slum residents. Recognizing that poverty, environment and health are closely interlinked is essential when planning effective emergency preparedness measures.

Greater investment is required to strengthen country capacities for emergency preparedness and response, which encompasses a wide range of actions in every sphere of public health, from creating awareness in the community and training health workers to reinforcing coordination systems, infrastructure and buildings to make them as disaster-proof as possible, especially in regions exposed to frequently occurring hazards. The benefits of such investment are long-term and not always immediately obvious or quantifiable.

With disaster after disaster crippling various countries in the Region, political consensus is growing to make emergency preparedness a priority. Following a World Conference on Disaster Reduction in Kobe, Japan, a regional Hyogo Framework for Action 2004–2015 was published, addressing specific weaknesses in emergency response. WHO Member States also expressed their commitment to this issue through resolution WHA58.1, adopted by the Fifty-eighth World Health Assembly. The resolution emphasized the need to formulate disaster management plans.

With the political will to improve disaster management gathering strength in the Asia Pacific Region, and the 12 benchmarks providing direction, perhaps in the next decade events such as typhoons and tsunamis will remain just that—events, not disasters.

12.4 Health research systems

Introduction

Health research plays a crucial role in improving health and health equity by developing and evaluating interventions and by informing decision-making in health. A health research system should, ideally, advocate for research; identify national health research priorities; translate health research into action; systematically apply existing knowledge; develop an efficient and effective research environment; and systematically monitor and evaluate the results of the system and its strengthening. In addition, capacity development for research must be an integral part of the system.

Research to strengthen health systems is fundamentally important for achieving internationally agreed upon health-related development goals, including the Millenium Development Goals (MDGs), improving performance of health systems, advancing human development, and attaining equity in health.

Planning of national health research agendas requires the capability and coordination to systematically align research capacities and priority health problems in order to enable countries to ensure the best match between the two.

Global investments in health research and development are heavily dominated by a few industrialized countries, with the United States of America ranking first with 50.1% and Japan ranking second with 11.4% of global spending in 2003.[19]

Health research output in the Asia Pacific Region

Health research output in the Asia Pacific Region was analysed using the Thomson Scientific databases from 1992 to 2001. Research topics included physical, mental and social components of health, as well as the organization and provision of preventive, curative and palliative services.

For the 10-year period 1992–2001, 496 006 papers were listed from the Asia Pacific Region, showing an increasing trend. Several Asian countries have significantly increased their research productivity, as seen in Table 12.3. Five countries from the Asia Pacific Region were among the top 20 producers of health-related publications between 1992 and 2001. These were Japan (8.1% of total global output), Australia (2.3%), China (1.6%), India (1.2%) and the Republic of Korea (0.6%).[20]

Table 12.3 Average annual number of papers on health topics produced and indexed in science and social sciences citation databases in selected Asia Pacific countries, 1992–2001

Country	Average annual number of papers		Change from 1992–1996 to 1997–2001 (%)
	1992–1996	1997–2001	
Australia	7 058	8 337	+18.1
Bangladesh	83	85	+1.7
China	3 911	7 275	+86.0
India	3 681	4 152	+12.8
Indonesia	59	75	+28.7
Japan	24 939	30 084	+20.6
Malaysia	181	207	+14.2
Nepal	19	33	+78.0
New Zealand	1 262	1 459	+15.6
Papua New Guinea	45	26	*-42.5*
Philippines	48	61	+27.7
Republic of Korea	945	3 178	+236.4
Singapore	417	648	+55.6
Sri Lanka	45	47	+3.9
Thailand	258	428	+65.9
Viet Nam	25	47	+84.2
Other countries[a]	50	29	*-41.0*
TOTAL	43 026	56 171	+30.6

[a] Other countries include Bhutan, Brunei Darussalam, Cambodia, Cook Islands, the Democratic People's Republic of Korea, the Federated States of Micronesia, Fiji, the Lao People's Democratic Republic, Maldives, the Marshall Islands, Myanmar, Mongolia, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Source: Sadana R, Paraje G, Karam G: *Analysis of health research outputs in the Western Pacific and South East Asian Regions, 1992-2001* (unpublished working document for the Meeting of the Western Pacific Advisory Committee on Health Research (WPACHR) and Health Research Councils, held in Manila, Philippines, from 4 to 6 October 2005).

Assessment of national health research systems

Several common challenges and constraints facing national health research systems were identified in case studies conducted in 2000 and 2001.[21,22] A workshop on Capacity Strengthening for Health Research System Analysis in 2004 and other studies identified similar issues.[23] They include the following:

- **Poor coordination between research institutions at national, regional and international levels.** Some countries have no national health research agenda or mechanism. Without a coordinating mechanism to devise and implement a national health research policy, countrywide health problems cannot be addressed adequately. Even when medical research councils in some countries (e.g., Bangladesh and India) have taken a stewardship role, they are usually focused on publicly financed medical research.

- **Inadequate participation of stakeholders in the research, policy and implementation processes.** Interaction between producers and users of research is important to translate policy questions or information needs into research questions with appropriate hypotheses, designs and methods. Several case studies note the lack of involvement of potential users of research in the design of research projects.
- **Lack of accessibility of research findings.** While policy-makers do not make sufficient use of the available research findings, they also face limited access to research results. Peer-reviewed journal articles referenced in international, regional and national databases are only a small proportion of total research output.
- **Lack of demand for research.** Communication between researchers and policy-makers has been shown to facilitate increased use of evidence in health policy. Conversely, when there is little participation of policy-makers in the research process, they tend to show low interest in health research results.
- **Inadequate financial capacity.** Virtually all health research systems in developing countries suffer from insufficient financial resources to sustain capacity and conduct research activities. Despite the enormous disease burden in South Asia, research is not often viewed as a productive investment. Studies from Bangladesh and Nepal report that most government funding for research goes towards training, salaries and infrastructure, resulting in research agendas heavily influenced by external donors.
- **Inadequate human capacity.** Several case studies identify the shortage of trained research personnel as a main constraint to health research systems, and existing trained researchers often face multiple demands because of their scarcity. Case studies for some countries note that health research is not viewed as a favourable career for reasons including low salaries, lack of career development and inadequate research facilities. The shortage of human resources is compounded by migration of health researchers.
- **Inadequate institutional capacity.** Due in part to limited funding, the infrastructure of many research institutions in low-income countries is underdeveloped, contributing to an unsupportive work environment for health researchers. Case studies found that some scientific libraries have a limited range of books and journals.
- **Lack of data.** Health research is also constrained by insufficient data, for example, lack of reliable indicators to measure health status.[24]
- **Weak research management environment.** Even when technical research experience and supporting resources are available, political commitment, managerial competencies and incentives for changing behaviour within health systems can be lacking. Management and coordination of health research needs to be strengthened in many countries.

Strengthening health research management has been an important concern in the Asia Pacific Region, where work has been ongoing in several countries to address issues such as better coordination of health research activities; setting priorities for health research; formulation of national health research policies and strategies; management of health research information; and the ethical review of research.

Access to research findings has been improved by the South Asia Regional Index Medicus, which includes "grey" literature and articles in national journals not included in indexed international databases. Similar work for development of Index Medicus has started in the Philippines and the Republic of Korea in 2005. Since the launch of the Health InterNetwork Access to Research Initiative (HINARI),

institutions in countries with per capita Gross National Product (GNP) below US$ 1000 are eligible for free access to over 3000 major international health journals, and institutions in countries with per capita GNP between US$ 1000 and US$ 3000 have access at a discounted price.

Health policy and systems research

When policy-makers know the strengths and weaknesses of the health sector and their causes, they can initiate adjustments and reforms to make it more effective. There is growing recognition that policy decisions should be informed by up-to-date evidence from health policy and systems research. Research can make a contribution in at least three phases of the policy-making process: agenda setting; policy formulation; and implementation.

Health policy and systems research is intended to generate knowledge to improve how societies organize themselves to achieve health goals, including how they plan, manage and finance activities to improve health, and the roles and perspectives of the actors in this effort. Research contributes to socially relevant and ethically acceptable guidance for more effective, efficient and sustainable health policies and systems.

A recent review of health policy research in South Asia focused on inequality analysis, expenditure analysis, private sector analysis, and consumer and provider perspectives.[25,26] It concluded that locally managed research is likely to be related to politically feasible reforms and policies, and to be more relevant to local policy-makers. International agencies and bilateral donors are increasingly contracting research meant to support regional needs and reform efforts to local research institutions.

The review also cited the value of Demographic and Health Surveys (DHS), funded by the United States Agency for International Development, and of National Health Accounts for expenditure and inequality analysis, but noted that the strong role of the private sector in health services delivery and finance in the Region makes comprehensive health policy and systems research more challenging because data from the private sector can be difficult to collect.

An analysis of health policy and systems research conducted in the Western Pacific [27] reported that:

- Improved research agenda setting for health policy and systems research is needed in the Region. In many poor countries, the health policy and systems research agenda is more likely to be driven by donors rather than driven by the needs of the country. Integrated research agendas should be jointly developed and endorsed by the countries themselves, donors, NGOs and other interested parties.
- There is a growing core of indigenous health policy and systems research institutions and organizations in the Region, and promising national and regional networks have recently been established on specific health policy and systems research issues. Regular intracountry, intercountry, and interregional sharing of knowledge needs continued reinforcement as its value is increasingly recognized.
- Translating research to policy and action is a major challenge. Health policy and systems research knowledge generation is unevenly distributed, with low- and lower middle-income countries having weak research capacity and relatively little health policy and systems research output that can improve health policy and programmes. Although there is substantial health policy and systems research literature from certain countries, there is less emphasis on translating knowledge into policy and action by communicating findings to policy-makers.

- Most of the training courses offered in the low-income countries were non-degree programmes, with a few degree programmes mainly for public health. There were more degree programmes in middle-income countries, mainly in China and the Philippines. Some degree programmes in Thailand accept participants from across the Asia Pacific.
- Although there is "global" health policy and systems research that is applicable to many countries and situations, health systems approaches need to be tailored to a country's situation and needs. Since governments usually cannot conduct all needed health policy and systems research themselves, they can and should have an active role in defining the research agenda for health policy and systems research institutions and networks.

In China, health policy and systems research has contributed to understanding the complex transitions of society.[28] There are significant examples of research that have been translated into policy, but health policies are mostly still formulated on the basis of weak evidence or an absence of evidence, and policy implementation is not systematically evaluated. Many researchers abstain from making conclusions that are critical of existing policies. But policy-makers, on the other hand, are slowly beginning to realize the value of critical, independent policy research.

Other examples of using results from health policy and systems research in policy-making include the reform of Thai health insurance schemes towards universal coverage, and the creation of legislation and regulations to improve the quality of care in private sector health facilities in Mumbai, India.[29]

Recent directions in strengthening health research in the Asia Pacific Region

Regional frameworks for health research

WHO in the Asia Pacific Region has developed regional frameworks for health research, including specific goals:

- formulate national and local strategies for health research policies in all countries;
- build capacity to generate quality research that addresses priority health needs in accordance with the strategic plan;
- enhance good governance and establish ethical review committees for health research;
- promote dissemination and utilization of health research results;
- enhance communication, collaboration and networking for research activities within and between countries and areas; and
- mobilize more resources for health research.

Innovative country and cooperative examples

The strong economic development of countries in the Asia Pacific Region has been supported by heavy investments in research and development in general, and also in health research.

- China's increasing proportion of health research output can be attributed to specific changes in research policies over the past two decades. The government has implemented policies that provide intensive financial support to key laboratories and institutions in health disciplines. China was the only developing country participating in the Human Genome Project, indicating the value of such investments.[30] Efforts to increase the quality of research include stronger

institutional and peer-review mechanisms, more international cooperation and major government-sponsored overseas education programmes. Incentives are offered to expatriate Chinese researchers in an effort to reverse the so-called "brain drain", including high wages, housing, and well-funded research environments that encourage regional and international collaboration.[31]

- Rapid and steady economic and social development is behind the Republic of Korea's health research gains. The Government remains the main source of the enormous increase in research and development expenditures over the last 30 years, from 0.31% of GDP to nearly 3% of GDP, with GDP itself increasing substantially. Some top research institutions have begun recognizing a researcher's ability to publish as an additional evaluation tool as a criterion for awarding promotion.[32]
- By 2003 three countries in the Asia Pacific Region (Australia, Japan and the Republic of Korea) had met the 1990 recommendation by the Commission on Health Research for Development of allocating at least 2% of public health spending to research and development.[33] As a result of government-sponsored research, India has been able to make substantial progress in improving availability of and access for drugs to treat and prevent diseases of poverty while decreasing costs.[34]
- In addition to having too few trained researchers, some health research systems also lack managerial capacity. Bangladesh has a strategy to develop a critical mass of adequate managerial skills. The Bangladesh Medical Research Council offers workshops to equip managers with the skills to identify priority problems, commission research and use research findings to make policy or management decisions.[35]
    - As a strategy to promote a research culture, Nepal's Health Research Council provides research training grants to students and, together with medical school authorities, is formulating a policy to require research and scientific publications for career advancement in universities, medical schools and related institutions.[36]
    - The Lao People's Democratic Republic has used results from health research system analysis to develop a long-term strategic plan for national health research system strengthening. Three areas are emphasized for the next five-year Health Research Plan: outcomes expected from health research investment in the next five years; priority issues that need to be strengthened; and strategies to strengthen the national health research system and enable it to produce the expected outcomes.[37]
- The 2004 WHO report on *Knowledge for better health* described how advances in health research have led to improved health and health equity. This report includes several examples of strengthening and use of health research in the Asia Pacific countries:
    - strengthening national health research systems in Malaysia and the Philippines;
    - the rapid evidence-based response to SARS in Hong Kong (China);
    - the use of operational research to develop national medicines policy in the Lao People's Democratic Republic;
    - health research by and for Maori people in New Zealand; and
    - financing public health research from earmarked tobacco and alcohol taxes in Thailand and the state of Victoria, Australia.

- There are 279 WHO collaborating centres in the Asia Pacific, and most of these are involved in health research and related activities such as disease surveillance.[38] The collaborating centres form an important network for support of global health development, performing up-to-date research based on regional and country realities and needs.
- "Healthier People in Healthier Environments" is the vision statement adopted by the WHO Centre for Health Development established in Kobe, Japan, in 1995 as an integral part of WHO. The Centre's research now focuses on urbanization and health equity, and the social determinants of health for vulnerable populations in urban settings. The Centre is also the hub of the knowledge network on urban settings of WHO's Commission on Social Determinants of Health.

Ethics in health research

Effective ethical review, monitoring and regulation of research to protect participants from harm and ensure that the community benefits from the research is weak in many countries.[39] Although most countries have institutional (some have national) ethics review committees to review research proposals, many countries still lack laws and regulations and national guidelines on research ethics. In many cases the ethics review committee members have not been properly trained, and committees do not have standard operational procedures or these procedures are not strictly followed.

There are some exceptions. For instance, in the Republic of Korea the Bioethics and Biosafety Law took effect in 2005. The Forum for Ethical Review Committees in Asia and the Western Pacific (FERCAP), established in 2000, actively promotes good ethical review practices with training courses, annual conferences and publications.[40] Regional training courses in research ethics have been provided by FERCAP, the University of the Philippines, and Nagasaki University. The Strategic Initiative for Developing Capacity in Ethical Review (SIDCER) evaluates ethics review committees and provides recognition certificates for those meeting high standards. SIDCER is supported by the UNICEF, UNDP, the World Bank and the WHO Special Programme for Research and Training in Tropical Diseases.

Regional partnerships and networks

As more research is needed to find interventions with interregional and global impact, partnerships to mobilize resources become critical to this work. Support for health research in the Asia Pacific Region is provided by the Asian Development Bank, other multilateral organizations and bilateral donors, UN agencies, and by foundations and other NGOs.

Regional and international research organizations active in the area of health sciences research include the Health Research Council of the Pacific (HRCP), the Global Forum for Health Research (GFHR), the Council for Health Research and Development (COHRED), INCLEN Trust (supporting clinical epidemiology networks), and the South Asian Forum for Health Research.

Networks for health policy and systems research[41] in the Region include the Asian Health Systems Reform Network (DRAGONET), engaged in comparative studies of health systems of leading Asian economic powers. Other networks that have been active in recent years include EQUITAP (Equity in Asia-Pacific Health Systems), a partnership of countries supported by the European Commission that studies equity in health systems in the Asia Pacific Region, and Asia-Pacific Health Economics Network and its affiliated Asia Pacific National Health Accounts Network.

Evidence-informed Policy Networks (EVIPNet) were established in response to this need to bridge the gap between research and policy. The pilot launch in 2005 involved five countries in Asia with seven teams (the Lao People's Democratic Republic, Malaysia, the Philippines, Viet Nam, and two provinces and the city of Beijing in China). All the teams have representation from core target audiences: policy-makers and/or health system managers responsible for health decision-making and health policy formulation and implementation. The main functions of these networks[42] are to: acquire, assess and adapt evidence; enhance links among producers and users of research; provide training; design and advise on strategies to promote the uptake of evidence, as well as study new methods on knowledge dissemination and application; advocate for evidence use; and identify health research gaps and communicate the need for new research and systematic reviews.

The first International Conference on Health Research for Development in 2000 adopted the Bangkok Action Plan with recommendations for correcting the "10/90 gap", as only about 10% of global health research funding is for poorer countries which bear 90% of the global disease burden.

Several developing countries in the Asia Pacific Region now have units within their ministries of health to help connect their policy-makers and health system managers with relevant health research. The International Dialogue on Evidence-informed Action to Achieve Health Goals in Developing Countries (IDEAHealth) in 2006 fostered an exchange of ideas about how health systems, especially those in low- and medium-income countries, can respond to challenges. It focused on a small number of priority health goals and brought together health policy-makers, researchers, citizens and consumers to share experiences and evidence.

Future directions for health research systems development

Research is increasingly seen as a global endeavour with open sharing of knowledge and information. It is now possible for policy-makers in the Asia Pacific Region to access reliable, relevant, reviewed and up-to-date evidence on the effects of interventions elsewhere. National health research systems in the Region still need to be strengthened by building research capacity, developing capable leadership, providing essential monitoring and evaluation tools, and improving capacity for ethical review of research.

Three aspects are critical to research capacity development: individual researchers need to acquire the techniques and competence to do research; an enabling environment for research (appropriate infrastructure, support staff, equipment and supplies) must be in place in research institutions; and coordinating, policy-making and evaluation must take place regularly and effectively.

The 2005 World Health Assembly in resolution WHA58.34 urged WHO Member States to: invest at least 2% of national health expenditure and at least 5% of aid to the health sector in health research; strengthen national health research policy and systems; encourage collaboration with partners; strengthen mechanisms for knowledge transfer; support networking of national health research agencies; and encourage public debate on the ethical and societal dimension of health research among stakeholders.

While there are many promising developments for implementation of these resolutions in the Asia Pacific Region, many challenges remain, especially in obtaining useful evidence bases for health policy and interventions in low-income countries and in small Pacific island countries and areas.

12.5 Health information systems

National health information systems development in the Asia Pacific Region

Health information systems provide the basis for evidence-based management to improve the effectiveness and efficiency of health services. Information can be defined as data which are processed, analysed, interpreted and presented for decision-making.[43] In the past, health information systems have been oriented towards collecting information on diseases and health service outputs such as mortality, morbidity and utilization. More recently, health information systems are focused on primary health care information and on providing specific information support for management at each level of the health system.[44] The extensive application of information communication technology (ICT) now facilitates the collection, transfer and access to information.

Nearly every country in the Asia Pacific Region has an information system within its health system, but the level of development and sophistication of information varies. Some countries have only a rudimentary system in place and depend heavily on data from surveys or one-time studies, a national statistics office, other ministries and from the private health sector. Some countries are using ICT and networks extensively in the collection and generation of health statistical reports.

The main objective of developing national health information systems (NHIS) in the Region is to improve the quality of actions taken, rather than to simply generate information. In the best examples, data are actively transformed into usable information and evidence to strengthen health system operations and reforms. Information generation should be based on the managerial functions of health systems, which involve planning, staffing, organizing, directing and controlling resources. These functions take place on strategic, tactical and operational management levels, with each level requiring different types and presentations of information. Analysis of information needs has not always been adequate in some countries, and fundamental issues remain such as completeness, accuracy, relevance, validity and timeliness of data. Correcting these shortcomings requires long-term investment and development of local expertise.

During the last two decades, national health information systems have evolved from paper-based and informally structured frameworks to networked systems and evidence-based information models. Independent datasets are being integrated into common databases. Table 12.4 shows the transformation of national health information systems from 1980 to the present.

Current issues in national health information systems development

National health information systems policies, strategies and development plans

Most of the less-developed countries in the Region do not have national health information system policies and very often the health information system is fragmented. Parallel information systems are run by various programmes and units, wasting scarce resources and creating unnecessary work for data collectors and contributing to the inefficiency of national health information systems. Most developing countries do not have a policy to guide the development of information systems. The fragmentation problem is accentuated by the existence of strictly vertical health programmes that have traditionally been accompanied by separate systems for collecting data and reporting by different sections of the same ministry.

Table 12.4 Evolution of national health information systems in the Asia Pacific Region

	Prior to Alma-Ata Declaration (1978)	Health-for-all 2000 era	Health system performance assessment era	Present Millennium Development Goals era (Health Metrics with networking)
Concept	National health information systems concept was rarely practised	National health information systems concept was recognized	National health information systems was seen as a pivotal link between health management and health policy debate	National health information systems is seen as network of federated subsystems and components
Focus	Focus was on routine service statistics on communicable diseases, health activities and health resources	Focus was on data to meet the reporting requirement on health for all indicators	Focus was on summary measures of health within the health system performance assessment framework	Focus is on development and use of routine service records at point-of-service delivery
Key development	Development of statistical tools and methods	Prolific development of health indicators	Development of health indexes	Building up time-place related databases common for all partners Use of statistical models to generate missing data and to correct for bias and incompleteness Realization of the need for harmonization and coordination of household surveys Global initiatives placing emphasis on performance indicators
ICT	No or little use of information technology (IT)	Beginning of IT use	Extensive use of IT	Mapping of health resources and application of GIS/ mapping technology

ICT – information communication technology

Sources: *10-point regional strategy for strengthening health information systems*. New Delhi, WHO Regional Office for South-East Asia, 2006.

Report. Informal consultation on health information system strategic plan for the Western Pacific Region. Manila, WHO Regional Office for the Western Pacific, 2005 (Report series number: RS/2005/GE/53[PHL]).

The complexity of health information systems also has implications for the timeliness and accuracy of data collected. While the national health information systems in many of the countries in the Asia Pacific Region are still evolving, most countries have attempted to streamline the data collection systems while strengthening the capacity to use information at all levels of their health systems. The health reporting systems in some large and populous countries such as China and India can have as many as five administrative levels with regard to data flow, while smaller countries and areas have as few as two levels.

Where it does not exist, national health information systems policy should be developed that covers long-term development plans and operational guidelines, including creation of a framework to integrate the various information systems. Integrating both quantitative and qualitative data into decision-making is now recognized as critical to evidence-based health system development. The critical questions that always should be asked by users are: 1) What information needs to be collected with changing health scenarios? 2) How can information be effectively used for health policy formulation? 3) How can the timeliness and accuracy of data be improved at the country level for international reporting?

The main strategic issues for national health information systems[45] are:

- the development of a good strategic health information system plan, which forms the basis of a long-term national health information systems development plan;
- harmonizing the various health information systems in the country; and
- promoting better resource and information sharing among programme managers, including an intersectoral approach.

It is often necessary to advocate effective health information systems to top management, who in turn should promote information coordination within the public sector and closer partnerships with donor agencies, NGOs and United Nations bodies. Parallel action is needed to provide the required skills to health decision-makers at all levels to enable them to make efficient use of the information and opportunities provided by a functional health information system. While there has been an increasing investment in health information systems by external donors, the support given has usually been restricted to specific programmes. This led to unbalanced development and gaps between different vertical disease programmes and the overall national health information systems. This warrants the attention of all stakeholders supporting health information system initiatives, and a coordinating mechanism needs to be established to harmonize efforts at the national level.

Human resources, national health information systems management and resource allocation

The emphasis on using information and evidence to improve decision-making at all levels by policy-makers and programme managers is in line with capacity-building in management and decentralization of health systems. Efforts have been made to integrate information support into the health management system, as in Malaysia, Sri Lanka and Viet Nam.

In general, capacity-building has been one of the priorities in resolving national health information systems problems. An adequate qualified workforce to carry out health information system work at the country level is mandatory but often lacking in many countries in the Region. There has been difficulty attracting and retaining qualified staff because of limited promotion opportunities and career development. The fast turnover of information staff, particularly in the Pacific island countries and areas, also imposes difficulty in sustaining the continuity of health information system work.

National health information systems need to be well managed at different levels of service delivery to collect good data from patient records and service registers. Managing of integrated data collection efforts, data compilation and analysis, and data flows and data dissemination requires good information managers with management skills, as well as adequate knowledge on the health service delivery system of the country. National health information systems do not often receive priority in resource allocation or funding, but the scenario is gradually changing. Better advocacy and better-trained managers are critical factors that can raise the importance and profile of information support in general. National and international efforts now focus on training local staff to manage information and analyse data for health system performance assessment. Strengthening and continuing these efforts can help overcome the problem of staff turnover.

Data quality, coverage, disease classifications and coding standards

The quality of some of the data coming to national health information systems in the Asia Pacific Region, with the exception of developed countries, is questionable. Data often come from different sources in different years, causing problems in trend analysis. Data dictionaries, definitions and guidelines are not readily available in many countries. Attempts have been made to tackle data coverage issues, particularly data from the private health sector which are often grossly underreported. Continued efforts are needed in most countries to ensure that data quality meets specific standards and to strengthen data processing capacity through the use of ICT and networks.[46]

Since the introduction of International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) in the early 1990s, about 60% of countries in the Asia Pacific Region have implemented it nationwide. Other countries are now introducing it, while some do not use ICD-10 at all. There are problems related to a shortage of local expertise in disease classification and coding, limited funds to conduct training courses and provide logistical support, and commitment from national administrations. Poor career development in the field and the resultant fast turnover of medical records staff are delaying the full implementation of ICD-10 and efficient medical record management systems. Coder competencies and coding standards are questionable even in countries which have implemented ICD-10 nationwide. Few countries in the Region conduct coding audits.

Tailoring information requirements to health system needs is a fundamental task. There is quite a bit of unprocessed data, and users of information often are not satisfied with the data they are getting in terms of quantity, quality, coverage and timeliness. Consolidating and selecting relevant indicators to meet planning and management needs are critical steps in the design of health information systems. The standardization of definitions for health indicators for national use and international comparison should also be addressed. Information systems should include data from the private health sector.

Setting standards and norms including implementation of International Classification of Functioning, Disability and Health (ICF) is another important undertaking aimed at enhancing data quality. There is a need to collaborate with other stakeholders. WHO has set up WHO-FIC (Family of International Classifications) committees and reference groups on training, mortality and morbidity to improve standards and promote its use with the help of WHO collaborating centres.

Analysis, utilization and dissemination of health information

There is much room for improving information management and data analysis and interpretation. Health system priorities such as the Millennium Development Goals, health sector reforms, and Sector-Wide Approaches (SWAp) also require disaggregating data to measure inequality among different populations, such as by gender and by urban and rural settings. These are information-rich activities suited to, and indeed only validated by, monitoring and evaluation for systematic review and tracking of progress.

Functional networks can ensure smooth data flow to promote information exchange and knowledge sharing across programmes and agencies. “Knowledge management” for promoting more rapid and extensive information sharing is a new initiative, closely interwoven with electronic media that is now actively promoted in several countries in the Region. Improving dissemination of research findings and the use of these findings in the formulation of policy also are important dimensions that are receiving more attention.

Box 12.8: Strengthening the health information system in Viet Nam

Recognizing the need to reduce duplication of collected data and the importance of relevant health indicators for health planning, the Ministry of Health undertook to develop the Health Management Information System. The information system also had the goal of better sharing and use of information from district to provincial levels and between technical programmes. The project started in 2002 and was piloted in two provinces.

The project involved the identification of health indicators by various technical programmes, development of training manuals on data collection and reporting, data use for local managers, training in computer system operations and maintenance, application software and data analysis. The registers used at operational levels were reduced to nine and the reporting system was streamlined. An assessment was made on the compliance to legislative decrees, the use of revised forms, the compilation of health indicators, their use at local level and application of reporting software.

There is a built-in process to monitor data coverage, data accuracy and data use to measure patient care and service improvement. After the assessment, some of the weaknesses were rectified. The system is being extended gradually to other provinces.

Sources: Chong YC. Report on the health information system in Viet Nam. Manila, WHO Regional Office for the Western Pacific, 2004 (MR/2004/0681).

Chong YC. Report on the review of the implementation of health management system in extended provinces in Viet Nam. Manila, WHO Regional Office for the Western Pacific, 2005 (MR/2005/0784).

Developing training packages for different management levels on data management and analysis, as well as data utilization for policy analysis and formulation, can raise the potential value of national health information systems. There are a number of active networks available for interested individuals to join that are forums for knowledge and experience-sharing and self-learning. Finally, to ensure the legal status of the information system, regulatory mechanisms must mandate disease reporting.

Information communication technology (ICT)

The application of information communication technology has become commonplace in developing countries, but information communication technology competency is still inadequate. Without restructuring the health information system, introducing information communication technology into an existing information system produces adverse results—including overburdening workers and a loss of confidence in the system by decision-makers—resulting in insufficient allocation of resources to health information systems development. In addition, many Member countries do not have adequate qualified IT professionals to institutionalize and properly implement ICT policy, and lack human resources for system development and maintenance. Software development and applications that solely depend on outsourcing to a single private vendor can pose risks in some cases.

Computers and other communication tools are available in all countries to conveniently send, receive, store and retrieve information. The introduction of ICT applications is increasing rapidly in most countries in the Region. "eHealth", which refers to the combined use of electronic communication and information technology in the health sector, is one of the most rapidly growing areas in health today.

Box 12.9: Introduction of information communication technology in the Asia Pacific Region

Several countries in the Region have created an enabling environment for information communication technology in the health sector, such as India's IT law setting guidelines and recommendations for information technology infrastructure in health. Bangladesh has established an ICT policy for use in health sector. Bhutan, China, Malaysia, Maldives and the Philippines have implemented telemedicine. Information technology centres have been established at the ministries of health of Bhutan and the Democratic People's Republic of Korea. There is a national eHealth plan for Myanmar and e-health initiatives in Sri Lanka and in Thailand.

Source: Adapted from country reports on the 2005 survey of the Global Observatory for eHealth (GOe) of WHO headquarters.

There are also successful applications of the Geographic Information System (GIS) in the Region. GIS was used to track the epidemiological patterns of the outbreak of SARS in China in 2003 by time, place and person. Viet Nam is using the HealthMapper for the epidemiological surveillance of avian influenza and also uses Service Availability Mapping (SAM) for health infrastructure, human resources and availability of key services. After regional training activities on SAM, some countries (India, Indonesia, Maldives, Myanmar, Sri Lanka and Viet Nam) are using it to monitor health service availability at the district level.

With globalization and increasing use of ICT, networks have been established to facilitate communication and knowledge sharing among health professionals worldwide. This trend provides a good opportunity for sharing experience and best practices. Among these are the Evidence-Informed Policy Network (EVIPNet Asia), Routine Health Information Network (RHINO), Health Metrics Network (HMN) and the Millennium Development Goal Network (MDG-NET).

Use of ICT will increase in coming years. For countries to be able to maximize its use for the benefit of their health systems there is a need to develop an adequate eHealth policy, strategy and action plan, to make available resources for ICT infrastructure and enhance ICT literacy. There must also be an increase in the number of qualified IT professionals to efficiently coordinate intersectoral activities, to manage the shift from paper-based to e-based systems, and to ensure proper maintenance, technological updates and sustainability.

Vital registration, census, demographic and health surveys

Although a universal vital registration component is recognized as an important indicator of the quality of national health information systems, coverage in most countries is far from complete and the quality of data on causes of disease, disability and death remains poor. All the countries in the Region are conducting a decennial population census, but most of the Pacific island countries and areas and many less developed countries do not have vital registration systems in place, depending instead on costly periodic surveys to obtain data. While many also conduct Demographic and Health Service (DHS) Surveys, again most Pacific island countries and areas are exceptions.

Box 12.10: Improving the quality of mortality statistics in India's Sample Registration System

Although only about 1% of the total population is under its purview, India's Sample Registration System (SRS) represents trends in birth and death rates reasonably well for the population. However, the quality of the reporting of causes of deaths has hindered the system since it was put in place in the late 1960s. Recording of causes of deaths in rural areas was initially entrusted to primary care centre staff. For urban areas and institutional deaths, medical certification of causes of death was done through the Vital Registration System of the Registrar-General. By the mid-1990s, the primary care centre-based system became defunct in most states, and even lay reporting of causes of deaths could not be sustained.

Beginning in 2000 a new SRS system took on the responsibility of recording and reporting causes of deaths for both rural and urban areas wherever it had a suitable presence. Cause of death as recorded in lay terms by SRS enumerators is checked by SRS supervisors using verbal autopsy techniques. The completed form for each death is sent to two doctors at nearby medical college hospitals for assigning medical terms for cause of death. In case of disagreement, further investigation is done to avoid a non-specific classification if possible. The medical audit of causes of deaths is facilitated by uploading death records to a website and providing Internet access to doctors and the coders to assign appropriate ICD-10 codes.

Source: Sample Registration System. New Delhi, Registrar General of India, Ministry of Home Affairs.

New initiatives and methodologies for improving health information systems

In recent years, new information tools and methods have been deployed to facilitate the evidence base for health system development. The burden of diseases (BoD) methodology developed with WHO and World Bank support has proven to be useful and is widely accepted. More than 100 experts from the Region have been trained in the BoD methodology and national BoD studies have been conducted in India, Indonesia, Malaysia, New Zealand and Thailand.

Box 12.11: Health Metrics Network

The Health Metrics Network (HMN) was officially launched at the World Health Assembly in May 2005. It is a global partnership working to improve health and save lives through stronger health information systems and was founded on the premise that better information means better decision-making and better health. The partnership aims to bring together users and producers of health data—countries, statistical and health experts, development partners, foundations, and global health initiatives—in a shared endeavour to increase the availability and use of timely, reliable health information through country-led plans to strengthen information systems. By 2011, the HMN expects to document improved health outcomes that can be credibly attributed to increased use of information for decision-making in at least 80 developing countries. Forty-one countries were awarded catalytic grants in its first call for proposals. A new health information systems framework and assessment tool have been developed.

Source: Information on the Health Metrics Network is available from http://www.who.int/healthmetrics/en/

In order to analyse discrepancies in health attainment across districts in Indonesia, and for the purpose of planning and monitoring, health system performance assessment (HSPA) methodology was adapted and used. District HSPA was required to monitor and evaluate health system outcomes as well as the efficiency of the health system; build evidence-based data about the relationship between the design and organization of the health system and performance; provide feedback in the policy debate; and further empower the public with information relevant to their well-being.

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13

Key health challenges in the Asia Pacific Region

Based on the preceding situation analyses, the key health challenges facing the Region and the actions countries need to take to address them are summarized in this chapter.

Environmental health challenges and actions

Global warming is a threat to health. Even if we are able to curb greenhouse gas emissions, warming of the Earth is expected to continue as gases already in the atmosphere will not be reduced. We need to deal with the consequences of global warming and adapt to new conditions, with adequate responses to environmental health challenges.

- Assessment of health vulnerability to climate change needs to be done in developing countries. Better evidence is needed on the links between climate change and human health to strengthen preparedness and response for climate-sensitive diseases, such as heat-related illness, waterborne and foodborne diarrhoeal diseases, and vector-borne diseases. Effective surveillance systems are needed to detect changes in environmental risks and associated health consequences and disease outbreaks. Combined with short- and medium-term weather forecasts, this would provide early health warnings to the public and policy-makers.
- Individuals, industries and businesses can contribute significantly to reducing greenhouse gas emissions by conserving and using less polluting forms of energy. Governments should support relevant strategies with media promotion and economic incentives.

Air quality, in particular indoor smoke and urban air pollution, is a threat to health. Indoor smoke from burning solid fuels for cooking and heating contributes to 1 million deaths per year, and urban air pollution contributes to over 500 000 deaths annually in the Region. Most of these deaths occur in developing countries.

- Smoke from cooking with solid fuels affects women and children most. Good ventilation and improved cooking stoves can dramatically reduce their exposure to smoke. Policies that promote moving from solid fuels to gas and electricity will save lives and reduce the burden of collecting solid fuels. Policy-makers need to be better informed about the problem of indoor smoke.
- Industrial growth, rapid urbanization and motorization in the Region aggravate urban air pollution. The removal of lead from gasoline considerably reduced ambient air concentration of lead and the blood lead level in children, but particulate matter and gaseous pollutants, such as nitrogen oxides, are still a problem in most cities in developing countries. Policies to reduce pollutant emissions from motor vehicles and industries should be established, and implementation should be strengthened where such policies exist.
- The Region has also suffered from cross-border air pollution problems, such as forest-fire-induced haze in South-East Asia and dust and sand storms in north-east Asia. Cooperation among countries involved is essential to solve such problems.

Lack of safe drinking water and sanitation threaten the health of hundreds of millions in the Region. Despite progress made over the years, over 600 million people in the Region are without access to improved sources of drinking water and nearly 2 billion people have no access to improved sanitation. According to global estimates, approximately 1.8 million people die annually from diarrhoeal diseases, including cholera, and 90% of these are children under the age of five, mostly in developing countries. In the Region, about 680 000 under-five children die every year from diarrhoeal diseases.

- Apart from providing safe drinking water and improved sanitation facilities, promoting good hygiene practices can reduce contamination of ingested water and food. Encouraging simple hand-washing is an extremely cost-effective measure that could save many lives.
- Hazardous chemicals in drinking water are a concern in several countries in the Region, particularly the natural arsenic and fluoride in groundwater. These chemicals are not easily removed by conventional water treatment. Often the only option is to provide an alternative source of water to those affected.

An increasing volume of various chemicals are used in workplaces and households, some posing serious risks to health if not properly controlled. Accelerating economic activity in the Region creates ever-increasing amounts of industrial and municipal solid wastes, a particular problem in the cities of developing countries, where reliable collection services and adequate disposal operations are not provided, often for financial reasons. Unsafe management of hazardous health-care waste poses risks to workers, patients, waste handlers and the general public.

- Legislation and multisectoral mechanisms to control the production, use, import and export, storage, transport and disposal of chemicals are in place in more industrialized and rapidly industrializing countries. Less developed countries still need to create these regulations and mechanisms.

- Most countries have legislation on waste management, including medical waste, but it is generally inadequate in scope and enforced only in more industrialized countries. More resources are needed for effective implementation of existing regulations and guidelines in developing countries.

Industrial and agricultural workplace injuries and disease must be reduced and occupational health services expanded.

- Challenges to improving occupational health programmes and control of physical hazards and toxic chemicals at workplaces (e.g. asbestos, silica and carcinogens) include strengthening monitoring and surveillance of occupational diseases and injuries, and developing critical human resources needed to implement strategic interventions.
- The coverage of occupational health services in developing countries is very limited, particularly for small-scale and informal sector enterprises. Only a small percentage of the workforce is covered by these services. Occupational health services based on the existing network of health services are being promoted in some countries.

Food contamination and food insecurity are dual threats to health, social welfare, and economic development of communities and populations, particularly those that are most vulnerable. The global impact of food safety and security in the Region cannot be underestimated, given that the Asia Pacific includes the two most populous countries in the world, the major exporters of agri-food products, countries heavily reliant on imported food, and a high proportion of the population living in close proximity to food animals, which puts them at greater risk of foodborne zoonoses. Many communities face chronic food shortages at a time of declining food aid and as natural resources are being placed under significant pressure. The true burden of foodborne illnesses is not clearly understood because of the diversity of illnesses involved and because many are simply reported in general terms such as gastrointestinal illness, diarrhoea, diseases of the digestive system, cancer or zoonoses. To achieve access to a nutritionally adequate diet and safe food for all, countries need to:

- Assess the impact of food insecurity on nutrition, and thereby health, and assess and meet the immediate nutritional and food security needs of vulnerable populations.
- Establish and implement intersectoral plans of action that identify how best to build longer-term resilience and contribute to food and nutrition security.
- Undertake comprehensive studies on the burden of foodborne disease and establish integrated monitoring programmes, with linkages to human and food-animal disease surveillance systems, to obtain rapid and reliable information on the prevalence and emergence of foodborne diseases and hazards in the food supply.
- Establish competent food safety authorities as independent and trusted public health bodies with the capacity to effectively enforce a comprehensive production-to-consumption food control programme, based on transparent and risk-based regulation consistent with the International reference for food safety (Codex Alimentarius).
- Establish procedures in conjunction with industry to rapidly identify, investigate and control food safety incidents.
- Communicate with and effectively train and educate consumers, the food industry and other stakeholders to empower safer food production and handling.

Communicable diseases challenges and actions

Communicable diseases continue to threaten the Region and the rest of the world. Outbreaks of severe acute respiratory syndrome (SARS) and avian influenza show that newly emerging infectious diseases can pose serious public health threats, with enormous potential impact on social and economic development. The capacity for disease surveillance and response needs to be improved in line with the implementation of the International Health Regulations (2005). Many countries still lack a basic system and capacity for outbreak communication.

- Governments should continue to develop and strengthen their national and regional systems and capacity to detect, assess, respond to and prepare for disease outbreaks and public health events. Countries should have effective event-based surveillance systems and rapid response systems with trained response teams, including field epidemiologists and laboratory experts.
- National risk communication plans and national and regional capacities for effective risk communication should be developed and maintained, especially for emerging infectious disease outbreaks.
- Public health laboratories need to be improved in many countries in terms of quality and capacity, and networking of laboratories should continue to be developed.
- Given that most emerging infectious diseases, such as avian influenza, originate from animals, countries need to establish and maintain effective collaboration between animal and human health sectors. More coordinated actions are required to reduce the risk of human infection from animals, to share disease information for early warning and to rapidly respond to zoonotic disease outbreaks.
- The capacity to prevent and control infection in health-care settings, including hospitals, should be strengthened by implementing effective infection control activities, including standard precautions.

The Region has a high number of HIV/AIDS cases and new infections are still occurring. The quality and scale of programmes for comprehensive prevention, care and treatment for HIV/AIDS need to be increased in several countries.

- This includes implementing comprehensive packages of interventions through the health sector and its partners in combating HIV/AIDS. Interventions should be targeted at population groups with the highest risk of exposure to HIV transmission.
- Care and treatment services should be expanded to accommodate new therapeutic approaches because effectiveness of current regimens may decline over time. Surveillance of drug resistance is a key component.

Malaria control presents a wide range of challenges and opportunities in the Region to bring the disease under control and limit its impact. Drug resistance and counterfeit drugs are now posing a major public health threat with potentially devastating consequence beyond the Region.

- Artemisinin tolerance in the border region between Cambodia and Thailand is being addressed and has been recognized as a key priority with global implications. Intensified actions involving key stakeholders are currently in progress to implement effective containment strategies to eliminate tolerant parasites. This involves preventing the use of artemisinin-based monotherapy and inappropriate treatment practices at all levels in the public and private sector, while applying an effective management system, proper surveillance, monitoring and evaluation.

- Actions are in progress to address the issue of counterfeit artemisinin in collaboration with the International Criminal Police Organization (ICPO-Interpol), relevant WHO Member States and other stakeholders, especially in the Mekong countries. This requires intensified and continuous collaboration among key stakeholders to sustain these efforts.
- Integrated vector management should be widely implemented with emphasis on a massive scaling up of the use of impregnated bednets, especially in those countries with the highest malaria burden.
- The feasibility of malaria elimination should be fully assessed for selected countries including Malaysia, the Republic of Korea and Vanuatu. Focal elimination in others, such as the Philippines, should also be considered.
- The issue of malaria during pregnancy needs to be made an integrated component of a regional malaria prevention and control strategy.

Current dengue fever and dengue haemorrhagic fever epidemics have resulted in much loss of life. Political and financial commitments are needed to ensure that a sustained, integrated dengue control and prevention strategy is implemented in the Region.

- Dengue surveillance needs to be strengthened by integrating with existing epidemic-prone diseases surveillance systems, including pandemic influenza.
- Surveillance systems should be linked to reliable information systems; efforts need to be made to improve existing information systems and to encourage their development where there are none.
- Countries need to develop a comprehensive national dengue integrated plan that includes surveillance, case management, social mobilization and communications, integrated vector management, outbreak response and operational research.
- Dengue transmission relies on a complex combination of multiple risk factors and calls for an intersectoral approach. Stakeholders' actions need to cut across sectors for an effective dengue prevention and outbreak response.
- Efforts need to be made by all stakeholders to define and establish clear responsibilities of each of the key stakeholders to optimize outbreak preparedness and response within the framework of the International Health Regulations (2005).

The disease prevention opportunities offered by current and new vaccines are still not fully exploited. Immunization programmes need to be strengthened and expanded, including taking the final steps toward eradication of polio and elimination of measles and maternal and neonatal tetanus.

- Measles mortality reduction and elimination and hepatitis B control should be priority immunization programme goals.
- The introduction of new and underutilized vaccines (e.g. against *Haemophilus influenzae* type b (Hib), pneumococcus and Japanese encephalitis) should be accelerated in all countries, where justified, based on disease burden.
- Public health laboratory services need to be further strengthened, using the existing platform of well-functioning laboratory networks, such as those for polio and measles.
- Immunization coverage in low-performing districts should be improved, and the Expanded Programme on Immunization surveillance and monitoring systems strengthened.

- Further coordination is required to exploit synergies with other health intervention approaches, including antenatal care, the Integrated Management of Childhood Illness and school health programmes, to deliver appropriate disease prevention packages.

Tuberculosis (TB) remains a major public health problem in the Region because of its high morbidity and mortality rates. Tuberculosis control needs to be further strengthened, with emphasis on addressing multidrug-resistant TB and TB-HIV coinfection.

- Strong support is needed to implement the programmatic management of multidrug-resistant TB across the Region.
- An effective infection control package needs to be introduced and scaled up.
- Tuberculosis laboratory capacity needs to be strengthened, including the introduction and scaling up of TB culture and drug-sensitivity testing, as well as new diagnostic tools.
- The high mortality associated with TB-HIV coinfection needs to be addressed by strengthening collaborative activities between HIV and TB programmes, including HIV testing among TB patients and TB screening among people living with HIV.
- Human and financial resources for TB control need to be sustained beyond 2010, including the provision of effective technical assistance.

Noncommunicable diseases challenges and actions

Noncommunicable diseases (NCDs) are rising in tandem with increased prosperity in the Region. More effective prevention and control programmes are needed, and in particular, health sector responses to the rapidly growing problem of obesity. There are risk factors common to several major NCDs, and country strategies could address these as a whole.

- Health systems must adapt to the needs posed by the burden of NCDs and develop integrated systems of care, from prevention through rehabilitation, that empower patients, provide continuity of care between different parts of the health sector and employ cost-effective approaches.
- The control of NCDs also requires strategies aimed at changing environmental and behavioural factors. The coordinated action of government, society and the private health sector are needed to enact appropriate public health laws and other measures to reduce the supply and demand for substances harmful to health, while promoting healthy behaviours.
- Low-cost and cost-effective interventions to control the NCD epidemic are currently available. The challenge is to ensure that they are used widely and consistently, especially for the poor and most vulnerable groups.

The prevalence of diabetes in the Region is expected to double over the next 15 years. Many countries in the Region do not undertake regular assessments of population health status. The disease is often managed badly due to poor access to health services and lack of knowledge or support, which usually results in serious complications.

- Environments that encourage population lifestyle changes, including diet and physical activity, need to be created through national planning to influence markets and promote self-responsibility for health. National plans and policies should be integrated and harmonized with other plans, such as for tobacco control, nutrition, physical activity, alcohol, hypertension and other diseases.

- It is essential that individuals with diabetes and those at risk be identified. This can only be done through regular national or provincial monitoring and surveillance. Effective health services should be put in place to enable treatment of those with diabetes because very little is currently provided for specialized treatment and follow-up care.

The global tobacco epidemic is the second major cause of all deaths from NCDs, and is the fourth most common risk factor for diseases worldwide. In the Asia Pacific Region, every year about 2.3 million people die prematurely from tobacco-use-related disease. In addition, millions of nonsmoking adults and children in the Region are exposed to secondary tobacco smoke.

The WHO Framework Convention on Tobacco Control (FCTC) drives the global public health agenda to curb the tobacco epidemic. It aims to protect present and future generations by reducing tobacco use prevalence and exposure to tobacco smoke pollution through legislation, policy and enforcement. Several countries have national tobacco control legislation that conforms to the FCTC, and others are developing legislation.

- There is a need to harmonize administrative, infrastructural and legislative measures with the provisions of the FCTC. Enforcement of policies, ordinances and regulations requires public awareness, social support and political will.

Accidental injuries, suicide and violence cause an alarming amount of death and disability in the Region. Road traffic is a major cause of injuries and deaths. Burns are a serious injury problem in South Asia, and drowning is a leading cause of death in children in many countries. Interpersonal violence—such as child abuse and neglect, violence against intimate partners, elder abuse and homicide—is a major public health problem, and gender-based violence has reached epidemic proportions in some countries. Three general types of interventions can be effective against these problems: surveillance, legislative and regulatory solutions, promotive activities and improving access to emergency treatment.

- Some developing countries have legislation on road safety, but there are large gaps in enforcement. For surface water transport, legislation and enforcement of provisions for life-saving devices and avoidance of overloading can prevent mass casualties. Interventions against violence include control of lethal weapons, alcohol and drugs; documentation of cases; and advocacy for violence prevention. Better control measures can reduce the availability of poisons linked to suicide. Telephone help lines for the depressed are also effective.
- Preventive strategies and interventions are available, but need to be widely implemented to be effective. Injury and death due to burns could be reduced by promotion of stable stands for lamps and stoves; installation of smoke detectors, fire alarms and extinguishers in houses and buildings; clear access to emergency exits; controlling the manufacture, sale and use of fireworks; increased use of flame retardant materials; and the availability of first aid and treatment. These practices are not common in developing countries and would also require regulatory action. Drowning deaths during water recreation can be prevented by adult supervision of children, swimming instruction and the training of lifeguards. In case of floods and storms, preventive measures include early warning and evacuation to safer places and prompt rescue activities.

Health promotion presents opportunities for people to make healthier lifestyle choices, increase influence over their environment and build healthier communities and societies. It also aims to strengthen the capabilities of individuals, empower communities and groups, and advocate for policies and actions to change social, environmental and economic conditions.

- Multiple interventions at many levels are needed for effective health promotion. Capacity mapping is a tool for identifying strategic entry points for strengthening health promotion. Countries can focus on national and local policies and legislation, sustainable infrastructure (health promotion units, foundations, councils and intersectoral committees), generating funding from various sources, capacity-building for leaders, and networks and movements for healthy settings.
- Health promotion programmes are most effective to counteract behavioural risks, e.g. unhealthy diets, sedentary lifestyles, tobacco use, harmful use of alcohol and unsafe sex. The recent Bangkok Charter on Health Promotion is a major effort to confront the changing context for promoting health, emphasizing actions that address broad determinants of health, such as persistent poverty, the increasing inequalities within and between countries, new patterns of consumption, communication, commercialization, global climate change and urbanization.

Challenges and actions in reproductive health, child and adolescent health, and care for older persons

The scope of reproductive health has broadened to include the concepts of sexuality and rights, along with family planning, safe motherhood, women's health care, prevention and treatment of infertility, prevention of abortion and management of its consequences. Maternal mortality is unacceptably high in some countries in the Region. The major risk factor for maternal and neonatal deaths is lack of access to three critical services—skilled care at birth, family planning and emergency obstetric care. Young people (ages 10–24) constitute a significant portion of the population, and early marriage and child-bearing is a way of life in many countries. Maternal mortality among girls under 18 is two to five times higher than in women between 18 and 25. There are nearly 8 million unsafe abortions each year in the Region.

Many countries have national plans of action, including the provision to all women and newborns of skilled care during pregnancy and at birth and after childbirth; emergency obstetric care; the strengthening of midwifery schools; increasing the training of community-level skilled birth attendants; improving maternal health care for rural populations; accessible and affordable reproductive health services; and mainstreaming gender equality in all health programmes.

- Political commitment and advocacy for maternal and newborn health are required for effective implementation of reproductive health plans. Many countries need to strengthen health systems and health workforce training in general. STEPwise strategies should be followed up to improve organizational and clinical management and registration of midwives, and to increase hospital beds.
- Birth spacing and contraception improve reproductive health outcomes. Despite a significant general increase in the use of contraceptives, the unmet need for birth spacing is still high. Family planning programmes need to be supported and strengthened to improve both coverage and quality.

Considerable progress has been made, but large disparities in child health and survival still exist between and within countries. Accelerated reduction of under-five mortality may require a focus on countries with high mortality, particularly to address causes of neonatal deaths and scale up integrated child survival interventions. Two thirds of childhood deaths could be prevented with existing

evidence-based interventions, but their current coverage is too low to reach many of those in greatest need. Pneumonia and diarrhoea are the top two single causes of death in children under age five in the Region, and undernutrition is an important underlying factor.

- Adoption of policies and strategies that can narrow inequities are necessary. These would focus on improving health service delivery with adequate human, financial and logistic resources, and by ensuring financial protection of the poor. Child health and survival should be mainstreamed in national poverty reduction and other intersectoral economic strategies.
- Of all child deaths in the Region, 45% occur in the first month of life. Essential life-saving interventions that address the most common causes of child deaths need to be scaled up to ensure a continuum of quality care that extends through pregnancy, childbirth and childhood, and covers all health service delivery channels from the home through tertiary referral.
- More efforts are needed to ensure that infants receive the benefits of exclusive breastfeeding. Promotion of appropriate complementary feeding practices needs more attention. The Integrated Management of Childhood Illness strategy should be scaled up to provide holistic management of the common causes of childhood deaths by improving provider skills, health-care delivery systems, and family and community practices.
- Improvement of hospital care is also possible by the endorsement and implementation of standards for the management of common illnesses in referral settings for very sick children who need higher-level care. Strengthening of public health approaches to provide high-quality, cost-effective health services for children is needed at all health service levels.
- Overall investment in child health in many countries is insufficient to take cost-effective child survival interventions to scale up. Child health should be at the core of the health systems development agenda. Strong national commitments are needed to accelerate action and track progress in overcoming barriers to providing, accessing and utilizing essential child health care.

Demographic change in the Region is characterized by longer life expectancies, ageing populations and smaller families, and raises new health and welfare issues in both developed and developing countries. There are already 335 million people over age 60 in the Region, and their numbers and proportion are rising steadily, including very old persons and the infirm, who require much health and social care.

- Health systems and new programmes should be prepared to cope with the increasing numbers and specific needs of older persons. They need better access to services for acute and chronic illness, support for healthy lifestyles, employment and income support, less marginalization in urban environments, and gender-specific programmes and services for the increasing proportion of older females.
- Multisectoral approaches are required to address the needs and concerns of older persons, including the collaboration of local communities, nongovernmental organizations and the private sector, to mobilize resources and deliver services. Policy initiatives and new services are required to improve community-based care to counter the loss of family caregiving. A successful approach would be for countries and local authorities to share responsibility.

Nutrition-related disease is an important health issue because inadequate or inappropriate diet is a major risk factor for the majority of premature deaths in the Region, especially of children. Rates of undernutrition are slowly declining but are still unacceptably high among the poor. There is now a double burden of disease in many countries as a result of increasing overnutrition. Proven, cost-effective interventions for nutritional deficiencies in infants and children are available.

- The main challenge for governments is to persuade decision-makers across all sectors that nutrition has a significant impact on the national economy as well as on public health. National nutritional surveillance should be used to target interventions and assess their effectiveness, and is a research instrument for the determinants and consequences of undernutrition and overnutrition.
- Chronic undernutrition is unevenly distributed, and wide variations within some countries distort national prevalence figures. The challenge is to target high rates of undernutrition in priority countries and in marginalized regions within countries. Even relatively mild forms of undernutrition have serious consequences for public health.
- Nutrition interventions are essential to achieve other goals, such as child survival and maternal mortality reduction, and should be integrated into related policies and plans of action. A distinguishing feature of successful programmes has been the involvement of communities in the identification of problems and the design of interventions. High-profile individuals have played a role in some successful programmes.
- Cost-effective nutritional interventions can help improve the health and welfare of the poorest communities. Special efforts should be made to improve the situation of women as primary child and family carers. The greatest impact can be expected when targeting all children in populations at risk rather than individuals below a certain cut-off point. The focus should be on complementary infant feeding and early childhood diet, including early and continued breastfeeding.
- Countries should develop plans and strategies that include population dietary guidelines. A health promotion strategy to maintain healthy body weight is to encourage people, particularly those in sedentary occupations, to do an average of one hour per day of moderate-intensity activity.

The disease burden and carrier rates for thalassaemia and other genetic diseases are not well documented in many countries. Even in countries where there is good epidemiological knowledge, responses are not optimal because thalassaemia competes for priority with other NCDs.

- The genetic nature of the disease poses many difficulties in prevention, spanning politics, culture and religion. A successful prevention model that includes premarital testing, prenatal diagnosis and termination of pregnancy may not be culturally acceptable in many societies.
- For children already diagnosed, the mainstay of treatment is blood transfusion. This requires an adequate blood transfusion service, but even where available, patients require difficult and expensive iron chelation.

Health systems development challenges and actions

The poor and other vulnerable groups in the Region continue to have poor access to quality health services. Those who need health services the most—groups with high burdens of morbidity and mortality—tend to use them the least because they face high barriers to access. Many kinds of disparities

exist in terms of health risks, health-seeking behaviour, access to services, responsiveness of the system and of providers, and health outcomes. The barriers include multiple dimensions of social exclusion. Health disparities of various types appear to be widening rather than narrowing, suggesting that health systems are not addressing these problems effectively. Reversing inequity, whether among individuals or populations, often requires intersectoral action and larger and better-targeted investments in services.

- Access to health services should be universal and not limited by factors such as age, sex, socioeconomic status, location, ethnicity, employment status and sexual orientation. A focus on equity and access is part of primary health care.
- The Region has the highest levels of dependence on out-of-pocket expenditure to finance health services. This has reduced access to health services and led to poverty caused by health-care costs. Governments need to take responsibility for adequate financing that is equitably and efficiently allocated and leads to universal coverage and access to essential services. Reforming health financing to enable wider access requires continued increasing investment and public spending on health, reducing out-of-pocket spending and increasing pre-payment and risk-pooling, which may include tax-based financing, compulsory social insurance and other types of health insurance or pre-payment.[1] Innovative mechanisms to promote risk-pooling and pre-payment for the informal sector should also be implemented.
- Donor assistance has caused fragmentation and distortion of the health sector in some countries that are highly aid dependent. Alignment of donors with national processes is particularly important in the least developed countries in order to decrease transaction costs and fragmentation while increasing efficiency in the health sector. Country-led planning and management processes are crucial. New initiatives in health must consider the sector holistically, gauge the impact of activities on the entire sector, and avoid short-term, top-down project-based approaches.

The Region suffers from imbalances in health worker skills, quality and density. Shortages are especially serious in South Asian countries, and worker emigration poses a difficult problem for the Pacific island countries. The fewest health workers are usually found where health needs are greatest. Inadequate salaries, incentives and supervision affect performance, motivation and retention of health workers. Health workforce planning and management need to be improved to ensure appropriate workforce size and skill mix, improved quality, performance, retention and geographical distribution.

- Production of high-quality health workers with the required skills must increase to meet population health needs.
- Strengthened health workforce information combined with well-designed research and analytical capacity is needed to guide human resources policy and strategy.
- The quality of basic and in-service training should be ensured by using defined standards, accreditation and monitoring of workforce training.
- Broad political commitment should be sought to improve health human resources. Partnerships with civil society, the private sector and other stakeholders can help sustain an adequate health workforce, with close collaboration with the education sector and training institutions.

[1] *Strategy on health care financing for countries of the Western Pacific and South-East Asia Regions (2006-2010)*. New Delhi, World Health Organization Regional Office for South-East Asia, and Manila, World Health Organization Regional Office for the Western Pacific, 2005.

Many countries in the Region have not achieved the goals of their national medicines policies. Many people face financial barriers to obtaining needed medicines, and at the same time, the sale of drugs to provide income for health workers contributes to irrational drug use in many settings. Counterfeit and substandard drugs are a major risk to public health throughout much of the Region due to weak quality assurance systems. Access to essential medicines is limited due to inefficiency of drug supply and distribution systems. In many countries, national essential medicines lists are not properly used as the basis for medicines procurement and reimbursement.

- Governments should increase their commitment and resources to systematically implement comprehensive national medicines policies and to monitor their implementation.
- Strengthening regulation, quality assurance, supply, distribution and rational use of medicines is integral to implementation of national medicines policies.
- Governments should develop systems to regulate and monitor the availability and affordability of essential medicines.
- Comprehensive programmes to combat counterfeit and substandard drugs must be developed and vigorously implemented.
- Governments should promote therapeutically effective, safe and cost-effective use of medicines through standard treatment guidelines, supervision, monitoring and good governance.

Scientifically sound, responsive and efficient health services will be able to deliver high-quality care, but quality is sometimes underemphasized in the quest for quantity and universal access. It is an essential function of government to ensure the quality and safety of all health services, including the private sector. This is a serious problem even in developed countries, where many hospitalized patients have an adverse event or die due to health-care errors. In developing countries, low quality is often attributed to a lack of resources. However, high-quality services do not necessarily entail large resource outlays.

- Accreditation and licensing are strategies that should be used more effectively to improve the quality of health care.
- Patient advocacy, improved education of professionals and the public, and effective systems for decreasing the risk of error will improve quality.
- Standards and protocols should be used to improve quality and control costs.
- Systematic implementation of quality management systems and external quality assessment are essential for health laboratory services.
- National networks to enhance information sharing among health laboratories and also blood transfusion facilities are operational in many countries, but their effectiveness could be improved.

The development and implementation of effective actions to reduce health inequalities is usually hampered by a lack of evidence. Health information on specific groups, knowledge and skills will be required to develop and communicate appropriate evidence to address the needs of these groups.

- The capacity for producing health data disaggregated by socioeconomic indicators should be developed in national health information systems.
- Information systems should have skilled personnel and sufficient resources to be able to respond quickly to changing information requirements, including health system performance assessment. This will require linkages in the areas of data collection, analysis, information sharing and utilization among different units in the health sector, as well as with other sectors producing or utilizing health information.
- Effective mechanisms to facilitate the linkage between health information, research and policy should be developed.
- The evidence base in the area of health policy and systems should be strengthened to support policy-making.

Even though the Region suffers a disproportionate share of natural disasters, many countries still do not have a dedicated organizational unit for emergency preparedness and response. Ad hoc actions cannot be an effective substitute for adequate preparation.

- National and subnational capacities for risk reduction and disaster preparedness, response, and recovery should be analysed and strengthened where needed.
- Political support is needed for the development of national policies for disaster planning and response systems. National and subnational programmes should support community-based disaster risk reduction activities.
- There is a need for better knowledge about the impact of disasters on health systems to allow them to plan for rapid recovery from disasters. Exercises and drills should be used to test response plans and guidelines.
- Capacity-building can be strengthened by incorporating concepts on health emergency preparedness and response in the curriculum of health sciences training programmes.

The range and seriousness of these key challenges means that population health requires a greater commitment from most governments in the Region to put health higher on government agendas, as well as to build infrastructure with the capacity to deal with foreseeable problems. Social determinants of health cut across nearly all these challenges, and hence multisectoral action and the participation of civil society and communities are needed to address them effectively.

Index*

A

B

* *The letters b, f and t after the numbers indicate box, figure and table, respectively.*

C

D

E

F

G

H

J

K

L

M

N

O

P

R

S

T

U

V

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Countries and areas of WHO's South-East Asia and Western Pacific regions share many problems, including inadequate resources for health and a high burden of disease. The differences and similarities that exist among the 37 countries and areas of the WHO Western Pacific Region and the 11 countries of the South-East Asia Region are more meaningful when viewed in the context of the larger Asia Pacific Region. This WHO report is a response to requests from Member States for an information resource covering the entire Asia Pacific Region and containing up-to-date reports on health trends and health systems.

The Asia Pacific Region covers 21% of the world's land area and is home to 53% of the global population. The challenges in many areas of public health, such as equity, human resources, health promotion, health service delivery and the social determinants of health, cannot be adequately described by numbers alone. To tell these stories, this publication provides a narrative of many aspects of the current health situation in the Region, supported by statistical data. Efforts to achieve better health for all, as well as the successes and the failures encountered, are covered in detail. Where possible, a comparative approach has been taken to underscore differences as well as similarities. This publication is aimed at a wide audience with the belief that national health authorities, policy-makers, scholars, researchers, health workers and others dedicated to the advancement of public health in the Asia Pacific Region will find it to be an invaluable resource that provides evidence crucial for sound policies and decisions.

World Health Organization
South-East Asia Region Western Pacific Region

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