



The world has reached a crucial moment in the history of HIV/AIDS, and now has an unprecedented opportunity to alter its course. The most important message of the latest *World Health Report* is that, today, the international community has the chance to change the history of health for generations to come and open the door to better health for all. Tackling HIV/AIDS is the world's most urgent public health challenge. Unknown barely a quarter of a century ago, it is now the leading cause of death for young adults worldwide. More than 20 million people have died from it and an estimated 34–46 million others are now infected with the virus. There is as yet no vaccine and no cure.

The World Health Report 2004 – Changing History, published by the World Health Organization, calls for a comprehensive HIV/AIDS strategy that links prevention, treatment, care and long-term support. Until now, treatment has been the most neglected element in most developing countries: almost 6 million people in these countries will die in the near future if they do not receive treatment – but only about 400 000 of them were receiving it in 2003.

WHO and its partners have declared the treatment gap a global emergency and have launched a drive to provide 3 million people in developing countries with antiretroviral therapy by the end of 2005 – one of the most ambitious public health projects ever conceived. This report shows how it can be done. It goes further, looking beyond 2005 to explain how international organizations, national governments, the private sector and communities can combine their strengths and simultaneously fortify health systems for the enduring benefit of all.

Illustrated with photographs of people whose lives have been deeply affected by the global pandemic, *The World Health Report 2004* makes essential reading for everyone with a political, professional or personal interest in health.

The World Health Report 2004

changing history

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World Health Organization



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message from the director-general



We are living in a time of unprecedented opportunities for health. In spite of many difficulties, technology has made important advances and international investment in health has at last begun to flow. Most of the increased funding is for the fight against HIV/AIDS. It brings a welcome and long overdue improvement in the prospects for controlling the worst global epidemic in several centuries. The responsibility of WHO and its partners in this effort is to ensure that the increased funding is used in such a way as to enable countries to fight HIV/AIDS and at the same time strengthen their health systems. HIV/AIDS control involves the full spectrum of economic, social and technical activities. A key role of WHO within this spectrum is to work with countries to build up the systems needed to provide treatment. Expanding the use of antiretroviral therapy will allow countries to support effective systems for delivering chronic care, thus extending their capacity to meet the long-term health needs of the population.

The initiative to make antiretroviral therapy available to 3 million people by the end of 2005 (known as “3 by 5”) is aimed at accelerating this process. It provides new ways to pursue the objectives for which WHO has been working since it was founded 56 years ago. However, the stakes are high: rapid expansion of antiretroviral treatment is a large, complex and difficult undertaking. It certainly cannot be done by one agency working on its own. Partnerships are indispensable for a task of this magnitude. Making them work requires great commitment, goodwill and talent on all sides. The initiative draws its strength from many partners with large amounts of all these ingredients, and we expect much more. But I am well aware that we and our partners took a risk in embracing 3 by 5. What I strongly felt we needed was a time-limited, difficult goal that would change the way we work. This is the best way to challenge ourselves to make the contribution that we as WHO should be making to the global effort against HIV/AIDS. Future generations will judge our era in large part by our response to the AIDS pandemic. By tackling it decisively we will also be building health systems that can meet the health needs of today and tomorrow, and continue the advance to Health for All. This is an historic opportunity we cannot afford to miss.

LEE Jong-wook
Director-General
World Health Organization
Geneva, May 2004



overview



David Walton/Partners In Health

The two photographs on the opposite page show how the history of HIV/AIDS is changing. They are snapshots of the past and the present, a vivid example of how, today, innovative treatment programmes are not only saving lives but also helping to strengthen health systems on which to build a brighter future.

Joseph Jeune is a 26-year-old peasant farmer in Lascahobas, a small town in central Haiti. When the first picture was taken in March 2003, his parents had already bought his coffin. Suffering from the advanced stages of AIDS, Joseph Jeune probably had only weeks to live. The second picture, taken six months later, shows him 20 kg heavier and transformed after receiving treatment for HIV/AIDS and tuberculosis (TB) coinfection.

There are millions of people like Joseph Jeune around the world. For most of them, HIV/AIDS treatment is still beyond reach, but Joseph shows what can be achieved. He receives care at the small clinic in his home town. The clinic's HIV/AIDS and TB treatment programmes are part of a wider initiative to strengthen the health service infrastructure across much of Haiti's central plateau. The effort involves nongovernmental organizations, the public sector and communities, with major support from the Global Fund to Fight AIDS, Tuberculosis and Malaria. Using antiretroviral therapy as an entry point, the programme is building up primary health care in communities, for a total population of about 260 000 people. It does so through improved drug procurement and management, the expansion of HIV counselling and testing, increased salaries for local health care personnel, and the training of numerous community health care workers. Primary care clinics have been refurbished, restocked with essential medicines, and provided with new staff. They are receiving up to 10 times more patients for general medical care daily than before the project began.

The World Health Report 2004 shows how projects like this can bring the medical treatment that saved Joseph Jeune to millions of other people in poor and middle-income countries and how, crucially, such efforts can drive improvements in health systems.

Effectively tackling HIV/AIDS is the world's most urgent public health challenge. Already, the disease has killed more than 20 million people. Today, an estimated 34–46 million others are living with HIV/AIDS. In 2003, 3 million people died and 5 million others became infected. Unknown a quarter of a century ago, HIV/AIDS is now the leading cause of death and lost years of productive life for adults aged 15–59 years worldwide.

A comprehensive HIV/AIDS strategy links prevention, treatment, care and support for people living with the virus. Until now, treatment has been the most neglected element in most developing countries. Yet among all possible HIV-related interventions it is treatment that can most effectively drive health systems strengthening, enabling poor countries to protect their people from a wide range of health threats. This report shows how international organizations, national governments, the private sector and communities can combine their strengths to expand access to HIV/AIDS treatment, reinforce HIV prevention and strengthen health systems in some of the countries where they are currently weakest, for the long-term benefit of all.

Almost 6 million people in developing countries will die in the near future if they do not receive treatment – but only about 400 000 of them were receiving it in 2003. In September 2003, WHO, the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the Global Fund declared lack of access to AIDS treatment with antiretroviral medicines a global health emergency. In response, these organizations and their partners launched an effort to provide 3 million people in developing countries with antiretroviral therapy by the end of 2005 – the 3 by 5 initiative, one of the most ambitious public health projects ever conceived.

A CHANCE TO CHANGE HISTORY

Advocacy by WHO and its partners for more global investment in health has begun to bear fruit. Official development assistance and other forms of global health investment are on the rise. Most of the increased spending is for HIV/AIDS. Along with the urgent need to tackle the pandemic, this fact now makes HIV/AIDS the key battleground for global public health. It also gives countries the chance to derive extra public health benefits from the new funds. The opportunity exists to invest these resources so as to save millions of threatened lives through treatment, reinforce comprehensive HIV/AIDS control and strengthen some of the world's most fragile health systems.

The objective of treating 3 million people in developing countries with antiretroviral drugs by the end of 2005 is a step on the way to the goal of universal access to antiretroviral therapy and HIV/AIDS care for all who need it. This goal far outreaches the capacities of any single organization. Through collaboration linking the skills of many partners, however, these aims can be achieved. The treatment initiative is important not only to tackle a grave health crisis, but also because it is building innovative mechanisms of collaboration in health, linking national governments, international organizations, the private sector, civil society groups and communities. Success in partnership on the initiative will accelerate other areas of global health work.

The initiative adapts lessons from HIV/AIDS programmes in developed countries and builds on the achievements of developing countries such as Botswana, Brazil, Senegal and Thailand in scaling up antiretroviral treatment. An increasing number of effective partnerships will mean that no country has to face the HIV/AIDS treatment challenge alone. UNAIDS has, for nearly a decade, kept HIV/AIDS at the forefront of global consciousness and spurred recognition that only an exceptional response can meet the challenge. Under its leadership, the entire United Nations system has embraced its responsibilities. The creation of the Global Fund has fostered partnership between governments, civil society, the private sector and affected communities. The World Bank has brought innovation, and is joined now by the European Union, bilateral initiatives such as the United States President's Emergency Plan for AIDS Relief, and the major contributions of individual governments and private foundations, including the Bill and Melinda Gates Foundation and the William J. Clinton Foundation. There have also been inventive new approaches to technical cooperation, such as hospital twinnings through the Ensemble pour une Solidarité

Thérapeutique Hospitalière en Réseau (ESTHER), initiated by the French government and now supported by Italy, Luxembourg, Spain and other partners.

Success in expanding HIV/AIDS treatment depends on the engagement of civil society. Without the mobilization of activist organizations and communities, the toll of HIV/AIDS over the past quarter-century would have been far heavier. The momentum for antiretroviral scale-up owes much to the sustained advocacy of treatment activists at local, national and global levels and to nongovernmental organizations such as Médecins Sans Frontières and Partners In Health-Zami Lasante, which demonstrated to the world the feasibility of delivering antiretroviral treatment in the poorest settings. This report shows WHO's commitment to work closely with national health authorities, the private sector, community-based organizations and others in delivering comprehensive HIV/AIDS programmes on the ground.

WHY TREATMENT MUST BE SCALED UP

The long-term economic and social costs of HIV/AIDS have been seriously underestimated in many countries. More accurate projections now suggest that some countries in sub-Saharan Africa will face economic collapse unless they can bring their epidemics under control, mainly because HIV/AIDS weakens and kills adults like Joseph Jeune in their prime. Data in this report and the forthcoming UNAIDS/WHO *Global report* confirm that the social devastation of the epidemic continues to grow. Reinforced prevention is vital to safeguard future generations but, at the same time, antiretroviral treatment expansion is essential to protect the stability and security of communities, countries and regions and to strengthen the foundations of future development.

The fact that effective treatment exists but has not been made accessible to millions of people in urgent need is something that WHO must tackle, given its special responsibility within the UNAIDS family of cosponsors. WHO's Constitution charges the Organization to pursue the universal realization of the right to health: "the attainment by all peoples of the highest possible level of health". In the case of HIV/AIDS, for those in clinical need of treatment the realization of this right requires access to antiretrovirals.

EXPANDING TREATMENT ACCESS

The report explains that the treatment initiative draws on the specific comparative strengths of multilateral, national and local actors and capitalizes on the motivating effect of a time-bound target.

Between the declaration of the global treatment emergency in September 2003 and the end of February 2004, more than 40 of the countries with the highest burden of HIV/AIDS expressed commitment to rapid treatment expansion and requested technical cooperation in designing and implementing scale-up programmes. WHO and its partners have worked closely with country health officials, treatment providers, community organizations and other stakeholders to revise treatment targets, design national treatment scale-up plans and launch implementation. In countries such as Kenya, the United Republic of Tanzania, and Zambia, WHO is linking with key bilateral partners to develop a target-focused, streamlined approach that will maximize efficiency under clear national leadership. Political commitment and national ownership of programmes are essential. The streamlined funding mechanisms developed by the Global Fund are enabling many countries to access funding and expand programmes more quickly.

As new funding flows in, technical and human resource capacities must be ready to ensure its effective use. Countries need technical cooperation to support implementation on the ground and have requested clear guidance on treatment delivery and programme management. WHO makes a fundamental contribution by providing such guidance.

An important task is to expand as rapidly as possible from small pilot projects to treatment programmes with national coverage, while maintaining quality of care in the face of serious resource constraints. For rapid expansion, noticing gaps in resources is the starting point for a plan to redesign care so that it is, from the outset, “scalable”. The initiative takes a practical “engineering” or “system design” approach. The key is not to require that countries simply accumulate the usual resources for care – enough doctors, nurses, clinics, and so on – to reach the entire population; in many poor countries, that will just not work at present. Instead, the WHO strategy begins with clearly defined objectives, and then works to develop innovative system designs that can be expanded even when the usual medical resources are in very short supply. Such solutions will vary from country to country, but many factors are relatively constant, and many lessons can be shared. The strategy draws on solid evidence of the success of pioneering projects and some existing national programmes. Knowledge gained, systematically measured and reflected upon can be quickly reapplied and shared widely.

To help accelerate the initiative, WHO has developed a simplified set of antiretroviral drug regimens, testing and treatment guidelines that are consistent with the highest standards of quality of care. They have the added advantage of enabling much more effective use of nurses, clinical officers and community health workers to support treatment. While physicians supervise the clinical teams, day-to-day patient management and adherence support tasks can be safely and effectively delegated to other workers, including appropriately trained community health workers. In this way there is a better chance of delivering care quickly despite shortages of physicians, laboratories and other facilities. These simplified regimens are the critical element in ensuring that expansion of treatment in poor countries can be carried out equitably. WHO has also designed streamlined guidelines for training health workers in a wide range of skills related to the use of antiretroviral drugs, from HIV counselling and testing and recruitment of patients to treatment delivery, clinical management of patients and the monitoring of drug resistance.

WHO is now working on the ground with health officials, treatment providers and communities to overcome technical challenges; it is also serving as a coordination, communications and information-sharing hub to gather, analyse and disseminate data, and is feeding back the information so that it can be used rapidly to improve programme performance. This intensified collaboration on antiretroviral treatment scale-up is part of WHO’s broad commitment to working closely with countries to meet their major health goals.

WHO, in partnership with UNICEF and the World Bank, has established the AIDS Medicines and Diagnostics Service as an operational arm to ensure that developing countries have access to quality antiretrovirals and diagnostic tools at the best prices. The service aims to help countries to buy, forecast and manage the supply and delivery of products necessary for the treatment and monitoring of HIV/AIDS.

As policy and technical support work at country level intensifies, WHO, UNAIDS and their partners will continue their global advocacy work to ensure that adequate resources flow to support countries. New resources available through the Global Fund and other partners will be critical to success. On request, WHO is providing countries with technical assistance in the preparation of applications to the Global Fund and other potential funders.

TOWARDS HEALTH FOR ALL

The global HIV/AIDS treatment gap reflects wider patterns of inequality in health and is a test of the international community’s commitment to tackle these inequalities. Beyond working to save millions of lives under immediate threat, WHO and its partners are confronting a broad range of health problems that afflict poor communities and keep them

poor, viewing HIV/AIDS treatment expansion and the Millennium Development Goals as steps on the road to Health for All.

The treatment initiative will not end in 2005. Ahead lie the challenges of extending treatment to many more millions of people and maintaining it for the rest of their lives, while simultaneously building and sustaining the health infrastructures to make that huge task possible. The ultimate aim is nothing less than to reduce health inequalities by building up effective, equitable health systems for all.

CHAPTER SUMMARIES

Chapter 1. A global emergency: a combined response

This chapter describes the current epidemiological state of HIV/AIDS epidemics around the world and examines the daunting challenges that lie ahead. It shows that the world is far from ready for what is to come: it provides evidence that the social and economic consequences of unchecked HIV/AIDS epidemics will be catastrophic for many communities and countries.

Although it has seemed a familiar enemy for much of the last 20 years, the global HIV/AIDS pandemic is only now beginning to be seen for what it is: a unique threat to human society, whose impact will be felt by future generations. The most explosive growth of the pandemic occurred during the middle of the 1990s, especially in sub-Saharan Africa. Today, an estimated 34–46 million people are living with HIV/AIDS. Two-thirds of the total live in Africa, where about one in 12 adults is infected, and one-fifth in Asia. Globally, unprotected sexual intercourse between men and women is the predominant mode of transmission of the virus.

The chapter explains why WHO, along with its partners, believes an emergency global and comprehensive response is essential and must embrace prevention, treatment and long-term care. Prevention is essential to protect the many millions of young adults and children who are most at risk but who are not yet affected. Treatment is the difference between life and death for the millions of people who are HIV-positive but are currently denied access to antiretroviral medications. Long-term care is also essential. Almost 6 million people need treatment now – only about 400 000 received it in 2003. The chapter argues that a treatment gap of such dimensions is indefensible, and that narrowing it is a public health necessity.

Together, prevention, treatment and long-term care and support can reverse the seemingly inexorable progress of the HIV/AIDS epidemics, offering the worst-affected countries and populations their best hope of survival.

Chapter 2. The treatment initiative

This chapter stresses the need for a comprehensive strategy that links prevention, treatment, research, and long-term care and support for people living with HIV/AIDS. But it points out that until now, treatment has been the most neglected component of this approach in much of the developing world. To accelerate prevention while limiting the social devastation now unfolding, rapid expansion of HIV/AIDS treatment with antiretroviral medicines in the countries hardest hit by the pandemic is needed immediately.

Despite mounting evidence that this treatment works in resource-poor settings, by late 2003 less than 7% of people in developing countries in urgent need were receiving it. The chapter examines public health arguments and economic and social arguments for scaling up antiretroviral therapy. It then presents WHO’s strategy for working with countries and partners to reach the treatment target and provides an estimate of the global

investment required. It explains the five pillars that support the strategy. These are: global leadership, strong partnership and advocacy; urgent, sustained country support; simplified, standardized tools for delivering antiretroviral therapy; effective, reliable supply of medicines and diagnostics; and rapid identification and reapplication of new knowledge and successes.

The opportunities and challenges facing selected countries are explored, highlighting the need to ensure that treatment scale-up reaches the poorest people. Finally, the chapter considers the wider importance of expanded treatment as a new way of working across the global health community for improved health outcomes and equity.

Chapter 3. Community participation: advocacy and action

The participation of communities and civil society groups, particularly groups of people living with HIV/AIDS, is crucial to treatment scale-up and comprehensive HIV/AIDS control. This participation will include both advocacy and the involvement of community members in delivering services and support to patients. Community involvement is essential to prevention, treatment, care, support and research.

This chapter describes the background of community participation as a dimension of public health work and recalls key achievements of civil society HIV/AIDS activism. It then considers the roles that civil society groups and community members will play in scaling up antiretroviral therapy in resource-poor settings.

State leadership will be indispensable to successful scale-up, and civil society cannot replace the public sector. But a key task of effective government leadership will be creating partnerships with civil society organizations and mechanisms to make use of the skills available within communities. The commitment to community participation links the treatment strategy with the Health-for-All vision and an equity-based agenda in global public health. The values of human rights, health equity and social justice embraced by many civil society AIDS activist groups are closely related to WHO's constitutional objective: "the attainment by all peoples of the highest possible level of health". This chapter shows that these values provide a basis for ongoing collaboration and partnerships between communities, civil society groups, national governments and international organizations, including WHO.

Such collaboration will be crucial to future health progress. The role of the 3 by 5 initiative in catalysing innovative partnerships is part of how it is changing ways of thinking and working in global health. For example, communities educated and mobilized around HIV/AIDS control will be better able to take part in health promotion, disease control and treatment efforts regarding health problems related to other Millennium Development Goals: to combat malaria and other diseases, maternal and child mortality, and the growing burden of chronic adult diseases in low-income and middle-income countries.

Chapter 4. Health systems: finding new strength

Health sector interventions against HIV/AIDS – especially the treatment initiative – are dependent on well-functioning health systems. In countries with a high burden of HIV/AIDS, systems are often degraded and dysfunctional because of a combination of underfunding and weak governance. HIV/AIDS places additional burdens on these weakened health systems.

The 3 by 5 initiative has the potential to strengthen health systems in a number of ways, by, for example, attracting resources to the health system in addition to those required for HIV/AIDS, stimulating investment in physical infrastructure, developing procurement and

distribution systems of generic application, and fostering interaction with communities which can benefit a wide range of health interventions. It is important that any potentially adverse effects on the wider health system are anticipated and minimized.

The chapter continues with a consideration of the health systems context in resource-poor settings, taking note of the participation of both public and private providers. It then considers how health systems can be strengthened, so that they can implement the expanded treatment initiative while continuing to improve and expand many other health interventions. The conceptual framework of the four main functions of health systems is used: leadership, service delivery, resource provision, and financing. In the medium term, the financing gap will have to be closed mainly by external donors, because national governments and economies are incapable of generating much more than they do already, whereas donors, aware of their past pledges, can be encouraged to do more.

Chapter 5. Sharing research and knowledge

This chapter records that, since scientists first identified the human immunodeficiency virus as the cause of AIDS in 1983, there have been many remarkable research achievements related to the disease and many people have benefited. Twenty years ago there was little effective treatment; today there is a range of antiretroviral drugs that dramatically improve patients' quality of life and chances of survival.

Despite significant advances, however, including the design and testing of more than 30 candidate HIV vaccines, it will be several more years at least before a safe and effective vaccine becomes widely available. In examining that continuing quest, the chapter also reviews research into other important areas of HIV/AIDS prevention, treatment and care.

There are four broad categories of challenges facing researchers.

- Prevention research – slowing down the growth and geographical expansion of the epidemic: a challenge for epidemiology and sociobehavioural aspects of prevention.
- Vaccine research – designing a safe and effective preventive vaccine, the best hope for the long-term prevention and control of HIV/AIDS.
- Treatment research – generating new antiretroviral drugs and designing new therapeutic strategies that would be active on "wild" and resistant strains of viruses, easy to take and better tolerated than currently available drugs: a challenge for basic and clinical research.
- Delivery system (operational) research – making care and antiretroviral treatment available to all of those who need it worldwide: a multidisciplinary undertaking.

The chapter examines important matters such as the prevention of HIV transmission from mother to child; the development and use of microbicides; the need to sustain long-term adherence to treatment; toxicities; drug resistance; joint approaches to HIV/AIDS and tuberculosis; economic issues; health policy analysis; equity issues; and international collaboration. The chapter leads on to the report's brief concluding section, which contains an optimistic view of the future. It emphasizes that a crucial moment has been reached in the history of HIV/AIDS, and that there is now an unprecedented opportunity to alter its course. Ahead lies the challenge of extending lifelong treatment to many more millions of people, while simultaneously building and sustaining the health infrastructures to make that huge task possible. The outcome can be better health for generations to come.



chapter one

a global emergency: a combined response

This chapter outlines the current state of the global HIV/AIDS pandemic and explains why an international response is needed. It describes some of the tragic social and economic consequences of the disease, including its destructive impact on health systems. The response must embrace prevention, support, treatment and long-term care. Together, these components can effectively combat the seemingly inexorable progress of HIV/AIDS epidemics, offering the worst-affected countries and populations their best hope of survival. Comprehensive action will accelerate progress towards all the Millennium Development Goals while offering an opportunity to help strengthen health systems.

THE GLOBAL SITUATION

Although it has seemed a familiar enemy for the last 20 years, HIV/AIDS is only now beginning to be seen for what it is: a unique threat to human society, whose impact will be felt for generations to come. Today, an estimated 34–46 million people are living with HIV/AIDS. Already, more than 20 million people have died from AIDS, 3 million in 2003 alone (1). Four million children have been infected since the virus first appeared. Of the 5 million people who became infected with the virus in 2003, 700 000 were children, almost entirely as the result of transmission during pregnancy and childbirth, or from breastfeeding.

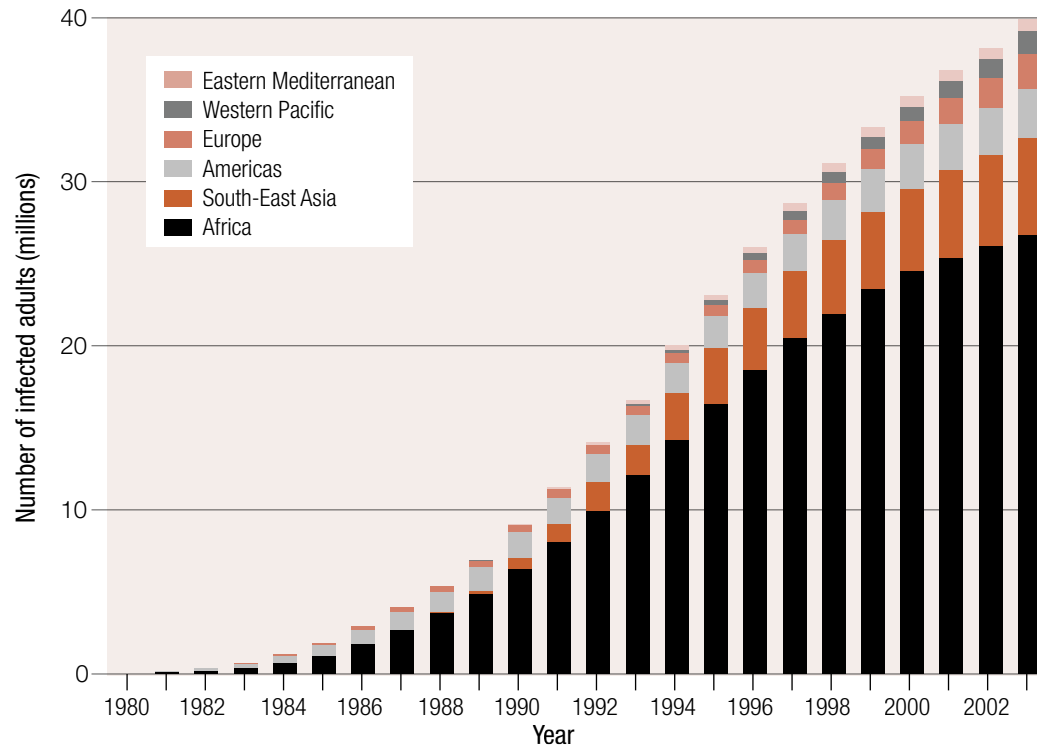
The most explosive growth of the epidemic occurred in the mid-1990s, especially in Africa (see Figure 1.1). In 2003, Africa was home to two-thirds of the world's people living with HIV/AIDS, but only 11% of the world's total population. Today, about one in 12 African adults

is living with HIV/AIDS. One-fifth of the people infected with HIV live in Asia.

Globally, unprotected sexual intercourse between men and women is the predominant mode of transmission of the virus. In sub-Saharan Africa and the Caribbean, women are at least as likely as men to become infected.

Other important modes of transmission include unprotected penetrative sex between men, injecting drug use, and unsafe injections and blood transfusions. In many countries, including most countries in the Americas, Asia and Europe, HIV infection is mainly concentrated in populations engaging in high-risk behaviour, such as unprotected sex (particularly in the context of commercial sex work or between men) and sharing of drug injection

Figure 1.1 Estimated number of adults infected with HIV, by WHO region, 1980–2003



equipment. In such situations, however, there is a persistent threat that localized epidemics will spill over into the wider population. In some countries, rapid growth of the size of the vulnerable populations – as a result of civil unrest, a rise in poverty or other social and economic factors – triggers epidemic growth and wider spread of the virus.

The prolonged time lag between infection with HIV and the onset of full disease (on average 9–11 years in the absence of treatment) means that the numbers of HIV-associated tuberculosis cases, AIDS cases and deaths have only recently reached epidemic levels in many of the severely affected countries. Globally, the greatest mortality impact is on people between the ages of 20 and 40 years. Dramatic changes in life expectancy can be observed in the most affected parts of the world. The pandemic has reversed decades of gradual gains in life expectancy in sub-Saharan Africa (2).

What does the global state of the pandemic mean in terms of progress towards the Millennium Development Goals? The eight goals, established following the historic Millennium Summit in New York in 2000, represent commitments by governments throughout the world to do more to reduce poverty and hunger and to tackle ill-health; specifically, to improve access to clean water and to reduce gender inequality, lack of education, and environmental degradation. This includes combating HIV/AIDS, and to have begun to reverse the spread of HIV by 2015. However, progress is not yet being made in many countries, and an unprecedented effort will be required in order for the worst-affected countries to make progress towards all of the Millennium Development Goals (see Box 1.1).

The uneven spread of HIV

A brief analysis of the regional spread of the HIV/AIDS pandemic shows major differences between regions, within regions and within countries, which have important implications for prevention, care and support. The striking differences in the size of the epidemics in sub-Saharan Africa and other regions of the world have been well documented. While almost all countries in sub-Saharan Africa have been severely affected, widening variations are also emerging within the region, indicating that the consequences of the pandemic will vary substantially (10).

The trends in HIV prevalence among pregnant women attending the same antenatal clinics since 1997 (see Figure 1.2) show that the epidemics in the countries of southern Africa are much larger than elsewhere in sub-Saharan Africa – and that the gaps appear to be widening. In eastern Africa HIV prevalence is now less than half that reported in southern Africa and there is evidence of a modest decline. In western Africa prevalence is now roughly one-fifth of that in southern Africa and no rapid growth is occurring. These striking differences are supported by data from population-based surveys and research studies (see Box 1.2). A range of socioeconomic, cultural, behavioural and biological factors are responsible, such as migration, male circumcision practices and the prevalence of herpes simplex virus type 2 infection (12, 13).

In most countries in Asia the epidemics tend to be concentrated in drug injecting and commercial sex networks, although Cambodia, Myanmar, Thailand and six

Box 1.1 The impact of HIV/AIDS on the Millennium Development Goals

HIV/AIDS epidemics are reducing the chances of achieving the Millennium Development Goals and targets for many heavily burdened countries, especially in sub-Saharan Africa.

The epidemics undermine poverty reduction efforts by sapping economic growth, thus hampering efforts to reach **Goal 1, to eradicate extreme poverty and hunger**. They have cut annual growth rates by 2–4% per year in Africa (3). But the cumulative long-term macroeconomic effects may be much more devastating and could result in complete economic collapse in some high-burden countries.

Educational opportunities recede as HIV/AIDS cuts family incomes and forces people to spend money on medical care and funerals, thus affecting the chances of reaching **Goal 2, to achieve universal primary education**. For example, in Uganda, 80% of the children in HIV/AIDS-affected households in one village were removed from school because school fees could not be paid or the children's labour was needed (4). In Zambia, the number of teachers killed by AIDS in 1998 was equivalent to two-thirds of the number of teachers trained in the same year (5). Globally, HIV/AIDS is creating millions of orphans with even fewer educational opportunities.

In addition to killing millions of women, HIV/

AIDS adds to the caregiving burdens of women and girls, reducing their chances of pursuing education and paid work, and hence undermining **Goal 3, to promote gender equity and empower women**. Girls are often required to care for their sick brothers and sisters at the expense of their own education. HIV-positive women face many forms of discrimination and psychological and physical abuse.

In the seven African countries with the highest adult HIV prevalence, AIDS has already produced a rise of more than 19% in infant mortality and a 36% rise in under-five mortality, thereby reducing many countries' chances of reaching **Goal 4, to reduce child mortality**. In Botswana, the under-five mortality rate will reach 104 deaths per 1000 live births by 2005. In the absence of HIV/AIDS, the rate would have been 45 deaths per 1000 (6).

The disease reduces the chances of reaching **Goal 5, to reduce maternal mortality**. In Rakai, Uganda, maternal mortality was found to be 1687 per 100 000 live births among HIV-positive women and 310 per 100 000 live births among HIV-negative women (7).

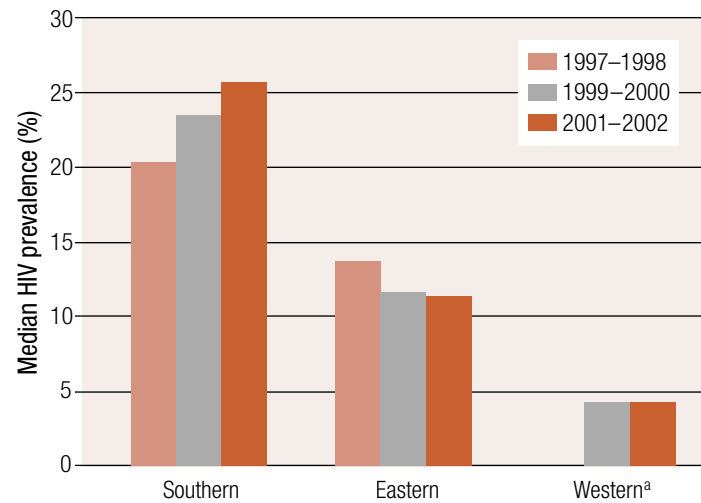
HIV infection also directly increases the risks of developing tuberculosis, and in HIV/AIDS-affected countries it is on the rise. In Malawi, for example, the incidence of tuberculosis

doubled between 1986 and 1994, largely because people living with HIV/AIDS are seven times more likely to develop tuberculosis than those who are not infected with the virus (8). In Uganda, HIV-infected women were more likely to develop malaria during pregnancy than HIV-negative women. The same study found that the mother-to-child HIV transmission rates were 40% among women with placental malaria compared with 15.4% for women without malaria (9). Thus the pandemic also adversely affects the chances of contending with malaria and other diseases, as part of **Goal 6, to combat HIV/AIDS, malaria and other diseases**.

One target of **Goal 7, to ensure environmental stability**, is significant improvement in at least 100 million slum dwellers' lives by 2020. However, HIV/AIDS is likely to threaten many millions of them.

All goals depend on **Goal 8, to develop a global partnership for development**. This goal links donors, governments, civil society and the private sector. HIV/AIDS is undermining progress here, for example through its decimation of countries' skilled workforces. Providing access to essential medicines is a key target. Expanding HIV/AIDS treatment will be vital to progress.

Figure 1.2 HIV prevalence among pregnant women attending antenatal clinics in areas of sub-Saharan Africa, 1997–2002



^a No estimate available for 1997–1998.

states in India have an estimated HIV prevalence among adults of more than 1%. The course of the epidemics in the two most populous countries in the world – China and India – will have a decisive influence on the global pandemic. In 2003 it was estimated that 840 000 people in China were living with HIV/AIDS, corresponding to 0.12% of the total adult population aged 15–49 years. About 70% of these infections are thought to have resulted from injecting drug use or faulty plasma-collection procedures; over 80% of all those infected are men. Official estimates in India for 2003 put the number of people infected at 3.8–4.6 million, with considerable variation between states; there has been a modest increase in recent years.

Countries in eastern Europe and central Asia are experiencing growing epidemics, driven by injecting drug use and to a lesser extent by unsafe sex among young people. In

the Russian Federation, where national prevalence is estimated to be just under 1%, 80% of people living with HIV/AIDS are under 30 years of age. In western Europe, the estimated number of new infections greatly exceeds the number of deaths, largely as a result of the success of antiretroviral therapy in lowering death rates. There are, however, worrying signs of increased incidence of other sexually transmitted infections, such as syphilis and gonorrhoea, and reported increases in risk behaviours in several countries (14, 15).

In the WHO Eastern Mediterranean Region it is estimated that there are around 750 000 people living with HIV/AIDS. Heterosexual sex is the main mode of transmission, accounting for nearly 55% of all reported cases. Injecting drug use has an increasing role in transmission and in the near future may become the driving force of the epidemics. A fivefold increase in infections among injecting drug users between 1999 and 2002 was recorded. In Sudan, the most affected country in the region, heterosexual sex is the predominant mode of spread.

In the Americas, the most affected area is the Caribbean, which has the second-highest prevalence in the world after sub-Saharan Africa: overall adult prevalence rates are 2–3%. In Latin America, an estimated 1.6 million people are now infected. Most countries here have concentrated epidemics, with injecting drug use and sex between men as the predominant modes of transmission. The predominant mode of transmission in the Caribbean is heterosexual sex, often associated with commercial sex work. In Central America, prevalence rates have been growing steadily and most countries there are facing a generalized epidemic. In the United States of America, 30 000–40 000 new infections occur every year, with African-Americans and Hispanics the most affected populations.

Rises in mortality, reductions in life expectancy

In many countries there is evidence of a reversal of the declines in child mortality achieved during the 1990s, especially in those most severely affected by HIV/AIDS.

These reversals indicate the adverse impact of HIV/AIDS on the Millennium Development Goal of reducing child mortality. Once again, however, large variations between African countries in their HIV-prevalence trends and levels of child mortality not associated with HIV will mean very different impacts in different places. It has been estimated that HIV/AIDS was the primary cause of about 8% of deaths in under-fives in sub-Saharan Africa in 2001 (16).

In the absence of vital registration and reliable cause-of-death information, evidence on the impact of HIV infection on child mortality is limited. It is known, however, that even before the introduction of antiretroviral therapy the progression of disease among children infected with HIV in Europe and the USA was considerably slower than that observed in Africa. In western and eastern Africa the median survival time is less than two years, compared with well over five years in developed countries (17).

The most dramatic effect of the HIV/AIDS epidemic has been on adult mortality (18). In the worst-affected countries of eastern and southern Africa, the probability of a 15-year-old dying before reaching 60 years of age has risen sharply – from 10–30% in the mid-1980s to 30–60% at the start of the new millennium. In community-based studies in eastern Africa, mortality among adults infected with HIV was 10–20 times higher than in non-infected individuals (19). Overall, the greatest difference in mortality between infected and uninfected people is usually observed between the ages of 20 and 40 years. Women tend to die at an earlier age than men, reflecting the fact that the rates of HIV infection typically peak among women 5–10 years earlier than they do in men. The most reliable estimates of the median survival time following infection with HIV have come from the Masaka study in Uganda (20) where the figure was of the order of nine years – two years less than that observed in developed-country cohort studies even before the advent of effective treatment.

Vital registration systems, national censuses, demographic surveys and demographic surveillance systems have provided information on mortality trends (18). Census and survey data from Kenya, Malawi and Zimbabwe have revealed steadily rising adult

Box 1.2 HIV estimates and population-based surveys

Estimating accurately the number of people living with HIV/AIDS is important for purposes of advocacy, programme planning and evaluation. The estimates for countries with generalized epidemics are based on data generated by surveillance systems that focus on pregnant women attending sentinel antenatal clinics. For countries with concentrated epidemics, the estimates are based on data on HIV prevalence in both high-risk and wider populations.

Recently, several countries have conducted national population-based surveys that include HIV testing, and many more countries plan to do so in the near future. Demographic and health surveys have included HIV testing in the Dominican Republic, Kenya, Mali and Zambia. National surveys with HIV testing have also been conducted in Burundi, Niger, South Africa and Zimbabwe. HIV prevalence is generally lower in the population-based surveys

than the existing estimates based on antenatal surveillance.

Nationally representative surveys have important advantages over antenatal surveillance, as they provide data on a wider sample of the population and especially on rural populations, which are often underrepresented in antenatal clinic surveillance systems. UNAIDS and WHO adjust data to correct for the underrepresentation of populations with lower prevalence, but this may not have been enough.

Population-based surveys vary in their methodologies, sampling approaches, biological sample collection methods, HIV testing strategies, and ways to deal with ethical issues and incentives for participation. Non-response rates at the household and individual levels complicate the interpretation of results. In particular, absence from the household is likely to be associated with higher HIV preva-

lence. In general, survey-based estimates can be expected to be somewhat lower than the true prevalence.

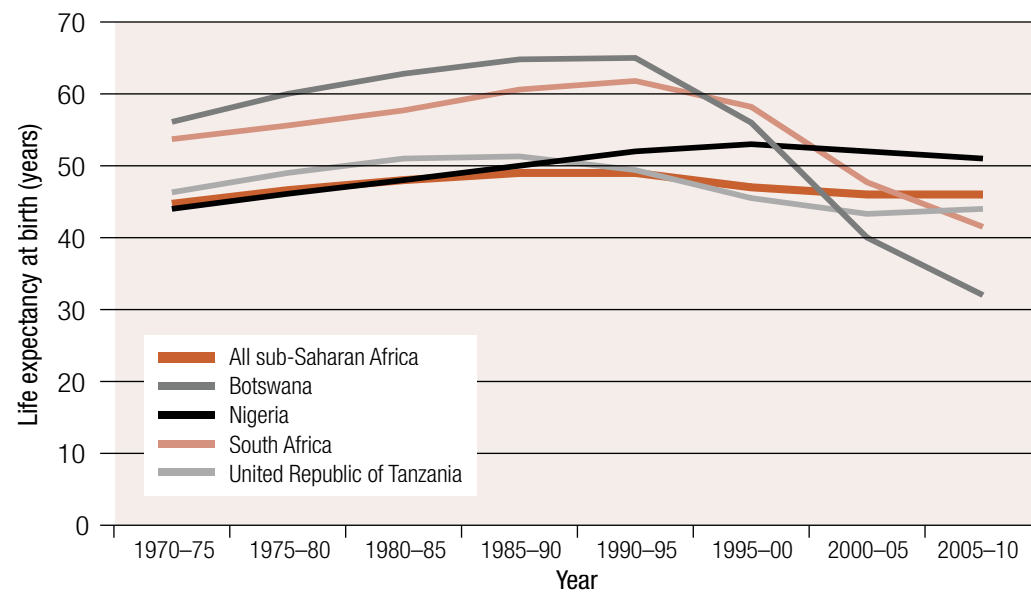
All estimates need to be critically appraised. A single method or data source will not usually provide the best estimate of HIV prevalence. The value of antenatal clinic-based surveillance lies primarily in the assessment of trends, and surveys conducted at 4–5-year intervals will help to improve estimates. High-quality population-based surveys can improve the assumptions that are used to estimate national levels of prevalence, for example assumptions related to rural adjustment and the computation of male prevalence. The results of population-based surveys point to the improvements needed in national HIV surveillance systems (11).

mortality throughout the 1990s. In Kenya, the probability of dying between the ages of 15 and 60 years rose from 18% in the early 1990s to 48% by 2002 (see Annex Table 1). In Malawi the figure is now 63%; it was less than 30% in the early 1980s. In Zimbabwe, the 1997 probabilities of 50% for women and 65% for men have risen to an overall 80%. There is evidence that in Thailand and Trinidad and Tobago there have been increases in mortality, even though the prevalence of HIV infection is considerably lower in those countries than in most of Africa. In Thailand, for example, the crude mortality rate for those aged 15–49 years almost doubled from 2.8 to 5.4 per thousand between 1987 and 1996.

The advent of the HIV/AIDS pandemic has reversed the gains in life expectancy made in sub-Saharan Africa, which reached a peak of 49.2 years during the late 1980s and which is projected to drop to just under 46 years in the period 2000–2005 (2) (see Figure 1.3). This turnaround is most dramatic in those severely affected countries in southern Africa that had relatively high life expectancy prior to the appearance of HIV/AIDS. In Botswana, for example, life expectancy decreased from nearly 65 years in 1985–1990 to 40 years in 2000–2005; in South Africa it is expected to drop from over 60 years to below 50 years. The United Republic of Tanzania (whose epidemic is less than half the size of that in South Africa) is likely to have experienced a decline in life expectancy from 51 to 43 years in the last 15 years. In Nigeria (where the epidemic is about half the size of that in the United Republic of Tanzania) the gradual improvements that were being made have stalled.

Overall, life expectancy at birth in the African Region was 48 years in 2002; it would have been 54 years in the absence of HIV/AIDS. In the countries of southern Africa life expectancy would have been 56 years instead of 43 years (see Figure 1.4).

Figure 1.3 Trends in life expectancy in sub-Saharan Africa and selected countries, 1970–2010



Source: (21).

THE DEADLY INTERACTION: HIV/AIDS AND OTHER DISEASES

The interaction of HIV/AIDS with other infectious diseases is an increasing public health concern. In sub-Saharan Africa, for example, malaria, bacterial infections and tuberculosis (TB) have been identified as the leading causes of HIV-related morbidity (22). HIV infection increases both the incidence and severity of clinical malaria in adults (23). In some parts of Africa, falciparum malaria and HIV infection represent the two most important health problems.

The pandemic has brought about devastating changes in the epidemiology of TB, especially in Africa where about one-third of the population is infected with TB but does not necessarily have the disease (it is dormant). However, by the end of 2000 around 17 million people in Africa and 4.5 million people in south-east Asia were infected with both TB and HIV (24). A high proportion of these people can be expected to develop active TB unless they receive treatment (25), because HIV, by weakening the immune system, greatly increases the likelihood of people becoming ill with TB.

In African countries with high rates of HIV infection, including those with well-organized control programmes, case-notification rates of TB have risen more than fourfold since the mid-1980s, reaching more than 200 cases per 100 000 population in 2002 (25). In the USA, 16% of TB cases have been attributed to the virus.

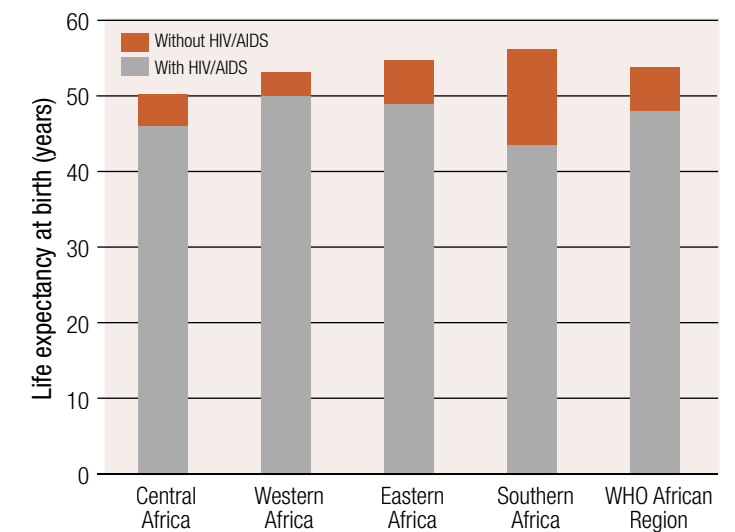
In parts of Asia and eastern Europe, the number of people coinfecting with multidrug-resistant TB and HIV is also likely to increase. In India, for example, where an estimated 1.7 million adults in 2000 were coinfecting with TB and HIV, there is a multidrug resistance rate of up to 3% of previously untreated TB patients.

THE AIDS TREATMENT GAP

The situation outlined above shows the devastating effects of the virus on the health of the world's people. But the effects are not evenly felt, and are often concentrated in the very places where treatment is least likely to be available. Overall, coverage with antiretroviral drugs is extremely low. In 2003, the estimated number of people worldwide needing treatment because they were in advanced stages of infection was nearly 6 million, although the numbers must be interpreted cautiously and the uncertainty range is large (4–8 million).

In 2003, about 400 000 people received treatment. Coverage is lowest in the African Region, where the burden is highest and only an estimated 100 000 people are receiving treatment: a coverage of 2%. Some 34 countries accounted for more than 90% of the number of adults in need of treatment in 2003. South Africa accounts for almost one in six people in need of treatment. Half of the global treatment needs are located in just seven countries: India and six countries in the WHO African Region.

Figure 1.4 Life expectancy in Africa, with and without HIV/AIDS, 2002



THE HUMAN, SOCIAL AND ECONOMIC CONSEQUENCES

Epidemics of disease are like famines, wars and natural catastrophes in one major respect: they invariably bring further disasters in their wake. Globally, HIV/AIDS epidemics are already having a disastrous domino effect. Millions of children are orphaned, communities are destroyed, health services are overwhelmed, entire countries face hunger and economic ruin.

The disease affects the poor most severely: they are the most vulnerable to infection, and the poorest families are hardest hit by the suffering, illness and death caused by the disease. The effects include devastating financial hardships that lead in turn to further tragic consequences. The disease forces poor families deeper into poverty, and it also condemns households that were relatively wealthy to a similar fate.

Large-scale negative changes to patterns of economic and social behaviour are likely to result from the epidemic's impact on population structure and adult life expectancy (26). Beyond the loss of income and the diversion of income to health expenditures, families resort to various "coping" strategies with negative long-term effects, including migration (27), child labour, sale of assets and spending of savings. Families suffering from the illness or death of one or more of their members experience both the direct costs of medical and funeral expenditures and the indirect costs of the impact of the illness on productivity (28, 29).

HIV/AIDS is changing the very structure of populations. There are increased dependency ratios in many African countries, for example, with smaller numbers of working-age adults on whom both children and elderly relatives depend; a situation that is becoming more severe.

The psychological effects on young people of seeing their immediate elders dying in huge numbers at such young ages, and consequent fears for their own future, are immense and will have profound effects on economic development. Moreover, as parents (most of them young adults) die prematurely, they fail to hand on assets and skills to their children. In this way, HIV/AIDS weakens the process through which human capital – people's experience, skill and knowledge – is accumulated and transmitted across generations (30).

The crisis of children having lost either or both parents to HIV/AIDS has been afflicting Africa for a decade, and will get worse. Today there are about 14 million such children in the world of whom the vast majority are in Africa, but the projected total number will nearly double to 25 million by 2010 (31, 32), a nation of children equal to the total population of Iraq. At that point, anywhere from 15% to 25% of the children in a dozen sub-Saharan countries will be orphans. Even in countries where HIV prevalence has stabilized or fallen, such as Uganda, the numbers of orphans will continue to rise as parents already infected continue to die from the disease. When orphans were relatively few, they could be cared for by extended families, but the numbers are now too great and many children end up living on the street.

Women: unequally at risk

Women in many countries are already facing severe hardships resulting from inequality, discrimination and victimization, and HIV/AIDS often exacerbates the hardships. In fact, these very factors help explain why women suffer disproportionately from the disease. About 58% of all people living with HIV/AIDS in the WHO African Region are women. They are infected at younger ages than men by, on average, 6–8 years. Young women are often forced into unequal sexual relationships and are frequently unable to negotiate safer sex. The unequal losses of life among women resulting from this

situation will create an imbalance in the adult population, with consequences that are unknown. One likely and ominous outcome, however, is that mature men will seek younger and younger women as partners, which in turn intensifies some of the risk factors for HIV spread.

The underestimated economic threat

In many countries, the cumulative effects of the epidemics could have catastrophic consequences for long-term economic growth and seriously damage the prospects for poverty reduction. Until recently, most experts believed that a generalized HIV/AIDS epidemic at 10% adult prevalence would reduce economic growth by about 0.5% per year (33). Several country-based studies have suggested that HIV/AIDS epidemics result in a reduction in gross domestic product (GDP) of around 1%, but recent economic studies and estimates suggest a much bleaker picture of current and future economic effects (30, 34).

A daughter's story



Gideon Mendel/Network

While being treated for tuberculosis at Ngwelezane Hospital, KwaZulu-Natal, South Africa, Samkelisiwe Mkhwanazi was diagnosed with HIV/AIDS. After leaving hospital she stayed for three months with a traditional healer and was treated with herbal medicines, but her condition did not improve.

Samkelisiwe, 30 years old, would normally be responsible for taking care of her child and her mother, Nesta, but now she has become dependent on her mother again. "I want to be with her until I die," she

says. The entire family relies on Nesta, who must look after everyone, including Samkelisiwe's late sister's children (see Nesta's story in Chapter 5).

Samkelisiwe is just one of approximately 6 million people in developing countries who need urgent treatment with antiretroviral drugs. With health care systems that are unable to cope, most people living with HIV/AIDS must rely on their family or community for care.

Studies previously misinterpreted the effects of epidemics as being similar to those caused by one-off shocks, such as natural disasters or international economic downturns, which many economies can absorb and which are beyond the control of planners. Predictions have also frequently reflected assumptions that the worst-hit countries in Africa had an excess of labour, and suggested that a contraction in work-force numbers might lead to more efficient use of land and capital. The belief was that GDP per capita would actually increase if a fall in GDP were lower than the fall in population. Similarly, it had been thought that the destruction of the labour force and hence the reduction in labour supply caused by HIV/AIDS could result in an increase in the productivity of each remaining worker because each would have more land and capital with which to work. The result of these misinterpretations and assumptions was a widespread failure nationally and internationally to revise economic policies to take account of HIV/AIDS.

HIV/AIDS will have long-term and widespread effects that will last for generations, and which do not reveal themselves in many economic studies. Ill-health and premature death lead to wasted investment in human capital and globally reduce the incentives to invest in building for the future. An inadequate response to HIV/AIDS will allow the disease to continue to destroy education systems and other vital institutions, reduce human capital and the ability to transmit it, and contribute to a long-term decline in savings and investment. There will therefore be substantial benefits in responding to epidemics – even those of low prevalence.

The threat of institutional collapse

The implications of reduced life expectancy in adults for societies heavily burdened by HIV/AIDS are becoming clear, though previous poor performance of institutions has sometimes obscured the specific impact of HIV/AIDS (35). Institutional malfunctioning in Africa, for example, has been concealed by long-running inefficiency and low performance expectations. The survival and functioning of institutions in a number of southern African countries are now threatened. Incapacity is critical. Already there are major shortages of qualified personnel in key organizations. Posts are vacant or occupied on an “acting” capacity. Continuity of staff is low because of deaths and the reshuffles they occasion. Morale is equally low. Numerous studies and anecdotal evidence point to the slowing down and near paralysis of agricultural services, judiciaries, police forces, education systems and health services.

Many African businesses have also been severely affected by reduced labour supply, especially the loss of experienced workers in their most productive years, increased absenteeism, reduced profitability and loss of international competitiveness (36). Threats to regional security caused by the epidemic are another example of indirect impacts that may negatively affect economic activities such as tourism (37) or inflows of foreign investment (38).

Across southern and eastern Africa, the education sector is suffering as the loss of teachers exceeds those being trained (39). This is not only a result of AIDS-related illness and death: some teachers are being hired by the private sector, which is also in need of skilled personnel, while others are migrating. The effects are masked by the fact that fewer children enrol in school because HIV/AIDS-affected families cannot afford school fees or need their children to work at home. The result will be lower educational achievement, with negative implications for efforts to reduce poverty, improve gender relations and decrease HIV transmission, and for the overall health of those who survive. The effort to enrol all children in school by 2015 (one of the Millennium

Development Goals) is being undermined with long-term negative consequences.

One of the many tragedies of HIV/AIDS is that it often strikes hardest where health systems are weakest, and deals a double blow. Systems that in any case cannot cope are weakened further by HIV/AIDS deaths and disability among large numbers of health personnel (see Chapter 4). In low-income countries which were already suffering from a lack of health care workers, health care systems are overburdened. In Côte d'Ivoire and Uganda, 50–80% of adult hospital beds are occupied by patients with HIV-related conditions. In Swaziland, the average length of stay in hospital is six days, but in 80% of cases increases to 30 days for patients with tuberculosis associated with HIV (40).

The impact of HIV/AIDS on the health sector is often enormous. The severity and complexity of clinical opportunistic conditions are associated with high hospitalization rates, inpatient mortality and increasing treatment costs. In some sub-Saharan countries, the rate of general hospital bed occupation by AIDS patients is frequently higher than 50%. The introduction of antiretroviral therapy, however, has been shown to lead to a sharp reduction in HIV/AIDS-related mortality, morbidity and care expenditures, with substantial improvements in the quality of life of patients. Chapter 4 deals at length with the key issues linking HIV/AIDS, health systems and treatment expansion.

Given the daunting social and economic consequences of the spread of HIV, the need for effective and wide-ranging methods of prevention is as clear as it has been since the very first days of the epidemic in the 1980s. The next section looks at the current range of prevention and care strategies in play around the world.

PREVENTION, CARE AND SUPPORT: STRATEGIES FOR CHANGE

HIV/AIDS may not be curable, but it is certainly preventable and treatable. It has been estimated that almost two-thirds of the new infections projected to occur during the period 2002–2010 can be prevented if the coverage of existing HIV prevention strategies is substantially increased (41). Prevention efforts can and do work to halt the spread of the virus, and real advances in treatment hold out the hope of longer and better lives for those already infected. Scaling up treatment must become a way to support and strengthen prevention programmes. Careful integration of prevention and treatment services will ensure that those who test positive are linked to counselling and treatment, which can lead them to protect others from infection (42). Furthermore,

Box 1.3 Prevention and treatment in Brazil and the Bahamas

The Brazilian experience shows that scaling up antiretroviral treatment enhances, rather than impedes, prevention efforts if they are scaled up simultaneously. Since 1996 (the year Brazil's universal antiretroviral drug distribution programme began), sexual behaviour, and more recently HIV prevalence, have been monitored among nearly 30 000 male army conscripts. In 1999–2002, over 80% of the conscripts were sexually active and the proportion with multiple partners remained steady; but HIV prevalence among the men was low (0.08%) and condom use was high

and increasing. In 1999, 62% of men reported condom use at last sexual intercourse, and in 2000 and 2002, 70% did so. Condom use with a paid partner in the previous year increased from 69% in 1999 to 77% in 2002.

The impact of prevention interventions was also observed among injecting drug users. The most significant reduction in the index of sexual risk behaviour was found in this group (43).

Similarly, in the Bahamas, the introduction of antiretroviral therapy has been accompanied by heightened prevention successes, in addition to significant reductions in deaths

(56% reduction in deaths from AIDS, including an 89% reduction in deaths among children). The success of prevention efforts is also evident from the fact that mother-to-child transmission of HIV was reduced from 28% to 3%; there was also a 44.4% reduction in new HIV cases, a 41% decline in HIV prevalence rate among patients being treated for sexually transmitted infections, and a 38% decline in HIV prevalence rate among pregnant women (44).

people who might otherwise be afraid to undergo testing are more likely to seek services for sexually transmitted infections and HIV/AIDS when they have access to treatment (see Box 1.3).

Preventing the sexual transmission of HIV

Prevention approaches can work in many populations, as long as they use evidence-based strategies, carefully tailored to the social and economic settings in which they are implemented and to the state of national HIV/AIDS epidemics. A comprehensive approach that supports social and individual rights, involves communities and is developed on the basis of their cultural values has been found to be effective when combined with the promotion of consistent condom use, voluntary testing and counselling for HIV, and delayed sexual initiation. Promotion of other strategies, such as abstinence and reduction in number of partners, also needs to be based on firm evidence.

Box 1.4 Cambodia and Thailand – successes and challenges

HIV infection in Asia remains largely confined to those people at higher levels of risk – sex workers, injecting drug users, men who have sex with men – and their sexual partners. Those at elevated risk represent anywhere from 7% to 25% of the adult population, making severe epidemics a possibility in all the countries of the region.

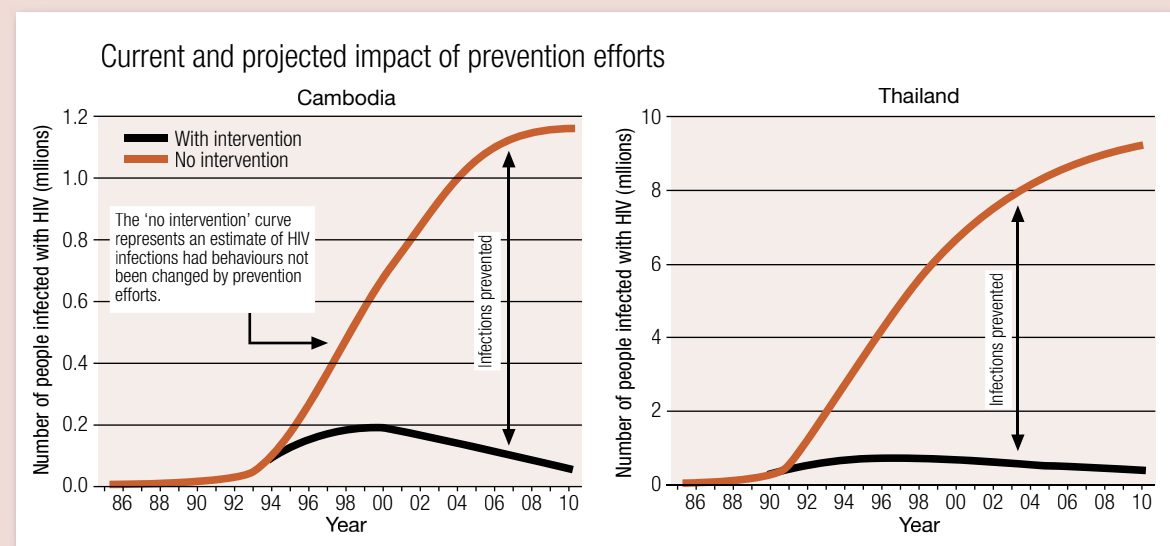
However, the focused nature of risk means in turn that focused prevention efforts with high coverage can slow or reverse the course of the epidemics. By mounting intensive, well-funded and extensive efforts to reduce the risks in sex work, Cambodia and Thailand have changed the course of their epidemics. In both countries, the role of sex work in HIV

transmission was realized early on and major nationwide prevention efforts were mounted, working not only with brothel owners and sex workers, but also reaching out to the large client populations – almost 20% of adult males in the early 1990s. In response to these programmes, condom use between sex workers and clients rose to more than 90%, and the number of men visiting sex workers was halved.

Using this Asian Epidemic Model, the East-West Center and its collaborators have explored the impacts of these prevention efforts. Without aggressive prevention programmes, it is estimated that both countries would now be looking at expanding epidemics with 10–15%

of their adult populations living with HIV/AIDS, instead of the declining epidemics of 2–3% currently seen.

But as one avenue of HIV transmission is closed off, others appear. Programmes for injecting drug users, men who have sex with men, and sexually active young people have been weak and ineffective to date. The epidemic among injecting drug users in Thailand continues unabated, condom use among young people remains low at around 20%, and there are HIV levels of around 15% in men who have sex with men. If the two countries are to sustain their past successes, they must adapt responses to be as effective and aggressive with new evolving patterns of risk (50, 51).



Level of social and economic development, and cultural factors such as gender inequality or access to education and health care, are all known to be obstacles to the successful implementation of prevention initiatives. Interventions that reduce the effects of such obstacles – by implementing measures that allow girls to stay in school for longer, for example – can have a lasting impact on rates of HIV transmission. The promotion of human rights, combined with behavioural change programmes, also helps (45, 46). Lessons learnt from various settings and communities show that the use of any chosen prevention measure requires that people not only have the proper knowledge but also the ability to apply it.

Consistent condom use demands a reliable distribution system to people who live in poverty or in difficult-to-reach areas (47). Interventions that have targeted populations at high risk such as men who have sex with men and female sex workers and their clients in Africa, Asia and Latin America are effective. In Abidjan (Côte d'Ivoire) and Cotonou (Benin), HIV prevalence among sex workers declined during the 1990s and the increased use of condoms contributed significantly to these declines (48, 49); similar changes have been observed in sex workers in Cambodia and Thailand (see Box 1.4). Evidence from a South African mining community showed that interventions among those most at risk increased condom use and greatly reduced rates of sexually transmitted infections – especially those most linked to HIV transmission – in the community (52).

Effective prevention programmes aimed at young people can teach them responsible and safe sexual behaviour, according to some of the latest research. Recent findings from Uganda indicate that young people have changed their behaviour considerably over the last few years, and that HIV prevalence among them has dropped (53).

Breaking the link with other sexually transmitted infections

Sexually transmitted infections increase the risk of HIV transmission by at least two to five times (49). They help drive the spread of HIV. If untreated, they not only increase the infectivity of HIV-positive individuals but also make those who are HIV negative more susceptible to infection. Early detection and treatment, and related efforts to reduce the prevalence of these infections, should therefore be an integral component of a comprehensive HIV prevention effort. The potential benefits are probably greatest in the early stages of a national HIV/AIDS epidemic when the virus spreads as a result of high rates of change of sexual partners, but evidence suggests that measures to control sexually transmitted infections have important effects even in more advanced epidemics.

Preventing infection in infants and children

Every year an estimated 2.2 million pregnant women infected with HIV give birth, and about 700 000 neonates contract HIV from their mothers. HIV transmission from mother to child may occur during pregnancy, labour and delivery, or during breastfeeding. In the absence of any intervention, 14–25% of children born to HIV-infected mothers become infected in developed countries, 13–42% in other countries (54). This disparity is mostly a result of different breastfeeding practices. It is estimated that 5–20% of infants born to HIV-infected women acquire infection through breastfeeding.

The most effective ways to prevent infection in infants and young children are to prevent HIV infection in women and to prevent unintended pregnancies among HIV-infected women. It is also possible, however, to prevent most cases of transmission

from HIV-infected pregnant women to their infants. Antiretroviral prophylaxis in combination with other interventions such as elective caesarean section before onset of labour and rupture of membranes, and refraining from breastfeeding, have now almost entirely eliminated HIV infection in infants in the developed world, with transmission rates below 2%. In developing countries where breastfeeding is the norm, the risk of HIV transmission to the newborn child can be more than halved by short-course antiretroviral regimens, though this reduction is not sustained where feeding practices to reduce risk are not adopted.

To reduce the risk of postpartum transmission of HIV through breastfeeding, WHO currently recommends that when replacement feeding is acceptable, feasible, affordable, sustainable and safe, HIV-infected mothers avoid all breastfeeding. Otherwise, exclusive breastfeeding is recommended during the first months of life. To minimize the risk of postpartum transmission, breastfeeding should be discontinued as soon as is feasible, taking into account local circumstances, the individual woman's situation and the risks posed by using replacement feeding, including infections other than HIV and malnutrition.

Although progress is now being made in the delivery of these low-cost and relatively simple interventions on a large scale in the most-affected countries, it has been slower than anticipated. Women must be encouraged and helped to attend antenatal care

facilities, to accept counselling and testing, to return for test results and to adopt safer infant feeding practices, and must be given access to correctly administered antiretroviral drugs. Current challenges include achieving a rapid increase in acceptance of HIV testing and counselling, integrating prevention of infection in infants and young children into maternal and child health services, and extending the prevention of mother-to-child transmission to include HIV-related care, treatment and support for HIV-infected mothers, their infants and family.

Injecting drug use – reducing the harm

There may be as many as 2–3 million past and current injecting drug users living with HIV/AIDS worldwide. There are HIV epidemics associated with such drug use in more than 110 countries. In the absence of harm-reduction activities, HIV prevalence among injecting drug users can rise to 40% or more within one to two years of the introduction of the virus into their communities. HIV transmission through the sharing of non-sterile injection equipment is augmented by sexual transmission among injecting drug users, and between them and their sex partners.

Injecting drug users should have access to services that help reduce the related risks of drug use and HIV infection. Drug treatment programmes should be accessible to those who want to stop using drugs or, through substitution therapy, to stop injecting. Harm reduction primarily aims to help injecting drug users to avoid the negative health consequences of injecting and to improve their health and social status. Interventions include projects that try to ensure that those who continue injecting have access to clean injection paraphernalia. One evaluation carried out in 99 cities showed a reduction in the risk of HIV transmission of 19% per year in cities with such projects (with no concomitant increase in drug use) compared with an 8% increase in cities without them (55).

Preventing transmission during health care

Improper blood-transfusion practices are another important route of parenteral HIV transmission. Policies and procedures are needed to minimize the risk of transmission through blood transfusion, including the creation of a national blood service, use of low-risk donors, eliminating unnecessary transfusions, and systematic screening of blood for transfusion.

Universal precautions in health care settings prevent the transmission of HIV and other bloodborne pathogens, and therefore increased access to safer technologies is needed. A review of published studies has shown that unsafe injections play a minor but significant role in HIV transmission in sub-Saharan Africa (56). Irrespective of the exact contribution to the HIV/AIDS pandemic, unsafe injections are an unacceptable practice and efforts should be increased in all health care settings to reduce the exposure of patients and carers to bloodborne infections.

Testing and counselling

The vast majority of people living with HIV/AIDS in low-income countries are unaware that they are infected. Testing is an essential means of identifying these people and beginning treatment, and for preventing infection in mothers and infants. It is also a critical component of a comprehensive strategy to prevent sexual transmission. Studies have shown that people who test positive for HIV tend to reduce risk behaviours (57). Joint counselling and testing sessions with couples may increase condom use.

Caring for HIV-positive infants in Moscow



Ilse Fiecht/lookat/Network

In eastern Europe and the former Soviet Union the number of HIV/AIDS cases has increased rapidly during the last decade. Unlike in most other regions, infection here is spread primarily through injecting drug use. Many women who become infected in this way transmit the virus to

their babies. These three infants are being cared for at a small clinic in the Orechovo-Zoejevo Hospital, Moscow. The clinic provides a home for HIV-positive children whose mothers have died or are unable to look after them.

There is an urgent need to scale up access to counselling and testing, which should be offered as standard practice. An HIV test should always be performed with informed consent and appropriate confidentiality. Testing and counselling services must keep pace with the current new treatment and prevention opportunities. The onus will increase on national governments to provide high-quality testing and counselling services. Such services should become a routine part of health care, for example during attendance at antenatal clinics, or at tuberculosis and sexually transmitted infection diagnosis and treatment centres.

To accelerate prevention and care, while limiting the social devastation now unfolding, rapid expansion of HIV/AIDS treatment in the countries hardest hit by the pandemic is a public health necessity. Treatment with antiretroviral medicines is effective and is much cheaper than a few years ago; it saves lives and will help to prevent the social and economic disasters outlined in this chapter. The necessary response is described in the following chapter, which deals with the bold initiative to deliver treatment to 3 million people with HIV/AIDS by the end of 2005 and explains how this can help strengthen health systems.

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chapter two

the treatment initiative

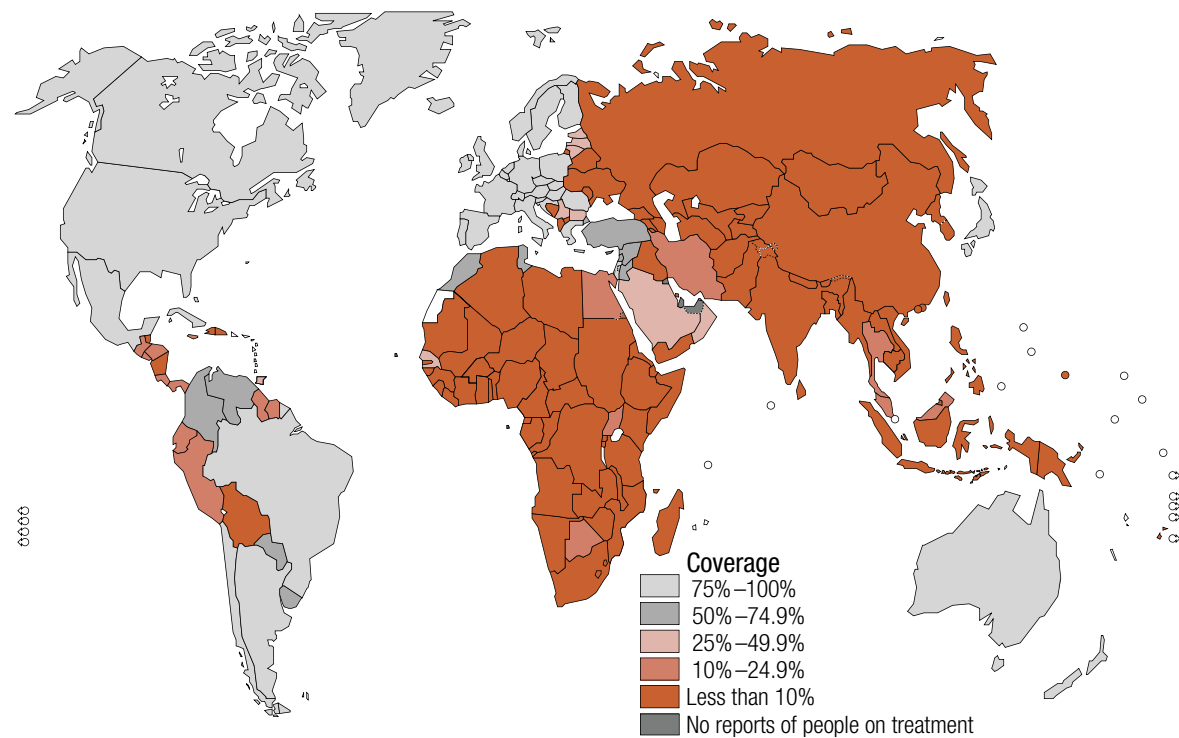
Chapter 1 showed the magnitude of the threat posed by HIV/AIDS. This chapter describes the magnitude of the task of responding to it and explains how WHO and its partners are supporting countries in one of the most ambitious endeavours in the history of public health. A comprehensive approach to HIV/AIDS links prevention, treatment and long-term care and support. In much of the developing world, however, treatment has until very recently been the most neglected component. It now needs to be rapidly expanded, along with accelerated prevention efforts, in the countries hardest hit by the pandemic.

Since 1996, more than 20 million people in the developing world have died of AIDS. If antiretroviral therapy had been rapidly deployed, most of these people would probably be alive today. Despite mounting political pressure and evidence that AIDS treatment works in resource-poor settings, by late 2003 less than 7% of people in developing countries in urgent need of antiretroviral drugs were receiving them (see Figure 2.1). In September 2003, LEE Jong-wook, Director-General of WHO, joined Peter Piot, Executive Director of UNAIDS, and Richard Feachem, Director of the Global Fund to Fight AIDS, Tuberculosis and Malaria, to declare the lack of access to antiretroviral therapy a global health emergency. In response, WHO, UNAIDS and a wide range of partners launched the “Treat 3 million by 2005” initiative – known as 3 by 5. Treating 3 million people by the end of 2005 is a necessary target on the way to the goal of universal access to antiretroviral therapy for everyone who needs it.

To reach this goal, major obstacles must be overcome. With few exceptions, HIV/AIDS has struck hardest in countries whose health systems were already weak. Many countries working to expand HIV/AIDS treatment face significant deficits in areas such as health sector human resources, HIV counselling and testing, drug procurement and supply management, health information systems, and laboratory capacity (including the ability to monitor drug resistance).

Delivering the results called for under 3 by 5 will challenge countries' capacities and test the will of the global health community. But it is an essential task whose implications go far beyond the immediate aim of saving millions of lives in the coming years. It may also be the key to saving some of the world's most fragile health

Figure 2.1 Estimated worldwide coverage with antiretroviral treatment, end 2003



systems from further decline, and thereby offering whole societies a healthier future. Seen in this context, the 3 by 5 initiative is a vital opportunity to ensure that the new global resources flowing into HIV/AIDS are invested in ways that strengthen health systems for the long-term benefit of everyone.

This chapter examines public health, economic and social arguments for scaling up antiretroviral treatment in resource-poor settings. It then presents WHO's strategy for working with countries and partners, and provides an estimate of the global investment required. The opportunities and challenges facing countries are explored, highlighting the need to ensure that antiretroviral treatment reaches the poorest and most marginalized people. Finally, the chapter considers the wider importance of 3 by 5 as a new way of working across the global health community for improved health outcomes and equity.

WHO's commitment to support countries is guided by a broad assessment of resources and needs in global public health. Global investment in health has risen in recent years while many other sectors of international development assistance have stagnated, but the bulk of the new health investment is in HIV/AIDS. As the international agency charged with seeking the highest possible level of health for all people, WHO has the responsibility both to support expanded access to antiretroviral therapy and to work with countries and international partners to ensure that the new resources flowing into HIV/AIDS are invested so as to build sustainable health system capacities. Only an international public health agency can fulfil this technical cooperation and stewardship function. Health systems strengthening is the key both to sustainable provision of antiretroviral treatment and to reaching other public health objectives,

including the health-related Millennium Development Goals and containment of the expanding epidemics of chronic diseases in the developing world.

TREATMENT SCALE-UP: PUBLIC HEALTH ARGUMENTS

Two considerations stand out among the public health arguments for emergency treatment scale-up. First is the sharp reduction in HIV/AIDS-related morbidity and mortality associated with treatment. This has been documented in high-income countries, in Brazil's national treatment programme (see Box 2.1) and in pioneering projects in resource-poor settings (1–3). Second is the synergistic effect that treatment can have on prevention efforts. The availability of treatment can enhance prevention in several ways:

- **Increased demand for voluntary counselling and testing:** providing opportunities for voluntary counselling and testing is crucial to effective prevention. As many as 9 out of 10 HIV-infected people in sub-Saharan Africa do not know their serostatus; and when treatment is unavailable, people may see little reason to find out. But the availability of treatment has been shown in numerous settings to increase voluntary counselling and testing – for example, it rose by 300% at a clinic in Haiti after antiretroviral therapy was introduced (4).
- **Enhanced opportunities for secondary prevention:** coming to health centres for treatment offers patients the chance to receive information about prevention behaviours. The value of this approach is reflected in HIV-prevention strategies recently designed by the United States Centers for Disease Control and Prevention to target people known to be infected (5).
- **Lower risk of transmission:** treatment lowers the likelihood of sexual transmission of HIV in the case of unprotected sexual intercourse. It must be recognized, however, that the longer life expectancy of patients on treatment will probably lead to an increase in sexual relations between people of different serostatus.

Box 2.1 Checking the spread of HIV/AIDS in Brazil

Brazil is one of the few countries that has successfully checked the spread of HIV/AIDS. The country's first HIV/AIDS Programme was established in the State of São Paulo in 1983 when only four cases of HIV/AIDS had been reported. Since then the Brazilian response has evolved rapidly, influenced in particular by the structure and role of the public health system. By December 2002, almost 260 000 cases had been reported to the Ministry of Health, with approximately 145 000 deaths. Brazil's prevalence in the year 2000, which the World Bank had estimated in 1992 would reach 1.2%, was in fact 0.6%.

Brazil was the first developing country to implement a large-scale universal antiretroviral distribution programme. Initiated in the early 1990s with the distribution of AZT, the programme was signed into federal law in 1996. The programme now provides free drugs

for opportunistic infections to about 130 000 people – a coverage of almost all those people living with HIV/AIDS in the country.

As a result, morbidity and mortality rates have fallen by 50–70%. From 1996 to 2002, more than 60 000 HIV/AIDS cases, 90 000 deaths and 358 000 HIV/AIDS-related hospital admissions were averted, and the savings in outpatient and hospital costs have outweighed the costs of implementation by more than US\$ 200 million in four years. These results demonstrate the feasibility of antiretroviral therapy even in a resource-poor setting, where the ideal infrastructure is often lacking. Among the factors which have contributed to the Brazilian success are: the concerted early government response; the strong and effective participation of civil society; multisectoral mobilization; a balanced prevention and treatment approach; and the advocacy of human rights.

Although the prevalence of drug resistance has increased as access to antiretroviral therapy has expanded, Brazil's rate of resistance is substantially lower than that found in many developed countries. In 2001, 6.6% of new infections involved drug-resistant strains, a rate that is roughly one-third to one-half of that reported in North America and parts of western Europe. The low level of primary resistance is a result of well-planned actions by the Ministry of Health, in which the distribution of antiretrovirals was accompanied by guarantees of long-term treatment in health facilities, continuous training of health care workers, use of standardized guidelines, and the involvement of nongovernmental organizations in promoting adherence. The distribution of free antiretrovirals in itself prevented the problems associated with black-market or substandard regimens.

There is little evidence from developing countries of how treatment availability affects risk behaviours. Planning and careful measurement are needed to make treatment and prevention efforts work effectively together. As treatment is scaled up, programmes will continuously have to measure the impact on prevention and be able to adapt and respond promptly to any weakening of preventive behaviours.

TREATMENT SCALE-UP: ECONOMIC AND SOCIAL ARGUMENTS

Economic and social analyses provide a clear rationale for emergency action on treatment scale-up. While a number of early studies suggested that the use of antiretroviral drugs was not cost-effective in poor countries, more recent analyses have indicated the contrary (6). *The World Health Report 2002* suggested that some types of treatment would be cost-effective even in resource-poor settings (7). Since then, prices of the drugs have fallen by more than 50%. Meanwhile, protocols developed for the 3 by 5 initiative should help make them even more cost-effective, particularly in countries where people with opportunistic infections are hospitalized. The use of antiretrovirals should reduce these infections for several years at least. This should in turn help cut health costs specific to HIV/AIDS, as has been documented in Brazil (8).

As Chapter 1 showed, many early studies seriously underestimated the cumulative economic and social damage of HIV/AIDS in high-burden countries. Antiretroviral treatment can help stem the loss of human capital and productivity if it restores the health of millions of people and enables them to earn an income, raise their children and contribute to society. Under Brazil's universal access antiretroviral treatment programme, the average survival time of people with AIDS seeking care at government

facilities has risen from less than six months to at least five years (9). Patients' quality of life has also improved significantly: they go on working, sustaining their families, educating their children and interacting with their friends.

THE 3 BY 5 STRATEGY

Countries are driving the process of treatment scale-up, supported by WHO, UNAIDS, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the United States President's Emergency Plan for AIDS Relief, and other partners. On 1 December 2003, WHO published its global strategy, outlining how the Organization will contribute to the 3 by 5 target (10). The strategy outlines key areas of activity in a framework of five pillars.

Pillar One:

Global leadership, strong partnership and advocacy

WHO is working closely with UNAIDS, the World Bank, and other multilateral organizations and international partners to ensure that the effort is integrated into the broader global development agenda. International resources committed to 3 by 5 should be additional to the support for countries' efforts to achieve targets such as the Millennium

A haven for HIV-positive children



At the Incarnation Children's Center in New York, USA, a girl called May shows her fancy dress costume to Dr Steve Nicholas. May comes from two generations of people with HIV/AIDS and is one of the children who, along with their families, receive care designed to minimize the effect of HIV/AIDS on their quality of life.

Founded in 1988, the Center meets the challenges of paediatric HIV/AIDS with a model of community-based care combining expertise and support, which takes children away from hospital wards. Since 1992, the Center has also operated an outpatient clinic for HIV-positive children living in the community.

Box 2.2 Ensuring the supply of medicines to the developing world

The AIDS Medicines and Diagnostics Service is the access and supply arm of the 3 by 5 initiative. It aims to ensure that developing countries have access to high-quality antiretroviral medicines and diagnostic tools at the best prices, by helping them to buy, forecast and manage supply and delivery. The service builds on years of work by UNAIDS, WHO, the United Nations Children's Fund, the World Bank, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the global health community to tackle the treatment gap, and operates with input from these partners.

The service is available to governments, nongovernmental organizations, health insurance and employer-benefit schemes, and other not-for-profit supply channels. Current information on sources, prices, and the patent and regulatory status of high-quality antiretrovirals and diagnostics will be made available to buyers, particularly at country level, to help them make informed choices on procurement. WHO does not envisage buying medicines direct but will continue to purchase diagnostic tests as part of a bulk procurement scheme.

The AIDS Medicines and Diagnostics Ser-

vice will also provide information to manufacturers to enable them to forecast demand, thus ensuring that quantities produced reflect real needs at affordable prices.

Countries can access specific technical support services, including:

- **Selection of core antiretroviral drugs and essential diagnostic tests** (advice on clinical guidelines; inclusion of products in the National Essential Medicines list).
- **Patent status and licensing** (information on patent status; advice on options for legal importation of generic medicines).
- **Registration and product specifications** (regulatory matters and registration status of antiretroviral drugs; strengthening capacity of drug regulatory agencies; quality and product specifications for procurement tenders and contracts).
- **Prequalification of antiretroviral drugs and diagnostics** (advice on products that meet WHO standards for quality, safety and efficacy; operational standards for evaluating supply agencies and quality control laboratories).
- **Market intelligence** (information on sources

and prices of antiretrovirals, other AIDS-related medicines and diagnostics; price indicators for raw materials for local production).

- **Procurement** (global guidance and training programmes on procurement; access to the WHO/UNAIDS diagnostics buyers group technical support; access to procedures to obtain economies of scale through international rate contracts).
- **Import taxes and margins** (tariffs, taxes and margins in other countries; technical and political support in efforts to reduce them).
- **Supply management and monitoring** (guidance and training programmes in supply management and monitoring; consultant support in improving national supply systems; technical support in preparing estimates of quantities).
- **Local production and quality assurance** (guidance on Good Manufacturing Practices standards; training courses on Quality Assurance and Good Manufacturing Practices; technical support to the national drug regulatory agency).

Development Goals. WHO advocates for pro-equity approaches that promote gender equity and responsiveness to the needs of vulnerable groups.

Pillar Two:
Urgent, sustained country support

WHO is providing essential policy advice and tools, and will cooperate with countries at every stage of the design and implementation of national plans.

Pillar Three:
Simplified, standardized tools for delivering antiretroviral therapy

Rapidly scaling up antiretroviral therapy requires user-friendly guidelines and tools to help health workers identify and enrol people living with HIV/AIDS, deliver therapy and monitor results, including drug resistance. WHO is developing these tools.

Pillar Four:
Effective, reliable supply of medicines and diagnostics

The AIDS Medicines and Diagnostics Service has been established to help coordinate the many ongoing efforts to improve access to HIV/AIDS medicines. It provides a range of support services tailored to country needs (see Box 2.2).

Pillar Five:
Rapid identification and reapplication of new knowledge and successes

WHO is documenting experiences and lessons from successful national antiretroviral therapy programmes and pilot projects in resource-limited areas and is coordinating an agenda for operational research relevant to the needs of antiretroviral therapy programmes (see Chapter 5).

PARTNERSHIPS: VITAL FOR SUCCESS

The 3 by 5 initiative will only succeed if it is supported by the many partners engaged in expanding treatment availability throughout the developing world. The initiative is above all a call for partnership – one whose strength lies in the different skills and comparative advantages of numerous organizations and communities (see Box 5.2).

The alliances and partnerships necessary for success involve national and local governments, civil society, bilateral donors, multilateral organizations, foundations, the private sector (including employers and pharmaceutical companies), trade unions, traditional authorities, faith-based organizations, nongovernmental organizations (international and national) and community-based organizations. People living with HIV/AIDS and the activist community are indispensable partners at all levels of WHO's activities. The full potential of the initiative will only be realized if it is linked to the work of the UNAIDS secretariat and other UNAIDS cosponsors.

Partnership and collaboration assume even greater importance as major programmes enter the implementation phase, including efforts financed by the Global Fund to Fight AIDS, Tuberculosis and Malaria and the World Bank's Multi-Country HIV/AIDS Program (see Boxes 2.3 and 2.4). At least US\$ 4.5 billion has been committed by the Global Fund and the World Bank to the fight against HIV/AIDS. This figure is expected to rise substantially as the United States President's Emergency Plan for AIDS Relief takes off. However, the current lack of technical capacity in a large number of recipient countries is a major obstacle to the effective use of these resources. One of the greatest collective tasks will be to work with countries and recipients to ensure that the

money achieves its intended results. Success depends on close collaboration between funders and technical agencies.

DELIVERING TREATMENT: A PRACTICAL NEW APPROACH

Despite resource constraints and technical obstacles, health care planners and treatment providers are working in many settings to scale up treatment as rapidly as possible, expanding from small pilot projects to national programmes. To enable this to succeed, the 3 by 5 initiative incorporates a practical "engineering" or "system design" approach. The plan is to develop innovative system designs and treatment protocols that can be scaled up even when the usual medical resources are in very short supply. This depends on streamlining and simplification of programme logistics, delivery of treatment and monitoring. The simplified strategies should allow nurses or clinical officers to treat patients within a physician-supervised treatment team, with community health workers providing follow-up support and adherence monitoring. Pilot projects have shown that, with proper supervision and streamlined treatment models, community health workers can shoulder much of the daily burden of delivering and supporting treatment (see Chapter 3).

Reducing complexity is necessary in order to accelerate the roll-out of treatment in areas with weak health care systems and a severe shortage of trained health professionals. Simplification applies to drug regimens and biological monitoring procedures recommended in WHO guidelines. It also covers protocols for treatment delivery, patient monitoring and support, and drug procurement and supply management. Such simplification does not imply poorer outcomes for patients than would be the case in wealthier countries. Many aspects of delivery, programme logistics and monitoring can be streamlined while still providing patients with excellent care.

In its new streamlined treatment guidelines, WHO has cut the number of recommended first-line treatment regimens from 35 to four. All four regimens are widely used in high-income countries and are highly effective (11). They use two different classes of antiretrovirals, reserving the protease inhibitor class for second-line therapy, and can be given to children, an important advantage for family therapy.

Box 2.3 The Global Fund to Fight AIDS, Tuberculosis and Malaria

The Global Fund to Fight AIDS, Tuberculosis and Malaria attracts, manages and disburses resources through a new public-private partnership. It does so in order to make a sustainable and significant contribution to the reduction of infections, illness and death, and thus contribute to poverty reduction and the Millennium Development Goals.

The Global Fund relies on the knowledge of local experts for programme implementation. It finances proposals that reflect national ownership and are developed and implemented through multisectoral country partnerships among all relevant players within a country and across all sectors of society.

As a financing mechanism, the Global Fund works closely with other multilateral and bilateral organizations involved in health and development issues to ensure that newly funded programmes are coordinated with existing ones. The Global Fund actively seeks to complement the finance of other donors and to use its own grants to catalyse additional investments by donors and by recipients themselves. Since its inception in January 2002, it has designed and implemented systems for the technical review of grant proposals, efficient fund disbursement and the monitoring and evaluation of programme performance and financial accountability. In December 2002, the first grant

agreement was signed and disbursement made. A year later, the Global Fund had awarded a total of US\$ 2.1 billion over two years to 224 programmes in 121 countries and 3 territories.

Specific goals include increasing the supply of antiretroviral drugs and supporting voluntary counselling and testing services to prevent the spread of HIV. The Global Fund is also supporting orphans with medical services, education and community care; tripling the number of people treated for multidrug-resistant tuberculosis globally; delivering millions of combination drug treatments for resistant malaria; and financing millions of bednets to protect African families from transmission of malaria.

These four regimens do not require a cold chain, are widely available and cost less than regimens based on protease inhibitors. They use few pills, and the four combinations cover a variety of circumstances including tuberculosis coinfection and potential pregnancy. Other important advantages concern laboratory requirements and toxicity profile. Fixed-dose combinations are single pills containing all three antiretroviral drugs belonging to a triple therapy. Availability in a fixed-dose combination is an important criterion for preferred simplified first-line regimens. Weighing all these factors, the use of nevirapine-based regimens, particularly the d4T/3TC/NVP combination, is most suitable for initial therapy in resource-poor settings.

In addition to their logistic advantages, simplified treatment regimens, fixed-dose combinations and reduced pill count are much preferred by patients. They help ensure that patients adhere to treatment and that regimens work longer. Thus they can be expected to reduce the risks of drug resistance (11).

Laboratory testing and diagnostic tools for monitoring the health of people living with HIV/AIDS must also be simplified and made more readily available to the poorest populations. Evidence shows that tests such as total lymphocyte count and haemoglobin colour-scale blood tests can be used where more sophisticated tests for viral load and CD4 cell count are not yet available. The simpler tests, combined with clinical evaluations by adequately trained health workers, can be effective in monitoring the progress of AIDS, the effectiveness of treatment and side-effects, even in settings with weak health infrastructure (11–14).

Building on the simplified drug regimens, WHO has developed streamlined protocols for treatment delivery which aim to facilitate treatment scale-up, above all in the many areas where physician shortages are a major constraining factor. With simplified treatment models, it should become possible to decentralize antiretroviral delivery progressively to the health centre level; this is vital to reach the people most in need. Treatment can be initiated in facilities at all levels of the formal health care system, wherever the following are in place: HIV counselling and testing; personnel who are trained and certified to prescribe treatment and follow up patients clinically; an uninterrupted antiretroviral supply; and a secure, confidential patient record system. Rolling out treatment under this model will pose many complex challenges. It will require

high standards of operational research to help identify what works and what does not, and why, and to provide rapid feedback and dissemination of that knowledge.

Drug supply management is a significant challenge in many regions hit hard by HIV/AIDS, but focusing on a small number of simplified drug regimens and using fixed-dose combinations should make it easier. Drugs are also a major part of the overall cost of 3 by 5 (see below), and minimizing these expenses is important to programme sustainability. WHO will work with countries and implementers to obtain the lowest possible prices on antiretrovirals of assured quality.

Antiretroviral drug resistance: acting now to prevent a major problem

Although the benefits of antiretroviral drugs are universally recognized, there is concern that their widespread and inappropriate use could cause the virus to develop resistance to them, thus creating a major new public health problem. The question arises as to whether such resistance might be accelerated by treatment expansion.

Virus strains with reduced sensitivity to zidovudine, the first drug used to treat HIV infection, were first observed in 1989, three years after it was introduced. Subsequently, resistance to every currently licensed antiretroviral drug has been observed (15).

WHO regards a surveillance system that enables monitoring of HIV drug resistance as an essential component of treatment scale-up. In this work, WHO and its partners are seeking the full support of the global HIV/AIDS scientific and public health community. WHO has established a coalition of 50 of the world's experts in policy, clinical management, and the science of HIV drug resistance (HIVResNet) to develop guidelines on how to conduct resistance surveillance in different settings and population groups.

Gathering reliable global data on the level of HIV drug resistance and its transmission has so far been extremely difficult. The prevalence of resistance in countries where antiretrovirals have been available for some years ranges from 5% to 27%. Recent data from 17 European countries showed that 10% of untreated patients carry drug-resistant virus. Very little data are available from the developing countries that will implement antiretroviral programmes, and much more information is required (16).

The threat of increased levels of resistance cannot be an excuse for not delivering life-prolonging therapy: it has not been a reason to delay universal access in developed countries. Instead, monitoring HIV drug resistance and developing approaches to reduce its emergence and spread are required.

WHO and its partners have established the following objectives:

- to track HIV drug resistance and assess its geographical and temporal trend;
- to understand more completely the determinants of resistance, especially adherence to treatment and factors that undermine it;
- to identify ways to minimize its appearance, evolution and spread;
- to provide information to international and country-level policy-makers through a rapid and easily accessible dissemination system.

WHO has identified the need to give strong support to global surveillance of antiretroviral resistance. Since December 2003, WHO's *Guidelines for HIV drug resistance surveillance* have been available on the WHO web site (17). These cover important aspects of a high-quality surveillance system such as sampling, data collection, laboratory testing, data management and analysis, quality control and ethical issues. The development and implementation of the HIV-resistance surveillance system will be

Box 2.4 Free antiretroviral therapy in Barbados

The Government of Barbados, with World Bank assistance (under its Multi-Country HIV/AIDS Prevention and Control Program for the Caribbean Region), has designed a multisectoral HIV/AIDS prevention and control project. The government has committed itself to universal and free provision of antiretroviral therapy for all citizens living with HIV/AIDS. The project has a total cost of US\$ 23 million for strengthening prevention activities and scaling up antiretroviral treatment.

The scale-up of HIV/AIDS treatment and care includes:

- a dedicated care and support outpatient facility, the Ladymeade Reference Unit, which was opened in early 2002 for

voluntary counselling and testing and the provision of antiretroviral therapy;

- the introduction of evidence-based treatment guidelines developed by WHO; they have proved to be easy to comply with, and adherence to the standard three-drug regimens has been very good;
- provision of an expanded laboratory service to include Elisa testing, CD4, CD8, and viral load estimations;
- a computerized HIV/AIDS case management, monitoring, evaluation and surveillance system.

The main outcomes achieved under the project so far include: an overall reduction in

deaths of clinic-registered patients by approximately 56%; a total of 85% of patients with an adherence rate greater than 95%; hospital admissions for treatment of opportunistic infections among HIV/AIDS patients reduced by 42%; total hospital days reduced by 59.4%; average length of stay in hospital reduced by 30%; and a sixfold reduction in mother-to-child transmission, maintaining levels of less than 6% transmission over five years.

The Government of Barbados is committed to financing antiretroviral therapy beyond the life of the project and has allocated the funds required for further expansion of the number of patients receiving treatment.

primarily supported in high-burden countries where antiretrovirals are currently not widely available. Gathering data on HIV drug resistance prevalence in those areas will allow a baseline picture that can be compared with data obtained over time.

WHO and its partners are developing and implementing systems to measure HIV drug resistance in treatment-naïve people (those who have not taken antiretroviral medicines before) in 20 countries and to monitor HIV drug resistance among treated people in five countries. By 2005, 40 countries will have implemented surveillance systems and 15 countries will have monitoring systems.

THE COSTS OF ACHIEVING 3 BY 5

The exact cost of reaching the 3 by 5 target will depend on how quickly care is scaled up in participating countries. It is likely to total at least US\$ 5.5 billion by the end of 2005 in the set of high-burden countries that together account for 90% of the target (18). This estimate assumes that 25% of the target is reached in 2004 and the remaining 75% the following year. It assumes that the prices of medicines remain at currently lowest available levels reported by the WHO Essential Drugs and Medicines Department (first-line treatment of US\$ 304 per person per year). Total programme costs could be significantly reduced if drug prices for all countries approached those negotiated by the William J. Clinton Foundation for the 14 countries it supports (first-line treatment at less than US\$ 140 per person per year).

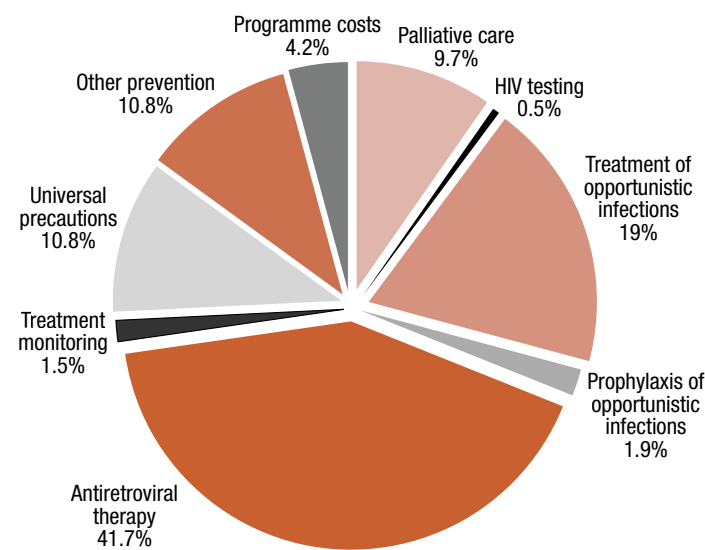
Cost projections are based on the treatment regimens required for three different entry points: tuberculosis patients, antenatal clinics and health facilities. They include at the patient level:

- counselling and condom distribution for the people tested as part of the programme;
- antiretroviral drugs (first-line drugs for all people identified in late-stage disease and second-line drugs for treatment failures);

- antiretroviral drugs to prevent mother-to-child transmission for women testing positive in antenatal care clinics and who are in early clinical stages of disease;
- treatment and prophylaxis of opportunistic infections;
- palliative care;
- laboratory tests for toxicity for those showing signs of toxicity and switches of individual drugs in case of confirmed toxicity.

At the programme level, costs include training for doctors, nurses, clinical officers, community health workers and lay volunteers, supervision and monitoring, increasing the capacity of the medicines distribution and storage system, recruiting community health workers, universal precautions, and post-exposure prophylaxis. They also include purchasing an appropriate number of CD4 machines, automated

Figure 2.2 Projected costs of the 3 by 5 initiative (total: US\$ 5.5 billion), 2004–2005



Handfuls of hope



Eugene Richards/Network

The AngloGold mining company in South Africa estimates the HIV/AIDS prevalence rate among its 44 000 workers to be between 25% and 30%. In July 2003 the company announced that it would offer antiretroviral therapy to all its HIV-positive employees. The therapy is to be provided from 2004 onwards through the company's own privately funded non-profit medical service, the largest of its kind in the world. The service is conducting an implementation study to develop an un-

derstanding of and solutions to the problems associated with treatment provision. The project is examining the operational requirements of providing treatment, particularly with regard to supporting adherence to the drug regimen. It will include assessing what impact, if any, antiretroviral therapy has on patients' capacities to carry out their work, especially underground, as well as monitoring for drug sensitivity.

blood counters and blood chemistry machines in low-income countries, beginning in 2005.

Figure 2.2 shows the breakdown of estimated costs of 3 by 5 over the two-year period 2004–2005. Not surprisingly, antiretroviral drugs account for the greatest proportion, while treatment of opportunistic infections, palliative care and universal precautions are also major contributors.

These estimates include preventive activities required to support the 3 by 5 strategy directly. They also assume that other preventive interventions for HIV/AIDS will continue at the current rate. They do not include major changes to the health system infrastructure, which are not possible given the short time frame of 3 by 5. If other interventions are scaled up at the same time – perhaps for malaria and/or tuberculosis with financing from the Global Fund to Fight AIDS, Tuberculosis and Malaria – short-term constraints might be encountered in terms of shortages of personnel, health facilities or laboratory testing facilities. To achieve the Millennium Development Goals by 2015, including those related to HIV/AIDS, immediate investment in infrastructure and in health systems strengthening will be needed in many of the countries implementing 3 by 5. These issues are discussed further in Chapter 4.

The figure of US\$ 5.5 billion concerns the countries with the highest burden from HIV/AIDS. Earlier, higher estimates have been superseded in other ways. For example, the model of care assumed in earlier calculations was more intensive in testing and staff time than that adopted by WHO to confront the AIDS treatment emergency. In addition, drug prices have fallen considerably.

THE FRONT LINES: WORKING IN COUNTRIES

Countries are driving the rapid expansion of HIV/AIDS treatment under 3 by 5. Those countries already severely affected by HIV/AIDS and those with small but expanding epidemics have committed themselves to the emergency initiative.

Solving the emergency requires innovation backed by experience and expertise. It implies streamlining or suspending familiar but unsuitable procedures and devising effective new ones at short notice as events unfold. Key elements of the emergency response at country level include:

- adequate political and financial commitment to scaling up treatment;
- high-level national mechanisms for planning, coordinating and leading treatment efforts;
- ensuring continuous availability of drugs and diagnostics;
- moving quickly to build capacity in health services and communities;
- establishing appropriate systems for monitoring and evaluation and operational research as programmes are rolled out.

When a WHO 3 by 5 emergency mission is invited to a country, it can help stimulate work in all the above areas. Within days of the declaration of the global HIV/AIDS treatment emergency, the first WHO country mission was on the ground in Kenya. The mission began work with national health officials and political leaders, community and nongovernmental organization representatives, private-sector health care providers, international agencies, and other stakeholders to build consensus and catalyse action for rapid scale-up of treatment. Similar WHO emergency assessment teams have been sent out as countries request them. By mid-February 2004, 15 emergency planning missions had been completed and several more were planned in response to country requests.

Countries approach the 3 by 5 challenge from very different departure points, and with varying strengths and weaknesses. Yet important areas common to all have emerged. Announcements in late 2003 of national commitment to significant scale-up from China, India, Kenya, Malawi, South Africa, Zambia and others strengthened the growing, shared momentum. Now countries, communities and international partners are working to translate political commitments into action that saves lives. The following case-studies describe the range of situations countries face and some emerging common themes.

China

More than 800 000 people in China are estimated to be living with HIV/AIDS. Injecting drug use has been the predominant mode of transmission, but heterosexual transmission related to sex work is on the increase. With new commitment from its political leaders, China has embraced the 3 by 5 initiative, which means aiming to provide treatment to 100 000 patients by the end of 2005.

Big problems must be tackled quickly. Epidemiological surveillance of HIV/AIDS needs further reinforcement. Implementation mechanisms for treatment are incom-

plete. Capacities need to be strengthened in many areas of work. Currently, despite provision of free antiretrovirals, patients must pay for HIV testing, symptomatic care, transportation costs and other expenses. These costs are serious obstacles to treatment access and adherence. Fortunately, China's strengths include a burgeoning domestic pharmaceutical industry which is now producing generic antiretroviral drugs. High-level commitment to intensified action on HIV/AIDS was underlined on World AIDS Day 2003, when Premier Wen Jiabao and Vice Premier Madam Wuyi visited people living with HIV/AIDS at Beijing's Youan Hospital.

India

Official estimates in India for 2003 put the number of HIV-positive people at 3.8–4.6 million, with 600 000 in urgent need of treatment. India's national HIV prevalence rate is below 1%, but some regions and population groups are much more heavily affected. For example, more than 50% of commercial sex workers in the state of Goa and the city of Mumbai are HIV-positive. Efforts to scale up treatment will focus initially on six states – Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland, and Tamil Nadu – but there are immense difficulties. For example, the city of Mumbai alone has a larger population than Botswana and Zambia combined.

India's health system has significant strengths, including a large pool of skilled doctors and other health professionals. Training in HIV care is now part of all medical and nursing curricula, though few students yet receive adequate practical experience in clinical management. The country has numerous medical centres of excellence and an array of high-level research institutions. Without doubt, antiretroviral procurement and distribution will pose major challenges, but on the other hand successful models of drug supply management do exist, such as that in Delhi State (19). India has a robust domestic pharmaceutical industry, which is also a major source of generic antiretrovirals (see Box 2.5).

Box 2.5 How Asian drugs help African patients

The success of the 3 by 5 initiative relies on the availability of affordable and high-quality antiretroviral drugs. Some of the world's leading manufacturers of affordable generic antiretrovirals are found in the WHO South-East Asia Region: India and Thailand export to African countries such as Ethiopia, Kenya, Nigeria, Senegal and Zambia.

India in particular has emerged as a major manufacturer of affordable antiretroviral drugs. Several Indian pharmaceutical companies are taking the lead in pushing down global prices. The steep reduction in prices that has taken place in recent years was triggered by a breakthrough announcement that Indian generic drugs would be offered to patients in Africa for only US\$ 350 per patient per year, through Médecins Sans Frontières. At that time, the price of the drugs provided by multinational companies ranged from US\$ 10 000 to US\$ 15 000 per patient per year. Thanks partly to the competition in generic drug production,

the price of antiretrovirals has dropped to one-thirtieth of its former level.

By December 2003, antiretroviral drugs manufactured by Indian pharmaceutical companies were available for as little as US\$ 140 per patient per year, after a deal negotiated by the William J. Clinton Foundation. The Indian Government is working with the pharmaceutical companies to offer drugs to HIV/AIDS patients in India through a public-private partnership model at even lower prices. Low-cost drugs have already prequalified as "quality" drugs. Twelve antiretroviral drugs are presently in India's national essential drugs list. The fixed-dose combination lamuvidine+stavudine+nevirapine, manufactured generically in India, was also recently prequalified by WHO and is expected to simplify the treatment regimen, allowing patients to take only one tablet twice a day. Prequalification would allow the procurement of fixed-dose combinations from Indian

generic manufacturers by the United Nations for use worldwide.

However, some of the newer generic drugs will fall under patent protection from 2005, when the World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property (TRIPS) takes effect in India. After this date, Indian generic manufacturers will have to wait until patents expire before they can begin production of new drugs, or the country may face trade sanctions. One option would be for the Indian pharmaceutical industry, as well as importers of generic drugs, to invoke the public health considerations of the Doha Declaration. It was agreed in a separate declaration at Doha that the TRIPS Agreement should not prevent members from taking measures to protect public health. Thus, the Doha Declaration will form a crucial element in expanding access to treatment.

On the eve of World AIDS Day in December 2003, as WHO released its 3 by 5 strategy, the Government of India announced a commitment to begin providing antiretroviral treatment free of charge to selected groups of patients in April 2004 and to place 100 000 people on treatment within a year. A WHO exploratory mission was invited to India within days of the government's announcement. WHO HIV/AIDS specialists are being deployed to each of the six high-burden states, with other initiatives aimed at supporting the country on issues such as clinical management, drug procurement, laboratory support and monitoring and evaluation.

By mid-February 2004, training of key staff in 16 institutions selected to initiate the treatment programme was advancing under the leadership of the National AIDS Control Organization. WHO worked with this organization on finalizing training curricula and materials, and a capacity-building plan.

Kenya

About 1.8 million Kenyans are living with HIV/AIDS. Of the 280 000 Kenyans who urgently require antiretroviral therapy, about 11 000, or 4%, are currently on treatment. The majority of these patients are treated in the private sector or by nongovernmental and faith-based organizations.

Kenya has shown high-level political commitment to scaling up treatment and care, alongside prevention efforts. State health officials have set the following target: "Progressively deliver effective antiretroviral therapy, reaching 50% (140 000 patients) by 2005 and 75% (200 000 patients) by 2008, so as to increase the quality of life and survival by 10 years; reduce HIV-related hospital admissions by 60% and enhance significantly national prevention efforts". Major obstacles to this objective include a large financing gap, understaffed health facilities and high unemployment among trained health care workers. Treatment literacy – the understanding of what treatment is and how to manage it – is low. This is associated with very high levels of stigma among both health workers and the general population.

The government has declared HIV/AIDS a national disaster and is finalizing the legal provisions to enhance HIV/AIDS control, including provision of care and treatment on an emergency basis. Kenya has already made significant progress in preparation for institutionalization of care and treatment. The Ministry of Health has advanced plans for the phased opening of 30 comprehensive HIV/AIDS care centres, selected on the basis of geographical coverage, HIV prevalence, and the level of preparedness for antiretroviral treatment. Training of health care workers has begun. Legal barriers to the importation and local manufacture of generic antiretrovirals have been removed.

Thailand

Around 100 000 people are currently in need of treatment in Thailand, but there are hopes that the country will reach the 3 by 5 objective of 50 000 patients by the end of 2005. Thailand has had a national, comprehensive HIV/AIDS control programme since the 1990s, integrating prevention, care and treatment (see Box 1.4).

By September 2003 the national antiretroviral treatment programme covered more than 13 000 patients. The government has allocated US\$ 25 million to reach the 2004 target. The programme is continuing to strengthen infrastructures and capacity at management and service delivery level. Antiretroviral medicines will soon be covered by the universal health insurance plan. The biggest challenges are ensuring adherence and strengthening programme monitoring as well as drug resistance surveillance.

Zambia

In Zambia, which has an adult HIV prevalence of 16%, about 1 million people are living with HIV/AIDS, and around 200 000 are in urgent need of antiretrovirals. The government has shown firm commitment to scaling up treatment, although progress has been slowed by limited resources and health system capacity. Only about 1000 patients were on antiretrovirals in the public sector at the end of 2003; an unknown number receive private-sector treatment. A national target of 100 000 people on treatment by the end of 2005 was adopted in 2003 after discussions between government health officials and a WHO delegation.

Obstacles to reaching this target are of similar scale and complexity to those encountered in many countries in sub-Saharan Africa. They include lack of funding to cover the projected costs of drugs, a significant health sector human resource shortage, weak laboratory capacity, weak monitoring and evaluation systems, and inadequate dissemination of information among stakeholders and communities. HIV/AIDS remains heavily stigmatized, limiting the number of people who seek testing and care in both the private and public sectors. Poverty and patients' inability to pay for medicines constitute major challenges for national treatment scale-up, given that 73% of Zambians are classified as poor (20).

In his State of the Nation address to Parliament in January 2004, Zambian President Levy Mwanawasa affirmed commitment to 3 by 5. WHO has worked closely with health ministry officials in preparing an implementation plan, which includes an ambitious programme to train thousands of health workers, community workers and volunteers in aspects of treatment provision during 2004–2005. WHO is also providing policy and technical cooperation in Zambia's development of a proposal for funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria. Funding from the United States President's Emergency Plan for AIDS Relief will further accelerate the national response.

ETHICAL POLICIES FOR TREATMENT

The 3 by 5 initiative is an opportunity for countries not only to increase significantly access to antiretroviral therapy, but also to accelerate the drive to achieve Health for All. The principles of primary health care – health systems equity, greater community participation, and multisectoral approaches – are essential to the ethics of HIV treatment as well. Special attention must be paid to questions of fairness as programmes get under way, since more people need treatment than will receive it. Yet the risk that programmes will not be perfectly fair should not delay action. Making them transparent, accountable, and inclusive of all affected communities and stakeholders, and demonstrably taking account of people's views, not only makes it more likely that these programmes will be ethically defensible and sustainable in the long term but should help countries reach other important health goals as well.

A key challenge facing policy-makers is to decide whether there are any morally significant differences among people that would make it right to draw distinctions among them as recipients of treatment. For example, should a consciously "pro-poor" approach be followed on the basis that health systems often bypass their needs?

Among the issues to consider are the following:

- To what extent should considerations of fairness constrain the usual objective of public health intervention, namely maximizing the benefits produced? The most efficient way to scale up treatment programmes may be to start with people

already on waiting lists, or those already in the health system. If such lists now exist predominantly at elite hospitals with specialized clinics, then poor, rural, and otherwise marginalized or affected groups would be underrepresented. On the other hand, waiting until outreach programmes are able to serve such groups will result in a much smaller number of lives being saved in the first few years.

- Should benefit be measured solely in terms of health effects? Some people have urged that antiretroviral therapy should be provided as a matter of priority to health workers on the assumption that if physicians and nurses are not saved, the health system will deteriorate further or collapse. Should the same apply to teachers, civil servants, police officers, soldiers, employees generally, family members, caregivers or others?
- “Vertical” approaches to providing health care – such as setting up specialized HIV/AIDS clinics – may maximize the number of people treated in the short term, but are unlikely to be sustainable in many settings over the longer term, and could draw resources away from primary health care and the public system in general. This would disadvantage other groups of patients, especially the poorest and most vulnerable who are most dependent on such care. Likewise, the decision to start with existing waiting lists, which are predominantly at urban hospitals, may or may not affect the development of programmes for hard-to-reach groups.
- Should people receiving antiretroviral therapy have to pay for it? The argument for making treatment free to users is often framed in medical and public health terms (charges will deter people from adhering to or continuing treatment, which could lead to drug resistance). An argument can also be made that a system in which fees are assessed based upon “ability to pay” is not only administratively burdensome but becomes a barrier that discourages poor people from getting care and undermines the ethical premise of solidarity that lies at the heart of Health for All.
- For many countries, it is not clear how the long-term commitment to provide antiretroviral drugs will be sustained without support from donors. Such support is not guaranteed. Is the possibility that the drugs might be unavailable in the future a reason for not starting treatment, or would the failure to provide treatment for as long as possible be the greater wrong?

WHO and UNAIDS have taken the lead in developing guidance on these and other ethical aspects of policy through consultation with countries, implementers, advocates for the underserved, people living with HIV/AIDS and ethicists. Although WHO recognizes that Member States have legally binding obligations under the right to health, WHO’s guidance will be framed as non-binding, policy-oriented, ethical principles. The guidance shows how a commitment to the principles of ethics, human rights, primary health care, and fair processes can assist in the resolution of the difficult choices that countries face.

Making 3 by 5 work for the poor and marginalized

The AIDS treatment gap mirrors widening polarization in health and well-being between the world’s haves and have-nots. The treatment initiative is an opportunity for the global community to unite in a bold effort to tackle health disparities through concrete, goal-driven action. Yet national authorities and implementers will face difficult political and ethical choices as they work to expand treatment.

Deep social and economic inequalities and disparities in access to health services characterize many areas in which 3 by 5 must work. HIV/AIDS treatment programmes alone cannot overcome these inequalities. However, programme planners and implementers, working with communities, can take steps to reduce the impact of existing inequalities on access, for example, by making it easier for women and children to receive treatment (see Box 2.6). Ensuring a fair chance for the poorest people in society, as well as for socially marginalized and stigmatized groups such as commercial sex workers and injecting drug users, will demand focused planning and ongoing vigilance in the design, financing and implementation of treatment programmes. The active involvement of groups representing poor and marginalized communities is crucial, as experience in the city of Rio de Janeiro, for example, has shown (see Box 2.7).

There are no simple answers to many of the ethical questions raised in connection with HIV treatment. WHO and UNAIDS have launched a consultative process on equitable access to HIV/AIDS treatment and care, involving many stakeholders. This will produce guidance for countries, treatment providers and communities. WHO and UNAIDS cannot impose uniform prescriptions, but can identify the relevant questions and procedural options.

The choices countries make on assigning priority for treatment may differ while respecting procedural fairness. Fundamental procedural requirements are that a clear, rule-governed mechanism be in place to determine priority in access and that this mechanism be designed and monitored through an inclusive, participatory process in which all stakeholder groups take part. Relevant stakeholders include people living with HIV/AIDS, health care workers, governments, medical associations, drug regulatory authorities, the private sector, donors, academic institutions and nongovernmental community-based and faith-based organizations. Involvement of communities is indispensable.

Box 2.6 Ensuring equal access for women and men

In most countries, gender relations are characterized by an unequal balance of power between women and men, with women having fewer legal rights and less access to education, training, income-generating activities, property and health services. These factors affect their ability to protect themselves from HIV as well as their access to health knowledge, treatment and care. Ideally, health interventions will not only recognize and respond to the existing situation, but promote transformative approaches which challenge unequal gender roles and relations.

The following are crucial considerations in the design of treatment programmes.

Access to information. Providing information about the availability and benefits of antiretroviral treatment (“treatment literacy”) is vital to generating and sustaining demand. The avenues (such as radio, drama and peer groups) used to reach people with information, and the messages given, may be different for women and men.

Access to services. Services need to tackle the gender-specific barriers that women face: economic, cultural, opportunity cost (distance, timing of services and waiting time may make the service inaccessible to women), stigma and discrimination, and quality of care. Involving people in the design of services can help identify these barriers, enhance the design of services and involve communities in providing support.

Entry points for antiretroviral treatment. While antenatal care is an obvious entry point for identifying women in need of treatment, it is necessary to go beyond this to reach out to women with HIV who are not pregnant, particularly young women.

Barriers to testing and counselling. The decision to seek testing is influenced by risk perception. Many married women who are monogamous and faithful may not feel themselves to be at risk. Women often fear the negative outcomes of testing.

Barriers to disclosure. Women’s justifiable fears of the consequences of disclosure, such as violence and rejection, need to be tackled. These appear to be more common when a woman is tested before her partner. Couple counselling and testing, mediated disclosure by a trained counsellor, and education of communities and family members can all help to reduce stigma and discrimination against women who test positive. Women’s right to confidentiality should be respected.

Monitoring and follow-up. Monitoring should be ongoing in order to identify who is being reached and who is not, and to make the necessary adjustments. Countries should be encouraged to set targets for women, based on local epidemiology.

Training of providers. Integrating gender considerations into treatment initiatives is an opportunity to focus on gender-based violence and other barriers.

BEYOND 2005

The 3 by 5 initiative has set a time-bound target, which is useful for the purposes of motivating performance and measuring results. But the initiative will not end in 2005, partly because people will need to remain on treatment for the rest of their lives. Moreover, beyond the immediate target stands the goal of universal access. The target covers only half the global HIV/AIDS treatment gap. Another 3 million people will remain in urgent need of antiretroviral therapy. Eventually, almost all of the 40 million people now infected with HIV worldwide will require access to therapy. Progress achieved in scaling up access by 2005 must rapidly be extended to people who are still deprived.

The immediate target and the wider goal of universal coverage will challenge communities, countries and global institutions concerned with health. But the challenge must be faced. The expansion of treatment is no longer a question of if, but how. The use of antiretroviral medicines in developing countries will expand rapidly in the coming years. Many people with HIV/AIDS, even very poor people, will find ways to obtain medicines that promise to extend their lives. Will this take place efficiently through rational programmes able to set high standards for drug quality, patient care and support, treatment adherence and monitoring? Will principles of equity and fair access be respected? Or will the inevitable increase in the use of antiretrovirals in resource-poor settings take place in a piecemeal and anarchic way, with access largely determined by geography, social status and the ability to pay? Will this involve only limited support for treatment adherence and scant oversight of drug quality and resistance monitoring?

Without serious commitment to treatment access, the latter scenario is the more likely, and will inevitably result in the exclusion of large numbers of patients in need, poorer outcomes for numerous patients who do obtain some form of treatment, and rapid spread of resistance to drugs. Shared commitment to treatment access across

Box 2.7 Reaching the poor in Rio de Janeiro

Rio de Janeiro is the second largest city in Brazil with 5.8 million inhabitants, including more than a million people living in the city's slums. The first HIV/AIDS case was registered there in 1982; since then, the municipal HIV/AIDS programme has been notified of 24 000 cases, an epidemic that is concentrated in the poorest neighbourhoods. Despite the large number of hospitals and clinics in the city, providing access to care has been very difficult. Since 1992, following the national government's example, a comprehensive package of prevention activities and care services has been implemented. Universal free access to triple antiretroviral treatment began in 1996.

To overcome the problem of lack of access to services, a continuously updated training programme of health care workers was launched. Today, staff at 51 health facilities, including university hospitals and primary care

units, provide antiretroviral drugs to more than 19 000 HIV/AIDS patients in all areas of the city. More than half of all patients are followed in primary care units where tuberculosis treatment, antenatal care and other health programmes are also in place.

At the same time as the training programme began, several projects directed at vulnerable populations were started by nongovernmental organizations in partnership with the municipal programme, and with financial support from the Ministry of Health. A total of 120 health units carry out prevention activities, including condom distribution, and nongovernmental organizations run more than 50 projects tackling the epidemic in specific populations.

A community health workers' programme has also been initiated and partnerships with community-based organizations have been established to disseminate prevention measures, bring those unaware of their infection to

where they can receive help, and reduce stigma. Training and support groups to promote adherence were started in clinics, with active contribution by nongovernmental organizations. So far, the evaluation of adherence and resistance in Brazil has shown results similar to those in developed countries.

Locally, partnership with civil society fosters the innovation required to tackle the epidemic. Political support at the local and national levels has been vital to the recognition of HIV/AIDS as a public health problem and hence the fast scale-up of activities through the entire health system. As a result of this multisectoral effort, AIDS-related deaths decreased by around 70% in Rio de Janeiro. A drop in hospital admissions and a rise in outpatient clinic visits demonstrate that there has been a widespread improvement in the treatment of AIDS-related illness (21–23).

the global health community can ensure that the process of expanding access to antiretroviral therapy unfolds quickly and fairly, maximizing benefits while limiting public health risks.

Such shared commitment will also strengthen partnerships that are vital to the future of global public health. Previous successful global campaigns – including smallpox eradication, the worldwide battle against tuberculosis, massive mobilization against polio and the response to SARS – provide important lessons for treatment scale-up. All of these efforts surmounted great obstacles and most ran into unforeseen difficulties. Yet none of them matches the HIV/AIDS treatment challenge in scope and complexity. The 3 by 5 initiative is catalysing new ways of working within WHO and across the global health community based on results-oriented teamwork among many partners, strong linkages between communities, national authorities and international institutions, and an overarching commitment to health equity.

Looking beyond 2005, WHO, UNAIDS and their partners will be developing a new strategic approach to maintain the gains of 3 by 5 and to extend them, using sustainable financing and delivery mechanisms, so that antiretroviral therapy becomes part of the primary health care package provided at every health centre and clinic. Mobilizing the resources and building the chronic care infrastructure needed to deliver lifelong treatment in primary care settings at the periphery will make lasting changes to health systems. As the next chapter explains, moving forward successfully in these directions will also depend on the close partnerships being forged between the formal health sector and many communities and groups, especially people living with HIV/AIDS.

The story of Anna Vincent

Like Joseph Jeune (see Overview), 36-year-old Anna Vincent had been very ill before being brought to the Lascahobas clinic in central Haiti, where she was diagnosed with HIV/AIDS and tuberculosis. She was hospitalized for three weeks and put on antiretroviral therapy. Since then, Anna has recovered very well and gained over 16 kg in weight.

"Without antiretroviral therapy, I would not be here for my children. I would not be here at all. My family has always been there for me, but without treatment they could only arrange my funeral. Now I can create a future for my children," says Anna.

She plans to resume her seamstress classes and in the meantime has been awarded a grant by the Lascahobas clinic to become a market vendor. She can now be seen daily in the local market with a smile on her face.



David Walton/Partners in Health

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chapter three

community participation: advocacy & action



Chapter 2 showed how WHO and partners are galvanizing treatment scale-up as part of a comprehensive response to the pandemic. Forming close partnerships with communities and civil society groups, particularly people living with HIV/AIDS, will be crucial to achieving the treatment target, to the success of the overall response, and to the wider goal of strengthening health systems. Such community participation will include advocacy, delivery of services and support to patients. Involving communities as full partners will require changes to the way in which public health services are delivered.

Throughout the history of HIV/AIDS, many communities and groups have demonstrated remarkable energy in working to help all those whose lives have been affected. This chapter touches on some of the most inspirational examples of that vigour, which have made important differences to public and political perceptions of the disease and led to major and lasting benefits for the community as a whole. Today, the commitment shown by communities is an invaluable resource that can support the expansion of antiretroviral treatment. Beyond that vital objective, it will powerfully influence progress towards more general improvements in public health and access to care.

This chapter describes the emergence of community participation as a recognized dimension of public health work. It then examines some of the historical milestones of civil society involvement in the fight against HIV/AIDS. It emphasizes the power of a rights-based approach to achieving health goals. Finally, the chapter explores civil society

and community participation in treatment expansion, particularly the role of community health workers.

Communities are groups of people living near each other, or with various social connections, and often with a shared sense of purpose or need. Within the wider community, specific HIV/AIDS communities exist, made up of people living with HIV/AIDS, their friends, families and advocates. These HIV/AIDS communities may or may not adopt formal organizational structures. Civil society organizations – those that do not fall within government or private industry – include associations of people living with HIV/AIDS and their advocates, faith-based organizations, and other groups such as trade unions or employer associations.

Achieving the 3 by 5 target will require building partnerships between national governments, international organizations, civil society and communities – and drawing on the specific strengths of each to get the work done on the ground. Government leadership will be indispensable, and civil society cannot replace the public sector. But part of effective government leadership will be forming partnerships with civil society groups and creating mechanisms to harness the skills available within communities. WHO and other international organizations can facilitate and support the process. By working with communities, the 3 by 5 initiative expresses the vision of Health for All affirmed at Alma-Ata (now Almaty, Kazakhstan) in 1978, which unites people's right to health with their right to participate in the decisions that affect their lives.

COMMUNITY PARTICIPATION IN PUBLIC HEALTH

WHO's Constitution of 1948 states that "Informed opinion and active co-operation on the part of the public are of the utmost importance" in improving health, but it was in the 1960s and early 1970s that the practical benefits of community participation in, and ownership of, health projects began to attract increasing attention. Projects in areas of Guatemala, Niger and the United Republic of Tanzania demonstrated that popu-

A choir sings farewell to Mzokonah



Gideon Mendel/Network

Mzokonah Malevu was ill for a long time before discovering he was HIV-positive. At first he wanted to tell only his mother, but with the guidance of a counsellor he decided to break the news to everyone in his community. At a service for the casualties of HIV/AIDS in Enseleni Township, South Africa, including orphans and carers, Mzokonah spoke in public for the first time to hundreds of people. He had a particular message for

young people about how he contracted HIV/AIDS, and he stressed the need for them to protect themselves.

"I hope there will be a purpose in my death, and that my dying will help to educate my family and my community," said Mzokonah. "I want my funeral to be an HIV/AIDS education funeral, where the message can be spread far and wide." His wish was granted.

lation health gains could be made as a result of increased community involvement. In these projects, community input helped shape programme priorities and community health workers took on significant responsibilities (1). In 1978, the full participation of the community in the multidimensional work of health improvement became one of the pillars of the Health for All movement. In 1986, the Ottawa Charter, signed at the First International Conference on Health Promotion, identified strengthening community action as one of five key priorities for proactive health creation (2).

Since then, there have been both successes and setbacks. The actual capacity of communities to participate in defining and implementing health agendas has been limited by resource constraints, entrenched professional and social hierarchies, and public health models focused on individual behaviours and curative biomedical interventions. Gender, race and class discrimination also play a role. Nevertheless, communities have taken part in many successful public health projects, including sanitation, nutrition, vaccination and disease control programmes (3). Recent reviews of primary health care have continued to find strong support for community participation and there is evidence that such involvement has led to significant health gains (4).

CIVIL SOCIETY RESPONDS TO THE AIDS TRAGEDY

The response to the HIV/AIDS pandemic by civil society around the world is one of the most vivid examples of community participation and self-determination. The emphasis in the Declaration of Alma-Ata on community participation "in the spirit of self-reliance and self-determination" fits with the views of early HIV/AIDS activists, expressed in the Denver Principles (5). Drafted in 1983 at a meeting of activists in Denver, USA, they assert the right of people living with HIV/AIDS to dignity in life and death and to representation and power in all decisions concerning their well-being.

In the USA, where the first HIV/AIDS cases had been reported in 1981, then in Europe, Canada and Australia, organizations of gay men and women were the first to respond. The Terrence Higgins Trust was established in the United Kingdom in 1982. Helseutvalget for Homofile (Norwegian gay health association) was created in 1983. These and similar groups built on strategies and social capital developed in the gay rights and feminist movements of the preceding decades.

Box 3.1 The Society for Women and AIDS in Africa

The Society for Women and AIDS in Africa (SWAA) is a pan-African, grass-roots nongovernmental organization established in 1988 in response to the impact of HIV/AIDS on women and children in Africa. It tackles the factors that lead to the unequal impact of the epidemic on women, and seeks gender equity in prevention and care programmes. SWAA works in 40 African countries, focusing on networking, research, advocacy, care and support, human rights and legal issues, orphans and vulnerable children, and prevention options for women. Some examples of its activities are described below.

In Burkina Faso, SWAA is actively involved in increasing awareness of the harmful effects of female circumcision, supports orphans and

vulnerable children through the distribution of books and other school supplies, and has launched a telephone hotline. A prevention project focuses on HIV/AIDS and other sexually transmitted infections among commercial sex workers. SWAA has also organized and coordinated subregional training on gender and HIV/AIDS.

An advocacy programme in Kenya focuses on men and aims to foster greater awareness of the relationships between men's behaviour and HIV/AIDS, to stimulate public debate on the issues of men and HIV/AIDS, to encourage the adoption of safer sex practices, and to increase the perception of personal risk.

In Senegal, with the support of the National Alliance Against AIDS, SWAA provides school

supplies for children affected by HIV/AIDS. It also organizes income-generating activities for women, promotion of the female condom, participation in the national programme for the reduction of mother-to-child transmission, and provision of nutritional advice and other psychosocial support.

In Ghana, the society is implementing a female condom promotion project, HIV/AIDS education, and the establishment of support centres for women living with HIV/AIDS, which provide women with counselling, food and clothes.

In Nigeria, SWAA is involved in organizing counselling training and services in 28 provinces and in developing a counselling training manual.

Groups such as the AIDS Coalition to Unleash Power (ACT UP), formed in the USA in 1987, combined a successful advocacy strategy with the building of a formidable scientific knowledge base, which enabled members to become informed participants in medical research and the policy-making process. During the 1980s and 1990s, these groups won increased funding for antiretroviral drug research, increased AIDS services budgets at federal, state and local levels, an accelerated testing process for drugs, and expanded access to experimental drugs for people not accepted into clinical trials.

International civil society organizations, including the International Federation of Red Cross and Red Crescent Societies, began HIV/AIDS-related work in the early 1980s. In African countries with struggling health systems, numerous community-based and nongovernmental organizations were on the front lines. In many communities, women assumed key leadership roles. The AIDS Support Organisation (TASO) was founded in Uganda in 1987. TASO's work has included advocacy and community education, and also a wide variety of services to people living with HIV/AIDS and their families. Working closely with government, other nongovernmental and faith-based organizations and the private sector, TASO has been a leading contributor to Uganda's HIV/AIDS control programme. In 1988, a group of African women created the Society for Women and AIDS in Africa (SWAA), to work with and for women and their families affected by the epidemic, based on locally defined concerns and priorities. Today, SWAA has become a continent-wide network, working in 40 countries (see Box 3.1).

Other women-led groups have had a powerful impact at country and local levels. Women Fighting AIDS in Kenya, for example, was founded in 1993 by a group of women in Nairobi, many of whom were HIV-positive. In addition to advocacy for women and children affected by the pandemic, the group offers a wide range of services to women and families, including HIV education, individual counselling and support, home-based care, and training in income-generating activities. From an early stage, faith-based organizations have assumed major responsibilities for activities connected with HIV prevention, community education, care, treatment and support (see Box 3.2).

Box 3.2 The role of faith-based organizations

Faith-based organizations have a crucial role to play in the widespread uptake of HIV/AIDS treatments, because of their influence within communities and their reach in rural and remote areas. Together with religious institutions, faith-based organizations are central to efforts to reduce stigma and discrimination. They account for around 20% of the total number of agencies working to combat HIV/AIDS. They are well positioned to offer psychosocial, moral and spiritual support to people in difficult circumstances, and they now have a growing role in treatment scale-up.

The Saint Stephen Anglican Church Widows' Group in Kisumu, Kenya, for example, helps operate a mobile voluntary counselling and testing clinic that also provides essential medicines for opportunistic infections and runs

income-generating activities for women and young people. Although they have not been directly engaged in the provision of antiretroviral drugs so far, their efforts are integral components of a successful scale-up strategy.

Some faith-based organizations have designed systems for tackling inequity and gender issues in relation to access to antiretroviral drugs. They have worked to ensure that certain individuals or groups do not have privileged access to treatment, but rather that communities develop their own criteria for access.

Other organizations are involved in the direct provision of drugs. For example, the Mission for Essential Drugs and Supplies, a joint collaboration between the Christian Health Association of Kenya and the Kenya Episcopal Conference-Catholic Secretariat, is providing

affordable essential medicines including antiretroviral drugs. They are importing generic drugs for the Mission and for other nongovernmental organizations at a reduced cost. The Mission's health facilities also have a home-based care component that supports monitoring of adherence to antiretroviral therapy and tuberculosis medications, and contributes to nutritional and other socioeconomic support to households and communities.

Faith-based organizations could be brought into treatment scale-up in order to combine their comparative advantages (in, for example, community mobilization, care activities, bringing about adherence and promoting confidence to seek treatment) with the training of their non-medical personnel in relevant medical skills.

THE POWER OF A HUMAN RIGHTS APPROACH

Advocacy arguments have increasingly been grounded in a human rights framework. This draws on both fundamental moral principles and the legal obligations of states to respect, protect and fulfil human rights, including the right to health. These obligations derive from international law, regional human rights agreements and national laws (6). A rights-based approach to HIV/AIDS has propelled social mobilization by civil society groups in a growing number of countries.

In Brazil, the Brazilian Interdisciplinary AIDS Association, founded in 1986, works to defend the rights of people with HIV/AIDS through research, education and policy analysis. In Bolivia, Venezuela and other Latin American countries, civil society organizations have successfully used legal action based on human rights conventions to obtain access to treatment through national health systems (7).

The Treatment Action Campaign in South Africa uses community education and mobilization, mass civil protest, media campaigns, legal mechanisms, and alliances with other nongovernmental organizations and labour groups to defend the rights of people infected with and affected by HIV. Its national fight for access to HIV/AIDS therapy led to the Pan-African Treatment Action Movement, launched in August 2002.

Human rights standards and principles should also guide the planning and implementation of treatment policies and programmes. The human rights approach recognizes that rights are universal and reinforces the value of full participation of all members of society. Such an approach also requires increased accountability of decision-makers and greater equity in health care policies.

Countries have increasingly acknowledged these imperatives. At the 1994 World AIDS Summit in Paris, 42 governments declared that the enhanced involvement of people living with or affected by HIV/AIDS was critical to ethical and effective national responses to the epidemic. This principle of greater involvement is fundamental to the fairness of any policies and programmes concerning HIV/AIDS (8). In 1998, the Office of the United Nations High Commissioner for Human Rights and UNAIDS jointly developed international guidelines on HIV/AIDS and human rights, a tool that applies human rights law and norms to the specific context of HIV/AIDS and identifies what states can and should do in the light of their human rights obligations (9). Commitment to these principles was reinforced in the Declaration of Commitment on HIV/AIDS, adopted at the United Nations General Assembly Special Session on HIV/AIDS in 2001 (10).

Nongovernmental organizations and civil society groups have led the application of human rights standards to the problem of access to medicines for the poor (see Box 3.3). Efforts such as the Access to Essential Medicines Campaign and the Drugs for Neglected Diseases Initiative of Médecins Sans Frontières have focused global attention on the medicines crisis in the developing world and helped drive public debate on the effects of trade and intellectual property rights regulations on poor people's access to treatments for a wide variety of health problems (11–13).

An international coalition of activists and civil society groups worked with representatives of developing countries before and during the World Trade Organization (WTO) Ministerial Conference in Doha, Qatar, in November 2001. Civil society engagement gave impetus to the Doha Declaration, which formally clarified that the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights "can and should be interpreted and implemented in a manner supportive of WTO members' right to protect public health and, in particular, to promote access to medicines for all" (14) (see Box 2.5). In April 2002, the United Nations High Commissioner for Human Rights welcomed the Doha Declaration and urged the international community quickly to define ways of enabling all countries to benefit from its provisions (15).

CIVIL SOCIETY AND TREATMENT EXPANSION

Civil society advocacy helped open the way for the 3 by 5 initiative. UNAIDS and WHO calculated in 2001 that it should be possible to provide 3 million people in developing countries with antiretroviral therapy by the end of 2005, but international commitment, funding and patient enrolment lagged. Energetic advocacy by activist groups in forums such as the 2002 Barcelona International AIDS Conference helped to turn the idea of expanded access to antiretroviral drugs into a definite policy commitment engaging national governments, the United Nations and other major international institutions.

Following the declaration of the global AIDS treatment emergency, representatives of people living with HIV/AIDS from Africa, Asia, the Caribbean, Europe, Latin America and North America were among the key partners consulted in the design of WHO's 3 by 5 strategy. Ongoing collaboration is vital. Catalysing innovative partnerships is one method of changing ways of thinking and working in global health. The treatment initiative is making community participation a measurable element of programme processes and outputs: an intermediate target has been set of 3000 partnerships established worldwide between formal antiretroviral therapy outlets and community-based groups by December 2004 (16).

From advocacy to service implementation

Advocacy, community education and promotion of rights will be crucial to the success of scaling up treatment. The vital role of communities in prevention and long-term care has been widely acknowledged (17). In many countries aiming to expand coverage with antiretroviral therapy despite severe health workforce shortages, members of local communities will also participate directly in service provision and support (18). Growing evidence from innovative treatment programmes shows that community members and their organizations are also capable of performing a broad range of essential tasks in the provision of antiretroviral treatment services.

Rapid assessments of treatment sites in a number of high-burden countries, together with a few documented programmes, suggest that the core function of communities and families lies in adherence support. In some treatment programmes, community organizations have transferred to their own settings tasks traditionally performed by facility-based formal health workers. For example, trained community members monitor side-effects and supervise pill intake in Haiti and Rwanda (19, 20).

Some associations of people living with HIV/AIDS in settings with limited treatment access have, purely as a survival strategy, initiated their own services with support from organizations in richer countries. They rely on the formal health care delivery

system only for essential medical tasks. Many treatment-related tasks, such as the administration of laboratory monitoring, are performed by community members (21). Another example of moving tasks out of formal medical facilities and into the community comes from Uganda, where TASO's Masaka branch takes responsibility for the initial selection and counselling of patients for antiretroviral treatment, then refers them to a treatment programme located in the district hospital (see Box 3.4).

In some cases, community members have worked within formal health centres. For example, in Thailand, day care centres have been set up within public health facilities, where people living with HIV/AIDS can meet and participate in various activities. Community organizations are an integral part of the care and treatment system. In Khayelitsha, South Africa, lay people have moved into the primary health care centre as counsellors, helping patients to make treatment plans in order to enhance adherence (23).

Experiences in several existing antiretroviral treatment sites suggest that the relationship between health facility and community can and should be structured as a genuine partnership. A partnership model allows for regular dialogue, assigns tasks to those best suited regardless of professional status, and supports mutual feedback. Considerable investments are necessary in terms of training, staff time for supportive supervision, and additional support. A critical issue is sharing ownership of the treatment programme: health workers who are usually accustomed to maintaining control over service provision, specifically with regard to treatment, may be reluctant to share ownership of the treatment programme with communities or even accept community members' input in responding to clients' needs.

Employing people living with HIV/AIDS as paid staff members is another strategy that may allow facilities to benefit from their unique skills and knowledge and help to break down barriers between health services, communities and clients. Different disease programmes have reported that health professionals often initially resist the involvement of community members in care and treatment, but later accept this involvement when they see the positive results obtained (24, 25).

Front-line facilities – health centres – are in direct contact with families and clients on a daily basis, and therefore in a position to maintain a functional partnership with communities. Evidence suggests, however, that this unique opportunity is often missed. Community organizations are frequently overlooked by health professionals, and their potential to contribute to health is often not appreciated by the health care system (26).

Shared ownership – increasing the control of communities and clients over health services – is not only desirable from a human rights point of view, it is a requirement for reaching the poor with antiretroviral treatment and other health services. Many success stories exist. In Zambia, the Chikankata faith-based district hospital generated a community process that resulted in excellent joint work for HIV/AIDS prevention and care (27). In one of the poorest communities in Haiti, clients and their fellow community members have become active contributors to antiretroviral treatment services (19). The network of AIDS Communities in South Africa mobilized external support and built a broad partnership to set up and run a treatment clinic in KwaZulu-Natal (28).

The success of the partnership model is clear at the level of small programmes, so the challenge is to scale up these models. As countries move to expand delivery of treatment, existing health service structures may be used to facilitate community partnerships. The most relevant in many settings may be those front-line structures connected with primary health care.

To establish community involvement as normal practice in existing health facilities targeted for scale-up of antiretroviral therapy, efforts are needed to change the relationships between communities and health providers. This implies fostering appropri-

Box 3.3 A successful community effort in Suriname

In Suriname, as in many developing countries, HIV/AIDS medicines are not included in any public or private health insurance package and they are not subsidized by the government. Although Suriname is able to obtain relatively cheap medicines from Brazil and India, the cost of treatment (around US\$ 60 per patient per month) is too high for most people living with HIV/AIDS, and many have died as a result.

The Emergency Treatment Fund for HIV/AIDS

was set up in Suriname to help prevent more deaths, with the collaboration of, among others, the Pan American Health Organization. The Fund also received an initial contribution of US\$ 15 000 from the Canada Fund for Africa, and in September 2002 began to purchase medication. Private donations were also solicited, by which people could "adopt" two children or one adult for US\$ 600 per year. In the first six months, 50 people profited from the work of the Fund, but initial resources were

insufficient to meet demand.

In collaboration with a fundraising committee, the Fund organized a mass media campaign aiming to raise US\$ 70 000, which seemed to many to be an impossible goal considering the poor economic situation in the country and the stigma surrounding the subject. However, more than US\$ 150 000 was raised. Since then, total donations have risen to over US\$ 200 000. This is enough to sustain the Fund for 1–2 years.

ate attitudes and skills among health professionals to work with communities and put in place incentives for this kind of work. Resource allocation must strengthen the front-line facilities that form the interface with communities. It also implies the need to build community capacity for a greater involvement, and the need to put in place specific arrangements for greater community ownership.

COMMUNITY HEALTH WORKERS AND TREATMENT

One approach to strengthening the active engagement of communities in health development is to train and deploy people as community health workers. Antiretroviral treatment programmes in resource-limited settings have so far not often built on existing community worker programmes, but it is important that countries assess their experiences in this area and look for chances to work with community health worker cadres and recruits drawn from associations of people living with HIV/AIDS (see Box 3.5).

Community health workers have functioned successfully in small-scale nongovernmental programmes, as well as in large-scale national programmes integrated into the public health system. In many countries in sub-Saharan Africa, for example, faith-based organizations have provided quality care for 20 years. Many faith-based health care facilities have large staffs of outreach workers, home and community health workers, who function in unique networks (29). Other organizations with similar networks have also played important roles in HIV/AIDS prevention and care. The 3 by 5 initiative will partly be run through these infrastructures, using the capacities and networks already in place.

Involving community health workers is a prime area for the practical approach to increasing treatment coverage. Although current knowledge is far from exhaustive, the existing evidence provides enough information to enable planners and implementers to move immediately to build programmes in a step-by-step, problem-solving manner, tackling obstacles as they arise. Operational research will be vital in providing quick feedback on lessons learnt from community health worker participation, as programmes scale up. This research must be planned and budgeted for.

Community health workers should not be viewed simply as local helpers who can temporarily take on tasks the formal health care delivery system lacks the resources to perform. They are not primarily a cheap way to deal with human resource constraints.

Box 3.4 Partnerships for treatment in Uganda

In the Masaka district of Uganda, antiretroviral treatment has been introduced for the poor by the Uganda Cares initiative, a partnership of the Ministry of Health, the Uganda Business Coalition on HIV/AIDS and the international AIDS Healthcare Foundation Global Immunity.

The treatment programme is located in Masaka district hospital as an outpatient service. The Masaka district office of The AIDS Support Organisation (TASO) which is the national HIV/AIDS service organization founded by people living with HIV/AIDS, is also located on the hospital premises. TASO-Masaka tackles prevention, care and treatment through a combined system of employed, paid staff

such as community-based counsellors, and a decentralized system of trained community volunteers who serve a number of houses in their own neighbourhood. Regular meetings between community volunteers, TASO and facility-based staff are held.

TASO fulfils various critical roles related to treatment, including:

- Initial selection (based on agreed criteria), counselling and referral of candidates for treatment from the members enrolled in its community and home care programme. This maximizes the treatment readiness of patients before they first visit the facility for counselling and clinical review. The Kitovu

mobile service (a faith-based community and home care organization) is a similar referral partner.

- Follow-up of patients at home and at community level, thereby minimizing patient drop-out from the treatment programme.
- Organizing transport to clinic appointments for those who are too ill to make their own arrangements.
- Nutritional support for those requiring it.

Overall, the treatment programme reported a 97% adherence rate after one year of operation (22).

Treating children with care



Jodi Bieber/Network

Sparrow Village in Johannesburg, South Africa, is a village community for the treatment and counselling of people living with HIV/AIDS in the terminal stages of the disease. It is home to children who play in brightly painted playgrounds. But Sparrow Village is not only a hospice, it is also a training centre and a base from which to educate the public about HIV/AIDS.

“Most of our patients were subjected to rejection and humiliation,”

says Dr Duncan McAulay. “But here they gain a moment of respite and a little dignity before they die.”

For treatment scale-up to succeed, extensive participation of civil society organizations and communities like this is a necessity. Some community and faith-based organizations have assumed major responsibilities for activities connected with HIV/AIDS prevention, treatment and care.

Rather, community health worker programmes can and should be seen as part of a broader strategy to empower communities, enable them to achieve greater control over their health and improve the health of their members.

The following areas are vital for achieving success:

Inclusion of curative activities: communities are usually in direct need of curative care. If community health workers are not involved in this area, people are less interested in and supportive of their activities (30). Experiences from Nepal, for example, show that when policies were established that allowed community health workers to dispense medication, community workers’ motivation and their acceptance by the wider community increased (31). Poor performance of community health worker programmes is also frequently associated with an insufficient supply of drugs (32, 33).

Supportive supervision, strong linkage with health professionals and referral systems: recent experiences show that, with supervision, HIV/AIDS treatment programmes relying extensively on community health workers are able to maintain quality (34). Experience in antiretroviral treatment from Haiti, Rwanda and South Africa shows

that supervision is effectively provided by regular meetings, simple forms that facilitate reporting and feedback, and willingness of health professionals to engage with communities (19, 20). A community health workers' programme should be integrated into a referral system that includes more advanced care centres able to respond to problems that cannot be solved at lower levels.

Remuneration: where financial compensation is provided to community health workers, both benefits (retention of workers) and negative effects (being viewed by communities as government employees) have been found (28). Community health workers who volunteer can usually contribute only a limited time each week.

Innovative ways to compensate volunteers for their time have been introduced. For example, community volunteers involved in the onchocerciasis control programme in Kabarole district, Uganda, combined the distribution of drugs to control onchocerciasis with the retail of condoms which became an effective income-generating activity (35). In several countries, volunteers receive no payment, but do receive incentives with monetary value, for example a bicycle that can be used for other purposes. Payment is needed to sustain the required level of commitment in the long run whenever community health workers are contributing an amount of time comparable to that given by professionally trained health workers. No community health workers' programme, whether relying on volunteers or paid workers, is without costs, and every such programme will need a budget to be effective and sustainable.

Relationship with the community: support and recognition from community organizations and leaders, and appreciation from members of the community, are identified as critical incentives for community health workers (36). Fostering such relationships will mean involving associations of people living with HIV/AIDS and other community-based organizations and leaders whose support will be vital. Through their networks, community organizations may complement community health workers by tackling needs such as nutrition and income generation. Efforts to keep community health workers strongly attached to community organizations are therefore important. This can be accomplished by working through existing community-based organizations in setting up and monitoring the community health workers' programme. It will be critical to put in place arrangements that guarantee accountability. One way to achieve this is to give the community organizations, rather than the formal health care system, control over monetary or other compensation for community workers.

COMMUNITY EMPOWERMENT AND PUBLIC HEALTH: SHAPING THE FUTURE

Community involvement is essential to all aspects of a comprehensive approach to HIV/AIDS: prevention, treatment, care, support – and research (see Chapter 5). In

Educating sex workers in Dhaka



Shahidul Alam/Drhk/Network

In Dhaka, Bangladesh, Hajera has established a sex workers cooperative to fight for better working conditions for her peers. She spends each evening distributing condoms to sex workers and sharing information about HIV/AIDS.

Community participation is a recognized dimension of public health work. CARE Bangladesh, a nongovernmental organization, has estab-

lished a behaviour change programme that works with target groups to educate vulnerable populations, provide access to condoms and promote the use of condom distribution outlets. The distributors are paid a small stipend, are taught to read and write, and receive basic health education about HIV/AIDS.

the expansion of treatment up to and beyond the targets of the 3 by 5 initiative, civil society must raise performance demands on the public, private and nongovernmental sectors. Scale-up cannot happen without government commitment, but civil society advocacy can support this commitment.

The success of this effort in HIV/AIDS control will have important implications for the wider public health agenda. The necessity of community involvement in treatment roll-out represents an opportunity to build skills and catalyse collaboration between communities, health care providers and public health planners that can carry over into other areas of public health work, and help strengthen health systems across the board. Communities educated and mobilized around HIV/AIDS control, provision of services and support will be better able to take part in health promotion, disease control and treatment efforts that tackle other health problems. These include tuberculosis and malaria, maternal and child health, and chronic adult diseases in low-income and middle-income countries. Recognizing and building up these capacities is part of

Box 3.5 Applying the expertise of people living with HIV/AIDS: Hellen's story

Hellen is the administrative clerk at an HIV/AIDS clinic in rural Uganda. As a person living with HIV who started antiretroviral treatment nine months ago, Hellen has considerable insight into the ups and downs of treatment. With this expertise, she is able to respond to many of the concerns that patients bring to the clinic.

Hellen is also an activist for the National Community of Women Living with AIDS in

Uganda. In this role she organizes nutritional support for patients on treatment and contributes to treatment education at the grass-roots level. As a member of the local HIV/AIDS drama group, Hellen is also involved in community education. She is thus the kind of expert within civil society who can create effective bridges between the formal health sector, the broader community, and people living with HIV/AIDS,

as well as linking prevention and treatment efforts.

Hellen says about her work in the community: *"Working at the grass-roots level is very important. People don't know much about treatment. If you look well, because of the treatment you get, people don't want to believe that you have AIDS. They think your illness was something else"* (22).

the process of strengthening health systems. Success in accelerating this process could be a lasting contribution of the 3 by 5 initiative to global health improvement.

This chapter has demonstrated the vital role that communities and civil society organizations play in the fight against HIV/AIDS and the success of the 3 by 5 initiative. Governments and international organizations, including WHO and its partners, will catalyse this process. The next chapter shows how the comprehensive response, with the close involvement of all these allies, aims to strengthen health systems and hence bring long-term improvements in health services for all.

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chapter four

health systems: finding new strength

The treatment initiative presents a tremendous challenge to the health systems of countries heavily burdened by HIV/AIDS. Ideally, those systems should function effectively, efficiently and serve the entire population. In most cases, however, they are poorly run, underfunded and sometimes barely able to function at all. This chapter examines what is necessary to strengthen them in order to implement the initiative, while also improving and expanding many other health interventions related to both communicable and chronic noncommunicable diseases. It shows that a major effort is urgently needed, requiring a massive increase in resource transfers from rich to poor countries.

Far from being a drain on resources, the 3 by 5 initiative has the potential to strengthen health systems in a number of ways. It can attract resources to the health system over and above those required for HIV/AIDS. It can spur investment in physical infrastructure, help develop procurement and distribution systems of generic products, and foster interaction with communities across a wide range of health interventions. Any possible adverse effects of the initiative on the wider health system must be anticipated so that they can be minimized.

Current levels of health expenditure in many poor countries are far below those needed to provide the bare minimum of services to their populations. In the years ahead, the financing gap will have to be filled largely by external donors. National governments and their economies are incapable of generating much more funding than they do al-

ready, while donors have still to live up to past collective undertakings.

The expansion of treatment should not divert resources and attention away from prevention and other forms of care. Indeed, the aim is for the initiative to become profoundly synergistic with those interventions ⁽¹⁾ (see Chapter 2).

Antiretroviral therapy calls for a pattern of chronic care in which individual patients receive continuous follow-up treatment for the remainder of their lives, rather than the occasional acute interventions that characterize the response to most infectious diseases. If health systems can be strengthened to accommodate this new pattern,



the management practices developed for antiretroviral therapy (appointment systems, integrated medical records, drug supply systems, and adherence support) can also be applied to the management of other common, chronic conditions such as diabetes and hypertension.

This chapter shows how both public and private providers within health systems have helped to combat HIV/AIDS in some developing countries. It then uses the conceptual framework of four principles of health systems – leadership, service delivery, resource provision and financing – to examine how health systems, and especially publicly funded systems, can be strengthened to implement the 3 by 5 initiative while continuing to improve and expand many other health interventions.

INVESTING IN CHANGE

With only a few exceptions, HIV/AIDS epidemics have hit hardest the countries whose health systems are least able to cope. Chronic underfunding and poor management largely explain their precarious position. Efforts to reform the public health sector have tended to focus on underfunding, centralized decision-making, and inefficient delivery of services. Responses have included the introduction of user fees, decentralization and contracting with the private sector. The limited successes – and frequent unintended adverse effects – of these reform initiatives have left public health providers in great need of capacity strengthening. Two broad strategies have been proposed: increased spending to overcome deficiencies of inputs and strengthen management systems; and the use of alternative delivery systems and health service providers from outside government (2).

New investments in capacity building, especially in human resources, need considerable time to mature. The alternative strategy of bypassing the public sector provider network offers the possibility of quicker benefits. This strategy has already been widely employed in a series of interventions, particularly in prevention efforts such as peer educator programmes, school education, social marketing of condoms, and mass media campaigns.

Most of the early experience with HIV/AIDS treatment in developing countries has been gained in private practice and in sites managed by nongovernmental organizations and research institutions, which are free of the bureaucracy and severe resource limitations that constrain the public system. Such providers have been prominent in demonstrating the feasibility of the treatment in resource-limited settings. However, scale-up will inevitably require a large number of treatment sites and therefore much larger participation by the public sector, which has the largest network of service delivery points. This is already apparent in many national plans, and it is inevitable that expanding treatment will entail the strengthening of public provider systems.

However, the treatment initiative will benefit from the experience of earlier disease programmes that have led to improved health system practice: collaboration between international, national and local authorities in the context of poliomyelitis eradication and SARS control; the value of monitoring systems based on outcome measures in the case of the DOTS strategy for tuberculosis control; and effective partnerships with parties outside government, also in the context of tuberculosis control. There are fewer examples of specific programmes enhancing the capacity to deliver other services, but improved disease surveillance and infection control measures for SARS (3) have wider application, and it has been possible to add the distribution of vitamin A supplements to polio eradication activities. There is little evidence that categorical programmes have undermined wider systems capacity. Synergistic benefits will occur

if they are planned in advance and, equally, any adverse effects need to be anticipated so that their impact can be mitigated (4).

It is therefore important that treatment scale-up is designed not to undermine the capacity of health systems to reach broader health goals by, for example, avoiding disproportionate diversion of existing resources into antiretroviral therapy, or refraining from the use of incentives only for staff directly engaged in HIV programmes. While the public sector will be the largest single provider of antiretroviral therapy in future, various other providers have pioneered treatment delivery and will continue to have an expanding role. The following sections indicate their potential.

BEYOND THE PUBLIC SECTOR

Since antiretroviral drugs became available, small numbers of patients in developing countries have been able to obtain treatment from private practitioners on a fee-for-service basis, financed either directly out of pocket or by third-party payers such as insurance schemes or employers. Even if governments begin to offer free treatment, the demand for private practitioner services is likely to increase as the price of drugs continues to fall.

Faith-based organizations (see Box 3.2) have also been pioneers in offering antiretroviral therapy on a fee-for-service basis. In Kenya, for example, the founders of a pilot programme at the Nazareth Hospital, near Nairobi, have proposed a scheme to embrace 20 other faith-based hospitals in western and central Kenya (5).

International nongovernmental organizations, notably Family Health International and Médecins Sans Frontières, have been associated with some of the most innovative programmes delivering antiretroviral therapy. Médecins Sans Frontières projects in Kenya and Malawi have provided free services to very poor rural populations, and in South Africa the organization has supported a community-based programme (see Box 4.1).

The business sector contribution

Many large private firms have been providing antiretroviral therapy to their employees, either directly as part of occupational health services or indirectly by financing access

Box 4.1 Antiretroviral therapy in the Western Cape Province, South Africa

South Africa's first public sector project offering antiretroviral therapy was established at community health centres in the Cape Town township of Khayelitsha, where clinics began treatment in May 2001. By June 2003, over 5000 patients had enrolled and over 600 children and adults had started treatment. The costs of drugs, viral load tests and the wages of half the clinical staff have been met by Médecins Sans Frontières; the remaining costs have been covered by the provincial government.

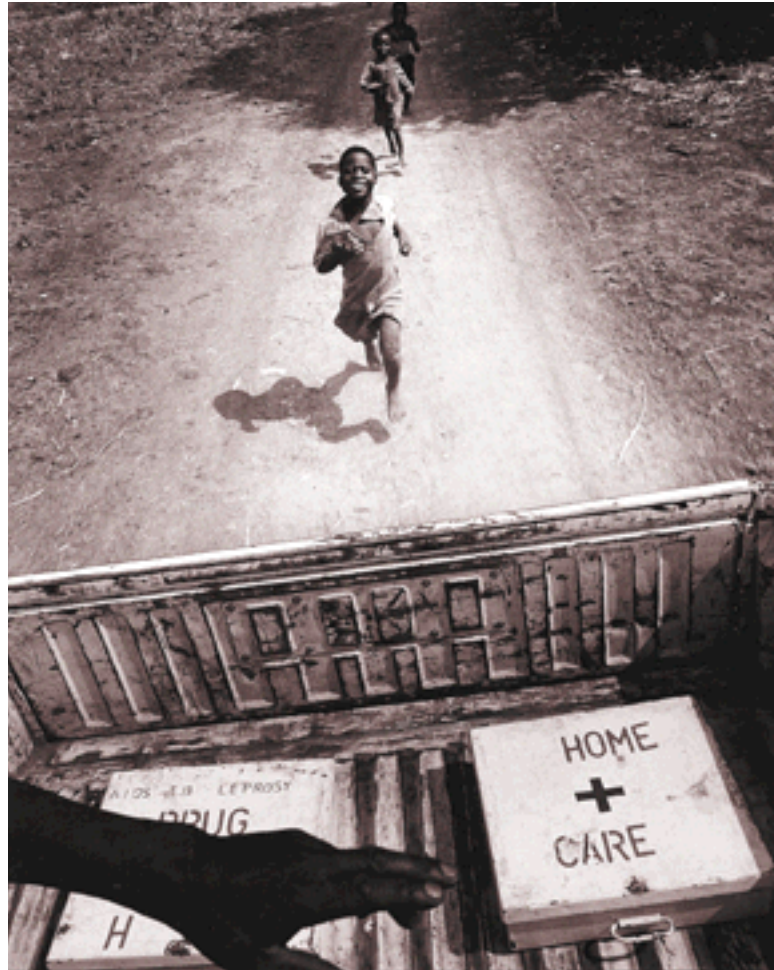
Adherence, survival and virological success in this project are comparable to if not better than those in many settings in wealthier countries. The primary care setting has contributed

greatly to a very high retention of patients. The potential to treat families in one setting, to connect with community-based support groups and nongovernmental organizations, and proximity to referring services all contribute to impressive clinical outcomes.

The province is attempting to bolster the entire primary care system in tandem with the delivery of antiretroviral therapy. To do this, management responsibility for primary care and HIV/AIDS has been located within one directorate, and aggressive staff recruitment and retention strategies try to fill posts in HIV/AIDS services and in other primary care services simultaneously.

Primary care services are benefiting from the strengthening of referral systems with hospitals, the provision of clinical support by specialists, and the increased emphasis on drug availability. Nurses with no formal training in diagnostics and curative care have rapidly become competent primary care clinicians through training and mentoring in HIV/AIDS care. Increased resources (both human and financial) have been directed at primary care as a result of the work of these projects. There has been a reinvigoration of clinical support networks, increased uptake of a range of services including voluntary counselling and testing, and more openness about HIV/AIDS (6, 7).

The health truck comes to town



Gideon Mende/Network

Children excitedly chase the truck delivering medicines to their village. The truck also brings health care workers from a distant hospital into this rural Zambian community where they help provide treatment.

"In Zambia it is difficult to afford aspirin. Our government spends US\$ 10 per head on health per year and several hundred thousand people live with HIV/AIDS, so it is impossible to look after everyone in hospitals or hospices," says Daphetone Siame from Chikankata Hospital's AIDS Management and Training Services. "The HIV/AIDS team at our hospital decided to visit people in their own homes in order to monitor their condition and to teach their families how to care for them: it works!"

There are many benefits in caring for people at home – it can be cheaper, many patients

prefer not to be in hospital, and community care can be a powerful means to break down prejudices and to educate people about HIV/AIDS.

Zambia's first home-based care programmes started in 1987, when nearly 90% of HIV/AIDS patients at the Chikankata Hospital said they would prefer to be at home. The hospital arranged for teams of health workers to visit them once a month, covering an area within an 80-km radius. In addition to delivering health care to patients, the teams counselled families and educated communities about HIV/AIDS. A key goal is to encourage acceptance of HIV/AIDS patients in the community and to stress that infection is not transmitted by ordinary household contact.

to other schemes. Very often, treatment is a logical extension of long-standing commitments to respond to HIV/AIDS in the workplace, with health education activities, condom distribution, counselling and testing, as well as long-term care and social support. In some cases, benefits extend to family members and the wider communities. However, there are two severe limitations on the contribution of the business sector. First, only a minority of businesses are implementing these enlightened policies. Second, most people who would benefit are not employed by the kind of multinational firms that can provide treatment.

The strengthening of health systems that the treatment initiative hopes to galvanize will therefore involve nongovernmental organizations and businesses, but this will not be enough. The key factor will be the leadership of governments.

LEADERSHIP FOR CHANGE

Providing wider access to antiretroviral therapy creates a set of challenges and opportunities that will require strong government leadership and guidance, while still involving local innovation and participation. Among the essential ingredients of good leadership are the ability to mobilize institutions and individuals around common goals and give a clear sense of direction, enlisting public and political support for health actions, as well as ensuring the application of common standards. Good leadership also means facilitating communication, brokering knowledge, identifying gaps and taking steps to fill them. It means promoting partnerships where appropriate, arbitrating in conflict, actively promoting accountability, and, crucially, making sure that vulnerable groups are protected.

Four aspects of leadership are particularly relevant. The first is to define a clear **national strategic framework** for prevention, care and treatment that gives the vision and direction needed by all actors across the health system. This has to be set in the context of a broader framework for responding to threats to population health, and needs to take a long-term view. The second element is the ability to build **coalitions** and maintain stakeholders' commitment to the agreed objectives and strategies. The third is the formulation and enforcement of a **system of rules and incentives** for all providers to ensure quality care, whether in the public or the private sector. The fourth element, **oversight**, involves maintaining a strategic overview of what is happening across the health system. It also means determining whether policies are being carried out, what is on course and what is not, and responding as needed. Designing a health information system and managing a monitoring process are critical to ensuring the factual basis on which sound leadership decisions can be made.

HEALTH INFORMATION SYSTEMS

Timely and accurate health information is the essential foundation for policy-making, and for the planning, implementation and evaluation of all health programmes. The 3 by 5 initiative needs careful and ongoing assessment of treatment requirements, programme access, coverage, quality of services and health outcomes, and operations research. Initially, health information may have to be collected as a vertical programme activity. The system will require the introduction of new technologies for patient identification and a continuous medical record, from which data can be extracted for the cohort analyses essential to the accurate measurement of treatment outcomes. Appointment systems and patient tracing are essential elements of chronic care management. The necessary investments and innovations in health information systems will assist the strengthening and reform of country health information systems towards

which WHO is working, partly in the context of the Health Metrics Network (8). WHO will also link the health information component to activities related to strengthening the capacity of national health research, aligning national health research production, knowledge sharing and applications, and other activities in countries.

MONITORING 3 BY 5

A sound strategy for 3 by 5 will involve monitoring indicators such as the number of patients receiving different services, treatment adherence, quality of care and availability of drugs. It will also require monitoring indicators that assess whether the goal of strengthening the wider health system is being achieved; these indicators include overall trends in inputs, processes, outputs and outcomes.

Although much information is already being produced, some critical gaps remain: these include details of the activities of the private sector and estimates of service requirements relative to those actually delivered. Making monitoring manageable will require selectivity and creativity in the information to be collected, in the ways information flows are managed, and in the ways information is synthesized and presented.

The ability to monitor resource flows is an essential element of monitoring, evaluation and policy development. It is important to know how much is spent on health, the sources of funds, through whom they are channelled, what goods and services are purchased, and who ultimately benefits. Tracking health expenditure using the national health accounts framework is the starting point for assessing the level of domestic and international commitment to supporting health, and can be adapted to show the commitment to particular activities such as HIV/AIDS prevention and care. It is also critically important to develop ways of tracking additional external resources to make sure that they do not replace normal expenditures on health or HIV/AIDS, and that they are used efficiently and equitably. Innovative processes will be required to collect and analyse new knowledge and disseminate the findings both nationally and internationally.

SERVICE DELIVERY

The majority of patients starting to receive antiretroviral therapy will be recruited from settings where opportunistic infections are already apparent: tuberculosis treatment services, acute medical care in outpatient departments and hospital wards, and home-based care programmes. Increasingly, patients will be identified as HIV-positive in other settings where testing is offered, such as free-standing voluntary counselling and testing centres, maternal and child health clinics where prevention of mother-to-child transmission programmes are in place, and clinics dealing with sexually transmitted infections. Patients identified at these entry points, even though asymptomatic and not eligible immediately for antiretroviral therapy, need to be inducted into a continuing review process. This will enable their opportunistic infections to be correctly diagnosed and treated. It will also ensure that they are prepared psychologically and socially for the time when they will receive treatment and that it is initiated at the right time. This continuing care might be provided in dedicated HIV clinics, in clinics specializing in tuberculosis or sexually transmitted infections, in general medical clinics, or in home care programmes. Making this continuum of services available to every community will be a tremendous challenge, and one for which all countries will need considerable assistance.

There are also geographical and institutional dimensions to the challenge of scaling up provision of antiretroviral therapy. Previously, the locations in which treatment has

been provided have been predominantly urban and the facilities have been mostly hospitals. This was natural during the pilot phase, which demonstrated the feasibility of the therapy in resource-poor settings, and it remains rational to expand the service delivery network by working downwards through the hierarchy of facilities from the better-endowed to the more basic. Population coverage on the scale envisaged, however, requires a dramatic expansion in the number of service delivery points, and that inevitably means expanding into the geographical periphery of each country and district and into lower-tier facilities which lack the staff and resources of the pilot sites. This dissemination of service delivery points is also important for geographical equity of access to services. Fortunately, some pilot sites have developed services on a district-wide basis and demonstrated the feasibility of delegating tasks to mid-level health workers in primary care facilities (9). The antiretroviral therapy treatment guidelines developed by WHO assume a pattern of services at district level whereby there is a central facility (hospital or major health centre) connected to a network of ambulatory care facilities by cross-referral of patients and specimens, and supportive supervision of the less skilled staff customarily found at lower-tier facilities (10).

Waiting for treatment



Gideon Menden/Network

Health systems in many developing countries are as frail and vulnerable as the HIV/AIDS patients they try to help. The systems themselves are also in desperate need of treatment. As this man quietly waits for attention in hospital, chronically underfunded health services must also

hope that their turn will come soon. For him, antiretroviral treatment is the answer. For health systems that are already overwhelmed, the future depends on injections of new resources.

Dissemination of service provision into primary care facilities may increase the distance to laboratories and skilled diagnosticians, but it reduces the distance (geographical and social) to the communities from which the patients come, which are themselves a crucial resource for care and treatment. Since a high level of adherence to treatment is a condition for viral load suppression, the proximity of drug re-supply and the support of community members in adherence and other tasks (as discussed in Chapter 3) are important for programme success.

HEALTH SYSTEM RESOURCES

The capacity of health providers to deliver services is determined by the resources they can deploy. These can be divided into tangible resources such as buildings, equipment, staff and supplies, and intangible ones – the management systems that control their deployment. These are all often severely defective in high-burden countries, and will need substantial investments. It can be argued that deficiencies in human resources most severely constrain the capacity for effective service delivery.

The human resource crisis

It is widely recognized that there now exists a health workforce crisis throughout the developing world (11–13). It is characterized by a shortage and maldistribution of trained health workers caused by elevated attrition rates from, among other things, voluntary changes of occupation and emigration from poor to richer countries, a short-fall in the production of trained health workers (in part attributable to a shortage of candidates qualified by general education attainment to enter pre-service training), and a tendency to focus training efforts on the higher-level, internationally recognized cadres.

This has been a crisis in the making for several decades, and certainly existed well before the advent of HIV/AIDS, but it has been exacerbated by the epidemic (14). There has been a dramatic increase in deaths within the health workforce, attrib-

utable to AIDS (see, for example, Figure 4.1). In Malawi, 44 deaths occurring in 1997–1998 among nurses represented 40% of the annual output from training; in Zambia, 185 deaths in 1999 represented 38% of the annual output from government training schools (16). Absence because of ill-health has also dramatically increased. One study of laboratory workers in Malawi found that nearly half of total working time was lost to sickness and related causes. A secondary effect is increased absenteeism as health workers need time to care for sick relatives and to attend funerals.

Systemic solutions to the workforce crisis

Human resource specialists now agree that the crisis will only yield to systemic solutions such as substantial improve-

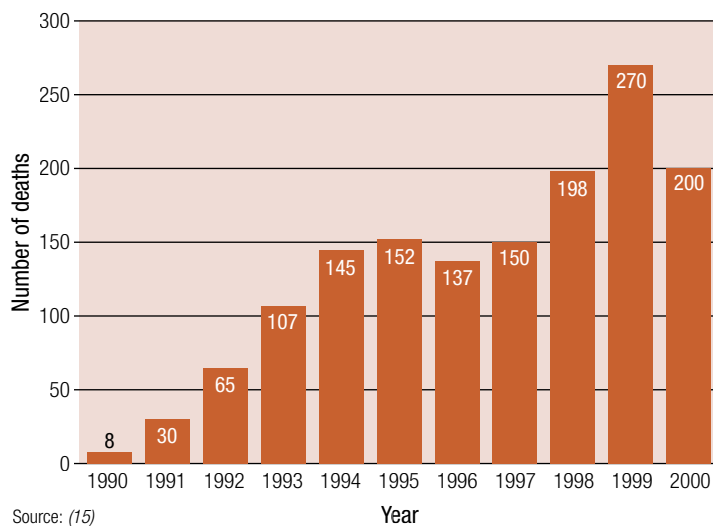
ment in the basic package of pay and benefits, an expansion in the volume of pre-service training, decentralization of some aspects of personnel management, a programme of management training focused on supportive supervision, and adequate protection of the workforce against the risk of occupational exposure to HIV infection (17–19).

Systemic solutions need to link improved rewards to improved productivity. One way to do this is to make payment conditional on the meeting of performance criteria. A good example is Médecins Sans Frontières' incentive payment scheme in Thyolo District, Malawi. The incentives are given to all health workers, not just those directly involved in activities supported by Médecins Sans Frontières; payment of the incentives is discretionary and dependent on performance criteria; and the scheme is administered by local managers, thus empowering their supervision of the workforce (see Box 4.2). This isolated example illustrates reform principles of system-wide relevance.

Given the prevailing shortages, massive expansion of human resources is needed to permit scale-up of antiretroviral therapy without excessive damage to existing programmes. This implies a large number of actions including: emergency recruitment, in some cases from abroad; relaxing fiscal constraints related to public sector hiring; introducing new cadres; increasing community input; initiating treatment-focused in-service training on a large scale; and expanding pre-service training. Although the benefits of expanded pre-service training will inevitably accrue outside the short timescale of 3 by 5, delay in tackling this crucial bottleneck will impose insuperable obstacles on efforts to maintain the momentum of expanded access.

The experience of the pilot sites delivering antiretroviral therapy provides only limited guidance for the optimum staffing of future services, since they have generally been intensive in their use of human resources. New patterns of service delivery and staffing, such as those recommended by WHO (20), need to be implemented; they should entail less frequent patient contact with the provider system, rely less on skilled labour inputs, and optimize the use of inputs other than those from the formal delivery system. These new patterns imply maximum delegation of tasks within the formal health care team, and maximum involvement of community resources. On the basis of standardized treatment guidelines, competency-based training (ensuring better alignment between training and practice), adequate supervision mechanisms, and improved management systems would contribute to productivity gains. Chapter 3

Figure 4.1 Deaths from HIV/AIDS among health workers in Malawi, 1990–2000



Source: (15)

Box 4.2 Incentives to health workers in Malawi

In Malawi, Médecins Sans Frontières is working in partnership with the Thyolo District Health Office to control tuberculosis and reduce the transmission of HIV; they also provide medical care, treatment, nutritional and social support for people living with HIV/AIDS, tuberculosis or both, and respond to nutritional or medical emergencies.

As part of this collaboration, Médecins Sans Frontières has sought innovative ways of tackling human resource constraints, focusing specifically on reducing staff attrition rates within the district and improving staff management, motivation and performance.

This work includes:

- ensuring that infection control measures and materials are in place;
- using non-clinical staff to conduct activities such as health promotion and voluntary counselling and testing;
- extending its workplace policy on antiretroviral therapy to all district health staff;
- piloting a performance-related incentive to all district health staff;
- using this incentive as a mechanism to encourage and supervise staff.

Incentive payments range from US\$ 6 to US\$ 22 per month, adding roughly 10% to

basic government salaries. They are dependent on a monthly review of performance carried out jointly by the district health management team and Médecins Sans Frontières programme managers, using a common evaluation checklist that assesses working hours, discipline, accuracy in carrying out tasks, management of resources (equipment, medicines, supplies, food) and cleanliness. Médecins Sans Frontières proposes that these innovations be carefully evaluated and considered for adoption at the national level.

described how volunteers drawn from people living with HIV/AIDS, who may already be receiving antiretroviral therapy, constitute a resource that can be deployed to good effect.

Different issues arise in the settings of middle-income countries and countries in transition, where resources are less severely constrained, the numbers of trained health workers are generally higher, and the basic capacities of health facilities are more secure. The emphasis therefore lies on ensuring, through appropriate collective financing mechanisms, universal entitlements to care that include the most vulnerable and stigmatized populations. Subsidiary concerns include reducing the cost of treatment regimes, establishing reliable diagnostic and drug distribution networks, and improving surveillance (21). Box 4.3 describes a remarkable success story.

FINANCING ISSUES

There are two interrelated levels at which the financing of HIV/AIDS interventions, including delivery of antiretroviral therapy, needs to be considered. The first, which has received the most attention, is the international division of responsibility between recipient countries and donors. The second level refers to the methods used within countries to finance provision of services.

One of the key messages of this report is that success in containing and reversing the HIV/AIDS pandemic is contingent on a massive increase in resource transfers from rich to poor countries. The 3 by 5 initiative cannot be implemented in isolation from a regeneration of health systems; this cannot be financed from the slender resources available to the poorest countries. It has been estimated that US\$ 35–40 per capita per annum is needed to finance a minimum health service package including antiretroviral therapy, but actual levels of expenditure fall far short of this (2). The average amount spent, per capita, on health services in low-income countries was US\$ 23 in 2001, of which only US\$ 6 was public spending.

Box 4.3 Universal access to antiretroviral therapy in Brazil

Brazil is the first developing country to have implemented a universal antiretroviral distribution programme. Initiated in the early 1990s, by 2003 the programme was providing free antiretroviral medication to about 125 000 patients. The programme is credited with a dramatic reversal in the previously rising trend of AIDS mortality, averting 90 000 deaths and 358 000 AIDS-related hospital admissions.

Brazil has a population of approximately 175 million. With an adult HIV prevalence rate of 0.7% and a per capita income of US\$ 4350, the challenge presented by HIV/AIDS may appear to be more manageable than in countries with higher disease burdens and lower incomes. However, this is a result of the national response: in 1990, Brazil had one of the highest reported numbers of infected individuals in the world, and the World Bank projected that 1.2 million people would become infected by 2000. The current UNAIDS

estimate is that approximately 600 000 people are living with HIV/AIDS, suggesting that the Brazilian response has succeeded in halving the impact of the epidemic.

This success is attributed to a concerted and early government response, the foundations for which were laid by political and professional changes in the 1980s, strong and effective participation of civil society, multisectoral mobilization, a balance between prevention and treatment, and systematic advocacy of human rights in all strategies and actions. In particular, guidelines for prevention policies have emphasized the need to direct attention to more vulnerable populations, such as men who have sex with men, injecting drug users and commercial sex workers; to ensure access to prevention supplies, especially condoms, syringes and needles; and to introduce preventive actions in health care services. Condom use increased tenfold between 1986

and 1999, while needle and syringe exchange programmes significantly lowered HIV prevalence rates among injecting drug users.

A number of features appear to be critical to the provision of universal access to antiretroviral therapy. Most important in Brazil was the government's acceptance of responsibility in a 1996 presidential decree that guaranteed all patients free access to HIV/AIDS medications. The cost of treatment was reduced by manufacturing antiretroviral drugs domestically, and by aggressive price negotiation with international pharmaceutical companies, using the threat of compulsory licensing. A drugs logistic system supplying 450 outlets was developed, and laboratory capacity was established to monitor viral load, CD4 counts and drug resistance. Services are delivered through a network of more than 1000 public care and testing services, financed by federal, state and municipal governments (22).

Even supposing that the poorest countries were able to make the greatly increased domestic fiscal effort to raise an additional 1–2% of gross national product (GNP) for health – relative to the average of 14% for all public expenditures – the per capita amounts generated would still be inadequate. With per capita incomes below US\$ 300 per annum, an additional 1% of GNP raised for public health expenditure still produces less than US\$ 3 per capita, leaving a substantial gap between resources required and those available. The shortfall can be made good only by transfers from the rich world. One estimate of the amount required is US\$ 22 billion annually by 2007 (1), against which current transfers, though supplemented by innovative mechanisms (see Box 4.4), remain inadequate.

This response would be attended by four important considerations:

- First is the need for ongoing work to maintain and enhance the recent substantial increases in donor assistance for HIV/AIDS. This will require the involvement of the donor community in broad planning and monitoring at the international level.
- Second, poor countries themselves need reassurance that the aid flows linked to HIV/AIDS will not experience the volatility that has been known in some other areas in the past.
- Third, some donor funds need to be available to repair deficiencies in basic system capacity and, above all, in the vital areas of staff salaries and pre-service training. If an expansion of aid is to be constructively used to build basic system capacities, it will have to be in more flexible forms that allow a jointly agreed programme of work to be undertaken. There has been some limited experience with the sector-wide approach, with notable success in Uganda and the United Republic of

Box 4.4 New international sources of finance

Billions of dollars of additional resource transfers from rich to poor countries are needed annually to support the 3 by 5 initiative and its associated investments in prevention, care and health systems strengthening. Some of this money will flow through long-established bilateral and multilateral channels, but increasing sums are expected to be channelled through newly established mechanisms. Prominent among these are the Global Fund to Fight AIDS, Tuberculosis and Malaria, the World Bank's Multi-Country HIV/AIDS Program, the President's Emergency Plan for AIDS Relief, and the contributions of private foundations such as the Bill and Melinda Gates Foundation and the William J. Clinton Foundation.

So far the Global Fund has received pledges totalling US\$ 4.8 billion and has committed expenditure of US\$ 2.1 billion as a result of applications received in the first three rounds (of which 60% has been allocated for combating HIV/AIDS). It had disbursed US\$ 178 million by the end of November 2003, its first year of expenditure. The Global Fund anticipates that commitments in relation to the first three rounds of applications will reach US\$ 2.5

billion by the end of 2004 and over US\$ 3.5 billion by the end of 2005, while disbursements (which necessarily lag behind commitments) will reach US\$ 1 billion by the end of 2004 and US\$ 2 billion by the end of 2005.

The President's Emergency Plan for AIDS Relief, announced in the 2003 State of the Union address, committed the USA to spending US\$ 15 billion to fight the HIV/AIDS pandemic over the following five years. Of this total, nearly US\$ 10 billion represents new commitments, to be disbursed through a number of federal government agencies, of which the largest are USAID and the Department of Health and Human Services, which oversees the Centers for Disease Control and Prevention and the National Institutes of Health. Through bilateral and multilateral channels, the US government plans to spend US\$ 2 billion on HIV/AIDS in the year to June 2004, and expenditure will clearly rise in the future. Some funding from the President's Emergency Plan will be disbursed through the Global Fund, to which US\$ 1.6 billion has been pledged, with the possibility of more to come if the pledge is matched by other donors' contributions.

The World Bank committed approximately US\$ 2 billion to HIV/AIDS programmes over the period 1988–2003. Most of this expenditure has been in the form of concessional loans. UNAIDS estimated the grant component of these loans to have reached US\$ 75 million annually by 2002.

Private foundations have begun to make significant contributions, some via the Global Fund and some acting in broad partnership within recipient countries. The Bill and Melinda Gates Foundation, in partnership with the pharmaceutical Merck Company Foundation and the Government of Botswana, established the US\$ 100 million African Comprehensive HIV/AIDS Partnership, which has supported a broad range of prevention and care interventions and has helped fund the largest public sector antiretroviral therapy programme in Africa. The William J. Clinton Foundation has developed programmes in several African and Caribbean countries, leveraging the contributions of other partners and successfully brokering access to cheaper generic medicines.

Tanzania (23), and across all development areas with poverty reduction strategy implementation using the proceeds of debt relief, with positive results in Ghana, Mozambique and Uganda (24).

- Fourth, it must be recognized that there is a potential problem with a massive increase in external aid threatening to produce adverse effects on macroeconomic stability and development by inducing domestic inflation and appreciation of the exchange rate.

The potential adverse effects may be transitory and more than offset by the effective use of aid to improve national productivity.

There is an obvious link between the international and domestic financing of health programmes. Smaller contributions from external sources mean that poor countries have to provide more funding from their own resources, either through collective mechanisms such as taxation or insurance, or individually out of pocket. South Africa receives very little external aid for its health sector, but it has recently seen some important changes in its domestic financing arrangements for antiretroviral therapy. In November 2003, the government committed itself to spending more than US\$ 1.73 billion over three years to combat HIV/AIDS, more than tripling the amount spent during the preceding three years. Of this, US\$ 270 million will be set aside for antiretroviral drugs. These funds will be insufficient, however, to cover all people who need medication, and multiple funding sources will be required to provide ongoing treatment.

In low-income developing countries, which generally do not have extensive insurance mechanisms, most personal health services are financed by a mix of taxation and user fees in the public sector. With the exceptions of Botswana and Brazil (both middle-income countries which have decided to meet the cost from public sources), developing country governments have not been greatly involved in financing antiretroviral therapy, probably because of its high unit cost. Private providers have been financing antiretroviral therapy through user fees for some time; international nongovernmental organizations and research-funded sites have received substantial external funds and have been able to provide either free or heavily subsidized treatment. Private-sector employers have provided free access to antiretroviral therapy, either directly through occupational health services or indirectly through private insurance intermediaries. A mixture of public and private financing is desirable, but only if it ensures equal access.

Box 4.5 Health financing reform in Kenya

Until recently, patients in Kenya paid fees at the point of treatment for government-provided health services, which worsened the plight of poor people. A situation in which private providers served all sections of the community on a fee-for-service basis led to out-of-pocket payments reaching 75% of total health expenditures. Recently, however, social health insurance reforms have been proposed, aiming at adequate, accessible and affordable health services, including antiretroviral treatment. The draft law was scheduled to be submitted to parliament in early 2004.

The new insurance system will be funded by prepaid contributions from active and retired

workers, enterprises and the self-employed, with government subsidies to enable participation by the poor. These contributions constitute the revenue of a new National Social Health Insurance Fund. When insured members seek treatment, they will no longer have to pay fees at the time and point of treatment. Health facilities will be paid by the Fund for the health services they provide to insured patients. Both outpatient and inpatient health services will be part of the insurance benefit package.

A series of financial projections for the period 2004–2008 have been undertaken to determine whether treatment costs for HIV/AIDS might overly burden the proposed health insur-

ance system. It is projected that the number of patients treated will rise from 108 000 in 2004 to 186 000 in 2008. For the poorest Kenyans, this treatment would be paid for via government subsidies to the National Social Health Insurance Fund, while the better off would pay half of the cost. The cost of antiretroviral drugs will occupy an increasing share of the Fund's revenues: from 5.4% in 2004 to 13.4% in 2008. It has been determined that up to 2007, inclusion of treatment in the benefit package is financially feasible. But from 2008 onwards the government subsidies would have to be revised upwards in order to secure financial equilibrium in the Fund.

Thus, scaling up the provision of antiretroviral therapy with greater public provider involvement presents a considerable challenge to governments.

Some governments are not confident that the costs will be adequately met by donors, they do not expect to be able to afford free provision from domestic resources (even with the dramatically reduced drug prices now in prospect), and do not see a basis for discrimination between antiretroviral therapy and other life-saving treatments for which user fees are charged. It is the stated intention of some governments to apply to antiretroviral therapy the standard regime of partial cost recovery (that is, user fees meet some but not all costs of service provision, the balance being borne by taxation) in public facilities. Almost all governments that operate user fees have some system of fee waivers which, in theory at least, allows very poor people to be exempt from payment.

In other quarters, there is an expectation that antiretroviral therapy will be provided free or at only nominal cost to all who need it, financed by external aid or other solidarity mechanisms. Inability to pay should not be a barrier to access. There is now evidence that out-of-pocket payment has undermined adherence to treatment and increased the risk of drug resistance. There are precedents for free treatment, for example for tuberculosis, even in countries which otherwise charge user fees in public facilities.

In most countries a mixed regime in financing antiretroviral therapy will probably continue, the argument being that people who are able to pay should do so and free treatment should be reserved for when payment could undermine access and adherence to treatment. This is a critical matter, because out-of-pocket payments for health already result in a substantial number of households facing financial catastrophe and poverty in the countries most affected by HIV/AIDS. The attention given to 3 by 5 may drive health financing reforms designed to improve access to all health services for the poor, an endeavour actively supported by WHO. An example of such reform is the proposal to develop a social health insurance scheme in Kenya (see Box 4.5).

MEETING THE CHALLENGE: HOPE FOR THE FUTURE

The 3 by 5 initiative presents a tremendous challenge to the health systems of countries with a high burden of HIV/AIDS, given the magnitude and urgency of the changes that will be initiated against a background of chronic incapacity and under-performance. An inspiring vision exists, based on the work of the treatment pioneers, of how health service and community resources can be combined in comprehensive prevention, treatment and care programmes, even in resource-poor settings. It must be hoped that this inspiration will reignite the determination of governments and people all over the world to invest sufficiently in health systems so that they can reverse the course of the HIV/AIDS epidemic. By doing so, strengthened health systems will gain the capacity to confront successfully the ancient enemy of infectious disease and the growing burden of chronic diseases.

The next chapter looks beyond 2005 and considers how advances in many areas of research, together with new approaches to gathering and sharing information, can assist international efforts in the prevention, treatment and control of HIV/AIDS and also contribute to building stronger health systems.

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chapter five

sharing research & knowledge



Harnessing the power of research to achieve treatment targets and to build health systems that respond to the broad array of complex health issues requires an innovative approach to gathering and sharing information. Existing, classic methods of research and dissemination of new knowledge – while still necessary – will not be sufficient to achieve these goals. In the short term, new methods of assessing the performance of treatment programmes are essential. So, too, is the rapid sharing of information in order for countries to benefit from the most recent and most relevant experience elsewhere and adapt it to local circumstances.

The HIV/AIDS treatment initiative is generating many urgent new research questions for which answers must be found quickly and communicated without delay. The fast progress that is simultaneously occurring in information and knowledge technologies will help. Innovative routes are already beginning to overtake and bypass standard research publishing processes and other conventional forms of knowledge sharing.

Traditional notions of research and publication are insufficient to bridge the wide gap between current knowledge and its successful application. A new approach is required which recognizes that useful knowledge can expand beyond formal research designs and can be quickly shared and applied through social networks and other channels, rather than simply through traditional publication methods. These applications of knowledge management in the public health sector are

relatively new, but early efforts show promise (1).

A modern approach to knowledge management strengthens existing information and research networks through the Internet and other means of communication, and builds vibrant new networks that allow the rapid sharing of knowledge and practical experience at the front line – among clinicians, researchers, health workers and others. Thus, the people most closely involved in achieving wider access to antiretroviral therapy can learn from each other's successes – and also from their failures – especially if this takes place in an atmosphere of transparency.

Both successes and failures have characterized much of the history of HIV/AIDS research in all its forms. Since

scientists first identified the human immunodeficiency virus (HIV) as the cause of AIDS in 1983, many remarkable research achievements, spanning the understanding, treatment and prevention of the disease, have benefited many millions of people. Twenty years ago no effective treatment was known; today a range of antiretroviral drugs exists – treatments that dramatically improve patients' quality and length of life, though they are still reaching only a tiny fraction of those who need them. Meanwhile, despite high hopes 20 years ago for an HIV vaccine, the world is still waiting. Notwithstanding significant advances, it will be several years at least before a safe and effective vaccine becomes widely available.

The development, licensing and delivery of such a vaccine remains the greatest hope for the eventual control of HIV/AIDS, and realizing this hope depends on scientific research. In examining the continuing quest for a vaccine, this chapter reviews research into other important areas of HIV/AIDS prevention, treatment and care. Even while awaiting effective vaccines, the moral obligation is unambiguous: to scale up activities to treat and care for people living with HIV/AIDS – whoever they are and wherever they live – and to contain the spread of the disease. Such ethically sound actions require new tools that can be produced only by research of the highest quality, research which must extend far beyond the laboratory to include multidisciplinary operational and health policy research.

HIV/AIDS researchers face four broad categories of challenge, all crucial to present and future success:

- Prevention research – slowing down the growth and geographical expansion of the epidemic: a challenge for epidemiology and sociobehavioural aspects of prevention.
- Vaccine research – designing a safe and effective preventive vaccine: the best hope for the long-term prevention and control of HIV/AIDS.
- Treatment research – generating new antiretroviral drugs and designing new therapeutic strategies that would be active on “wild” and resistant strains of viruses, be easy to take and better tolerated than currently available drugs: a challenge for basic and clinical research.
- Delivery system research (operational research) – making care and antiretroviral treatment available to all those who need it worldwide: a multidisciplinary undertaking. This is the greatest research challenge because it must deliver results on the ground, often more complicated than the relatively straightforward task of scientific discovery. Furthermore, this aspect of research has, until now, been largely neglected by both researchers and funding organizations. Here, too, a knowledge management framework may prove useful.

PREVENTION RESEARCH

Linking prevention and access to treatment

As efforts to provide treatment are scaled up, concerns have been voiced regarding its potential impact on preventive behaviours. The availability of treatment, some fear, may lower people's perception of risk and hence lead to lower vigilance; in contrast, others argue that the strengthening of health-related interventions will encourage testing and counselling, and that the knowledge of HIV status may increase protective behaviour. Studies of people living with HIV in developing countries indicate that treatment is, indeed, associated with increased sexual activity but, at the same time, it is associated with more consistent condom use. In developed countries, an increase in risky behaviour was documented among certain population groups after the

introduction of effective antiretroviral therapy, without clear evidence of why this happens (2, 3). The epidemiological data are only suggestive, and trends need to be documented across settings, over time, and among key subpopulations, in particular in people living with HIV/AIDS and other highly exposed groups.

Treatment may directly contribute to prevention of new infections to the extent that lowering of viral load decreases the probability of sexual transmission. Decreased infectiousness is likely to be counterbalanced by increases in the life expectancy of patients. Research must contribute to the adaptation of interventions in order to ensure the sustainability of prevention over the long term (4, 5).

More generally, better evidence is needed on how preventive behaviours can be promoted across age groups, sexes, social strata and different categories of serological status, especially in the context of scaling up access to treatment. The mechanisms linking risk perceptions to behavioural change are shaped by contextual variables and are situation-specific and partner-specific (6). Better evidence is also needed on the extent to which the findings from developed countries are valid for developing countries. There are also indications that gender influences the selection of strategies to reduce risk (7). It is important to investigate whether such differences in perceived risks and protection represent a general gendered pattern.

Treatment and care for children with HIV



Young HIV-positive children at the Incarnation Children's Center, New York, USA, play with their carers. The Center is funded to conduct clinical trials of new treatment options, including antiretroviral therapy.

Many children with HIV have lost a parent to the disease. They are likely to have behavioural and emotional difficulties, which can complicate their treatment as they grow older.

Microlevel studies indicate that medical information and public health recommendations are not automatically accepted by the general public and that people interpret professional advice in the light of local notions and past experience with health care (8). Investigations of beliefs and practices that are contrary to public health recommendations can suggest ways to communicate better with the public. The availability of effective treatments should contribute to furthering confidence in medicine and public health.

Preventing transmission from mother to child

Among the issues that urgently require further research are better methods of ensuring the prevention of HIV transmission from mother to child, particularly in developing countries and in the postnatal period. Every year, an estimated 700 000 children become infected with HIV. The overwhelming majority acquire the virus through mother-to-child transmission, which can occur either during pregnancy and delivery or postnatally during breastfeeding. In the absence of any intervention, rates of this form of transmission can vary from 15% to 30% without breastfeeding, and reach as high as 45% with prolonged breastfeeding (9). Transmission during the peripartum period accounts for one-third to two-thirds of overall numbers infected, depending on whether breastfeeding transmission occurs or not, and this period has therefore become a focus of prevention efforts.

Transmission of HIV from mother to child can be prevented almost entirely by anti-retroviral drug prophylaxis (usually now given in combinations), elective caesarean section before onset of labour and rupture of membranes, and refraining from breastfeeding (10, 11). In resource-poor countries, however, elective caesarean section is not a safe option, and refraining from breastfeeding is often not feasible or acceptable. In Africa, no more than 5% of HIV-infected women and neonates who could benefit from interventions are receiving them.

Antiretrovirals, either alone or in combinations of two or three drugs, have been shown to be highly effective in reducing mother-to-child transmission of HIV. Evidence of the efficacy of antiretroviral prophylaxis from Africa, Europe, Thailand and the USA has been demonstrated for short-course drug regimens. The substantial efficacy of triple combinations has been shown in observational studies in industrialized countries (10, 11), where rates of transmission are now below 2% in the absence of breastfeeding. There is an urgent need for evidence from breastfeeding mothers in sub-Saharan Africa, one of the most affected populations. Short-term safety and tolerance of the prophylactic regimens have been demonstrated in all the controlled clinical trials on mother-to-child transmission (12). Further studies of these issues are required, especially on the long-term implications of potential antiretroviral resistance for HIV-infected mothers and their children.

Preventive interventions with antiretrovirals have not yet been successfully implemented on the scale required (13). Even where antiretroviral treatment is applied peripartum, infants remain at substantial risk of acquiring infection in the breastfeeding period. These facts also require investigation; they demonstrate once again the need to strengthen health systems, while integrating HIV/AIDS interventions with reproductive and maternal and child health services.

Protecting women with microbicides

Protecting women against HIV infection is another important area for researchers. Microbicides are anti-infective products such as gels, creams, impregnated sponges and similar devices that women apply before sexual intercourse to prevent HIV transmission and other sexual infections. Unlike the condom, their use is controlled by the woman and they will not necessarily be contraceptive. Attempts are also being made to incorporate microbicides into silicone intravaginal rings that are left in the vagina for several weeks to ensure contraception, with sustained release of the agent providing continuous protection against infection.

Microbicides could make a very substantial difference by widening people's choice of protective interventions. To achieve high levels of use will require a continuing education process aimed at women as well as health policy officials and providers. Epidemiological modelling based on data from over 70 low-income countries suggests that even a partially effective microbicide is likely to have a significant impact on the epidemic: a product that is only 60% effective in protecting against HIV could avert 2.5 million new infections over a three-year period, even if it is used in only 50% of sex acts not protected by condoms, and assuming it is used by only 20% of people easily reached by existing health services (14). However, the microbicide concept has only recently received sufficient support to allow progress to be made. Pharmaceutical companies have not so far regarded microbicides as providing economic incentives for substantial investment, though the Bill and Melinda Gates Foundation is now giving serious consideration to this matter.

VACCINE RESEARCH

Although advances have been made in both prevention and treatment, the best hope for prevention and control of HIV/AIDS lies in the development, licensing and delivery of a safe and effective preventive vaccine.

The existence of globally diverse strains of HIV remains one of the greatest obstacles to HIV vaccine development. Attempts to design immunogens capable of eliciting effective neutralizing antibodies against those strains have been unsuccessful. In the absence of such immunogens, the main focus has been on developing vaccines to elicit cell-mediated immunity against HIV. This type of vaccine could suppress viral load, slow the progression of disease, and potentially blunt transmission (15).

The design of improved next-generation candidate HIV vaccines faces many scientific challenges. The mechanisms for protective immunity are unknown, as are the necessary antigens. Despite the failure of one of the most hopeful candidates in recent efficacy trials, however, it is now clear that circulating HIV strains can in fact be neutralized. Another challenge is the extensive genetic diversity of HIV, suggesting that successful vaccines may need to contain cocktails of antigens from across different clades of the virus. Recent clinical data on some vaccines currently in clinical trials have been encouraging, but whether the responses elicited by the vaccines correlate with clinical protection awaits human efficacy trials.

The development of an HIV vaccine faces hurdles of manufacturing, clinical trials, regulation and delivery. These aspects will need to be tackled to ensure that safe and effective HIV vaccines are licensed and delivered as quickly as possible. The development of vaccines is hampered by the limited capacity for efficacy trials, particularly in

the developing world. There is also limited regulatory capacity to facilitate the testing and eventual licensure of successfully developed HIV vaccines.

The next five years will probably see the first results from efficacy trials testing the concept of vaccines that aim to suppress viral load, slow disease and potentially blunt transmission of HIV. Several new candidates are expected to be evaluated in clinical trials for safety and immunogenicity. It is likely, however, that to achieve significant improvements in HIV vaccine design and improve the prospects for success, solutions to the major scientific questions will need to be found. As a result, the major stakeholders in HIV vaccine development have recently come together to propose a “global enterprise” to accelerate HIV vaccine development (16). Achievement of this vision will probably require significantly greater resources. The International AIDS Vaccine Initiative recently found that worldwide expenditure for research on HIV vaccines was, in 2001, between US\$ 500 million and US\$ 600 million, which represented only 10% of the expenditure for research in other areas of HIV/AIDS. Creative strategies to enhance coordination and collaboration among the many stakeholders are also required.

TREATMENT RESEARCH

A cornerstone of efforts to reach universal access targets is sustained dedication to basic research and to the understanding of AIDS pathogenesis, in order for new drugs, novel therapeutic strategies and vaccines to be designed and developed.

The availability of potent combinations of antiretroviral drugs in the developed world has resulted in a steep decline in HIV-associated morbidity and mortality. Death rates from AIDS fell by 80% over the four years following the launch of highly active antiretroviral therapies in Europe and North America. Following their more widespread introduction in the second half of the 1990s, it also became clear that issues relating to adherence, toxicities, immunological and virological failure of treatment, and occurrence of resistance all needed to be tackled.

Sustaining long-term adherence

Effective treatment with antiretroviral drugs requires long-term adherence. From an operational research point of view, monitoring the uptake of treatment involves: defining optimal measures of adherence which can be used in resource-poor countries; assessing the validity of self-reports, compared with other methods such as pharmacy records or electronic monitoring systems; and identifying ways to encourage more accurate reporting by patients.

Evidence shows that the variables with the strongest effect on adherence are treatment-related. These include the complexity of the regimen, side-effects, the “battle fatigue” that results from long-term use, and patients’ attempts to remedy these problems by modifying the dosage or administration of drugs. Misperceptions and lack of trust regarding the medication’s effectiveness further compound these problems. Women face unique obstacles related to child care, lack of partner support, and the attitudes of peers and family members. Among the social variables that are found to affect adherence, stigma and fear of disclosure have the strongest effects (17). In addition, costs matter: copayment is detrimental to long-term adherence (18).

Questions about long-term use remain, despite new ideas regarding barriers to adherence. The increased availability and lower costs of drugs, and the advent of fixed-dose combinations, have raised hopes of reducing access problems by lowering cost.

Initiation and continued use are influenced by different factors, however, so attention has to be focused on use over the long term. Recent studies show that patients in Haiti and a number of African countries take about 90% or more of their drugs (19, 20). This gives cause for optimism. At the same time, however, lifelong use of drugs raises the question of sustainability, for which operational research may provide some insights (21).

A number of interventions (most of them tested in developed countries) have been conducted with antiretrovirals. Individualized education and advice have proved to be successful, especially when associated with participation in support groups. Scaling up treatment will mean sharing responsibilities with health workers who lack formal medical training – allowing health workers to monitor and follow up patients – and this will have profound implications. The extent to which the lessons from successful programmes can be rapidly implemented in diverse settings indicates a rich agenda for operational research, and the key role of innovative knowledge-sharing mechanisms.

Coping with toxicities

The importance of treatment-associated adverse effects in current HIV therapy is illustrated by several studies demonstrating that 40% or more of patients initiating highly active antiretroviral therapies will experience one or more forms of drug toxicity, and consequently may need to modify their regimen within the first year of treatment (22). Examples include hepatic toxicity, rash, diarrhoea, anaemia and peripheral neuropathy. Other adverse effects may become noticeable clinically only after more prolonged exposure to therapy (one to two years) (23, 24).

Innovative ways of assessing the potential toxicity of new drugs are needed at all preclinical and clinical phases of drug development. To ensure that millions of people get the best, sustained treatment, it is imperative that issues of resistance and longer-term safety and tolerability of treatment receive sufficient attention as treatment expansion unfolds. However, drug toxicities will always be preferable to inevitable death in the absence of drug treatment, particularly if concerns over toxicities prevent availability of treatment in resource-poor settings.

Preventing drug resistance

The issue of resistance by HIV to antiretroviral drugs is a major concern. Evidence from clinics, apart from clinical treatment trials, suggests that the frequency of incomplete virological suppression in people treated with combination therapies may exceed 50% (25). Incomplete suppression results in acquired viral resistance to antiretrovirals. Resistance often occurs to more than one or two of the three drugs that are being taken by the patient, because of cross-reactivity between drugs within a given antiretroviral family. While the emergence of a drug-resistant virus may be associated with a slower immunological decline in some people, virological failure of treatment places people at risk of developing resistance to antiretroviral drugs. They are also at risk of losing treatment options after treatment has been modified several times, and of ultimate immunological failure and morbidity.

Methods are needed that ensure the effectiveness of antiretroviral therapies in preventing virological treatment failure, and novel, more potent drugs will have to be designed that are active on both “wild” and resistant strains of viruses. Since current therapy is capable of suppressing viral replication but not capable of viral eradication

from the host, no current therapeutic regimen will be completely successful. Thus, reservoirs of infection are established early and apparently persist in all HIV-infected people irrespective of therapy (26). A systematic and rigorous approach to treatment offers the best opportunity to study and promote adherence and thereby reduce drug resistance and treatment failure (see Chapter 2).

Developing new drugs and strategies

Dozens of new drugs are being researched, including those belonging to the three currently available families of antiretrovirals: nucleosidic and non-nucleosidic reverse transcriptase inhibitors and protease inhibitors. Research and development of new compounds in these three families aims at providing drugs that are more potent, easier to take and better tolerated, as well as new formulations combining several of the drugs in one pill.

The first of a new class of “entry inhibitor” drugs that prevent the virus getting into cells in the first place was launched in 2003. These drugs will probably be the most important new antiretrovirals. They target human cell components, rather than viral components, and therefore the virus should find it more difficult to develop resistance to them. The next class of drugs expected is that of inhibitors of the integration of viral DNA into the host’s genome.

The issues of toxicities and insufficient virological and immunological potency are not being solved by current treatment strategies. Therefore, new strategies need to be targeted at immune-based approaches to the treatment of HIV-1 infection, such as therapeutic vaccination, passive immunization or eradication of the “reservoirs” of infection. These approaches represent a vital area of basic and clinical research for the coming years.

Tackling tuberculosis and HIV/AIDS together

Tuberculosis (TB) impacts heavily on HIV morbidity and mortality, as HIV is the most potent risk factor for reactivation of latent tuberculosis infection to active disease. A person dually infected with HIV and *Mycobacterium tuberculosis* has an annual risk of developing TB ranging from 5% to 15%, compared with the lifetime risk of 10% for someone with an intact immune system.

One component of the strategy to decrease TB-related morbidity in people living with HIV/AIDS is to prevent the progression of latent TB infection to active disease, by offering isoniazide preventive therapy as part of the clinical package of HIV care. This treatment has been shown to reduce the risk of TB in tuberculin test positive HIV-infected individuals by 67% (27). Because of reinfection, however, the effect is relatively brief in communities where TB is endemic. The BCG vaccine for TB does not protect against primary infection and, on average, has a protective effect against active disease of only 50%. A crucial means of improving HIV-related morbidity will be the development of an improved TB vaccine. The many steps needed to identify TB infection, and the need to take treatment for at least six months with periodic evaluations for adverse reactions, mean that the proportion of individuals who complete treatment, even under the best conditions, is small.

In order for isoniazide preventive therapy to be an effective public health measure, further research is needed to understand how to diminish the loss of treatment candidates at each step of the process, and how to find effective, shorter-term treatment with few side-effects. New medication delivery methods (for example, medication skin

patches and other depo-preparations) are also required, as are new methods other than tuberculin skin tests to determine cases of infection.

OPERATIONAL RESEARCH

Pilot treatment programmes have been successfully conducted in several countries including Côte d'Ivoire, Senegal, Thailand and Uganda, clearly demonstrating that treatment in those settings is feasible, and that adherence to treatment, tolerance of therapy and incidence of resistance are no different from those found in developed countries (20, 28, 29). Expanding care and antiretroviral therapy to all those who need them worldwide raises a number of challenges for sociobehavioural, clinical and operational research. The term “operational research” refers here to an array of subjects and disciplines supporting the design and improvement of the systems that allow effective prevention, treatment, care and, ultimately, vaccines to reach all those who need them. It denotes the sciences underlying the rational organization of care, and might also be called “delivery system research”. In its own way, its enquiries tackle problems as difficult and as intellectually challenging as those in the other three areas of research summarized above; the methods are not those of biomedical science, but rather of social science, economics, statistics, engineering, psychology and anthropology, among others.

Operational research, so defined, can help to involve, guide and coordinate the roles of care providers from government, the private sector, nongovernmental organizations, communities, faith-based organizations and the workplace, and to deliver antiretroviral therapy. Equally importantly, such research is needed to measure and monitor in a standardized way the impact of antiretroviral therapy in terms of parameters such as additional years of healthy life, fewer deaths, economic progress across society,

Box 5.1 Learning by doing – the operational research agenda

In treatment programmes it is critical to obtain data about what works, what does not work and why, and to have this information available as quickly as possible. This is implicit in the 3 by 5 strategy, where one of the two strategic elements in Pillar Five, “The rapid identification and reapplication of new knowledge and successes” (see Chapter 2), is to learn continuously by doing – with ongoing evaluation and analysis of programme performance and a focused operational research agenda.

The treatment initiative’s operational research agenda has six areas of activity.

- *Coordinating and helping to develop an appropriate operational research agenda.* Consensus will be developed with programme managers about the immediate needs of antiretroviral therapy programmes, and the agenda will be reviewed regularly as data and evidence are generated and new issues emerge.
- *Seeking data on the impact of scaling up*

antiretroviral therapy. While treatment is expected to accelerate prevention, clear evidence is required that this does happen. Any negative interactions, such as stigma and discrimination, must also be identified rapidly so that they can be halted.

- *Identifying ways to define the effects of scaling up therapy on health systems performance.* The resource inputs and capacity building called for in line with the targets are expected to strengthen health systems. It is important to provide clear evidence that this does indeed happen, and to seek ways to facilitate it. It is equally important to see where the opposite is happening and to identify ways to minimize any negative impacts.
- *Identifying ways to cost and analyse antiretroviral therapy programmes.* The debate about whether treatment or prevention is more cost effective has been made redundant by the universal

recognition of the merits of a comprehensive approach. Nevertheless, solid cost data and cost-effectiveness analysis must be made available to help develop sustainable systems and their long-term financing.

- *Improving programme design and finding better tools.* The results of all operational research and other strategic information-gathering on risky behaviour and the evolution of drug resistance need to be analysed rapidly. The capacity of research groups in developing countries will be supported to enable most data analysis to be done nationally.
- *Incorporating new knowledge into policy and practice.* Data and new knowledge need to be fed back rapidly both to the centres where the research was carried out (an ethical obligation) and, more widely, to any programmes facing a similar situation. This core activity of WHO underpins the entire operational research approach.

development of drug resistance, and adherence to treatment (see Box 5.1).

Key issues to be tackled through operational research include:

- optimizing therapeutic regimens for scaling up therapy, for example by performing clinical trials and following up cohorts of treated patients;
- monitoring tolerance of therapy in trials and open patient cohorts;
- establishing optimal ways of monitoring therapy in the context of resource-limited settings; specifically, improving means of enumerating CD4 cell counts, measuring plasma HIV viral load and assessing viral resistance;
- building surveillance programmes to monitor resistance to antiretroviral drugs: when resistance develops to today's drugs, new treatments will be needed;
- improving diagnosis and treatment of opportunistic infections;
- seeking data on the impact of scaling up antiretroviral therapy on prevention and risky behaviour, mitigation, and stigma and discrimination, and using the data to improve programmes designed to reduce risky behaviours;
- identifying the consequences of antiretroviral treatment scale-up on health systems performance;
- creating peer-to-peer learning systems at the clinic, district and country levels so that new findings discovered in the field, combined with existing knowledge, can be quickly disseminated and applied;
- developing innovative, scalable models of how human resources in resource-poor settings can best be mobilized and trained to tackle HIV/AIDS prevention, care and treatment.

Economic issues

Economic research is essential to ensure that therapeutic strategies using antiretrovirals are successful in developing countries. Earlier cost-effectiveness analyses erroneously concluded that such treatment is not cost effective compared with other interventions, especially prevention. These studies did not adequately consider major issues such as the strong link between treatment and prevention (which are not substitutes but are complementary activities); the economic law of diminishing returns that makes prevention very effective at low levels of coverage but each additional input less effective as coverage approaches 100%; and the underestimation of the impact of HIV/AIDS on economic activity and development. Furthermore, they are now rendered obsolete by the huge fall in the cost of antiretrovirals that has since taken place.

Researchers have already linked the dynamic relationship between potential famine and the spread of HIV among rural agricultural workers; the relationship between HIV and malnutrition in general; and the effect of food insecurity on the autonomy of individuals, particularly women. Understanding the complex intersectoral relationships gives a better picture of HIV's true impact, and illuminates possible points of intervention (30, 31).

To discover and improve methods of scaling up access to treatment, economic analysis must be coupled with clinical data provided by longitudinal follow-up of patients in resource-poor settings. The cost-effectiveness ratio of different clinical and economic strategies will provide information that will help answer questions, such as: at what level can treatment ideally be initiated? What are the most effective strategies for switching regimens? How can biological monitoring be optimized? Economic research will also contribute to the identification and evaluation of different strategies of funding access to treatment. At the macroeconomic level, it will be important to establish

how the cost burden is distributed between domestic and international sources and, among domestic contributions, the share and incidence of out-of-pocket payments. At the microeconomic level, the effect of different financing arrangements on treatment adherence, the development of drug resistance, and final treatment outcomes will be significant topics of study.

Health policy analysis

It will be important to identify the factors that affect efforts to increase access to treatment, particularly in the context of health services. Some of the key factors are: leadership and management skills; sufficient and sustained funds for antiretroviral medications; technical competence in drugs and commodities procurement; training; monitoring of outcomes; and, in the public sector, a functioning district health system capable of delivering services. Research should include: identifying which factors increase or hinder integration of HIV/AIDS control programmes with public health policy and collaboration with other programmes; developing policies that support such collaboration and integration; and analysing the roles and comparative advantages of all the stakeholders involved in implementation of HIV/AIDS and other interventions.

Unsafe blood practices transmit infection



Wang Kai Jai's mother contracted HIV/AIDS after selling her blood to a hospital. In turn, Wang Kai Jai, now four years old, from Licheng, Hebei Province, China, became infected.

Many people living with HIV/AIDS have acquired the virus through

infected blood or blood products or by using unsafe blood donation facilities. In some areas of China, people eager to escape poverty sold their blood through middlemen who often reused needles.

Scaling up access to treatment must be used as an opportunity to promote global health reforms at the country level with benefits that go beyond HIV care. There is the potential to create effective incentives to improve health infrastructure in resource-limited settings. Research is needed to identify all the potentially negative and positive externalities of scaling up access and their effects on health systems.

Equity issues

Social inequality in the settings where care is to be implemented, the constraints on resources available for treatment, and the need to define eligibility criteria for the provision of antiretroviral drugs, all call for special attention to the equity dimension of the intervention. Special measures need to be taken in order to avoid the possibility of unwittingly reinforcing existing inequalities, setting up a two-tier system in allocating resources, or weakening other disease control efforts by giving priority to HIV/AIDS. In addition, care must be taken to protect the rights of patients when measures such as partner notification and disclosure are deemed to be necessary, and attention must be directed to the local conditions that may hamper confidentiality, especially when treatment is implemented on a large scale.

Many of the barriers that prevent disadvantaged members of society from accessing health care and obtaining treatment are a result of the deficiencies of health services, and there is a growing awareness that the treatment scale-up initiative represents an opportunity to tackle some of these shortcomings. Hence, it will be necessary regularly to review socioeconomic information about treated patients in order to make sure that poorer people have equal access to medication. More work is needed on the appropriate indicators of equity and how information can be collected about them.

Special consideration should be given to gender as it affects the provision of care. A better understanding is required of the particular circumstances that lead to discrimination against HIV-positive women, and of those conditions that enable women to respond and take control of their own affairs. It would be useful to keep track of programmes that have sought to integrate gender considerations into health services, which have an important role to play.

Another obstacle to care comes from the stigma that is attached to seropositive status, and concerted efforts to assess this information can help define locally effective strategies. There is little doubt that stigma and avoidance of testing and treatment are mutually reinforcing, and that it is precisely the individuals who are marginalized because of their status who are not reached by prevention and care efforts. The evidence base for what works in order to reduce stigma and why is, however, thin and has to be strengthened by well-designed studies, both to substantiate the effect of multiple interventions and to define the packages that are effective in different contexts (32, 33).

INTERNATIONAL COLLABORATION

Progress has been accelerating in international collaboration and coordination in HIV/AIDS research, which is critical to achieving the Millennium Development Goal of halting and reversing the pandemic by 2015.

Joint innovative actions, through global research networks and partnerships between the public sector, academic institutions, communities, the private commercial sector and civil society organizations, bring benefits greater than the sum of current high-quality but separate research projects. The benefits include quicker generation of

research findings, consensus on international standards for the conduct of research, and research capacity strengthening.

Collaboration permits parallel, concurrent efforts to obtain more timely answers to critical questions. Partnership across sectors through creative public-private alliances can contribute to faster progress in research by linking together diverse approaches and different stages of the research process (see Box 5.2).

International collaboration can lead to consensus on standards for the conduct of research which respect the human rights of study participants, support the research priorities of host countries, and promote community involvement in the design and conduct of research. Collaboration can also ensure that prevention and care interventions that are demonstrated to be safe and effective are rapidly made available to all study participants and to other members of the high-risk populations from which they were drawn.

International collaboration to strengthen research capacity enables the creation of a critical mass of researchers who can focus on national priorities, participate in policy-making bodies, and contribute to international research efforts. International and regional training partnerships must be complemented by active efforts to stem the brain drain from developing to developed countries, as Brazil, China and India are doing. This is achieved through investment in research and development to construct strategic knowledge-based industries that can employ nationals educated at home and abroad and attract expatriates to return.

Building national and international research infrastructures, laboratory capacity and improved surveillance systems; collecting, processing and disseminating data; and training basic and clinical researchers, social scientists, health care providers and technicians are all essential to efforts to accelerate knowledge creation. Such acceleration is required to respond to the scale of the HIV/AIDS pandemic. The substantial remaining challenge, and one to which the 3 by 5 initiative is directed, is to ensure that this knowledge immediately improves the lives of people most in need (34).

Box 5.2 Building partnerships in the fight against disease

The long-term struggles against poliomyelitis and tuberculosis (TB) have shown how international and multisectoral partnerships can work effectively to combat major diseases.

When the World Health Assembly established the goal of polio eradication in 1988, the need for a new kind of partnership was evident. The pioneering work to eliminate polio from the WHO Region of the Americas was initially carried out by a small group of partners, consisting of WHO, Rotary International, the United Nations Children's Fund (UNICEF) and the US Centers for Disease Control and Prevention. This group then grew to include the government of every country in the world, 30 major donor partners (contributing more than US\$ 1 million) and dozens of implementing partners, including national and international

humanitarian organizations and nongovernmental organizations.

To ensure effectiveness, a number of basic principles have guided work over the 15 years during which this group has worked together in pursuit of its common goal of a polio-free world:

- multisectoral representation;
- long-term commitment;
- top-level institutional representation;
- full use of comparative advantages;
- common operating principles and forums (for example, the work of the partnership was guided by a series of common, strategic plans covering several years, resource requirement documents and workplans at the international, regional and national levels).

As part of the campaign to combat TB, the Stop TB Partnership has become greatly respected globally. It includes WHO and the World Bank, and its strategic objectives have been formulated in close consultation with high-burden countries themselves. These objectives are directed towards the problems and policy priorities of the principal stakeholders, for example in relation to the United Nations Millennium Development Goals.

The Partnership has an increasing number of active participants. It has made significant progress against TB, highlighted work on new diagnostics, drugs and vaccines, and rapidly operationalized the Green Light Committee and Global Drug Facility to tackle lack of access to TB drugs.

Sharing knowledge

Extending treatment opportunities needs a faster research process than is available through traditional notions of research. The nature of the HIV/AIDS epidemic is changing quickly in many countries – too quickly to be effectively countered through standard research processes, whose timeline is typically measured in years. In addition, many of the decisions on which research projects are to be funded and pursued are made by policy-makers at some distance from the problem. As a result, resources and efforts are invested in work that may have little or no relevance to actual implementation in the field.

The public health community must rethink its definition of knowledge and the structure by which it is generated, shared and applied. The aims of knowledge management are to collect all relevant information and intellectual capital into a common system, and provide equal access to that information, ensuring that it can be synthesized with local needs. Such a system enables members of the public health community to

communicate directly with their peers on matters of mutual interest, such as effective practice in their own localities.

The 3 by 5 goal prompts public health practitioners to share and exploit experiential knowledge in a much more direct way, for example through “communities of practice” – informal networks linking individuals and groups who share common professional interests and who benefit from frequent exchanges of knowledge through the Internet or other telecommunication methods. Progress in information and communication technologies and other learning systems such as communities of practice gives cause for optimism. Improved communication can spur a knowledge revolution that will particularly benefit poor countries and communities, through greater use of the Internet, e-mail and telephone, and better satellite and wireless technology. By whatever means, the promotion and improvement of learning systems at all levels should greatly assist the achievement of public health goals as well as helping to strengthen health systems in general.

A mother's story



Gideon Mendel/Network

Nesta Mkhwanazi comforts her daughter, Samkelisiwe, who has been receiving antiretroviral treatment in the tuberculosis ward of Ngwelezane Hospital, KwaZulu-Natal, South Africa (see Samkelisiwe's story in Chapter 1).

“My daughter's recurring tuberculosis cannot be cured,” says Nesta. “She has also been tested and diagnosed with HIV/AIDS. This has

made life very difficult for us, as I have only a monthly pension of 500 rand [approximately US\$ 75] with which to support and care for my two daughters and four grandchildren. At 51 I find it hard to be a mother again to all these children. However, I am proud that my daughter has decided to disclose her HIV/AIDS status to our community and to help educate others about this disease.”

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conclusion

This report began with the story of Joseph Jeune, a 26-year-old peasant farmer in Haiti. It is a story of how hope can triumph over despair, and it also is an example of how people can fight back successfully against HIV/AIDS.

This is a crucial moment in the history of HIV/AIDS, and an unprecedented opportunity to alter its course. The most important message of this report is that, today, the international community has the chance to change the history of health for generations to come and to open the door to better health for all.

The World Health Report 2004 has chronicled the global spread of HIV/AIDS over the last quarter of a century. It has also traced the efforts of advocacy groups, civil society organizations, community health care workers, researchers and many others to control it and to combat its many side-effects, including stigma and discrimination. Despite those often heroic efforts, more than 20 million people have died from HIV/AIDS and an estimated 34–46 million others are now infected with the causative virus, for which there is as yet no vaccine and no cure.

But there is treatment. Joseph Jeune owes his life to it, as do many others. The pictures of Joseph before and after treatment illustrate what can be done. Antiretroviral therapy saved him from an early grave and enabled him to return to work in his fields and care for his family.

Effectively tackling HIV/AIDS is the world's most urgent public health challenge. In advocating a comprehensive strategy which links prevention, treatment, care and support, this report makes a special case for treatment, which has been the most neglected element in most developing countries.

Treatment is the key to change. It is now possible to save the lives of millions of people who need that treatment but do not yet have access to it. Almost 6 million people now need antiretroviral drugs but only about 400 000 received them in 2003. This knowledge underpins the commitment of WHO and its partners to help provide 3 million people in developing countries with antiretroviral therapy by the end of 2005 – and not to stop there.

The treatment expansion initiative far outreaches the capacities of any single organization. It is one of the most ambitious

public health projects in history, and is fraught with difficulties. But within the multiple partnerships of the international community, the knowledge that this *can* be done is leading to the recognition that it *must* be done.

The moral imperative needs no reinforcement, yet there are other excellent reasons to support the treatment initiative. As this report has shown, the long-term economic and social costs of HIV/AIDS in many countries have been seriously underestimated, and some countries in sub-Saharan Africa may be brought to the brink of economic collapse. Treatment expansion is vital to protect their stability and security and to strengthen the foundations of their future development. Furthermore, and of inestimable importance, treatment can be the accelerator that drives efforts to strengthen health systems in all developing countries.

Building up health systems is essential, not just in the fight against HIV/AIDS but also in generally improving access to better health care for those most in need. This report has demonstrated how international organizations, national governments, the private sector and communities can combine their strengths to achieve this objective.

Advocacy by WHO and its partners for increased international investment in health is beginning to bear fruit. Countries should get the maximum public health benefit from new funds that are now becoming available. Although largely intended for HIV/AIDS, these resources can simultaneously strengthen some of the world's most fragile health systems.

Beyond 2005 lies the challenge of extending treatment to many more millions of people, and of maintaining it for the rest of their lives, while simultaneously building and sustaining the health infrastructures to make that huge task possible. The success of this action cannot be guaranteed. But inaction will not be forgiven. It will be judged by those who suffer and die needlessly today, and by the historians of tomorrow. They will have a right to ask why, if we let the chance of changing history slip through our fingers, we did not act in time.



statistical annex

explanatory notes

The tables in this technical annex present information on core indicators of population health in WHO Member States and regions for the year 2002, selected national health accounts aggregates for 1997–2001, and baseline estimates for health-related Millennium Development Goal indicators in WHO Member States. These notes provide an overview of concepts, methods and data sources, together with references to more detailed documentation. It is hoped that careful scrutiny and use of the results will lead to progressively better measurement of core indicators of population health and health system financing. The main results in the population health tables are reported with uncertainty intervals in order to communicate to the user the plausible range of estimates for each country on each measure.

Because the production time of *The World Health Report 2004* has been much shorter than usual, it was not possible to carry out consultations on new figures with Member States. Annex Tables 1–6 thus present figures for the same years as the Annex Tables published in *The World Health Report 2003*. Initial WHO estimates and technical explanations were sent to Member States for comment. Comments or data provided in response were discussed with them and incorporated where possible. The estimates reported here should, however, still be interpreted as the best estimates of WHO rather than the official viewpoint of Member States. Only new information received from Member States following consultations in 2003, which was received too late for inclusion in *The World Health Report 2003*, has been used to update Annex

Tables 1–6. Additionally, revisions to Annex Tables 2 and 3 have taken into account new data for some causes of death as described below.

The work leading to the production of these annex tables was undertaken mostly by the WHO Evidence and Information for Policy cluster in collaboration with counterparts from the WHO regional offices and WHO representatives in Member States. All six WHO regional offices provided updated health expenditure information obtained from Member States in their regions. The WHO Regional Offices for the Americas and Europe also provided cause-of-death data from their Member States.

ANNEX TABLE 1

To assess overall levels of health achievement, it is crucial to develop the best possible assessment of the life table for each country. Life tables have been developed for all 192 Member States for 2002, starting with a systematic review of all available evidence from surveys, censuses, sample registration systems, population laboratories and vital registration on levels of and trends in child mortality and adult mortality (1). This review benefited greatly from a collaborative assessment of child mortality levels for 2001 by WHO and UNICEF and from analyses of general mortality by the United States Census Bureau (2) and the United Nations Population Division (3). WHO uses a standard method to estimate and project life tables for all Member States using comparable data. This may lead to minor differences compared with official life tables prepared by Member States.

All estimates of population size and structure for 2002 are based on the 2002 demographic assessments prepared by the United Nations Population Division (3). These estimates refer to the de facto population, and not the de jure population in each Member State. The annual growth rate, the dependency ratio, the percentage of population aged 60 years and more, and the total fertility rate are also derived from the United Nations Population Division database. To aid in demographic, cause-of-death and burden of disease analyses, the 192 Member States have been divided into five mortality strata on the basis of their levels of child and adult male mortality. The matrix defined by the six WHO regions and the five mortality strata leads to 14 epidemiological subregions, since not every mortality stratum is represented in every region. These subregions are defined on pages 156–157 and used in Annex Tables 2 and 3 for presentation of results.

Because of increasing heterogeneity of patterns of adult and child mortality, WHO has developed a model life table system of two-parameter logit life tables using a global standard, and with additional age-specific parameters to correct for systematic biases in the application of a two-parameter system (4). This system of model life tables has been used extensively in the development of life tables for those Member States without adequate vital registration and in projecting life tables to 2002 when the most recent data available are from earlier years.

Demographic techniques (Preston–Coale method, Brass Growth–Balance method, Generalized Growth–Balance method and Bennett–Horiuchi method) have been applied, as appropriate, to assess the level of completeness of recorded mortality data for Member States with vital registration systems. For Member States without national vital registration systems, all available survey, census and vital registration data were assessed, adjusted and averaged to estimate the probable trend in child mortality over the past few decades. This trend was projected to estimate child mortality levels in 2002. In addition, adult sibling survival data from available population surveys were analysed to obtain additional information on adult mortality. Life expectancy, under-five mortality in terms of probability of dying by five years of age and adult mortality in terms of probability of dying between 15 and 60 years of age derive directly from the life tables.

To capture the uncertainty resulting from sampling, indirect estimation technique or projection to 2002, a total of 1000 life tables have been developed for each Member State. Uncertainty bounds are reported in Annex Table 1 by giving key life table values at the 2.5th percentile and the 97.5th percentile. This uncertainty analysis was facilitated by the development of new methods and software tools (5). In countries with a substantial HIV/AIDS epidemic, recent estimates of the level and uncertainty range of the magnitude of the epidemic have been incorporated into the life table uncertainty analysis.

ANNEX TABLES 2 AND 3

Causes of death for the 14 epidemiological subregions and the world have been estimated based on data from 112 national vital registration systems that capture about 18.6 million deaths annually, representing one-third of all deaths occurring in the world. In addition, information from sample registration systems, population laboratories and epidemiological analyses of specific conditions has been used to improve estimates of the cause-of-death patterns (6–16). These data are used to estimate death rates by age and sex for underlying causes of death as defined by the International Statistical Classification of Diseases and Related Health Problems (ICD) classification rules.

Cause-of-death data have been carefully analysed to take into account incomplete coverage of vital registration in countries and the likely differences in cause-of-death patterns that would be expected in the uncovered and often poorer subpopulations. Techniques to undertake this analysis have been developed based on the Global Burden of Disease study (17) and further refined using a much more extensive database and more robust modelling techniques (18).

Special attention has been paid to problems of misattribution or miscoding of causes of death in cardiovascular diseases, cancer, injuries and general ill-defined categories. A correction algorithm for reclassifying ill-defined cardiovascular codes has been developed (19). Cancer mortality by site has been evaluated using both vital registration data and population-based cancer incidence registries. The latter have been analysed using a complete age, period cohort model of cancer survival in each region (15).

The regional and global estimates of mortality and burden of disease by cause for 2002 published in Annex Tables 2 and 3 have been updated from those published in *The World Health Report 2003*, not only to take into account revisions to life tables for a few countries but also to include revised estimates of mortality for some causes, based on improved data and recent evidence.

Estimates of HIV/AIDS mortality have been revised to take into account new and different sources of data, such as national household surveys, as well as improved information on emerging epidemics in the Americas, Asia and eastern Europe (8). Latest estimates available for countries (as at February 2004) have been incorporated into the revision of Annex Tables 2 and 3. Tuberculosis prevalence and mortality for 2002 have been revised based on latest tuberculosis notification data, treatment rates, and case-fatality rate data, as published in WHO's *Global tuberculosis control report 2004*.

Estimates of measles mortality have been revised to take into account new information on the effects of supplemental immunization campaigns in reducing measles mortality. The number and quality of supplemental immunization campaigns have substantially increased since 2000 in Africa. Estimates of deaths from pertussis and poliomyelitis for 2002 have also been revised to take into account new information on notifications and immunization coverage. Neonatal tetanus and maternal tetanus incidence and mortality have been revised, to take into account the implementation of tetanus toxoid supplemental immunization activities. These activities target all women of childbearing age in the highest-risk districts, and have been implemented in 29 countries since 1999.

Annex Table 3 provides estimates of the burden of disease for the 14 epidemiological subregions using disability-adjusted life years (DALYs). One DALY can be thought of as one lost year of "healthy" life and the burden of disease as a measurement of the gap between the current health of a population and an ideal situation where everyone in the population lives into old age in full health (20, 21). DALYs for a disease

or health condition are calculated as the sum of the years of life lost (YLL) owing to premature mortality in the population and the years lost through disability (YLD) for incident cases of the health condition. DALYs for 2002 have been estimated based on cause-of-death information for each subregion and regional or country-level assessments of the incidence and prevalence of diseases and injuries. The latter are based on a systematic assessment and analysis of data on major diseases and injuries available to WHO technical programmes and through collaboration with scientists worldwide (16). WHO programme participation in the development of these estimates and consultation with Member States ensure that estimates reflect all information and knowledge available to WHO. Estimates of incidence and point prevalence for selected major causes by subregion are also available on the WHO web site at www.who.int/evidence/bod.

ANNEX TABLE 4

Annex Table 4 reports the average level of population health for WHO Member States in terms of healthy life expectancy (HALE). HALE is based on life expectancy at birth (Annex Table 1) but includes an adjustment for *time spent in poor health*. It is most easily understood as the equivalent number of years in full health that a newborn can expect to live based on current rates of ill-health and mortality (22, 23). The methods used by WHO to calculate HALE have been developed to maximize comparability across populations. WHO analyses of over 50 existing national health surveys for the calculation of healthy life expectancy identified severe limitations in the comparability of self-reported health status data from different populations, even when identical survey instruments and methods were used (24). These comparability problems are a result of unmeasured differences in expectations and norms for health, so that the meaning that different populations attach to the labels used for response categories in self-reported questions (such as mild, moderate or severe) can vary greatly (25). To resolve these problems, WHO undertook a Multi-Country Survey Study (MCSS) in 2000–2001 in collaboration with Member States, using a standardized health status survey instrument together with new statistical methods for adjusting biases in self-reported health (25, 26).

The MCSS carried out 71 representative household surveys in 61 Member States in 2000 and 2001, using a new health status instrument based on the *International classification of functioning, disability and health* (27), which seeks information from a representative sample of respondents on their current states of health according to seven core domains. To overcome the problem of comparability of self-report health data, the WHO survey instrument used performance tests and vignettes to calibrate self-reported health in each of the core domains (26). The calibrated responses are used to estimate the prevalence of different states of health by age and sex.

The measurement of *time spent in poor health* is based on combining condition-specific estimates from the Global Burden of Disease study with estimates of the prevalence of different health states by age and sex derived from the MCSS, and weighted using health state valuations (28). Data from the Global Burden of Disease study were used to estimate severity-adjusted prevalences for health conditions by age and sex for all 192 WHO Member States for 2002. Data from 62 surveys in the MCSS were used to make independent estimates of severity-adjusted prevalences by age and sex. Finally, posterior prevalences for all Member States for 2002 were calculated based on the Global Burden of Disease study and survey prevalences.

Household surveys including a valuation module were conducted in fourteen countries: China, Colombia, Egypt, Georgia, India, Indonesia, Islamic Republic of Iran,

Lebanon, Mexico, Nigeria, Singapore, Slovakia, Syrian Arab Republic and Turkey. Data on nearly 500 000 health state valuations from over 46 000 respondents were used to develop average global health state valuations for the calculation of HALE (29).

The methods used by WHO to calculate healthy life expectancy were peer-reviewed during 2001 and 2002 by the Scientific Peer Review Group (SPRG) constituted by the Director-General, in response to a request by the WHO Executive Board (EB107.R8). The SPRG's final report to the Director-General (30) considered that the methodology for the measurement of HALE was well advanced, and made a number of technical recommendations which have been followed for the calculations reported in Annex Table 4. In particular, steps have been taken to include residents in health institutions and dependent comorbidity (16).

Annex Table 4 reports for all Member States for 2002 the following: average HALE at birth, HALE at age 60, expected lost healthy years (LHE) at birth, percentage of total life expectancy (LE) lost, and 95% uncertainty intervals. LHE is calculated as LE minus HALE and is the expected equivalent number of years of full health lost through living in health states other than full health. LHE expressed as a percentage of total LE represents the proportion of total life expectancy that is lost through living in health states of less than full health.

ANNEX TABLE 5

National health accounts (NHA) are a synthesis of the financing and spending flows recorded in the operation of a health system, with the potential to monitor all transactions from funding sources to the distribution of benefits across geographical, demographic, socioeconomic and epidemiological dimensions. NHA are related to the macroeconomic and macrosocial accounts whose methodology they borrow.

Annex Table 5 provides the best estimates that were available to WHO up to July 2003 for each of its 192 Member States. Although more and more countries collect health expenditure data, only a limited number have produced full national health accounts. Nationally and internationally available information that has been identified and obtained has been compiled for each country. Standard accounting estimation and extrapolation techniques have been applied to provide adequate time series. A policy-relevant breakdown of the data (for example, public/private expenditure) is also provided. Each year draft templates are sent to ministers of health for their comments and their assistance in obtaining additional information as appropriate. The constructive responses from ministries have provided valuable information for the NHA estimates reported here.

An important methodological contribution to producing national health accounts is now available in the *Guide to producing national health accounts with special applications for low-income and middle-income countries* (31). This guide is based on the Organisation for Economic Co-operation and Development (OECD) *System of health accounts* (32). Both reports are built on the principles of the United Nations *System of national accounts* (commonly referred to as SNA93) (33).

The principal international references used to produce the tables are the International Monetary Fund (IMF) *Government finance statistics yearbook, 2002* (34), *International financial statistics yearbook, 2003* (35) and *International financial statistics* (September 2003) (36); the Asian Development Bank *Key indicators 2002* (37); *OECD Health Data 2003* (38) and *International development statistics* (39); and the United Nations *National accounts statistics: main aggregates and detailed tables, 2000* (40). The organizations charged with producing these reports facilitated the supply of advance copies for WHO and gave additional related information, and their contributions are acknowledged here with gratitude.

National sources include: national health accounts reports, public expenditure reports, statistical yearbooks and other periodicals, budgetary documents, national accounts reports, statistical data on official web sites, nongovernmental organization reports, academic studies, and reports and data provided by central statistical offices, ministries of health, ministries of finance and economic development, planning offices, and professional and trade associations.

Annex Table 5 provides both updated and revised figures for 1997–2001. Figures have been updated when new information that changes the original estimates has become available. This category includes benchmarking revisions, whereby an occasional wholesale revision is made by a country owing to a change in methodology, when a more extensive NHA effort is undertaken, or when shifting the denominator from SNA68 to SNA93. Colombia is a case in point.

Total expenditure on health has been defined as the sum of general government expenditure on health (GGHE or public expenditure on health), and private expenditure on health (PvtHE). All estimates are calculated in millions of national currency units (million NCU). The estimates are presented as ratios to gross domestic product (GDP), to total health expenditure (THE), to total general government expenditure (GGE), or to private expenditure on health (PvtHE).

GDP is the value of all goods and services provided in a country by residents and non-residents without regard to their allocation among domestic and foreign claims. This (with small adjustments) corresponds to the total sum of expenditure (consumption and investment) of the private and government agents of the economy during the reference year. The United Nations *National accounts statistics: main aggregates and detailed tables, 2000 (40)*, Table 1.1, was the main source of GDP estimates. For the 30 Member countries of the OECD, the macroeconomic accounts have been imported from the *National accounts of OECD countries: detailed tables 1990/2001*, 2003 edition, Volume II (41), Table 1. Collaborative arrangements between WHO and the United Nations Statistics Division and the Economic Commission for Europe of the United Nations have permitted the receipt of advance information on 2001. For Iraq, Lebanon and the United Arab Emirates, United Nations Economic and Social Commission for Western Asia data were used.

When United Nations data were unavailable, GDP data reported by the IMF (*International financial statistics*, September 2003) as well as unpublished data from the IMF Research Department have been used. They included Cape Verde, Comoros, Djibouti, Eritrea, the Gambia, Ghana, Guinea, Mauritania, and Sao Tome and Principe. In the few cases where none of the preceding institutions reported updated GDP information, WHO has used data from other institutions or national series. National series were used for Andorra, Federated States of Micronesia, Nicaragua, Niue, Palau, Samoa, Solomon Islands and Tonga. Figures for Kiribati were obtained from the Asian Development Bank. The estimates for the Democratic People's Republic of Korea and Timor-Leste originate from policy reports, as no standard statistical sources had any information on these countries. Likewise, the estimates for Afghanistan, Liberia and Somalia originate from the web site of the United Nations Statistical Department (UNSTAT). Estimates for Equatorial Guinea originate from the Banque des Etats de l'Afrique Centrale (BEAC).

The data for China exclude estimates for Hong Kong Special Administrative Region and Macao Special Administrative Region. The health expenditure data for Jordan exclude the contributions from United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), which provided basic health services support to

Palestinian refugees residing on Jordanian territories, but include UNRWA expenditures to UNRWA clinics. The 1997 and 1998 health expenditure data for Serbia and Montenegro included the provinces of Kosovo and Metohia, but for 1999 and 2000 the data excluded them, since these territories have been placed under the administration of the United Nations. The estimate for 2001 was also extrapolated without Kosovo and Metohia.

General government expenditure (GGE) includes consolidated direct outlays and indirect outlays (for example, subsidies to producers, transfers to households), including capital of all levels of government (central/federal, provincial/regional/state/district, and municipal/local authorities), social security institutions, autonomous bodies, and other extrabudgetary funds. *National accounts of OECD countries: detailed tables 1990/2001*, 2003 edition, Volume II, Table 12, row 51, supplies the information for 27 member countries. The IMF *Government finance statistics yearbook* supplies an aggregate figure for 133 central/federal governments with complements for 23 regional and 45 local/municipal governments (as well as some social security payments for health data received from the IMF). It reports central government disbursement figures in its *International financial statistics*, row 82. Several other public finance audits, executed budgets, budget plans, statistical yearbooks, web sites, World Bank and Regional Development Bank reports, and academic studies have been consulted to verify total government expenditure. Extrapolations were made on incomplete time series using, inter alia, the differential between current disbursement plus savings in the United Nations *National accounts* up to 1995 and the IMF central government disbursement level. Several national authorities have also confirmed the GGE series during the consultative process.

GGHE comprises the outlays earmarked for the enhancement of the health status of population segments and/or the distribution of medical care goods and services among population segments by:

- central/federal, state/provincial/regional, and local/municipal authorities;
- extrabudgetary agencies, principally social security schemes, which operate in several countries;
- external resources (mainly grants and credits with high grant components to governments).

The figures for social security and extrabudgetary expenditure on health include purchases of health goods and services by schemes that are compulsory and under governmental control. A major hurdle has been the need to verify that no double counting occurs and that no cash benefits for sickness and/or loss of employment are included in the estimates, as these are classified as income maintenance expenditure.

All expenditures are to be accounted for, including final consumption, subsidies to producers, transfers to households (chiefly reimbursements for medical and pharmaceutical bills), investment and investment grants (also referred to as capital transfers). The classification of the functions of government, promoted by the United Nations, IMF, OECD and other institutions, sets the boundaries. In many instances, the data contained in the publications are limited to those supplied by ministries of health. Expenditures on health, however, should include expenditures where the primary intent is for health regardless of the implementing entity. An effort has been made to obtain data on health expenditures by other ministries, the armed forces, prisons, schools, universities and others, to ensure that all resources accounting for health expenditures are included. Information on external resources was received courtesy

of the Development Action Committee of the OECD (DAC/OECD). A quarter of Member States explicitly monitor the external resources entering their health system, information that has been used to validate or amend the order of magnitude derived from the DAC entries.

OECD health data 2003 supplies GGHE entries for its member countries, with some gaps for the year 2001. In addition, the data for the year 2001 for Austria, Belgium, Iceland, Japan, Luxembourg, Republic of Korea and Turkey have been largely developed by WHO as they were not yet available through the OECD. Those have been projected by WHO. NHA studies were available for 54 non-OECD countries for one or more years. The detailed information in these reports permitted a more reliable basis for estimation than in other years. The IMF *Government finance statistics* reports central government expenditure on health for 122 countries, regional government outlays for health for 23 countries, and local government outlays on health for 45 countries. The entries are not continuous time series for all countries, but the document serves as an indicator that a reporting system exists in the 122 countries. A thorough search was conducted for the relevant national publications in those countries. In some cases it was observed that expenditures reported under the government finance classification were limited to those of the ministry of health rather than all expenditures on health regardless of ministry. In such cases, other series were used to supplement that source. Government finance data, together with external resources data, statistical yearbooks, public finance reports, and analyses reporting on the implementation of health policies, have led to GGHE estimates for most WHO Member States. Information on Brunei Darussalam, for example, was accessed from national sources, but also from an International Medical Foundation of Japan data compendium (42). This source provided a means for double checking health budget data for seven countries.

Several processes have been used to judge the validity of the data. For example, the aggregate expenditure obtained has been compared against inpatient care expenditure, pharmaceutical expenditure data and other records (including programme administration and other costs entering the *System of health accounts* classifications) to cross-validate the information, in order to ensure: that the outlays for which details have been assembled constitute the bulk of the government expenditure on health; that intra-government transfers are consolidated; and that the estimates obtained are judged plausible in terms of systems' descriptions. The aggregate governmental health expenditure data have also been compared with total GGE, providing an additional source of verification. Sometimes the GGHE and, therefore, the figures for total health expenditure, may be an underestimate if it is not possible to estimate for local government, nongovernmental organizations and insurance. For example THE for India may not include some agents leading to a possible underestimate of between 0.3% and 0.6% of GDP. Information for Afghanistan and Iraq was received from the Regional Office for the Eastern Mediterranean, and for Cambodia from the country office.

Private expenditure on health has been defined as the sum of expenditures by the following entities:

- Prepaid plans and risk-pooling arrangements: the outlays of private and private social (with no government control over payment rates and participating providers but with broad guidelines from government) insurance schemes, commercial and non-profit (mutual) insurance schemes, health maintenance organizations, and other agents managing prepaid medical and paramedical benefits (including the operating costs of these schemes).

- Firms' expenditure on health: outlays by public and private enterprises for medical care and health-enhancing benefits other than payment to social security.
- Non-profit institutions serving mainly households: resources used to purchase health goods and services by entities whose status does not permit them to be a source of income, profit or other financial gain for the units that establish, control or finance them. This includes funding from internal and external sources.
- Household out-of-pocket spending: the direct outlays of households, including gratuities and in-kind payments made to health practitioners and suppliers of pharmaceuticals, therapeutic appliances, and other goods and services, whose primary intent is to contribute to the restoration or the enhancement of the health status of individuals or population groups. This includes household payments to public services, non-profit institutions or nongovernmental organizations and non-reimbursable cost sharing, deductibles, copayments and fee-for-service. It excludes payments made by enterprises which deliver medical and paramedical benefits, mandated by law or not, to their employees and payments for overseas treatment.

Most of the information on private health expenditures comes from NHA reports, statistical yearbooks and other periodicals, statistical data on official web sites, reports of nongovernmental organizations, household expenditure surveys, academic studies, and relevant reports of and data provided by central statistical offices, ministries of health, professional and trade associations. For the 30 OECD member countries they are obtained from the *OECD health data 2003*. Standard extrapolation and estimation techniques were used to obtain the figures for missing years.

ANNEX TABLE 6

Annex Table 6 presents total expenditure on health and general government expenditure on health in per capita terms. The methodology and sources to derive THE and GGHE have been discussed in the notes to Annex Table 5. Ratios are represented in per capita terms by dividing the expenditure figures by population figures. These per capita figures are expressed first in US dollars at an average exchange rate, which is the observed annual average number of units at which a currency is traded in the banking system. It is then also presented in international dollar estimates, derived by dividing local currency units by an estimate of their purchasing power parity (PPP) compared to US dollars, i.e. a rate or measure that minimizes the consequences of differences in price levels existing between countries.

OECD health data 2003 is the major source for population estimates for the 30 OECD member countries, just as it is for other health expenditure and macroeconomic variables. All estimates of population size and structure, other than for OECD countries, are based on demographic assessments prepared by the United Nations Population Division (3). This report uses the estimates referred to as the de facto population, and not the de jure population, in each Member State. An exception was made for Serbia and Montenegro for 2001, as expenditure figures excluded the provinces of Kosovo and Metohia, which became territories under the administration of the United Nations. Estimates for Serbia and Montenegro, excluding the populations of Kosovo and Metohia, were obtained from the *Statistical yearbook of Yugoslavia 2002*, thus ensuring consistency of the basis for the numerator and denominator.

Three-quarters of the exchange rates (average for the year) have been obtained from the IMF's *International financial statistics, September 2003*, row rf. Where information

was lacking, available data from the United Nations, the World Bank and ad hoc donor reports (in the case of Afghanistan for example) were used. The euro:US dollar rate has been applied for Andorra, Monaco and San Marino. The New Zealand dollar:US dollar rate has been applied for Niue. The Australian dollar:US dollar rate has been applied for Nauru and Palau. Ecuador dollarized its economy in 2000, but the entire dataset has been recalculated in dollar terms for the five-year period reported.

For OECD member countries, the OECD PPP has been used to calculate international dollars. For countries that are part of the UNECE but are not members of OECD, the UNECE PPPs were calculated on the same basis as the OECD PPP. The remaining calculations for international dollars have been estimated by WHO using methods similar to those used by the World Bank.

ANNEX TABLE 7

In September 2000, representatives of 189 countries met at the Millennium Summit in New York and committed themselves to working towards a world in which sustaining development and eliminating poverty would have the highest priority. The Millennium Development Goals (MDGs) summarize these commitments and have been commonly accepted as a framework for measuring development progress. They are an integral part of the *Road map towards the implementation of the United Nations Millennium Declaration*, which was endorsed by the United Nations General Assembly (43). The MDGs give high prominence to health: three of the eight goals and 17 indicators of progress are health-related. They assist in the development of national policy frameworks, such as poverty reduction strategies and national health policies focusing on the poor, and help track the performance of health programmes and systems. Although the MDGs do not cover the whole range of public health domains, a broad interpretation of the goals provides an opportunity to tackle important cross-cutting issues and key constraints to health and development. Some common constraints include human resources for health, health care financing and government capacity, especially in the area of stewardship.

WHO is working closely with other United Nations agencies in reporting on the health-related MDGs. WHO shares lead agency responsibility with UNICEF for reporting on child mortality, maternal health, childhood nutritional status, malaria prevention measures and access to clean water, and with UNAIDS on HIV prevention. At global level, interagency mechanisms have been established to ensure technical coherence in the collection, analysis and validation of MDG-related data, and to define reporting responsibilities. At country level, WHO, through its country representatives, is the lead authority for the health content of the MDGs within United Nations country teams.

Annex Table 7 provides baseline information for WHO Member States for selected MDG health indicators. The notes below summarize definitions, measurement methods, sources of information and give further references for the MDG health indicators.

Percentage of underweight children among children under five years of age

The internationally recommended way to assess malnutrition at population level is to take body measurements (e.g. weight and height) and to relate them to an individual's age or height. In children the three most commonly used anthropometric indices are weight-for-height, height-for-age and weight-for-age. Anthropometric values are compared across individuals or populations in relation to a set of reference values and the choice of the reference population has a significant impact on the proportion of

children identified as being undernourished and overnourished. Since the late 1970s WHO has been recommending the National Center for Health Statistics (NCHS) growth reference, the so-called NCHS/WHO international reference population, for the comparison of child growth data.

The data sources presented in Annex Table 7 are population-based surveys which fulfil the following main criteria:

- a defined population-based sampling frame;
- a probabilistic sampling procedure involving at least 400 children;
- use of standard anthropometric measurement techniques;
- presentation of prevalence of underweight in z-scores cut-off points (i.e. standard deviation scores) in relation to the NCHS/WHO international reference or availability of the raw data, allowing a standardized analysis.

The figures shown in the table are estimated for each Member State from the most recent population-based survey available that fulfil these criteria (44–46).

Under-five mortality rate

Under-five mortality rate is the probability (expressed as rate per 1000 live births) of a child born in a specific year dying before reaching five years of age, if subject to current age-specific mortality rates. Under-five mortality represents over 90% of child deaths under the age of 18 worldwide.

Age-specific mortality rates calculated from birth and death data are derived from vital registration, census, and/or household surveys. When using household surveys, under-five mortality estimates are obtained in a direct Multiple Indicators Cluster Survey (MICS) (using birth history as in demographic and health surveys) or in an indirect way (such as in MICS Brass method). When mortality is high, the indirect method tends to overestimate infant mortality and underestimate child mortality.

Sources used for the calculation of child mortality rates for WHO Member States include the demographic and health surveys, MICS, national vital registration systems and national censuses (16). Under-five mortality rates for 2000 published here have been revised for consistency with the 2002 figures given in Annex Table 1, using the same cycle of information, and may differ from previously published estimates of under-five mortality for the year 2000.

Infant mortality rate

Infant mortality rate is the probability (expressed as rate per 1000 live births) of a child born in a specific year dying before reaching one year of age, if subject to current age-specific mortality rates.

When using household surveys, infant mortality estimates are obtained in a direct (using birth history as in demographic and health surveys) or indirect way (such as in MICS Brass method). When using indirect estimates, the infant mortality estimates must be consistent with the under-five mortality estimates. Sources used for the calculation of infant mortality rates for WHO Member States include national vital registration systems, demographic and health surveys, MICS, and national censuses (16).

Percentage of one-year-old children immunized against measles

Estimates of immunization coverage are generally based on two sources of empirical data: reports of vaccinations performed by service providers (routinely recorded data) and surveys containing items on children's vaccination history (coverage surveys). For estimates based on routinely recorded data, the immunization coverage is derived by

dividing the total number of vaccinations given by the number of children in the target population. For most vaccines the target population is the national annual number of births or number of surviving infants (this may vary depending on countries' policies and the specific vaccine).

For estimates based on immunization coverage surveys the denominator corresponds to children aged 12–23 months who had received at least one measles vaccination by the time of the survey or had done so before the age of 12 months.

Measles immunization coverage for 2001 is based on the WHO and UNICEF review of coverage data based on administrative records, surveys, national reports and consultation with local and regional experts (47–49).

Maternal mortality ratio

The International statistical classification of diseases and related health problems, tenth revision (ICD-10) defines a maternal death as: the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Measuring maternal mortality both reliably and in a cost-effective way is not possible except where comprehensive registration of deaths and causes of death exists. Elsewhere, survey methods or models have to be used to estimate levels of maternal mortality. WHO recommends a variety of measurement methods depending on a country's vital registration system and its capacity to provide direct observation of maternal deaths.

For Member States with good vital registration (90% coverage, medical certification of cause of death), the vital registration system is the main source for direct counting of maternal deaths in a given period. Misclassification and miscoding of maternal deaths are frequent, especially where the pregnancy status of the woman is not included in the death certificate. Adjustment methods are therefore required to produce a more accurate estimate of maternal mortality (reported maternal deaths are adjusted by a nationally reported adjustment factor if available, or by 1.5 if not).

For Member States with incomplete vital registration, but with maternal mortality estimates derived from population-based surveys, demographic and health survey and the MICS use a sibling survival method, asking respondents questions about the survival of their adult sisters in relation to the period around pregnancy and childbirth.

For Member States with no reliable national data on maternal mortality, statistical modelling is the only possibility. WHO, UNICEF and UNFPA have developed model-based estimates. A statistical model is used to estimate the proportion of deaths of women of reproductive age from maternal causes. Estimates of the number of maternal deaths are then obtained by applying this proportion to the best available figure of the total number of deaths among women in reproductive age, which is currently the WHO HIV-adjusted envelope of female deaths.

Alternative methods used include reviews of all deaths of women of reproductive age (Reproductive Age Mortality Study (RAMOS)), longitudinal studies of pregnant women, repeated large-scale household surveys and inclusion of maternal mortality-related questions in national censuses. All these methods, however, still rely on accurate reporting of deaths of pregnant women and of the cause of death, which are difficult to obtain.

Full details of methods and data sources used by WHO, UNICEF and UNFPA are given in a recent joint publication, *Maternal mortality in 2000: estimates developed by WHO, UNICEF and UNFPA* (14).

Percentage of live births attended by skilled health personnel

The term skilled attendant refers exclusively to people with midwifery skills (for example doctors, midwives and nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose or manage obstetric complications. They must be able to manage normal labour and delivery, recognize the onset of complications, perform essential interventions, start treatment, and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in the setting in question. Traditional birth attendants, trained or not, are excluded from the category of skilled attendant at delivery.

For most countries, the main sources of information on skilled attendance at delivery are household surveys (14). While efforts are made to standardize definitions of skilled birth attendants, there are concerns about the comparability of some of the results across countries and within countries at different times. Although WHO has defined the specific competencies that the skilled attendant should have, there have been no systematic efforts to ensure that the groups classified under the heading of skilled attendant actually have them. In some settings, groups of providers in the skilled attendant category include those unlikely to have the skills and experience required to manage childbirth complications safely.

Issues related to the way data on skilled attendance at delivery are collected include:

- the extent to which respondents can accurately report the skills of the birth attendant;
- potential bias introduced by the fact that most household surveys report on live births in the past five years, thus missing many adverse health outcomes which are disproportionately concentrated among women experiencing adverse outcomes such as stillbirths or miscarriages;
- the potential overrepresentation of women with short birth intervals who are almost certain to exhibit other risk factors for adverse pregnancy outcome, including high parity, low levels of education and absence of contact with other health services such as family planning. Surveys should only include the most recent birth for the survey period.

HIV prevalence among adults aged 15 to 49 years

This indicator measures the proportion of the total population aged 15 to 49 years infected with HIV. It includes people who have progressed to AIDS, but does not include people who have died from the disease. Estimates of HIV prevalence have been developed by UNAIDS and WHO for most Member States and revised periodically to account for new data and improved methods (7, 8, 50). For the most recent round of estimates, two different types of model have been used, depending on the nature of the epidemic in a particular country. For generalized epidemics, in which infection is spread primarily through heterosexual contact, a simple epidemiological model was used to estimate epidemic curves based on sentinel surveillance data on HIV seroprevalence. For countries with epidemics concentrated in high-risk groups, prevalence estimates were derived from the estimated population size and prevalence surveillance data in each high-risk category.

The HIV prevalence figures shown for 2000 have been revised from previously published figures to take into account new data and are consistent with the latest UNAIDS and WHO estimates of prevalences for 2003.

For a few countries where prevalence estimates for HIV seropositive cases (including

AIDS) are not directly available, they have been derived by scaling regional prevalence estimates by the ratio of country-specific HIV mortality to regional HIV mortality. Because different countries may be at different phases of the epidemic, the relationship between prevalence and mortality may vary across countries.

Malaria mortality rate

Malaria-specific mortality cannot be monitored routinely in most malaria endemic African countries since there are few systems in place for reliable measurement of malaria deaths. Symptoms and signs of malaria (such as fever or convulsions) are non-specific and overlap with other diseases, so verbal autopsy methods have low sensitivity and specificity for malaria. Since malaria may increase the susceptibility of young children to other infections, many child deaths may be malaria-related rather than directly attributable to malaria. Moreover, a majority of deaths do not occur in hospitals and are not routinely recorded in the health information system, and these are unlikely to be picked up in the – usually incomplete – vital registration.

Malaria mortality estimates for all regions except the African Region were derived from the cause-of-death data sources described above in the notes to Annex Table 2. For Africa, country-specific estimates of malaria mortality were based on analyses by Snow et al. (13) and updated using the most recent geographical distributions produced by malaria risks in Africa (MARA) mapping, together with available information on total child mortality rates, and the contributions of other specific causes. Work is currently under way in collaboration with expert groups to refine and revise these country-specific estimates of malaria mortality.

Tuberculosis prevalence (excluding HIV-infected people)

In 1997 WHO began to develop country estimates of tuberculosis incidence, prevalence and mortality. The data sources and methods have been described in detail elsewhere (6). Briefly, estimates of incidence are derived from case notifications adjusted by estimated case detection rates, prevalence data on active disease combined with estimates of average case durations, or estimates of infection risk multiplied by a scalar factor relating incidence of smear-positive pulmonary tuberculosis to annual risks of infection.

Since the original estimates for 1997 were completed, revised and updated estimates have been prepared. The majority of countries reporting to WHO have provided notification data with interpretable trends, and with no other evidence for a significant change in the case detection rate. For most countries, therefore, except those with evidence of changes in case detection rates, it has been assumed that trends in notification rates represent trends in incidence rates. Annual reports on tuberculosis control have included further details on surveillance methods, case notifications and incidence estimates by country (51).

Tuberculosis cases include all people in whom tuberculosis has been bacteriologically confirmed or diagnosed by a clinician: *definite cases* (positive culture for the mycobacterium tuberculosis), *smear-positive pulmonary cases*, *smear-negative pulmonary cases with clinical evidence*, *extrapulmonary tuberculosis*, and *relapse cases* (previously declared cured case with new episode).

Tuberculosis prevalence rates reported here are for all forms of tuberculosis excluding cases in HIV-positive people. Under the rules of the International Classification of Diseases, HIV is classified as the underlying cause of morbidity or death in HIV-positive people with tuberculosis. Although total tuberculosis prevalence rates, including

cases of tuberculosis in HIV-positive people, have been reported elsewhere for this MDG indicator, Annex Table 7 reports the prevalence of tuberculosis not associated with HIV infection, for consistency with the tuberculosis mortality indicator. The total prevalence of tuberculosis in 2000 is estimated at approximately 8 million; an additional 700 000 HIV-positive people have the disease.

Estimated prevalence of all forms of tuberculosis (excluding HIV-positive people) for 2000 was calculated by multiplying estimated incidence by estimated duration. Country-specific estimates of duration were weighted for the proportion of cases treated and the proportion smear-positive. These prevalences may differ from previously published figures for 2000, as they have been updated to take into account new data from Member States. For Member States where vital registration data have been used to estimate tuberculosis mortality, incidence and prevalence estimates have been revised to be consistent with estimated deaths, estimated case-fatality rates for treated and untreated cases, and the proportion of incident cases treated.

Tuberculosis mortality rate

The *death rate* from tuberculosis is estimated from incidence by multiplying by the estimated case-fatality rate, weighted for the proportion of cases treated and the proportion of smear-positive cases (6, 51). Tuberculosis deaths in HIV-infected individuals are not included but are attributed to HIV/AIDS. For Member States with reasonably good-quality or complete death registration data, death rates are derived from direct observation and counting of registered tuberculosis deaths. These death rates may differ from previously published figures for 2000, as they have been updated to take into account new data from Member States.

Proportions of smear-positive tuberculosis cases detected and successfully treated under DOTS

The recommended approach to tuberculosis control is via DOTS, an inexpensive strategy that could prevent millions of cases and deaths in years to come. DOTS is a five-pronged strategy for tuberculosis control consisting of: (i) sustained government commitment; (ii) detection of cases through sputum smear microscopy among symptomatic people; (iii) regular and uninterrupted supply of high-quality drugs; (iv) 6–8 months of regularly supervised treatment (including direct observation of drug-taking for at least the first two months); (v) reporting systems to monitor treatment progress and programme performance.

The success of DOTS depends on expanding case detection while ensuring high treatment success rates. These two indicators reflect the two main national targets of the strategy to be achieved for each implementing country: 85% treatment success rate and 70% case detection rate. Many of the 155 national DOTS programmes in existence by the end of 2001 have shown that they can achieve high treatment success rates, close to or exceeding the target of 85%. The global average treatment success rate for DOTS programmes was 82% for the cohort of patients registered in 2000, though cure rates tend to be lower, and death rates higher, where drug resistance is frequent or HIV prevalence is high.

These indicators are constructed from country notification of cases detected and successfully treated (51). The *DOTS detection rate* is the percentage of estimated new infectious tuberculosis cases detected under the DOTS case detection and treatment strategy. Case notifications represent only a fraction of the true number of cases arising in a country because of incomplete coverage by health services, inaccurate

diagnosis, or deficient recording and reporting.

The *DOTS treatment success rate* is the percentage of new, registered smear-positive (infectious) cases that were cured (identified as a bacteriological conversion from positive to negative) or in which a full course of DOTS treatment was completed. “Successfully treated” is therefore the sum of “cured” cases and the cases that “completed the full treatment course”. WHO routinely compiles data on the six standard, mutually exclusive outcomes of treatment. Figures are reported as percentages of all registered cases, so that the six possible outcomes plus the fraction of cases not evaluated sum to 100%. Although treatment success is expressed as a percentage, it is usually referred to as the “treatment success rate”.

Percentage of population using solid fuels

Solid fuels include biomass fuels such as wood, agricultural residues, animal dung, charcoal and coal. In many countries in which a large proportion of the population cooks with solid fuels, household energy data are widely, although not universally, available. This is the case for around 60 countries. For countries where there are no data, WHO has developed a statistical model to predict household solid fuel use from development-related parameters. As countries develop, people gradually shift from solid to cleaner fuels.

A wide range of development indicators were tested in the modelling process, including average annual growth rates, per capita electricity and petroleum consumption, Gini coefficient, per capita fuel wood production, and traditional fuel use at the national level. As information on traditional fuel use at the national level performs similarly to gross national product (GNP) per capita, but GNP per capita is more reliable, more routinely updated, and widely available, the model uses per capita GNP rather than traditional fuel use. The final model includes percentage rural population, location within the WHO Eastern Mediterranean Region (thought to be important as it indicates oil production), GNP per capita (log transformed), and per capita petroleum use (52). This is consistent with the theory that household solid fuel use declines with increases in economic growth and urbanization.

Percentage of population with sustainable access to an improved water source

The monitoring of the population with access to adequate water supply has proved problematic, because the data are often limited when estimated by service providers. Therefore WHO and UNICEF have now turned to consumer-based information to estimate water and sanitation coverage (53). For data collection, two main sources are used: household surveys and assessment questionnaires (to complement survey data or to provide estimates where survey data are not available). This allows for a far more detailed picture of the water supply technologies being used. It also captures information related to use and breakdown of self-built water facilities, of which service providers may be unaware.

Population-based surveys do not provide specific information on the adequacy of water supply facilities. It is assumed that certain types of technology are safer than others and that some of them cannot be considered as “coverage”. The term “safe” was replaced with “improved”. The population with access to improved water supply is considered to be covered. It is assumed that if the user has access to an “improved source” then such a source would be likely to provide 20 litres per capita per day at a distance no longer than 1000 metres. The following technologies represent improved

water supply: household connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection.

Percentage of urban population with access to improved sanitation

The monitoring of access to adequate sanitation facilities has proved to be complicated for the same reasons that apply to water source. WHO and UNICEF have now turned to consumer-based information to estimate sanitation coverage by using household surveys and assessment questionnaires (to complement survey data or to provide estimates where survey data are not available) as the two main sources (53). This allows for a far more detailed picture of the sanitation technologies being used. It also captures information related to usage and breakdown of self-built facilities, of which service providers may be unaware.

As for access to improved water, population-based surveys do not provide specific information on the adequacy of sanitation facilities. By assuming that certain types of technology are better than others and that some of them cannot be considered as “coverage”, the term “adequate” was replaced with “improved” to accommodate these limitations. The following technologies represent improved sanitation: connection to a public sewer, connection to septic system, pour-flush latrine, simple pit latrine, ventilated improved pit latrine.

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Annex Table 1 Basic indicators for all WHO Member States

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	POPULATION ESTIMATES								LIFE EXPECTANCY AT BIRTH (YEARS) Both sexes 2002	LIFE EXPECTANCY AT BIRTH (YEARS)				PROBABILITY OF DYING (PER 1000)									
	Total population (000)	Annual growth rate (%)	Dependency ratio (per 100)		Percentage of population aged 60+ years		Total fertility rate			Males		Females		Under age 5 years				Between ages 15 and 60 years					
			1992	2002	1992	2002	1992	2002		1992	2002	2002	Uncertainty	2002	Uncertainty	Males		Females		Males		Females	
																2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty
1	Afghanistan	22 930	3.8	88	86	4.7	4.7	7.0	6.8	42.6	1	41.9	32.0 - 49.5	43.4	31.3 - 53.2	258	208 - 310	256	205 - 306	494	335 - 731	413	192 - 705
2	Albania	3 141	-0.4	60	53	7.9	9.5	2.9	2.3	70.4	2	67.3	65.9 - 68.7	74.1	73.0 - 75.0	27	13 - 41	23	11 - 34	167	137 - 199	94	79 - 111
3	Algeria	31 266	1.8	82	60	5.7	6.1	4.2	2.8	69.4	3	67.5	66.2 - 69.1	71.2	69.8 - 72.5	54	43 - 64	43	35 - 52	170	152 - 187	128	112 - 146
4	Andorra	69	1.8	48	46	20.0	21.6	1.4	1.3	80.3	4	76.8	76.0 - 77.8	83.7	83.0 - 84.3	5	5 - 6	4	4 - 5	113	101 - 125	43	39 - 48
5	Angola	13 184	2.9	97	101	4.6	4.4	7.2	7.2	39.9	5	37.9	29.5 - 44.1	42.0	32.8 - 50.6	279	248 - 312	247	219 - 275	594	425 - 824	481	255 - 726
6	Antigua and Barbuda	73	1.2	63	56	9.2	10.5	1.8	1.6	71.4	6	69.0	67.5 - 70.5	73.9	72.3 - 75.4	22	11 - 33	18	9 - 28	195	173 - 216	125	111 - 141
7	Argentina	37 981	1.3	64	59	13.0	13.5	2.8	2.5	74.4	7	70.8	70.4 - 71.2	78.1	77.9 - 78.3	20	18 - 21	16	15 - 17	177	170 - 184	90	88 - 93
8	Armenia	3 072	-1.3	57	44	10.5	13.1	2.2	1.2	70.0	8	67.0	66.2 - 67.9	73.0	72.1 - 73.8	39	22 - 56	35	19 - 46	204	184 - 225	98	85 - 115
9	Australia	19 544	1.2	50	48	15.6	16.7	1.9	1.7	80.4	9	77.9	77.6 - 78.1	83.0	82.7 - 83.2	6	6 - 7	5	5 - 6	91	89 - 94	52	50 - 54
10	Austria	8 111	0.3	48	47	19.9	21.3	1.5	1.3	79.4	10	76.4	76.1 - 76.7	82.2	81.8 - 82.4	6	5 - 7	4	4 - 5	117	113 - 121	59	56 - 63
11	Azerbaijan	8 297	1.1	63	57	7.6	9.2	2.8	2.1	65.8	11	63.0	61.7 - 64.2	68.6	67.5 - 69.8	80	64 - 98	70	56 - 83	231	199 - 261	122	103 - 144
12	Bahamas	310	1.5	58	53	6.8	8.5	2.6	2.3	72.6	12	69.4	68.7 - 70.2	75.7	75.2 - 76.3	18	15 - 21	14	12 - 16	265	249 - 282	148	141 - 155
13	Bahrain	709	3.0	51	47	3.7	4.0	3.5	2.7	73.2	13	72.1	70.7 - 73.6	74.5	73.2 - 75.8	13	8 - 22	10	6 - 15	113	96 - 130	82	68 - 98
14	Bangladesh	143 809	2.3	81	71	4.8	5.1	4.4	3.5	62.6	14	62.6	61.3 - 63.9	62.6	61.4 - 63.7	71	68 - 75	73	70 - 77	251	223 - 282	258	232 - 284
15	Barbados	269	0.4	55	43	15.0	13.1	1.6	1.5	74.3	15	70.5	69.6 - 71.4	77.9	76.8 - 79.0	17	13 - 22	15	9 - 23	189	171 - 206	103	91 - 115
16	Belarus	9 940	-0.4	52	46	17.4	19.3	1.7	1.2	68.3	16	62.6	62.0 - 63.2	74.3	73.7 - 74.9	14	11 - 16	10	8 - 13	371	347 - 397	134	120 - 148
17	Belgium	10 296	0.3	50	53	20.9	22.2	1.6	1.7	78.4	17	75.2	74.9 - 75.5	81.5	81.3 - 81.8	6	5 - 7	5	4 - 6	126	122 - 130	67	64 - 69
18	Belize	251	2.5	91	73	6.0	5.9	4.4	3.2	69.7	18	67.4	66.0 - 68.7	72.4	71.4 - 73.4	44	33 - 56	34	25 - 42	189	172 - 211	123	117 - 129
19	Benin	6 558	2.8	105	93	4.6	4.1	6.5	5.7	51.2	19	50.1	42.9 - 56.5	52.4	43.0 - 60.1	166	163 - 170	158	155 - 161	424	253 - 634	360	176 - 611
20	Bhutan	2 190	2.3	88	86	6.1	6.5	5.8	5.1	61.3	20	60.2	52.3 - 67.6	62.4	53.5 - 69.0	93	74 - 111	92	73 - 111	272	111 - 474	226	102 - 428
21	Bolivia	8 645	2.2	81	77	6.1	6.6	4.8	3.9	63.2	21	61.8	54.6 - 69.3	64.7	56.2 - 70.9	78	74 - 82	73	70 - 77	260	101 - 445	209	91 - 402
22	Bosnia and Herzegovina	4 126	0.4	43	40	11.1	15.3	1.6	1.3	72.8	22	69.3	67.9 - 71.0	76.4	75.2 - 77.6	20	15 - 25	15	11 - 19	192	162 - 220	90	76 - 105
23	Botswana	1 770	2.1	89	74	3.7	4.4	4.5	3.7	40.4	23	40.2	37.3 - 43.3	40.6	37.7 - 44.1	104	89 - 121	102	86 - 118	786	718 - 842	745	676 - 801
24	Brazil	176 257	1.4	63	51	6.8	8.1	2.6	2.2	68.9	24	65.7	65.2 - 66.2	72.3	71.8 - 72.7	42	36 - 49	34	29 - 40	246	235 - 257	136	128 - 145
25	Brunei Darussalam	350	2.6	57	51	4.1	4.5	3.1	2.5	76.1	25	74.8	73.5 - 76.3	77.4	76.6 - 78.2	14	12 - 16	12	11 - 14	112	94 - 128	85	73 - 98
26	Bulgaria	7 965	-0.8	50	45	19.9	21.7	1.5	1.1	72.2	26	68.8	68.7 - 69.0	75.6	75.5 - 75.8	17	16 - 19	15	13 - 16	218	214 - 221	94	91 - 96
27	Burkina Faso	12 624	2.9	108	106	4.5	4.0	7.1	6.7	41.7	27	40.6	34.3 - 46.6	42.6	34.7 - 49.8	232	211 - 251	217	197 - 235	597	417 - 793	522	334 - 736
28	Burundi	6 602	1.3	97	99	4.6	4.4	6.8	6.8	40.8	28	38.7	33.0 - 44.5	43.0	36.0 - 50.2	189	152 - 224	177	142 - 216	692	541 - 834	563	393 - 750
29	Cambodia	13 810	2.8	98	81	4.4	4.6	5.5	4.8	54.6	29	51.9	44.8 - 57.4	57.1	49.1 - 63.4	149	138 - 159	124	115 - 132	400	261 - 604	298	165 - 487
30	Cameroon	15 729	2.4	94	86	5.5	5.6	5.7	4.7	48.1	30	47.2	41.1 - 53.9	49.0	41.4 - 56.7	162	151 - 174	158	147 - 169	519	344 - 697	454	273 - 658
31	Canada	31 271	1.0	47	45	15.8	17.1	1.7	1.5	79.8	31	77.2	77.0 - 77.4	82.3	82.1 - 82.4	6	6 - 6	5	5 - 5	95	93 - 97	58	57 - 60
32	Cape Verde	454	2.2	103	80	6.6	6.3	4.8	3.4	70.1	32	66.6	62.4 - 71.0	72.9	69.6 - 75.8	42	33 - 50	30	24 - 36	210	125 - 312	120	76 - 178
33	Central African Republic	3 819	2.1	89	89	6.1	6.1	5.6	5.0	42.9	33	42.1	36.2 - 48.4	43.7	36.7 - 50.2	187	156 - 219	173	142 - 201	620	474 - 780	566	418 - 740
34	Chad	8 348	3.1	96	99	5.2	4.9	6.7	6.7	47.7	34	46.1	38.3 - 53.1	49.3	40.9 - 57.6	202	168 - 235	180	149 - 210	477	305 - 684	402	203 - 618
35	Chile	15 613	1.4	57	54	9.2	10.7	2.5	2.4	76.7	35	73.4	72.7 - 74.0	80.0	79.7 - 80.3	16	14 - 18	13	12 - 14	134	124 - 144	67	64 - 70
36	China	1 302 307	0.9	49	44	8.6	10.0	2.0	1.8	71.1	36	69.6	69.0 - 70.3	72.7	72.0 - 73.5	31	29 - 33	41	38 - 44	165	154 - 175	104	93 - 112
37	Colombia	43 526	1.8	66	59	6.4	7.1	3.0	2.6	71.8	37	67.5	66.8 - 68.2	76.3	75.4 - 77.1	27	24 - 29	19	17 - 21	236	220 - 251	99	87 - 113
38	Comoros	747	3.0	95	82	4.0	4.2	5.9	4.9	63.3	38	61.6	53.7 - 68.9	64.9	56.4 - 71.3	80	64 - 96	72	57 - 86	260	100 - 464	207	91 - 405
39	Congo	3 633	3.2	96	99	4.8	4.6	6.3	6.3	53.1	39	51.6	44.6 - 58.9	54.5	46.7 - 61.6	109	82 - 135	101	75 - 125	474	309 - 651	410	263 - 611
40	Cook Islands	18	-0.2	71	65	6.2	7.2	4.0	3.2	71.6	40	69.2	68.2 - 70.3	74.2	73.4 - 75.0	21	10 - 31	19	10 - 27	173	150 - 193	109	98 - 123
41	Costa Rica	4 094	2.4	68	56	7.1	7.9	3.0	2.3	77.1	41	74.8	74.5 - 75.0	79.5	79.3 - 79.8	12	11 - 13	10	9 - 11	127	122 - 131	74	70 - 78
42	Côte d'Ivoire	16 365	2.1	94	82	4.4	5.2	6.1	4.8	45.3	42	43.1	36.4 - 50.1	48.0	40.8 - 54.7	192	154 - 232	143	114 - 169	577	400 - 757	502	353 - 694
43	Croatia	4 439	-0.6	46	49	18.3	21.7	1.6	1.6	74.8	43	71.0	70.6 - 71.4	78.6	78.1 - 79.0	8	7 - 10	7	7 - 8	178	169 - 187	72	67 - 77
44	Cuba	11 271	0.4	45	44	11.9	14.5	1.6	1.6	77.1	44	75.0	74.6 - 75.4	79.3	79.1 - 79.5	8	7 - 10	7	6 - 7	138	132 - 145	89	86 - 91
45	Cyprus	796	1.2	58	51	14.8	16.1	2.3	1.9	77.3	45	75.5	74.8 - 76.2	79.1	77.2 - 80.9	7	6 - 9	7	6 - 9	102	93 - 111	48	38 - 63
46	Czech Republic	10 246	-0.1	50	42	17.8	18.8	1.7	1.2	75.8	46	72.4	72.1 - 72.8	79.0	78.7 - 79.3	5	4 - 6	4	4 - 5	163	157 - 170	72	69 - 76
47	Democratic People's Republic of Korea	22 541	0.9	47	48	8.0	10.6	2.3	2.0	65.8	47	64.4	56.5 - 72.3	67.1	57.9 - 75.2	56	29 - 83	54	30 - 80	236	83 - 416	191	70 - 386
48	Democratic Republic of the Congo	51 201	2.4	100	98	4.4	4.2	6.7	6.7	43.5	48	41.0	34.7 - 47.1	46.1	38.0 - 52.8	221	190 - 252	198	169 - 225	585	432 - 749	449	298 - 655
49	Denmark	5 351	0.3	48	50	20.2	20.4	1.7	1.8	77.2	49	74.8	74.6 - 75.0	79.5	79.4 - 79.7	6	5 - 7	5	4 - 6	123	120 - 127	76	73 - 78
50	Djibouti	693	2.3	85	86	4.6	5.1	6.3	5.7	49.6	50	48.6	42.4 - 56.1	50.7	43.0 - 58.2	156	132 - 179	144	121 - 166	481	290 - 657	431	259 - 639
51	Dominica	78	0.7	63	56	9.2	10.5	2.0	1.8	73.3	51	71.0	69.7 - 72.2	75.8	74.2 - 77.2	13	11 - 15	14	10 - 18	206	182 - 235	120	94 - 155
52	Dominican Republic	8 616	1.7	70	59	5.6	6.9	3.2	2.7	68.0	52	64.9	63.9 - 65.9	71.5	70.5 - 72.4	37							

Annex Table 1 Basic indicators for all WHO Member States

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	POPULATION ESTIMATES								LIFE EXPECTANCY		LIFE EXPECTANCY AT BIRTH (YEARS)				PROBABILITY OF DYING (PER 1000)								
	Total population (000)	Annual growth rate (%)	Dependency ratio (per 100)		Percentage of population aged 60+ years		Total fertility rate		AT BIRTH (YEARS)		Males		Females		Under age 5 years		Between ages 15 and 60 years						
			1992	2002	1992	2002	1992	2002	1992	2002	2002	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty		
	2002	1992-2002	1992	2002	1992	2002	1992	2002	2002	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty		
56	Equatorial Guinea	481	2.6	87	91	6.4	5.9	5.9	5.9	53.4	56	51.9	44.4 - 58.8	54.8	46.0 - 61.7	157	132 - 181	144	125 - 166	383	217 - 596	318	152 - 548
57	Eritrea	3 991	2.4	93	91	3.6	3.6	6.2	5.5	57.6	57	55.8	47.2 - 65.8	59.3	51.0 - 66.8	117	107 - 127	102	93 - 111	350	176 - 496	286	137 - 484
58	Estonia	1 338	-1.4	51	48	17.8	21.5	1.7	1.2	71.1	58	65.1	64.8 - 65.5	77.1	76.8 - 77.4	10	7 - 12	6	4 - 7	322	313 - 331	112	105 - 118
59	Ethiopia	68 961	2.8	94	94	4.4	4.6	6.8	6.2	48.0	59	46.8	39.3 - 54.0	49.4	41.3 - 57.2	185	148 - 220	168	138 - 196	487	316 - 693	422	244 - 628
60	Fiji	831	1.2	67	57	5.0	6.0	3.4	2.9	67.3	60	64.6	63.7 - 65.7	70.3	69.3 - 71.4	30	27 - 33	27	24 - 29	281	260 - 301	176	159 - 193
61	Finland	5 197	0.3	49	49	18.7	20.3	1.8	1.7	78.2	61	74.8	74.5 - 75.0	81.5	81.2 - 81.8	4	4 - 5	3	3 - 3	135	131 - 140	60	56 - 64
62	France	59 850	0.4	52	53	19.5	20.5	1.7	1.9	79.8	62	76.0	75.7 - 76.2	83.6	83.3 - 83.8	6	5 - 6	4	4 - 5	135	131 - 139	60	58 - 62
63	Gabon	1 306	2.6	92	83	7.4	6.2	5.2	4.0	59.2	63	57.3	49.9 - 64.6	61.4	52.9 - 68.9	100	91 - 108	79	72 - 86	342	171 - 557	281	133 - 499
64	Gambia	1 388	3.3	84	80	5.1	5.8	5.7	4.8	57.1	64	55.4	47.5 - 62.3	58.9	50.2 - 66.7	132	112 - 152	117	99 - 135	330	159 - 552	265	110 - 467
65	Georgia	5 177	-0.5	52	49	15.6	18.9	1.9	1.4	71.7	65	68.4	67.2 - 69.6	75.0	73.1 - 76.7	26	23 - 28	20	18 - 22	207	181 - 237	86	67 - 109
66	Germany	82 414	0.2	46	48	20.5	24.0	1.3	1.3	78.7	66	75.6	75.2 - 75.9	81.6	81.4 - 81.7	5	5 - 6	4	4 - 4	118	114 - 123	60	59 - 62
67	Ghana	20 471	2.4	92	77	4.6	5.2	5.4	4.2	57.6	67	56.3	49.0 - 64.4	58.8	50.1 - 66.0	106	92 - 123	99	87 - 112	354	171 - 557	303	153 - 529
68	Greece	10 970	0.7	48	49	20.7	23.8	1.4	1.3	78.4	68	75.8	75.6 - 76.0	81.1	80.7 - 81.5	7	6 - 7	5	4 - 6	118	115 - 120	48	45 - 51
69	Grenada	80	-0.5	63	56	9.2	10.5	4.0	3.5	67.4	69	65.9	64.8 - 67.1	68.8	67.8 - 70.0	25	18 - 30	21	15 - 27	261	238 - 283	222	204 - 239
70	Guatemala	12 036	2.7	96	87	5.2	5.3	5.4	4.5	65.9	70	63.1	61.9 - 64.3	69.0	67.7 - 70.1	57	52 - 63	50	45 - 55	283	247 - 324	162	131 - 199
71	Guinea	8 359	2.4	93	88	4.4	4.5	6.4	5.9	52.3	71	50.9	44.0 - 57.5	53.7	45.0 - 61.0	163	148 - 179	153	138 - 168	401	232 - 596	332	159 - 559
72	Guinea-Bissau	1 449	3.0	95	101	5.4	4.9	7.1	7.1	47.2	72	45.7	37.9 - 51.6	48.7	39.8 - 56.8	215	194 - 237	198	179 - 217	462	311 - 681	383	186 - 615
73	Guyana	764	0.4	67	54	6.8	7.0	2.6	2.3	64.3	73	61.5	58.9 - 64.5	66.9	63.8 - 70.0	61	30 - 90	50	26 - 76	299	268 - 328	202	170 - 233
74	Haiti	8 218	1.4	91	76	5.7	5.9	4.9	4.0	50.1	74	49.1	42.8 - 55.5	51.1	43.6 - 57.3	138	119 - 157	128	111 - 145	493	345 - 660	438	309 - 615
75	Honduras	6 781	2.8	91	80	4.6	5.4	5.0	3.8	67.2	75	64.2	60.3 - 67.8	70.4	67.2 - 73.2	44	42 - 46	42	40 - 44	269	195 - 362	150	102 - 214
76	Hungary	9 923	-0.4	49	45	19.2	20.0	1.7	1.2	72.6	76	68.4	68.2 - 68.5	76.8	76.7 - 77.0	9	8 - 10	8	8 - 9	259	256 - 262	110	108 - 112
77	Iceland	287	1.0	55	53	14.8	15.3	2.2	2.0	80.1	77	78.4	77.8 - 79.0	81.8	81.4 - 82.2	4	4 - 5	3	3 - 3	85	79 - 92	55	51 - 60
78	India	1 049 549	1.8	68	62	6.9	7.7	3.8	3.1	61.0	78	60.1	59.4 - 60.8	62.0	61.1 - 62.8	87	81 - 92	95	86 - 106	291	268 - 314	220	197 - 243
79	Indonesia	217 131	1.4	64	54	6.4	7.9	3.1	2.4	66.4	79	64.9	64.1 - 65.8	67.9	67.1 - 68.8	45	40 - 50	36	33 - 40	244	226 - 261	208	194 - 224
80	Iran, Islamic Republic of	68 070	1.4	93	59	5.9	6.4	4.5	2.4	68.9	80	66.5	65.4 - 67.8	71.7	70.5 - 72.8	42	33 - 50	36	29 - 43	213	194 - 230	132	121 - 145
81	Iraq	24 510	2.9	88	79	4.4	4.6	5.7	4.8	61.0	81	59.1	57.1 - 60.9	63.1	61.3 - 64.9	119	101 - 139	110	94 - 127	252	228 - 278	176	155 - 197
82	Ireland	3 911	1.0	60	47	15.3	15.3	2.0	1.9	77.1	82	74.4	73.8 - 75.0	79.8	79.3 - 80.1	8	7 - 9	6	5 - 7	113	105 - 121	66	62 - 71
83	Israel	6 304	2.7	66	61	12.6	13.1	2.9	2.7	79.4	83	77.3	77.1 - 77.5	81.4	81.2 - 81.5	7	6 - 8	6	6 - 7	98	95 - 101	53	50 - 56
84	Italy	57 482	0.1	45	49	21.7	24.5	1.3	1.2	79.7	84	76.8	76.4 - 77.1	82.5	82.2 - 82.8	5	5 - 6	5	4 - 5	96	92 - 100	49	46 - 51
85	Jamaica	2 627	0.9	73	61	9.9	9.6	2.8	2.4	72.8	85	71.1	69.9 - 72.5	74.6	73.6 - 75.6	16	13 - 19	14	11 - 17	162	137 - 184	121	107 - 134
86	Japan	127 478	0.2	43	48	18.6	24.4	1.5	1.3	81.9	86	78.4	78.4 - 78.4	85.3	85.2 - 85.3	4	4 - 4	4	4 - 4	95	95 - 96	46	45 - 46
87	Jordan	5 329	3.9	91	69	4.4	4.8	5.0	3.6	70.8	87	68.6	67.7 - 69.8	73.3	72.6 - 74.0	28	23 - 32	26	22 - 30	191	171 - 210	121	113 - 130
88	Kazakhstan	15 469	-0.9	59	51	9.4	11.5	2.5	2.0	63.6	88	58.7	58.0 - 59.4	68.9	68.1 - 69.7	38	29 - 48	28	21 - 36	426	385 - 462	195	177 - 213
89	Kenya	31 540	2.3	104	82	4.1	4.2	5.5	4.1	50.9	89	49.8	43.8 - 57.4	51.9	44.8 - 59.3	119	108 - 129	113	104 - 122	509	328 - 684	448	285 - 642
90	Kiribati	87	1.5	70	68	6.2	7.0	4.7	4.1	64.1	90	61.8	60.8 - 62.8	66.7	65.6 - 67.6	80	74 - 88	69	60 - 79	293	260 - 327	190	167 - 215
91	Kuwait	2 443	2.1	56	38	2.1	2.7	3.3	2.7	76.4	91	75.4	74.9 - 75.9	77.7	77.1 - 78.2	14	13 - 15	12	11 - 13	77	72 - 82	63	57 - 70
92	Kyrgyzstan	5 067	1.3	75	64	8.4	8.7	3.5	2.7	64.5	92	60.4	59.5 - 61.4	68.9	68.1 - 69.8	63	50 - 76	55	44 - 66	345	314 - 371	163	146 - 180
93	Lao People's Democratic Republic	5 529	2.4	91	84	5.9	5.5	5.9	4.8	55.1	93	54.1	51.4 - 56.7	56.2	53.5 - 58.8	146	120 - 174	131	106 - 158	338	303 - 373	306	278 - 333
94	Latvia	2 329	-1.3	51	48	18.4	21.8	1.7	1.1	70.3	94	64.6	64.3 - 64.9	75.8	75.6 - 76.1	15	12 - 17	12	10 - 14	327	320 - 334	118	113 - 122
95	Lebanon	3 596	2.3	65	56	8.3	8.6	2.9	2.2	69.8	95	67.6	66.4 - 68.8	72.0	71.1 - 73.1	35	31 - 39	29	26 - 32	201	177 - 225	139	123 - 154
96	Lesotho	1 800	1.1	94	81	6.7	6.9	4.8	3.9	35.7	96	32.9	29.3 - 38.5	38.2	33.0 - 44.9	166	133 - 201	160	128 - 191	902	791 - 965	742	599 - 853
97	Liberia	3 239	4.6	97	96	3.9	3.7	6.9	6.8	41.8	97	40.1	32.2 - 47.0	43.7	34.8 - 51.7	242	197 - 293	222	178 - 262	582	435 - 773	471	283 - 690
98	Libyan Arab Jamahiriya	5 445	2.0	81	54	4.5	6.0	4.3	3.1	72.6	98	70.4	66.3 - 73.8	75.5	73.0 - 77.8	19	16 - 21	17	15 - 20	173	110 - 263	99	65 - 142
99	Lithuania	3 465	-0.6	51	51	16.9	19.7	1.8	1.3	71.9	99	66.2	65.2 - 67.0	77.6	77.0 - 78.2	11	9 - 13	9	7 - 11	303	272 - 341	103	94 - 112
100	Luxembourg	447	1.5	44	49	18.1	18.3	1.6	1.7	78.8	100	75.7	75.3 - 76.2	81.7	81.1 - 82.3	5	4 - 7	5	4 - 6	119	113 - 125	64	58 - 70
101	Madagascar	16 916	2.9	92	91	4.8	4.7	6.2	5.7	56.3	101	54.4	46.8 - 61.0	58.4	49.5 - 65.0	145	126 - 164	125	110 - 141	333	177 - 543	262	123 - 474
102	Malawi	11 871	1.9	94	99	4.8	5.2	6.8	6.1	40.2	102	39.8	35.0 - 45.2	40.6	35.0 - 47.1	197	183 - 210	190	178 - 203	657	509 - 803	610	449 - 769
103	Malaysia	23 965	2.4	67	60	5.8	6.7	3.7	2.9	72.0	103	69.6	69.1 - 70.1	74.7	74.4 - 75.1	10	8 - 11	8	7 - 10	192	181 - 202	106	100 - 111
104	Maldives	309	3.0	99	86	5.4	5.2	6.2	5.4	66.1	104	66.5	65.7 - 67.4	65.6	64.9 - 66.5	38	33 - 42	43	38 - 49	205	179 - 231	202	174 - 229
105	Mali	12 623	2.8	103	107	3.9	3.8	7.0	7.0	44.8	105	43.9	35.8 - 49.7	45.7	36.8 - 54.0	233	211 - 256	224	200 - 244	487	328 - 718	417	210 - 662
106	Malta	393	0.7	51	47	15.1	17.5	2.0	1.8	78.7	106	76.1	75.5 - 76.7	81.2	80.6 - 81.7	7	6 - 8	6	4 - 7	86	80 - 91	50	46 - 54
107	Marshall Islands	52	1.3	70																			

Annex Table 1 Basic indicators for all WHO Member States

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	POPULATION ESTIMATES								LIFE EXPECTANCY AT BIRTH (YEARS) Both sexes 2002	LIFE EXPECTANCY AT BIRTH (YEARS)				PROBABILITY OF DYING (PER 1000)									
	Total population (000)	Annual growth rate (%)	Dependency ratio (per 100)		Percentage of population aged 60+ years		Total fertility rate			Males		Females		Under age 5 years				Between ages 15 and 60 years					
			1992	2002	1992	2002	1992	2002		1992	2002	2002	Uncertainty	2002	Uncertainty	Males		Females		Males		Females	
	2002	1992-2002	1992	2002	1992	2002	1992	2002		2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty
111	Micronesia, Federated States of	108	0.7	92	74	5.5	5.1	4.8	3.8	66.5	111	64.9	63.0 - 67.1	68.1	66.1 - 70.2	63	44 - 81	51	35 - 67	211	184 - 236	176	151 - 202
112	Monaco	34	1.1	52	53	19.5	20.5	1.7	1.8	81.2	112	77.8	77.6 - 77.9	84.5	84.0 - 85.0	5	4 - 5	3	3 - 4	109	108 - 111	47	44 - 50
113	Mongolia	2 559	1.1	81	59	5.9	5.6	3.5	2.4	62.9	113	60.1	59.8 - 60.5	65.9	65.5 - 66.3	75	73 - 78	66	64 - 68	319	310 - 327	219	210 - 227
114	Morocco	30 072	1.7	73	57	6.0	6.6	3.6	2.8	70.8	114	68.8	67.4 - 70.3	72.8	71.6 - 74.1	43	36 - 49	41	35 - 47	160	138 - 185	104	88 - 120
115	Mozambique	18 537	2.6	96	89	5.2	5.1	6.2	5.7	42.6	115	41.2	35.3 - 47.5	43.9	36.8 - 51.3	212	185 - 240	201	176 - 226	613	479 - 741	519	375 - 665
116	Myanmar	48 852	1.5	69	59	6.8	6.9	3.8	2.9	58.9	116	56.2	48.4 - 64.0	61.8	52.6 - 69.6	118	88 - 151	94	66 - 122	335	175 - 539	236	107 - 444
117	Namibia	1 961	2.7	87	88	5.4	5.6	5.6	4.6	49.3	117	48.1	43.3 - 54.3	50.5	44.0 - 56.8	97	86 - 107	93	83 - 103	605	479 - 733	529	404 - 691
118	Nauru	13	2.5	70	68	6.2	7.0	4.5	3.9	62.7	118	59.7	55.6 - 64.0	66.5	63.1 - 70.3	18	14 - 21	12	10 - 15	448	326 - 564	303	211 - 389
119	Nepal	24 609	2.3	81	78	5.6	5.8	5.0	4.3	60.1	119	59.9	58.9 - 61.0	60.2	59.2 - 61.1	81	77 - 85	87	83 - 91	301	277 - 325	290	271 - 310
120	Netherlands	16 067	0.6	45	48	17.5	18.5	1.6	1.7	78.6	120	76.0	75.7 - 76.3	81.1	80.8 - 81.3	6	6 - 7	5	5 - 6	94	91 - 97	65	63 - 68
121	New Zealand	3 846	1.1	53	53	15.3	15.9	2.1	2.0	78.9	121	76.6	76.2 - 77.1	81.2	80.8 - 81.6	7	6 - 8	6	4 - 7	98	94 - 104	63	59 - 67
122	Nicaragua	5 335	2.8	95	82	4.4	4.7	4.8	3.8	70.1	122	67.9	67.2 - 68.6	72.4	71.6 - 73.2	38	31 - 45	32	27 - 38	213	199 - 226	143	126 - 163
123	Niger	11 544	3.5	108	108	3.6	3.3	8.0	8.0	42.6	123	42.6	31.9 - 50.6	42.7	30.9 - 51.6	249	199 - 299	256	206 - 307	497	327 - 755	443	232 - 744
124	Nigeria	120 911	2.8	96	91	4.7	4.8	6.4	5.5	48.8	124	48.0	41.2 - 54.6	49.6	40.7 - 57.1	183	162 - 205	181	159 - 202	453	287 - 632	392	217 - 612
125	Niue	2	-1.2	71	65	6.2	7.2	3.6	2.9	70.3	125	67.6	63.9 - 70.8	73.3	70.4 - 76.1	38	14 - 91	24	12 - 48	191	124 - 261	132	89 - 182
126	Norway	4 514	0.5	55	54	20.6	19.6	1.9	1.8	79.1	126	76.4	75.8 - 76.9	81.7	81.4 - 81.9	5	4 - 6	4	4 - 4	100	93 - 106	60	57 - 63
127	Oman	2 768	3.3	82	65	3.0	3.5	6.5	5.0	73.1	127	71.0	67.1 - 74.5	76.3	73.8 - 78.7	15	13 - 18	14	12 - 16	165	105 - 249	93	60 - 136
128	Pakistan	149 911	2.5	86	82	5.5	5.7	5.9	5.1	61.4	128	61.1	59.3 - 62.9	61.6	59.7 - 63.7	105	89 - 120	115	98 - 134	227	201 - 254	201	176 - 225
129	Palau	20	2.3	70	68	6.2	7.0	2.8	2.4	68.5	129	66.4	65.9 - 66.9	70.9	70.0 - 71.9	24	17 - 30	22	16 - 27	236	224 - 246	202	184 - 223
130	Panama	3 064	2.0	65	59	7.3	8.3	2.9	2.7	75.4	130	72.8	72.0 - 73.8	78.2	77.4 - 78.9	25	23 - 28	21	19 - 23	146	132 - 159	84	76 - 94
131	Papua New Guinea	5 586	2.6	79	77	4.2	4.0	5.1	4.1	59.8	131	58.4	56.5 - 60.4	61.5	59.7 - 63.4	98	78 - 117	92	73 - 108	311	284 - 337	249	227 - 272
132	Paraguay	5 740	2.5	84	74	5.3	5.5	4.6	3.9	71.7	132	68.7	67.9 - 69.7	74.7	74.0 - 75.4	37	31 - 42	26	22 - 31	171	155 - 189	120	109 - 132
133	Peru	26 767	1.7	71	63	6.2	7.4	3.7	2.9	69.7	133	67.5	66.4 - 68.5	72.0	71.1 - 72.9	38	33 - 44	34	29 - 39	205	182 - 229	144	127 - 163
134	Philippines	78 580	2.1	77	67	5.0	5.7	4.2	3.2	68.3	134	65.1	64.3 - 65.8	71.7	70.9 - 72.5	39	33 - 45	33	28 - 38	258	238 - 279	133	118 - 151
135	Poland	38 622	0.1	54	44	15.2	16.6	1.9	1.3	74.7	135	70.6	70.2 - 71.0	78.7	78.4 - 79.0	9	8 - 10	8	7 - 9	204	194 - 215	82	78 - 86
136	Portugal	10 049	0.2	49	48	19.5	21.1	1.5	1.5	77.1	136	73.6	73.1 - 74.0	80.5	80.3 - 80.8	7	6 - 7	5	5 - 6	154	147 - 163	65	62 - 68
137	Qatar	601	2.0	39	39	2.1	3.1	4.2	3.3	74.3	137	74.8	73.9 - 75.8	73.8	71.8 - 75.5	14	11 - 18	12	10 - 14	93	84 - 101	77	61 - 98
138	Republic of Korea	47 430	0.8	43	39	8.2	11.8	1.7	1.4	75.5	138	71.8	71.3 - 72.3	79.4	79.2 - 79.6	8	7 - 9	7	7 - 8	166	156 - 176	61	59 - 63
139	Republic of Moldova	4 270	-0.2	57	45	12.9	13.8	2.2	1.4	67.8	139	64.0	63.3 - 64.8	71.6	71.1 - 72.2	31	23 - 39	23	17 - 29	294	274 - 316	144	132 - 156
140	Romania	22 387	-0.3	50	45	16.3	18.9	1.6	1.3	71.4	140	68.0	67.2 - 68.9	75.0	74.2 - 75.7	22	21 - 24	19	17 - 20	235	212 - 259	108	96 - 121
141	Russian Federation	144 082	-0.3	50	42	16.3	18.3	1.6	1.2	64.6	141	58.3	58.0 - 58.5	71.8	71.6 - 71.9	19	19 - 20	15	14 - 15	469	463 - 475	173	169 - 176
142	Rwanda	8 272	3.2	98	91	3.8	4.0	6.7	5.8	44.4	142	41.9	36.5 - 48.1	46.8	39.7 - 53.9	186	170 - 203	170	157 - 184	605	431 - 774	474	283 - 695
143	Saint Kitts and Nevis	42	0.0	63	56	9.2	10.5	2.7	2.4	70.4	143	68.7	67.8 - 69.5	72.2	71.0 - 73.3	20	17 - 23	24	18 - 30	206	188 - 225	148	123 - 175
144	Saint Lucia	148	0.9	75	57	8.6	7.8	3.2	2.3	72.2	144	69.8	68.7 - 70.9	74.4	73.0 - 75.7	14	11 - 17	15	12 - 20	211	185 - 238	145	114 - 177
145	Saint Vincent and the Grenadines	119	0.6	79	61	8.7	9.2	2.9	2.2	69.8	145	67.8	66.5 - 69.1	71.9	70.6 - 73.2	25	21 - 30	20	13 - 30	238	207 - 272	184	160 - 207
146	Samoa	176	0.8	81	81	6.3	6.5	4.7	4.2	68.2	146	66.8	66.0 - 67.7	69.7	68.6 - 70.8	27	22 - 31	21	16 - 26	235	219 - 251	203	186 - 221
147	San Marino	27	1.4	45	49	21.7	24.5	1.3	1.2	80.6	147	77.2	75.8 - 78.6	84.0	82.5 - 85.7	5	4 - 9	3	3 - 3	85	72 - 99	31	25 - 37
148	Sao Tome and Principe	157	2.6	104	83	6.6	6.4	5.0	4.0	62.7	148	61.7	54.2 - 68.8	63.6	54.5 - 70.6	80	62 - 98	82	60 - 104	259	108 - 454	217	95 - 414
149	Saudi Arabia	23 520	3.0	80	72	3.4	4.3	5.8	4.6	70.8	149	68.4	64.0 - 72.3	73.9	70.9 - 76.5	30	23 - 37	25	19 - 31	192	120 - 298	112	74 - 163
150	Senegal	9 855	2.4	95	85	4.1	4.0	6.1	5.0	55.8	150	54.3	46.7 - 60.6	57.3	48.3 - 64.5	139	122 - 157	129	112 - 145	349	187 - 560	284	131 - 512
151	Serbia and Montenegro	10 535	0.2	50	49	16.0	18.4	2.0	1.7	72.3	151	69.7	69.3 - 70.1	74.9	74.5 - 75.2	17	16 - 19	13	12 - 15	186	177 - 195	98	93 - 103
152	Seychelles	80	1.0	52	46	8.4	9.0	2.1	1.8	71.5	152	67.0	66.1 - 67.9	77.2	76.1 - 78.3	15	11 - 18	10	8 - 13	243	219 - 268	113	91 - 138
153	Sierra Leone	4 764	1.5	87	89	5.0	4.7	6.5	6.5	34.0	153	32.4	22.7 - 39.9	35.7	25.0 - 45.4	332	286 - 380	303	255 - 351	682	497 - 898	569	323 - 836
154	Singapore	4 183	2.8	38	40	8.7	11.1	1.8	1.4	79.6	154	77.4	76.4 - 78.4	81.7	81.3 - 82.1	4	4 - 4	3	3 - 3	90	80 - 101	53	49 - 56
155	Slovakia	5 398	0.2	54	43	15.0	15.5	1.9	1.3	74.0	155	69.8	69.2 - 70.3	78.3	77.9 - 78.7	9	8 - 11	7	6 - 9	206	195 - 219	79	73 - 84
156	Slovenia	1 986	0.2	44	42	17.4	19.8	1.4	1.2	76.7	156	72.8	72.3 - 73.2	80.5	80.2 - 80.8	5	4 - 6	4	4 - 5	163	154 - 172	71	67 - 76
157	Solomon Islands	463	3.2	93	84	4.4	4.4	5.6	4.5	65.4	157	63.6	61.5 - 66.2	67.4	65.7 - 69.0	86	73 - 99	75	64 - 86	199	160 - 238	147	127 - 168
158	Somalia	9 480	2.8	102	101	4.2	3.8	7.3	7.3	44.3	158	43.0	35.9 - 48.5	45.7	35.3 - 53.0	218	198 - 239	223	199 - 245	534	388 - 738	418	232 - 676
159	South Africa	44 759	1.5	70	59	5.2	6.1	3.4	2.6	50.7	159	48.8	45.5 - 52.0	52.6	50.0 - 55.0	86	61 - 108	81	55 - 105	598	404 - 818	482	321 - 653
160	Spain	40 977	0.4	48	46	20.0	21.6	1.3	1.2	79.6	160	76.1	75.6 - 76.7	83.0	82.8 - 83.3	5	5 - 6	5	4 - 5	120	111 - 128	47	45 - 49
161	Sri Lanka	18 910	0.9	58	47	8.8	10.2	2.4	2.0	70.3	161	67.2	65.1 - 69.6	74.3	73.3 - 75.4	20	17 - 23	16	14 - 19	238	1		

Annex Table 1 Basic indicators for all WHO Member StatesFigures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	POPULATION ESTIMATES							LIFE EXPECTANCY AT BIRTH (YEARS)		LIFE EXPECTANCY AT BIRTH (YEARS)				PROBABILITY OF DYING (PER 1000)									
	Total population (000)	Annual growth rate (%)	Dependency ratio (per 100)		Percentage of population aged 60+ years		Total fertility rate		Both sexes	LIFE EXPECTANCY AT BIRTH (YEARS)				Under age 5 years				Between ages 15 and 60 years					
			1992	2002	1992	2002	1992	2002		1992	2002	Males		Females		Males		Females		Males		Females	
												2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty	2002	Uncertainty
166	Switzerland	7 171	0.3	46	49	19.4	22.1	1.5	1.4	80.6	166	77.7	77.2 - 78.2	83.3	83.1 - 83.6	6	5 - 7	5	4 - 6	92	87 - 98	51	49 - 53
167	Syrian Arab Republic	17 381	2.6	98	70	4.2	4.6	4.8	3.4	71.2	167	68.8	68.0 - 69.7	73.6	73.0 - 74.3	26	24 - 29	20	18 - 22	190	175 - 205	127	117 - 137
168	Tajikistan	6 195	1.2	89	73	6.3	6.7	4.5	3.1	63.7	168	61.0	59.2 - 62.7	66.5	64.8 - 68.0	68	47 - 90	57	40 - 72	283	231 - 339	172	137 - 216
169	Thailand	62 193	1.1	53	46	6.7	8.8	2.1	1.9	69.3	169	66.0	64.8 - 67.1	72.7	71.7 - 73.8	32	28 - 37	26	22 - 30	279	250 - 311	153	131 - 178
170	The former Yugoslav Republic of Macedonia	2 046	0.6	50	48	12.2	14.7	1.8	1.9	72.0	170	69.0	68.3 - 69.7	75.1	74.4 - 75.8	17	16 - 19	15	13 - 16	195	180 - 212	89	81 - 99
171	Timor-Leste	739	-0.7	77	73	3.6	5.2	4.8	3.9	57.5	171	54.8	46.4 - 62.1	60.5	50.5 - 67.7	142	108 - 178	108	81 - 134	326	162 - 533	242	111 - 463
172	Togo	4 801	2.9	94	89	4.8	4.9	6.2	5.4	51.7	172	50.0	43.4 - 55.7	53.3	46.0 - 59.8	149	131 - 166	127	110 - 143	459	316 - 636	394	265 - 569
173	Tonga	103	0.3	78	74	7.4	8.2	4.5	3.8	70.7	173	70.0	69.5 - 70.5	71.4	70.8 - 72.0	23	20 - 27	15	12 - 18	171	166 - 177	181	174 - 188
174	Trinidad and Tobago	1 298	0.5	64	43	8.8	10.0	2.2	1.6	69.9	174	67.1	66.1 - 68.1	72.8	72.2 - 73.4	24	20 - 28	18	15 - 21	246	221 - 272	153	138 - 169
175	Tunisia	9 728	1.3	71	52	7.4	8.4	3.2	2.0	71.6	175	69.5	68.7 - 70.3	73.9	73.0 - 74.7	31	28 - 34	24	21 - 26	167	154 - 180	115	102 - 128
176	Turkey	70 318	1.6	67	57	7.2	8.2	3.2	2.5	70.0	176	67.9	67.1 - 68.8	72.2	71.1 - 73.4	44	40 - 48	42	38 - 46	177	162 - 192	112	94 - 130
177	Turkmenistan	4 794	2.1	79	64	6.2	6.5	4.1	2.7	62.7	177	58.8	58.3 - 59.3	66.9	66.1 - 67.7	63	56 - 69	47	42 - 52	369	349 - 385	193	172 - 215
178	Tuvalu	10	1.4	71	65	6.2	7.2	3.5	2.9	60.6	178	60.0	58.4 - 61.8	61.4	59.7 - 62.9	72	54 - 91	56	43 - 69	298	247 - 345	280	234 - 342
179	Uganda	25 004	3.0	105	111	4.1	3.9	7.1	7.1	49.3	179	47.9	42.3 - 53.2	50.8	43.6 - 56.5	148	142 - 154	136	130 - 142	505	370 - 661	431	306 - 606
180	Ukraine	48 902	-0.6	51	45	18.5	20.8	1.7	1.2	67.2	180	61.7	61.0 - 62.4	72.9	72.0 - 73.8	22	19 - 24	16	15 - 18	378	343 - 417	139	120 - 161
181	United Arab Emirates	2 937	2.8	42	37	1.8	2.4	3.9	2.9	72.5	181	71.3	71.0 - 71.5	75.1	74.9 - 75.3	10	9 - 11	10	9 - 10	169	165 - 174	122	120 - 125
182	United Kingdom	59 068	0.3	54	53	21.1	20.8	1.8	1.6	78.2	182	75.8	75.3 - 76.3	80.5	79.9 - 81.0	7	6 - 8	6	5 - 6	107	101 - 113	67	61 - 72
183	United Republic of Tanzania	36 276	2.6	96	91	3.7	3.9	6.1	5.2	46.5	183	45.5	44.3 - 46.9	47.5	46.2 - 49.0	163	149 - 177	144	132 - 156	561	534 - 585	512	484 - 536
184	United States of America	291 038	1.1	52	51	16.4	16.2	2.0	2.1	77.3	184	74.6	74.2 - 75.1	79.8	79.7 - 80.0	9	8 - 9	7	7 - 7	140	134 - 148	83	81 - 84
185	Uruguay	3 391	0.7	60	61	16.7	17.3	2.5	2.3	75.2	185	71.0	70.5 - 71.6	79.3	79.0 - 79.7	18	15 - 21	13	12 - 14	182	172 - 192	88	84 - 92
186	Uzbekistan	25 705	1.8	81	65	6.5	7.0	3.7	2.5	68.2	186	65.6	64.8 - 66.3	70.8	70.1 - 71.6	37	36 - 39	26	25 - 28	243	224 - 263	152	136 - 169
187	Vanuatu	207	2.7	90	80	5.3	4.9	4.9	4.2	67.7	187	66.4	64.7 - 68.5	69.1	67.4 - 70.9	40	30 - 51	40	30 - 50	217	185 - 245	175	150 - 200
188	Venezuela, Bolivarian Republic of	25 226	2.1	70	60	5.9	6.9	3.3	2.7	73.9	188	71.0	70.2 - 71.8	76.8	76.5 - 77.2	23	21 - 26	19	17 - 21	182	168 - 197	97	92 - 103
189	Viet Nam	80 278	1.5	76	59	7.3	7.4	3.4	2.3	69.6	189	67.1	66.3 - 68.1	72.2	71.4 - 73.1	41	36 - 46	33	28 - 37	200	184 - 215	129	117 - 140
190	Yemen	19 315	3.9	114	104	3.5	3.6	7.9	7.0	60.4	190	58.7	51.1 - 65.5	62.2	53.8 - 68.7	106	93 - 119	94	82 - 106	286	130 - 498	228	103 - 421
191	Zambia	10 698	2.1	94	98	4.4	4.7	6.3	5.7	39.7	191	39.1	34.5 - 43.6	40.2	35.2 - 45.4	191	170 - 214	176	155 - 195	700	590 - 810	654	546 - 768
192	Zimbabwe	12 835	1.5	96	87	4.5	5.1	5.2	4.0	37.9	192	37.7	35.7 - 40.2	38.0	35.8 - 40.8	115	104 - 125	107	97 - 116	821	776 - 856	789	739 - 828

^a See explanatory notes for sources and methods.

Annex Table 2 Deaths by cause, sex and mortality stratum in WHO regions,^a estimates for 2002Figures computed by WHO to assure comparability;^b they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Cause ^d	SEX ^c						AFRICA					THE AMERICAS					SOUTH-EAST ASIA					EUROPE					EASTERN MEDITERRANEAN					WESTERN PACIFIC				
	Both sexes		Males		Females		Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum							
	(000)	% total	(000)	% total	(000)	% total	High child, high adult	High child, very high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult					
Population (000)	6 224 985		3 131 052		3 093 933		311 273	360 965	333 580	445 161	73 810	Population (000)					298 234	1 292 598	415 323	222 846	239 717	142 528	360 296	155 400	1 562 136											
TOTAL Deaths	57 029	100	29 891	100	27 138	100	4 657	6 007	2 720	2 701	541	TOTAL Deaths					2 191	12 466	3 920	1 865	3 779	706	3 446	1 146	10 794											
I. Communicable diseases, maternal and perinatal conditions and nutritional deficiencies	18 324	32.1	9 365	31.3	8 959	33	3 245	4 426	167	482	227	I. Communicable diseases, maternal and perinatal conditions and nutritional deficiencies					625	5 143	241	166	156	92	1 637	125	1 573											
Infectious and parasitic diseases	10 904	19.1	5 795	19.4	5 109	18.8	2 211	3 414	69	195	133	Infectious and parasitic diseases					380	2 542	50	60	85	37	916	23	781											
Tuberculosis	1 566	2.7	1 030	3.4	536	2.0	143	205	1	26	19	Tuberculosis					138	461	5	19	45	5	133	5	361											
STIs excluding HIV	180	0.3	91	0.3	89	0.3	41	52	0	1	1	STIs excluding HIV					3	55	0	0	0	0	23	0	2											
Syphilis	157	0.3	84	0.3	72	0.3	39	50	0	1	0	Syphilis					1	42	0	0	0	0	21	0	1											
Chlamydia	9	0.0	0	0.0	9	0.0	1	0	0	0	0	Chlamydia					1	7	0	0	0	0	1	0	0											
Gonorrhoea	1	0.0	0	0.0	1	0.0	0	0	0	0	0	Gonorrhoea					0	0	0	0	0	0	0	0	0	0										
HIV/AIDS	2 777	4.9	1 447	4.8	1 330	4.9	479	1 616	14	50	39	HIV/AIDS					59	377	6	1	29	1	43	0	61											
Diarrhoeal diseases	1 798	3.2	939	3.1	859	3.2	351	356	2	34	21	Diarrhoeal diseases					41	563	2	13	1	15	244	1	153											
Childhood diseases	1 124	2.0	563	1.9	562	2.1	308	219	0	1	4	Childhood diseases					39	352	0	6	0	0	153	0	41											
Pertussis	294	0.5	147	0.5	147	0.5	78	53	0	0	3	Pertussis					0	111	0	0	0	0	46	0	2											
Poliomyelitis ^e	1	0.0	0	0.0	0	0.0	0	0	0	0	0	Poliomyelitis ^e					0	0	0	0	0	0	0	0	0											
Diphtheria	5	0.0	3	0.0	3	0.0	1	1	0	0	0	Diphtheria					0	3	0	0	0	0	0	0	0											
Measles	611	1.1	306	1.0	305	1.1	180	131	0	0	0	Measles					31	165	0	6	0	0	70	0	28											
Tetanus	214	0.4	107	0.4	107	0.4	49	35	0	0	0	Tetanus					8	74	0	0	0	0	36	0	11											
Meningitis	173	0.3	90	0.3	83	0.3	8	12	1	8	9	Meningitis					9	64	2	10	3	2	23	0	20											
Hepatitis B ^f	103	0.2	71	0.2	32	0.1	10	10	1	3	2	Hepatitis B ^f					7	30	2	2	1	1	9	1	25											
Hepatitis C ^f	54	0.1	35	0.1	18	0.1	4	4	5	2	0	Hepatitis C ^f					3	11	3	1	0	1	4	4	10											
Malaria	1 272	2.2	607	2.0	665	2.5	557	579	0	1	0	Malaria					12	53	0	0	0	2	57	0	11											
Tropical diseases	129	0.2	79	0.3	50	0.2	28	28	0	12	4	Tropical diseases					0	36	0	0	0	0	15	0	5											
Trypanosomiasis	48	0.1	31	0.1	17	0.1	24	23	0	0	0	Trypanosomiasis					0	0	0	0	0	0	1	0	0											
Chagas disease	14	0.0	8	0.0	7	0.0	0	0	0	11	4	Chagas disease					0	0	0	0	0	0	0	0	0											
Schistosomiasis	15	0.0	10	0.0	5	0.0	1	1	0	1	0	Schistosomiasis					0	0	0	0	0	0	9	0	4											
Leishmaniasis	51	0.1	30	0.1	21	0.1	4	4	0	0	0	Leishmaniasis					0	36	0	0	0	0	5	0	2											
Lymphatic filariasis	0	0.0	0	0.0	0	0.0	0	0	0	0	0	Lymphatic filariasis					0	0	0	0	0	0	0	0	0											
Onchocerciasis	0	0.0	0	0.0	0	0.0	0	0	0	0	0	Onchocerciasis					0	0	0	0	0	0	0	0	0											
Leprosy	6	0.0	4	0.0	2	0.0	0	0	0	1	0	Leprosy					1	2	0	0	0	0	1	0	1											
Dengue	19	0.0	8	0.0	10	0.0	0	0	0	1	1	Dengue					3	9	0	0	0	0	1	0	4											
Japanese encephalitis	14	0.0	7	0.0	7	0.0	0	0	0	0	0	Japanese encephalitis					0	8	0	0	0	0	2	0	3											
Trachoma	0	0.0	0	0.0	0	0.0	0	0	0	0	0	Trachoma					0	0	0	0	0	0	0	0	0											
Intestinal nematode infections	12	0.0	6	0.0	6	0.0	1	2	0	0	1	Intestinal nematode infections					1	4	0	0	0	0	1	0	1											
Ascariasis	3	0.0	1	0.0	2	0.0	0	1	0	0	0	Ascariasis					0	1	0	0	0	0	0	0	1											
Trichuriasis	3	0.0	2	0.0	1	0.0	0	0	0	0	0	Trichuriasis					0	2	0	0	0	0	0	0	0											
Hookworm disease	3	0.0	2	0.0	1	0.0	1	1	0	0	0	Hookworm disease					1	0	0	0	0	0	0	0	0											
Respiratory infections	3 963	6.9	1 989	6.7	1 974	7.3	580	538	72	107	47	Respiratory infections					126	1 348	174	62	52	21	333	98	400											
Lower respiratory infections	3 884	6.8	1 948	6.5	1 936	7.1	573	531	72	106	45	Lower respiratory infections					123	1 330	171	60	49	21	327	97	374											
Upper respiratory infections	75	0.1	38	0.1	37	0.1	7	6	0	1	2	Upper respiratory infections					3	17	3	2	2	0	6	0	26											
Otitis media	4	0.0	3	0.0	1	0.0	1	1	0	0	0	Otitis media					0	1	0	0	0	0	0	0	0											
Maternal conditions	510	0.9	...	...	510	1.9	102	129	1	9	7	Maternal conditions					11	160	0	2	1	3	65	0	21									
Perinatal conditions ^g	2 462	4.3	1 367	4.6	1 095	4.0	284	270	17	132	26	Perinatal conditions ^g					82	930	10	39	16	28	275	1	348											
Nutritional deficiencies	485	0.9	215	0.7	270	1.0	67	76	8	39	14	Nutritional deficiencies					26	163	7	3	2	4	49	3	24											
Protein-energy malnutrition	260	0.5	130	0.4	131	0.5	50	54	5	29	9	Protein-energy malnutrition					10	58	3	1	1	2	24	1	13											
Iodine deficiency	7	0.0	3	0.0	3	0.0	0	2	0	0	0	Iodine deficiency					0	1	0	0	0	0	2	0	0											
Vitamin A deficiency	23	0.0	11	0.0	12	0.0	10	7	0	0	0	Vitamin A deficiency					0	2	0	0	0	0	3	0	0											
Iron-deficiency anaemia	137	0.2	47	0.2	90	0.3	6	11	3	7	5	Iron-deficiency anaemia					13	67	3	2	1	1	9	1	8											

Annex Table 2 Deaths by cause, sex and mortality stratum in WHO regions,^a estimates for 2002Figures computed by WHO to assure comparability;^b they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Cause ^d	SEX ^c						AFRICA					THE AMERICAS					SOUTH-EAST ASIA					EUROPE					EASTERN MEDITERRANEAN					WESTERN PACIFIC				
	Both sexes		Males		Females		Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum			Mortality stratum		Mortality stratum							
	Population (000)	% total	Population (000)	% total	Population (000)	% total	High child, high adult	High child, very high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Population (000)	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	Low child, high adult	Population (000)	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	Low child, high adult	Population (000)	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	Low child, high adult	Population (000)	Very low child, very low adult	Low child, low adult	Low child, high adult			
	6 224 985		3 131 052		3 093 933		311 273	360 965	333 580	445 161	73 810		298 234	1 292 598	415 323	222 846	239 717	142 528	360 296	155 400	1 562 136															
Respiratory diseases	3 702	6.5	1 912	6.4	1 790	6.6	124	133	199	176	23		153	721	220	72	112	27	128	59	1 550															
Chronic obstructive pulmonary disease	2 748	4.8	1 413	4.7	1 335	4.9	52	65	141	90	10		100	556	140	45	76	15	80	21	1 354															
Asthma	240	0.4	122	0.4	118	0.4	12	14	6	10	2		20	77	12	9	22	2	14	5	37															
Digestive diseases	1 968	3.5	1 094	3.7	874	3.2	75	82	99	154	31		87	415	182	76	131	22	130	45	435															
Peptic ulcer disease	264	0.5	155	0.5	109	0.4	7	8	6	11	3		15	84	17	9	13	2	10	4	75															
Cirrhosis of the liver	786	1.4	503	1.7	283	1.0	26	28	31	61	13		34	170	65	39	67	8	59	14	171															
Appendicitis	21	0.0	12	0.0	10	0.0	1	1	1	2	1		1	7	1	0	1	0	1	0	5															
Diseases of the genitourinary system	848	1.5	442	1.5	406	1.5	51	55	66	55	15		57	149	62	25	25	21	62	28	175															
Nephritis/nephrosis	677	1.2	345	1.2	332	1.2	47	52	47	43	12		45	124	42	20	14	9	56	24	141															
Benign prostatic hypertrophy	32	0.1	32	0.1	...	...	1	1	1	2	0		2	11	1	1	3	1	2	0	6														
Skin diseases	69	0.1	26	0.1	43	0.2	10	9	5	6	2		5	10	9	0	3	1	4	1	3															
Musculoskeletal diseases	106	0.2	38	0.1	69	0.3	4	3	17	10	2		7	10	20	2	4	1	2	6	20															
Rheumatoid arthritis	25	0.0	7	0.0	18	0.1	1	0	3	2	1		1	3	4	1	1	0	0	2	5															
Osteoarthritis	5	0.0	2	0.0	3	0.0	0	0	1	1	0		0	0	1	0	0	0	0	0	0															
Congenital abnormalities	493	0.9	255	0.9	238	0.9	21	35	13	40	5		20	129	11	13	14	19	64	4	104															
Oral diseases	2	0.0	1	0.0	1	0.0	0	0	0	0	0		0	0	0	0	0	0	0	0	0															
Dental caries	0	0.0	0	0.0	0	0.0	0	0	0	0	0		0	0	0	0	0	0	0	0	0															
Periodontal disease	0	0.0	0	0.0	0	0.0	0	0	0	0	0		0	0	0	0	0	0	0	0	0															
Edentulism	0	0.0	0	0.0	0	0.0	0	0	0	0	0		0	0	0	0	0	0	0	0	0															
III. Injuries	5 168	9.1	3 464	11.6	1 705	6.3	344	397	173	321	46		225	1 242	190	110	492	113	279	84	1 145															
Unintentional	3 551	6.2	2 307	7.7	1 244	4.6	258	230	120	168	33		149	931	137	76	321	98	196	48	779															
Road traffic accidents	1 192	2.1	869	2.9	323	1.2	96	99	49	76	10		72	224	46	22	59	58	75	14	290															
Poisoning	350	0.6	225	0.8	125	0.5	21	18	14	2	1		8	87	6	6	99	3	12	1	74															
Falls	392	0.7	236	0.8	156	0.6	11	9	18	12	1		15	106	47	9	24	6	17	7	108															
Fires	312	0.5	120	0.4	192	0.7	24	20	4	3	1		14	170	3	3	18	8	24	2	18															
Drowning	382	0.7	262	0.9	120	0.4	36	29	4	15	3		14	84	4	6	28	5	21	6	126															
Other unintentional injuries	923	1.6	595	2.0	328	1.2	71	56	30	58	18		26	261	32	31	94	18	47	18	162															
Intentional	1 618	2.8	1 157	3.9	461	1.7	86	167	53	154	13		76	310	53	33	170	15	83	36	366															
Self-inflicted	873	1.5	546	1.8	327	1.2	15	19	35	26	2		37	209	48	23	92	9	25	35	296															
Violence	559	1.0	445	1.5	114	0.4	57	77	17	119	10		28	85	4	8	61	4	22	1	65															
War	172	0.3	155	0.5	17	0.1	14	71	0	8	0		10	11	0	2	17	0	35	0	3															

^aSee list of Member States by WHO region and mortality stratum.^bSee explanatory notes for sources and methods.^cWorld totals for males and females include residual populations living outside WHO Member States.^dEstimates for specific causes may not sum to broader cause groupings owing to omission of residual categories.^eFor WHO Regions of the Americas, Europe and the Western Pacific, these figures include only late effects of poliomyelitis cases with onset prior to regional certification of polio eradication in 1994, 2000 and 2002, respectively. For all other regions, except where vital registration reports late effects of polio cases, these deaths are from acute poliomyelitis.^fDoes not include liver cancer and cirrhosis deaths resulting from chronic hepatitis virus infection.^gThis category includes deaths from causes originating in the perinatal period as defined in Chapter XVI of the International Classification of Diseases, principally low birthweight, prematurity, birth asphyxia and birth trauma, and does not include all deaths occurring in the early neonatal period.

... Data not applicable.

Annex Table 3 Burden of disease in DALYs by cause, sex and mortality stratum in WHO regions,^a estimates for 2002Figures computed by WHO to assure comparability;^b they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Cause ^d	SEX ^c						AFRICA			THE AMERICAS			SOUTH-EAST ASIA			EUROPE			EASTERN MEDITERRANEAN		WESTERN PACIFIC		
	Both sexes		Males		Females		Mortality stratum			Mortality stratum			Mortality stratum			Mortality stratum			Mortality stratum		Mortality stratum		
	(000)	% total	(000)	% total	(000)	% total	High child, high adult	High child, very high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	Low child, high adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult			
<i>Population (000)</i>	6 224 985		3 131 052		3 093 933		311 273	360 965	333 580	445 161	73 810	<i>Population (000)</i>			298 234	1 292 598	415 323	222 846	239 717	142 528	360 296	155 400	1 562 136
TOTAL DALYs	1 490 126	100	772 912	100	717 213	100	160 415	200 961	46 868	81 589	17 130	TOTAL DALYs	62 463	364 110	51 725	37 697	60 900	24 074	115 005	16 384	248 495		
I. Communicable diseases, maternal and perinatal conditions and nutritional deficiencies	610 319	41.0	296 796	38.4	313 523	43.7	115 317	150 405	3 106	16 334	7 210	I. Communicable diseases, maternal and perinatal conditions and nutritional deficiencies	18 533	166 116	2 552	6 198	5 287	4 444	59 929	929	53 358		
Infectious and parasitic diseases	350 333	23.5	179 307	23.2	171 025	23.8	75 966	111 483	1 228	6 719	3 944	Infectious and parasitic diseases	10 598	78 355	891	2 040	2 734	1 529	30 881	322	23 349		
Tuberculosis	34 736	2.3	21 905	2.8	12 831	1.8	3 786	5 480	12	506	410	Tuberculosis	3 167	10 764	47	437	1 031	112	2 928	37	5 993		
STIs excluding HIV	11 347	0.8	3 855	0.5	7 492	1.0	1 930	2 444	75	487	69	STIs excluding HIV	479	3 475	79	149	125	144	1 327	34	515		
Syphilis	4 200	0.3	1 970	0.3	2 230	0.3	1 028	1 417	2	56	20	Syphilis	35	860	3	7	4	3	706	1	54		
Chlamydia	3 571	0.2	302	0.0	3 269	0.5	364	428	55	241	15	Chlamydia	262	1 251	61	95	79	100	309	25	281		
Gonorrhoea	3 365	0.2	1 473	0.2	1 892	0.3	520	573	16	183	31	Gonorrhoea	164	1 261	15	43	39	39	296	7	172		
HIV/AIDS	84 458	5.7	42 663	5.5	41 795	5.8	14 620	49 343	454	1 594	1 163	HIV/AIDS	1 501	10 628	201	39	1 149	51	1 351	8	2 295		
Diarrhoeal diseases	61 966	4.2	32 353	4.2	29 614	4.1	11 548	11 689	106	1 494	750	Diarrhoeal diseases	1 482	18 817	110	485	97	568	8 093	46	6 641		
Childhood diseases	41 480	2.8	20 713	2.7	20 767	2.9	11 061	7 934	54	177	162	Childhood diseases	1 502	12 722	66	259	29	55	5 568	34	1 834		
Pertussis	12 595	0.8	6 283	0.8	6 312	0.9	3 078	2 165	52	163	146	Pertussis	126	4 336	64	59	25	37	1 878	33	425		
Poliomyelitis ^e	151	0.0	76	0.0	74	0.0	11	4	3	6	1	Poliomyelitis ^e	9	56	1	1	0	4	13	0	43		
Diphtheria	185	0.0	96	0.0	89	0.0	24	24	0	2	7	Diphtheria	7	96	0	1	2	0	16	0	6		
Measles	21 475	1.4	10 727	1.4	10 748	1.5	6 328	4 587	0	0	0	Measles	1 111	5 772	1	195	2	9	2 470	0	988		
Tetanus	7 074	0.5	3 530	0.5	3 543	0.5	1 620	1 155	0	6	8	Tetanus	249	2 462	0	2	0	4	1 192	0	371		
Meningitis	6 192	0.4	3 082	0.4	3 110	0.4	394	497	43	356	280	Meningitis	219	1 906	67	325	85	85	1 134	11	781		
Hepatitis B ^f	2 170	0.1	1 459	0.2	711	0.1	302	280	20	56	38	Hepatitis B ^f	143	576	17	53	19	24	166	16	459		
Hepatitis C ^f	1 004	0.1	668	0.1	336	0.0	120	122	77	29	1	Hepatitis C ^f	67	212	36	19	9	12	69	39	189		
Malaria	46 486	3.1	22 243	2.9	24 242	3.4	20 070	20 785	0	86	25	Malaria	502	2 275	1	20	0	92	2 158	0	441		
Tropical diseases	12 245	0.8	8 273	1.1	3 973	0.6	2 939	2 743	9	604	178	Tropical diseases	251	4 334	0	7	0	45	601	0	516		
Trypanosomiasis	1 525	0.1	966	0.1	559	0.1	744	740	0	0	0	Trypanosomiasis	0	0	0	0	0	0	39	0	0		
Chagas disease	667	0.0	343	0.0	324	0.0	0	0	8	483	171	Chagas disease	0	0	0	0	0	0	0	0	0		
Schistosomiasis	1 702	0.1	1 020	0.1	681	0.1	621	713	0	74	0	Schistosomiasis	3	4	0	0	0	29	197	0	55		
Leishmaniasis	2 090	0.1	1 249	0.2	840	0.1	208	175	1	38	5	Leishmaniasis	6	1 352	0	6	0	16	232	0	50		
Lymphatic filariasis	5 777	0.4	4 413	0.6	1 364	0.2	976	1 035	0	9	1	Lymphatic filariasis	242	2 977	0	1	0	0	122	0	411		
Onchocerciasis	484	0.0	280	0.0	204	0.0	390	80	0	1	1	Onchocerciasis	0	0	0	0	0	0	10	0	0		
Leprosy	199	0.0	117	0.0	82	0.0	12	11	0	18	0	Leprosy	13	105	0	0	0	0	25	0	13		
Dengue	616	0.0	279	0.0	337	0.0	1	4	0	31	38	Dengue	89	292	0	0	0	10	20	0	131		
Japanese encephalitis	709	0.0	338	0.0	371	0.1	0	0	0	0	0	Japanese encephalitis	29	277	0	0	0	0	83	0	320		
Trachoma	2 329	0.2	597	0.1	1 732	0.2	486	726	0	162	2	Trachoma	0	168	0	0	0	91	283	0	400		
Intestinal nematode infections	2 951	0.2	1 490	0.2	1 461	0.2	809	329	1	66	101	Intestinal nematode infections	135	669	0	1	0	1	225	2	611		
Ascariasis	1 817	0.1	910	0.1	907	0.1	714	144	0	23	39	Ascariasis	63	346	0	0	0	0	158	1	325		
Trichuriasis	1 006	0.1	519	0.1	488	0.1	78	155	1	42	29	Trichuriasis	63	305	0	0	0	0	60	1	272		
Hookworm disease	59	0.0	31	0.0	27	0.0	17	29	0	0	0	Hookworm disease	8	1	0	0	0	0	2	0	1		
Respiratory infections	94 603	6.3	48 177	6.2	46 427	6.5	18 976	16 619	390	1 876	1 050	Respiratory infections	1 824	31 202	690	1 524	901	552	10 267	344	8 310		
Lower respiratory infections	91 374	6.1	46 548	6.0	44 826	6.3	18 625	16 286	337	1 721	986	Lower respiratory infections	1 707	30 551	626	1 427	811	504	9 949	322	7 447		
Upper respiratory infections	1 795	0.1	874	0.1	921	0.1	229	191	14	43	41	Upper respiratory infections	45	301	27	62	66	11	202	9	552		
Otitis media	1 435	0.1	755	0.1	680	0.1	122	141	38	112	24	Otitis media	72	350	37	35	24	38	116	13	310		
Maternal conditions	33 632	2.3	...	...	33 632	4.7	5 200	6 549	215	1 154	544	Maternal conditions	1 004	10 391	167	370	269	412	4 104	67	3 146
Perinatal conditions ^g	97 335	6.5	53 212	6.9	44 123	6.2	10 869	10 485	781	5 528	1 098	Perinatal conditions ^g	3 414	35 733	501	1 592	655	1 321	10 817	68	14 321		
Nutritional deficiencies	34 417	2.3	16 100	2.1	18 316	2.6	4 305	5 269	493	1 057	575	Nutritional deficiencies	1 693	10 435	303	671	729	631	3 860	128	4 232		
Protein-energy malnutrition	16 910	1.1	8 580	1.1	8 330	1.2	2 705	3 044	36	651	264	Protein-energy malnutrition	703	5 392	24	109	54	174	1 869	18	1 850		
Iodine deficiency	3 519	0.2	1 759	0.2	1 760	0.2	261	868	7	97	33	Iodine deficiency	81	571	3	241	449	121	623	0	163		
Vitamin A deficiency	793	0.1	364	0.0	428	0.1	347	248	0	0	1	Vitamin A deficiency	1	100	0	1	0	0	90	0	5		
Iron-deficiency anaemia	12 224	0.8	4 998	0.6	7 226	1.0	975	1 089	446	274	268	Iron-deficiency anaemia	891	3 959	271	297	200	334	928	106	2 171		

Annex Table 3 Burden of disease in DALYs by cause, sex and mortality stratum in WHO regions,^a estimates for 2002Figures computed by WHO to assure comparability;^b they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Cause ^d	SEX ^c						AFRICA					THE AMERICAS					SOUTH-EAST ASIA					EUROPE					EASTERN MEDITERRANEAN				WESTERN PACIFIC			
	Both sexes		Males		Females		Mortality stratum					Mortality stratum					Mortality stratum					Mortality stratum					Mortality stratum				Mortality stratum			
	High child, high adult	High child, very high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult	High child, high adult	Very low child, very low adult	Low child, low adult				
<i>Population (000)</i>	<i>6 224 985</i>		<i>3 131 052</i>		<i>3 093 933</i>		<i>311 273</i>	<i>360 965</i>	<i>333 580</i>	<i>445 161</i>	<i>73 810</i>	<i>Population (000)</i>					<i>298 234</i>	<i>1 292 598</i>	<i>415 323</i>	<i>222 846</i>	<i>239 717</i>	<i>142 528</i>	<i>360 296</i>	<i>155 400</i>	<i>1 562 136</i>									
	(000)	% total	(000)	% total	(000)	% total	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)	(000)				
II. Noncommunicable conditions	697 815	46.8	356 231	46.1	341 585	47.6	30 124	34 727	39 217	51 825	8 030	35 713	150 663	45 091	27 441	42 807	14 862	42 361	13 827	159 791														
Malignant neoplasms	75 545	5.1	40 536	5.2	35 009	4.9	2 238	2 517	5 830	4 553	749	3 231	10 511	8 549	3 289	5 322	981	2 835	2 787	22 035														
Mouth and oropharynx cancers	3 566	0.2	2 568	0.3	997	0.1	83	111	97	135	16	198	1 407	264	109	209	24	226	60	624														
Esophagus cancer	4 250	0.3	2 764	0.4	1 486	0.2	52	178	136	140	9	34	764	233	72	123	34	133	96	2 242														
Stomach cancer	8 095	0.5	5 046	0.7	3 048	0.4	174	196	132	403	123	114	516	421	283	648	118	124	366	4 469														
Colon/rectum cancer	5 818	0.4	3 121	0.4	2 697	0.4	118	102	654	295	40	295	365	1 027	285	550	58	138	392	1 488														
Liver cancer	7 135	0.5	5 041	0.7	2 095	0.3	301	305	141	165	32	347	431	282	113	137	63	113	265	4 432														
Pancreas cancer	1 975	0.1	1 112	0.1	863	0.1	34	56	247	149	17	65	131	377	111	217	17	32	154	365														
Trachea/bronchus/lung cancers	11 228	0.8	7 955	1.0	3 273	0.5	71	112	1 398	453	28	419	1 324	1 668	620	956	99	183	433	3 452														
Melanoma and other skin cancers	691	0.0	381	0.0	309	0.0	34	44	135	66	7	12	28	147	46	73	10	21	25	40														
Breast cancer	6 171	0.4	23	0.0	6 148	0.9	258	164	687	439	55	367	835	939	277	487	75	348	198	1 029														
Cervix uteri cancer	3 287	0.2	...	...	3 287	0.5	185	282	102	299	101	226	1 171	111	112	169	21	97	44	364												
Corpus uteri cancer	1 121	0.1	...	...	1 121	0.2	12	16	161	178	16	44	32	206	91	157	13	21	61	111												
Ovary cancer	1 647	0.1	...	...	1 647	0.2	44	68	156	102	18	129	225	238	91	172	16	75	60	250												
Prostate cancer	1 629	0.1	1 629	0.2	...	...	147	109	281	167	27	49	116	369	69	103	25	37	70	56												
Bladder cancer	1 478	0.1	1 002	0.1	476	0.1	55	41	135	56	7	50	277	243	80	115	19	178	41	178														
Lymphomas, multiple myeloma	4 308	0.3	2 298	0.3	2 010	0.3	291	262	368	246	68	236	1 161	428	167	138	76	326	116	416														
Leukaemia	4 686	0.3	2 655	0.3	2 031	0.3	104	109	251	362	76	257	791	316	195	201	147	328	93	1 450														
Other neoplasms	1 749	0.1	915	0.1	834	0.1	74	86	114	139	20	49	281	185	36	65	127	240	68	261														
Diabetes mellitus	16 194	1.1	7 608	1.0	8 587	1.2	529	586	1 455	1 835	224	1 245	3 562	1 105	566	522	410	843	387	2 873														
Nutritional/endocrine disorders	7 961	0.5	3 568	0.5	4 393	0.6	570	720	854	1 162	224	449	637	632	176	168	209	633	213	1 278														
Neuropsychiatric disorders	193 278	13.0	94 230	12.2	99 049	13.8	8 242	9 655	13 888	18 966	2 934	8 340	39 974	13 732	7 055	8 562	4 340	10 680	3 812	42 722														
Unipolar depressive disorders	67 295	4.5	26 743	3.5	40 552	5.7	2 011	2 316	5 237	5 863	898	2 897	17 671	4 117	2 626	2 598	1 259	3 754	1 007	14 926														
Bipolar affective disorder	13 952	0.9	7 049	0.9	6 903	1.0	795	936	531	1 063	177	704	2 994	618	479	449	380	869	237	3 697														
Schizophrenia	16 149	1.1	8 235	1.1	7 914	1.1	777	899	537	1 268	210	1 047	3 683	593	577	442	471	1 037	231	4 348														
Epilepsy	7 328	0.5	3 886	0.5	3 442	0.5	701	880	175	745	143	367	1 883	245	191	188	122	502	65	1 105														
Alcohol use disorders	20 331	1.4	17 242	2.2	3 089	0.4	241	672	2 502	3 513	333	325	1 623	2 227	636	1 799	55	44	489	5 836														
Alzheimer and other dementias	10 397	0.7	3 992	0.5	6 405	0.9	166	175	1 300	658	76	369	1 213	1 989	398	549	101	242	765	2 374														
Parkinson disease	1 570	0.1	776	0.1	794	0.1	35	40	252	53	7	36	211	288	70	93	40	59	117	268														
Multiple sclerosis	1 477	0.1	638	0.1	839	0.1	56	45	120	105	16	63	276	157	63	87	35	75	29	347														
Drug use disorders	7 388	0.5	5 789	0.7	1 599	0.2	660	656	787	839	232	159	827	774	192	489	562	812	57	322														
Post-traumatic stress disorder	3 335	0.2	923	0.1	2 412	0.3	149	173	184	209	32	181	719	208	127	130	84	192	81	860														
Obsessive-compulsive disorder	4 923	0.3	2 116	0.3	2 808	0.4	393	459	227	558	87	172	837	257	275	277	191	349	62	765														
Panic disorder	6 758	0.5	2 292	0.3	4 466	0.6	360	427	278	512	85	363	1 494	322	248	239	186	428	124	1 680														
Insomnia (primary)	3 477	0.2	1 494	0.2	1 983	0.3	141	161	269	326	49	118	861	348	119	158	35	161	130	595														
Migraine	7 666	0.5	2 078	0.3	5 588	0.8	193	254	508	754	150	340	1 727	742	258	236	136	421	151	1 781														
Sense organ disorders	69 381	4.7	32 453	4.2	36 928	5.1	4 289	4 649	1 950	3 638	528	6 151	16 217	2 465	1 589	2 167	2 108	5 016	809	17 655														
Glaucoma	3 866	0.3	1 716	0.2	2 150	0.3	451	481	35	219	11	209	195	107	91	102	216	512	16	1 207														
Cataracts	25 251	1.7	11 051	1.4	14 200	2.0	2 483	2 670	123	1 156	248	3 479	7 562	112	149	167	570	1 873	29	4 581														
Vision loss, age-related and other	14 191	1.0	6 303	0.8	7 889	1.1	437	440	414	1 116	119	813	1 418	390	588	633	757	1 127	141	5 755														
Hearing loss, adult onset	26 034	1.7	13 364	1.7	12 669	1.8	918	1 058	1 377	1 144	148	1 648	7 029	1 855	760	1 261	564	1 497	623	6 109														
Cardiovascular diseases	148 190	9.9	79 886	10.3	68 304	9.5	5 187	5 724	6 847	7 426	901	6 576	36 411	8 838	8 175	17 405	2 945	9 115	2 545	29 868														
Rheumatic heart disease	5 862	0.4	2 556	0.3	3 306	0.5	300	207	40	107	11	242	2 376	71	122	192	104	476	17	1 594														
Hypertensive heart disease	7 647	0.5	3 856	0.5	3 791	0.5	260	327	322	580	126	518	1 138	307	521	389	249	642	35	2 209														
Ischaemic heart disease	58 645	3.9	34 338	4.4	24 307	3.4	1 461	1 564	3 304	2 685	230	2 804	17 930	3 569	3 382	8 800	1 365	3 956	770	6 732														
Cerebrovascular disease	49 200	3.3	25 429	3.3	23 771	3.3	1 757	1 911	1 654	2 534	288	1 681	8 714	2 654	2 522	5 618	577	1 954	1 228	16 048														
Inflammatory heart disease	5 854	0.4	3 438	0.4	2 417	0.3	400	467	382	437	27	173	1 338	265	360	683	133	423	76	678														

Annex Table 4 Healthy life expectancy (HALE) in all WHO Member States, estimates for 2002

Figures computed by WHO to assure comparability; ^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Healthy life expectancy (HALE) (years)								Expectation of lost healthy years at birth (years)		Percentage of total life expectancy lost		
	Total population	Males				Females				Males	Females	Males	Females
		At birth	At birth	Uncertainty interval	At age 60	Uncertainty interval	At birth	Uncertainty interval	At age 60					Uncertainty interval
1 Afghanistan	35.5	35.3	26.7 - 40.4	8.6	8.0 - 9.1	35.8	26.3 - 43.5	9.5	9.0 - 10.2	6.6	7.7	15.8	17.7
2 Albania	61.4	59.5	58.0 - 60.8	10.5	9.6 - 11.2	63.3	61.7 - 63.9	13.9	13.1 - 14.6	7.8	10.8	11.6	14.6
3 Algeria	60.6	59.7	58.2 - 61.1	12.5	12.2 - 12.8	61.6	60.4 - 63.2	13.3	12.9 - 13.6	7.9	9.6	11.7	13.5
4 Andorra	72.2	69.8	68.5 - 70.7	16.6	15.9 - 16.9	74.6	73.7 - 75.5	19.9	19.4 - 20.3	7.0	9.1	9.2	10.8
5 Angola	33.4	31.6	25.0 - 36.4	8.1	7.6 - 8.7	35.1	28.1 - 42.1	9.6	9.2 - 10.6	6.3	6.9	16.6	16.4
6 Antigua and Barbuda	61.9	60.1	58.6 - 61.7	11.6	11.3 - 12.0	63.6	62.4 - 65.3	13.8	13.4 - 14.3	8.9	10.3	12.8	13.9
7 Argentina	65.3	62.5	61.8 - 63.2	13.0	12.8 - 13.2	68.1	67.5 - 68.8	16.5	16.3 - 16.7	8.3	10.0	11.7	12.8
8 Armenia	61.0	59.4	58.3 - 60.5	10.9	10.5 - 11.3	62.6	61.1 - 63.1	13.3	12.3 - 13.8	7.6	10.4	11.3	14.2
9 Australia	72.6	70.9	70.2 - 71.4	16.9	16.6 - 17.1	74.3	73.7 - 75.1	19.5	19.2 - 19.8	7.0	8.7	9.0	10.4
10 Austria	71.4	69.3	68.6 - 70.0	16.2	16.0 - 16.5	73.5	72.9 - 74.3	19.3	19.0 - 19.6	7.1	8.6	9.3	10.5
11 Azerbaijan	57.2	55.8	54.5 - 57.2	10.6	10.3 - 10.9	58.7	57.0 - 59.4	12.4	11.8 - 12.9	7.2	10.0	11.4	14.6
12 Bahamas	63.5	61.0	60.0 - 62.0	14.4	14.2 - 14.8	66.0	65.1 - 67.0	16.2	15.6 - 16.7	8.4	9.7	12.1	12.8
13 Bahrain	64.3	64.2	63.2 - 65.5	11.5	10.6 - 12.7	64.4	63.6 - 65.8	11.6	11.1 - 12.6	7.9	10.1	10.9	13.6
14 Bangladesh	54.3	55.3	54.0 - 56.7	11.1	10.8 - 11.5	53.3	52.2 - 54.7	11.1	10.8 - 11.4	7.3	9.3	11.7	14.8
15 Barbados	65.6	62.9	61.9 - 64.1	13.1	12.8 - 13.5	68.2	67.0 - 69.5	16.6	16.1 - 17.2	7.6	9.8	10.7	12.5
16 Belarus	60.7	56.6	55.7 - 57.5	10.5	10.1 - 10.9	64.9	63.6 - 65.5	14.6	14.3 - 14.9	6.1	9.4	9.7	12.6
17 Belgium	71.1	68.9	68.3 - 69.5	15.7	15.4 - 15.9	73.3	72.8 - 74.1	19.1	18.9 - 19.4	6.3	8.2	8.3	10.1
18 Belize	60.3	58.4	57.0 - 59.8	11.5	11.2 - 11.8	62.2	61.2 - 63.4	13.3	13.0 - 13.6	9.0	10.2	13.3	14.1
19 Benin	44.0	43.4	37.6 - 48.5	9.7	8.8 - 10.8	44.5	37.4 - 50.9	10.4	9.5 - 11.6	6.6	7.9	13.3	15.0
20 Bhutan	52.9	52.9	46.3 - 58.8	10.8	9.6 - 12.6	52.9	45.5 - 57.5	11.3	10.0 - 12.3	7.3	9.5	12.1	15.2
21 Bolivia	54.4	53.6	47.5 - 59.2	10.9	9.5 - 12.6	55.2	47.8 - 59.6	12.1	10.6 - 13.3	8.2	9.4	13.2	14.6
22 Bosnia and Herzegovina	64.3	62.3	60.8 - 63.9	12.4	12.0 - 13.0	66.4	64.7 - 67.2	15.4	15.0 - 16.0	7.0	10.0	10.2	13.1
23 Botswana	35.7	36.0	34.4 - 40.0	10.9	10.7 - 13.0	35.4	33.9 - 39.5	11.9	11.7 - 13.5	4.2	5.2	10.4	12.9
24 Brazil	59.8	57.2	56.3 - 58.0	11.6	11.4 - 11.8	62.4	61.7 - 63.3	13.7	13.4 - 13.9	8.5	9.8	13.0	13.6
25 Brunei Darussalam	65.3	65.1	63.8 - 66.4	13.1	12.5 - 13.8	65.5	64.7 - 66.6	13.3	13.0 - 13.7	9.7	11.9	13.0	15.4
26 Bulgaria	64.8	62.6	61.9 - 63.3	12.5	12.2 - 12.7	67.1	66.4 - 67.8	15.0	14.8 - 15.3	6.2	8.5	9.1	11.3
27 Burkina Faso	35.6	34.9	30.3 - 40.3	8.6	8.1 - 9.7	36.3	30.2 - 42.4	9.7	9.2 - 10.8	5.6	6.3	13.9	14.8
28 Burundi	35.1	33.4	29.3 - 38.8	8.6	7.9 - 10.0	36.8	32.0 - 43.9	10.4	9.5 - 12.0	5.3	6.2	13.7	14.4
29 Cambodia	47.5	45.6	39.5 - 49.9	9.7	8.7 - 10.7	49.5	42.5 - 54.0	11.0	10.0 - 12.0	6.3	7.6	12.1	13.3
30 Cameroon	41.5	41.1	36.8 - 47.2	9.7	8.9 - 11.6	41.8	36.3 - 48.4	10.4	9.6 - 12.0	6.0	7.3	12.8	14.8
31 Canada	72.0	70.1	69.5 - 70.7	16.1	15.8 - 16.3	74.0	73.4 - 74.6	19.3	19.0 - 19.5	7.1	8.3	9.2	10.0
32 Cape Verde	60.8	58.8	55.1 - 62.6	11.8	10.7 - 13.1	62.9	60.5 - 65.5	13.4	12.5 - 14.3	7.9	10.0	11.8	13.7
33 Central African Republic	37.4	37.0	32.5 - 42.9	9.6	8.9 - 11.2	37.7	32.5 - 43.6	10.4	9.7 - 11.9	5.1	6.1	12.0	13.8
34 Chad	40.7	39.7	33.2 - 45.2	9.2	8.5 - 10.2	41.7	35.1 - 48.5	10.0	9.3 - 11.2	6.4	7.6	13.9	15.5
35 Chile	67.3	64.9	64.2 - 65.7	13.9	13.5 - 14.3	69.7	69.2 - 70.5	16.8	16.6 - 17.1	8.5	10.3	11.5	12.9
36 China	64.1	63.1	62.2 - 63.9	13.1	12.9 - 13.4	65.2	64.3 - 66.2	14.7	14.4 - 15.0	6.5	7.6	9.3	10.4
37 Colombia	62.0	57.8	57.7 - 59.1	12.6	12.4 - 12.8	66.3	65.6 - 67.4	15.4	15.0 - 15.8	9.7	10.0	14.4	13.1
38 Comoros	54.6	53.9	47.3 - 59.4	10.8	9.4 - 12.6	55.3	48.2 - 60.0	11.5	10.1 - 12.6	7.8	9.6	12.6	14.8
39 Congo	46.3	45.3	39.9 - 51.7	10.4	9.3 - 12.6	47.3	41.4 - 53.7	11.5	10.4 - 13.6	6.3	7.2	12.2	13.2
40 Cook Islands	61.6	60.6	58.9 - 61.2	11.5	11.0 - 12.0	62.7	61.7 - 63.8	12.6	12.1 - 12.7	8.6	11.5	12.5	15.5
41 Costa Rica	67.2	65.2	64.4 - 66.0	14.4	13.7 - 15.1	69.3	68.6 - 70.0	16.7	16.1 - 17.3	9.5	10.3	12.8	12.9
42 Côte d'Ivoire	39.5	37.6	32.6 - 44.2	9.5	8.8 - 11.1	41.3	36.2 - 47.7	10.7	9.9 - 12.4	5.4	6.7	12.6	13.9
43 Croatia	66.6	63.8	63.2 - 64.6	12.5	12.4 - 12.9	69.3	68.4 - 70.0	16.1	15.5 - 16.2	7.2	9.3	10.1	11.8
44 Cuba	68.3	67.1	66.1 - 67.9	15.2	14.8 - 15.4	69.5	68.8 - 70.3	16.7	16.4 - 16.9	7.9	9.8	10.5	12.4
45 Cyprus	67.6	66.7	65.9 - 67.5	14.2	13.8 - 14.6	68.5	67.1 - 70.0	15.0	14.1 - 16.0	8.8	10.6	11.7	13.4
46 Czech Republic	68.4	65.9	65.2 - 66.5	13.5	13.3 - 13.7	70.9	70.2 - 71.7	16.8	16.5 - 17.1	6.6	8.1	9.1	10.3
47 Democratic People's Republic of Korea	58.8	58.0	50.9 - 64.2	12.1	10.5 - 14.4	59.7	51.6 - 65.7	13.2	11.4 - 14.9	6.4	7.4	10.0	11.0
48 Democratic Republic of the Congo	37.1	35.0	29.6 - 39.5	8.6	7.9 - 9.4	39.1	32.6 - 44.4	10.2	9.5 - 11.1	6.0	7.0	14.7	15.1
49 Denmark	69.8	68.6	68.0 - 69.1	15.2	15.0 - 15.4	71.1	70.6 - 71.8	17.2	16.9 - 17.4	6.3	8.4	8.4	10.5
50 Djibouti	42.9	42.5	37.8 - 48.9	9.8	9.0 - 11.7	43.2	37.7 - 49.7	10.6	9.6 - 12.2	6.1	7.4	12.6	14.7

Member State	Healthy life expectancy (HALE) (years)								Expectation of lost healthy years at birth (years)		Percentage of total life expectancy lost		
	Total population	Males				Females				Males	Females	Males	Females
		At birth	At birth	Uncertainty interval	At age 60	Uncertainty interval	At birth	Uncertainty interval	At age 60					Uncertainty interval
51 Dominica	63.7	61.9	60.5 - 63.1	13.8	13.4 - 14.1	65.6	64.3 - 67.2	15.3	14.9 - 15.7	9.1	10.2	12.9	13.5
52 Dominican Republic	59.6	57.2	54.7 - 59.7	11.3	11.1 - 11.6	61.9	60.9 - 63.1	13.7	13.4 - 13.9	7.7	9.6	11.9	13.4
53 Ecuador	61.9	59.8	58.9 - 60.6	13.2	13.0 - 13.5	64.1	63.3 - 65.1	15.2	14.9 - 15.4	8.1	9.4	11.9	12.8
54 Egypt	59.0	57.8	57.0 - 58.2	9.9	9.7 - 10.1	60.2	59.6 - 60.9	11.3	11.0 - 11.4	7.4	8.8	11.4	12.8
55 El Salvador	59.7	57.2	55.9 - 58.5	12.6	12.4 - 12.9	62.3	61.5 - 63.3	14.1	13.8 - 14.3	9.3	10.4	14.0	14.3
56 Equatorial Guinea	45.5	44.7	38.7 - 50.3	9.7	8.8 - 10.9	46.3	39.7 - 52.2	10.5	9.7 - 11.7	7.2	8.5	13.9	15.5
57 Eritrea	50.0	49.3	39.0 - 53.3	10.6	8.9 - 12.0	50.8	43.7 - 56.4	11.3	9.9 - 12.7	6.5	8.6	11.7	14.5
58 Estonia	64.1	59.2	58.6 - 59.8	11.9	11.4 - 12.2	69.0	67.5 - 70.5	16.5	16.3 - 16.9	6.0	8.1	9.2	10.5
59 Ethiopia	41.2	40.7	34.6 - 46.7	9.7	8.9 - 11.0	41.7	35.6 - 48.2	10.2	9.5 - 11.6	6.1	7.7	13.0	15.6
60 Fiji	58.8	56.9	56.4 - 58.6	10.4	10.1 - 10.7	60.6	60.1 - 62.4	11.9	11.5 - 12.4	7.7	9.7	12.0	13.8
61 Finland	71.1	68.7	68.0 - 69.3	15.7	15.4 - 15.9	73.5	72.7 - 74.1	18.9	18.5 - 19.1	6.1	8.0	8.1	9.9
62 France	72.0	69.3	68.7 - 70.0	16.6	16.3 - 16.9	74.7	74.0 - 75.4	20.4	20.1 - 20.7	6.7	8.8	8.8	10.6
63 Gabon	51.4	50.2	44.5 - 56.4	10.6	9.4 - 12.7	52.6	45.9 - 58.6	11.6	10.2 - 13.5	7.1	8.8	12.4	14.3
64 Gambia	49.5	48.5	42.0 - 54.1	10.4	9.3 - 11.7	50.5	43.1 - 56.2	11.2	10.1 - 12.4	6.9	8.4	12.5	14.2
65 Georgia	64.4	62.2	61.1 - 63.3	12.6	12.3 - 13.0	66.6	64.8 - 67.7	14.6	13.3 - 15.1	6.2	8.4	9.1	11.2
66 Germany	71.8	69.6	68.9 - 70.4	15.9	15.6 - 16.2	74.0	73.4 - 74.8	19.0	18.8 - 19.3	5.9	7.6	7.8	9.3
67 Ghana	49.8	49.2	43.3 - 55.8	10.5	9.3 - 12.4	50.3	43.8 - 56.3	11.2	10.0 - 12.8	7.2	8.5	12.7	14.4
68 Greece	71.0	69.1	68.4 - 69.7	16.0	15.8 - 16.3	72.9	72.3 - 73.8	18.1	17.7 - 18.4	6.7	8.1	8.9	10.0
69 Grenada	59.2	58.4	57.0 - 59.7	11.1	10.8 - 11.5	60.0	58.8 - 61.3	12.6	12.3 - 12.9	7.5	8.9	11.4	12.9
70 Guatemala	57.4	54.9	53.6 - 56.2	12.3	11.9 - 12.7	59.9	58.6 - 61.4	13.3	13.0 - 13.6	8.2	9.1	13.0	13.2
71 Guinea	44.8	43.9	38.2 - 49.0	9.6	8.7 - 10.7	45.6	38.9 - 51.7	10.5	9.6 - 11.6	7.0	8.2	13.7	15.2
72 Guinea-Bissau	40.5	39.6	33.1 - 44.1	9.2	8.5 - 10.0	41.5	34.3 - 48.0	10.1	9.4 - 11.0	6.1	7.2	13.4	14.7
73 Guyana	55.2	53.1	50.6 - 55.9	10.2	9.9 - 10.6	57.2	54.6 - 59.9	12.2	11.8 - 12.7	8.4	9.7	13.6	14.5
74 Haiti	43.8	43.5	38.1 - 48.7	10.3	9.2 - 11.9	44.1	37.9 - 49.1	11.7	10.5 - 12.9	5.6	6.9	11.4	13.6
75 Honduras	58.4	56.3	53.1 - 59.2	11.4	10.4 - 12.6	60.5	58.1 - 62.9	13.1	12.3 - 14.0	7.9	9.9	12.4	14.0
76 Hungary	64.9	61.5	61.0 - 62.0	12.1	12.0 - 12.3	68.2	67.6 - 68.8	16.0	15.8 - 16.2	6.8	8.6	10.0	11.2
77 Iceland	72.8	72.1	71.2 - 72.9										

Annex Table 4 Healthy life expectancy (HALE) in all WHO Member States, estimates for 2002

Figures computed by WHO to assure comparability; ^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Healthy life expectancy (HALE) (years)									Expectation of lost healthy years at birth (years)		Percentage of total life expectancy lost	
	Total population	Males				Females				Males	Females	Males	Females
		At birth	At birth	Uncertainty interval	At age 60	Uncertainty interval	At birth	Uncertainty interval	At age 60					Uncertainty interval
101 Madagascar	48.6	47.3	40.8 - 52.3	10.1	9.1 - 11.1	49.9	42.5 - 54.8	11.1	10.0 - 12.0	7.2	8.4	13.1	14.4
102 Malawi	34.9	35.0	31.6 - 40.5	9.7	9.0 - 11.4	34.8	30.8 - 40.7	10.4	9.7 - 11.9	4.8	5.8	12.1	14.3
103 Malaysia	63.2	61.6	60.8 - 62.5	10.9	10.7 - 11.1	64.8	64.1 - 65.6	12.0	11.8 - 12.3	8.0	10.0	11.4	13.3
104 Maldives	57.8	59.0	58.1 - 60.5	10.5	10.3 - 10.7	56.6	55.7 - 57.7	9.4	9.2 - 9.6	7.5	9.0	11.3	13.8
105 Mali	37.9	37.5	31.0 - 42.0	8.8	8.2 - 9.4	38.3	31.4 - 44.7	9.5	8.9 - 10.3	6.4	7.4	14.6	16.1
106 Malta	71.4	69.9	69.1 - 70.6	15.4	15.0 - 15.9	72.9	72.2 - 73.7	18.2	17.7 - 18.7	6.2	8.3	8.2	10.2
107 Marshall Islands	54.8	53.9	52.3 - 55.7	9.8	9.6 - 10.1	55.7	54.4 - 57.3	10.7	10.4 - 10.9	7.2	8.9	11.7	13.8
108 Mauritania	44.5	42.8	36.0 - 47.5	9.5	8.6 - 10.2	46.3	38.4 - 51.4	10.5	9.7 - 11.4	6.9	8.2	14.0	15.1
109 Mauritius	62.4	60.3	59.2 - 61.3	11.7	11.4 - 12.0	64.6	63.8 - 65.6	13.8	13.6 - 14.1	8.1	10.9	11.9	14.5
110 Mexico	65.4	63.3	62.8 - 63.9	14.4	14.2 - 14.6	67.6	67.0 - 68.2	16.2	16.0 - 16.4	8.3	9.3	11.6	12.1
111 Micronesia, Federated States of	57.7	57.0	55.2 - 59.0	10.9	10.6 - 11.3	58.4	56.6 - 60.4	11.5	11.2 - 11.9	7.9	9.6	12.2	14.2
112 Monaco	72.9	70.7	70.0 - 71.4	17.3	17.1 - 17.6	75.2	74.4 - 76.0	20.5	20.1 - 20.9	7.1	9.3	9.1	11.0
113 Mongolia	55.6	53.3	52.4 - 54.4	10.2	10.0 - 10.4	58.0	57.1 - 58.9	12.4	12.2 - 12.6	6.8	8.0	11.3	12.1
114 Morocco	60.2	59.5	58.2 - 60.7	11.4	11.0 - 11.8	60.9	59.9 - 62.2	12.7	12.3 - 13.1	9.4	11.9	13.6	16.4
115 Mozambique	36.9	36.3	29.5 - 39.2	9.8	9.0 - 11.1	37.5	30.1 - 41.3	10.4	9.7 - 11.7	4.9	6.4	11.9	14.5
116 Myanmar	51.7	49.9	43.2 - 55.9	10.1	9.1 - 11.6	53.5	45.5 - 58.8	11.3	10.0 - 12.5	6.3	8.4	11.2	13.5
117 Namibia	43.3	42.9	39.8 - 49.1	11.2	9.9 - 14.8	43.8	39.2 - 49.7	12.1	10.6 - 14.8	5.2	6.7	10.8	13.3
118 Nauru	55.1	52.7	49.6 - 56.2	8.7	8.1 - 9.6	57.5	55.0 - 60.5	10.5	10.0 - 11.4	6.9	9.0	11.6	13.5
119 Nepal	51.8	52.5	51.3 - 53.6	10.5	10.3 - 10.8	51.1	50.2 - 52.3	10.8	10.5 - 11.0	7.4	9.1	12.4	15.1
120 Netherlands	71.2	69.7	69.1 - 70.4	15.5	15.2 - 15.8	72.6	72.0 - 73.4	18.4	18.1 - 18.7	6.3	8.5	8.3	10.4
121 New Zealand	70.8	69.5	68.8 - 70.2	16.0	15.7 - 16.3	72.2	71.5 - 73.0	18.2	17.8 - 18.5	7.2	9.0	9.3	11.1
122 Nicaragua	61.4	59.7	58.4 - 60.3	13.0	12.8 - 13.3	63.1	61.9 - 64.0	14.5	14.3 - 14.9	8.2	9.3	12.0	12.9
123 Niger	35.5	35.8	26.8 - 41.3	8.5	7.9 - 9.2	35.2	26.2 - 42.5	9.3	8.9 - 10.0	6.8	7.5	15.9	17.5
124 Nigeria	41.5	41.3	35.2 - 45.6	9.3	8.5 - 10.4	41.8	34.9 - 47.7	10.0	9.3 - 11.2	6.8	7.8	14.1	15.6
125 Niue	60.4	58.9	55.7 - 61.4	11.6	10.5 - 12.7	62.0	59.9 - 64.3	12.8	12.0 - 13.6	8.6	11.3	12.8	15.5
126 Norway	72.0	70.4	69.5 - 71.3	16.2	15.7 - 16.6	73.6	72.8 - 74.4	18.9	18.5 - 19.1	5.9	8.1	7.8	9.9
127 Oman	64.0	62.7	59.9 - 65.3	11.9	10.7 - 13.1	65.3	63.4 - 67.1	13.7	12.9 - 14.6	8.3	11.1	11.8	14.5
128 Pakistan	53.3	54.2	52.5 - 56.0	11.4	11.0 - 11.7	52.3	50.7 - 54.4	11.4	11.1 - 11.7	6.9	9.3	11.3	15.0
129 Palau	59.6	58.7	57.9 - 59.7	10.2	10.0 - 10.4	60.5	59.6 - 61.7	12.0	11.8 - 12.4	7.7	10.4	11.5	14.7
130 Panama	66.2	64.3	63.2 - 65.4	14.9	14.5 - 15.4	68.0	67.2 - 69.2	16.8	16.4 - 17.2	8.5	10.2	11.7	13.0
131 Papua New Guinea	51.9	51.4	49.7 - 53.6	10.1	9.8 - 10.3	52.4	50.9 - 54.4	10.6	10.3 - 10.9	7.0	9.1	12.0	14.8
132 Paraguay	61.9	59.6	58.5 - 60.6	11.7	11.2 - 12.0	64.2	63.3 - 65.1	14.6	14.1 - 14.7	9.1	10.5	13.2	14.0
133 Peru	61.0	59.6	58.4 - 60.7	12.7	12.4 - 13.1	62.4	61.4 - 63.6	14.4	14.1 - 14.7	7.9	9.6	11.7	13.3
134 Philippines	59.3	57.1	56.2 - 58.1	10.6	10.4 - 10.8	61.5	60.6 - 62.6	12.1	11.9 - 12.4	8.0	10.2	12.4	14.3
135 Poland	65.8	63.1	62.4 - 63.8	12.8	12.6 - 13.0	68.5	67.9 - 69.2	16.1	15.8 - 16.3	7.5	10.2	10.6	13.0
136 Portugal	69.2	66.7	66.0 - 67.4	14.9	14.7 - 15.2	71.7	71.1 - 72.5	17.7	17.4 - 17.9	6.9	8.8	9.4	10.9
137 Qatar	65.2	66.7	65.6 - 67.6	13.7	13.1 - 14.4	63.8	62.4 - 65.4	11.2	10.2 - 12.3	8.2	10.0	10.9	13.6
138 Republic of Korea	67.8	64.8	64.1 - 65.6	13.2	13.0 - 13.5	70.8	70.1 - 71.6	17.1	16.8 - 17.3	6.9	8.6	9.7	10.8
139 Republic of Moldova	59.8	57.2	56.2 - 58.2	11.0	10.8 - 11.1	62.4	61.2 - 62.9	13.2	12.9 - 13.4	6.8	9.2	10.6	12.9
140 Romania	63.1	61.0	59.9 - 62.1	12.3	12.1 - 12.6	65.2	64.3 - 66.3	14.6	14.2 - 15.0	7.0	9.7	10.3	13.0
141 Russian Federation	58.4	52.8	51.9 - 53.6	9.7	7.0 - 12.3	64.1	63.3 - 64.8	14.0	13.8 - 14.2	5.5	7.7	9.4	10.7
142 Rwanda	38.3	36.4	33.0 - 42.5	9.0	8.3 - 10.4	40.2	35.6 - 47.4	10.5	9.7 - 11.8	5.6	6.6	13.3	14.1
143 Saint Kitts and Nevis	61.5	59.9	59.0 - 61.0	11.9	11.6 - 12.2	63.1	61.9 - 64.3	13.5	13.2 - 13.8	8.7	9.1	12.7	12.7
144 Saint Lucia	62.7	61.2	60.0 - 62.5	12.5	12.2 - 12.8	64.2	63.0 - 65.7	14.4	14.1 - 14.8	8.6	10.2	12.3	13.7
145 Saint Vincent and the Grenadines	61.0	59.9	58.6 - 61.3	12.6	12.4 - 12.9	62.2	61.0 - 63.6	14.2	13.6 - 14.8	7.9	9.8	11.7	13.6
146 Samoa	59.7	59.2	58.1 - 60.3	10.9	10.7 - 11.2	60.3	59.3 - 61.6	11.6	11.3 - 11.9	7.6	9.4	11.3	13.5
147 San Marino	73.4	70.9	69.4 - 72.3	16.2	15.3 - 17.1	75.9	75.0 - 78.0	19.9	19.5 - 21.6	6.3	8.1	8.2	9.6
148 Sao Tome and Principe	54.4	54.2	47.7 - 59.7	11.0	9.6 - 12.7	54.7	46.7 - 59.5	11.4	10.1 - 12.6	7.5	9.0	12.2	14.1
149 Saudi Arabia	61.4	59.8	56.5 - 63.1	11.2	10.2 - 12.5	62.9	60.7 - 65.2	13.0	12.2 - 13.9	8.6	11.0	12.6	14.9
150 Senegal	48.0	47.1	41.0 - 52.1	9.9	8.9 - 11.1	48.9	41.9 - 54.4	10.7	9.8 - 11.9	7.3	8.4	13.4	14.7
151 Serbia and Montenegro	63.8	62.7	62.0 - 63.5	12.1	11.8 - 12.4	64.9	63.7 - 65.3	13.9	13.7 - 14.2	7.0	10.0	10.1	13.3
152 Seychelles	61.2	57.4	56.4 - 58.4	9.9	9.6 - 10.1	64.9	63.8 - 66.2	14.0	13.6 - 14.5	9.6	12.3	14.3	15.9
153 Sierra Leone	28.6	27.2	19.4 - 32.6	7.8	7.4 - 8.3	29.9	21.7 - 37.7	9.2	8.9 - 10.0	5.1	5.8	15.9	16.2
154 Singapore	70.1	68.8	67.7 - 70.0	14.5	14.0 - 15.1	71.3	70.6 - 72.1	16.3	15.9 - 16.5	8.6	10.4	11.1	12.7
155 Slovakia	66.2	63.0	62.3 - 63.8	12.3	12.1 - 12.5	69.4	68.7 - 70.2	16.1	15.9 - 16.4	6.7	8.9	9.6	11.4

Member State	Healthy life expectancy (HALE) (years)									Expectation of lost healthy years at birth (years)		Percentage of total life expectancy lost	
	Total population	Males				Females				Males	Females	Males	Females
		At birth	At birth	Uncertainty interval	At age 60	Uncertainty interval	At birth	Uncertainty interval	At age 60					Uncertainty interval
156 Slovenia	69.5	66.6	65.8 - 67.4	14.3	14.0 - 14.5	72.3	71.6 - 73.1	18.1	17.8 - 18.3	6.1	8.2	8.4	10.2
157 Solomon Islands	56.2	55.4	53.4 - 57.6	10.9	10.5 - 11.4	57.1	55.7 - 58.8	11.6	11.2 - 11.9	8.3	10.3	13.0	15.3
158 Somalia	36.8	36.1	30.5 - 40.4	8.3	7.6 - 9.0	37.5	29.6 - 43.3	9.4	8.9 - 10.2	6.9	8.1	16.1	17.7
159 South Africa	44.3	43.3	39.8 - 46.8	10.6	10.0 - 12.0	45.3	39.8 - 50.8	12.1	11.5 - 13.1	5.5	7.3	11.3	13.8
160 Spain	72.6	69.9	69.1 - 70.7	16.4	16.1 - 16.8	75.3	74.6 - 76.1	19.9	19.6 - 20.2	6.2	7.7	8.2	9.3
161 Sri Lanka	61.6	59.2	57.3 - 61.0	10.5	9.9 - 11.1	64.0	63.0 - 65.1	12.7	12.3 - 13.0	8.0	10.3	11.8	13.9
162 Sudan	48.5	47.2	41.8 - 52.7	9.8	8.7 - 11.5	49.9	43.0 - 54.6	10.7	9.5 - 11.8	7.8	9.4	14.1	15.9
163 Suriname	58.8	56.7	55.3 - 58.3	10.6	10.2 - 11.0	60.8	59.7 - 62.4	12.8	12.3 - 13.2	7.6	10.0	11.8	14.1
164 Swaziland	34.2	33.2	30.9 - 36.5	10.2	9.1 - 12.1	35.2	31.5 - 38.9	10.9	9.7 - 12.5	3.7	5.2	10.1	12.9
165 Sweden	73.3	71.9	71.2 - 72.5	17.1	16.8 - 17.4	74.8	74.0 - 75.5	19.6	19.3 - 19.9	6.2	7.9	7.9	9.5
166 Switzerland	73.2	71.1	70.3 - 71.8	17.1	16.7 - 17.5	75.3	74.5 - 76.0	20.4	20.1 - 20.7	6.6	8.1	8.5	9.7
167 Syrian Arab Republic	61.7	60.4	59.3 - 61.5	11.3	11.0 - 11.6	63.1	62.3 - 64.1	12.9	12.6 - 13.2	8.5	10.5	12.3	14.2
168 Tajikistan	54.7	53.1	51.7 - 55.0	9.5	9.3 - 9.7	56.4	54.5 - 57.6	11.0	10.7 - 11.2	7.9	10.1	13.0	15.2
169 Thailand	60.1	57.7	56.5 - 58.9	12.7	12.4 - 13.0	62.4	61.5 - 63.5	13.2	13.0 - 13.5	8.4	10.2	12.7	14.1
170 The former Yugoslav Republic of Macedonia	63.4	61.9	61.0 - 62.8	12.2	11.9 - 12.7	65.0	63.7 - 65.6	14.0	13.6 - 14.5	7.2	10.2	10.4	13.5
171 Timor-Leste	49.8	47.9	40.8 - 53.6	10.0	9.0 - 11.2	51.8	43.5 - 56.9	11.1	10.0 - 12.2	6.9	8.7	12.7	14.4
172 Togo	44.6	43.5	38.0 - 48.1	9.8	8.8 - 11.0	45.7	39.6 - 50.6	10.7	9.7 - 11.9	6.5	7.7	12.9	14.3
173 Tonga	61.8	61.9	61.0 - 62.7	11.9	11.7 - 12.1	61.8	61.0 - 62.7	12.0	11.8 - 12.2	8.2	9.6	11.7	13.5
174 Trinidad and Tobago	62.0	59.8	58.8 - 60.8	11.9	11.6 - 12.1	64.2	63.4 - 65.1	14.1	13.9 - 14.4	7.3	8.6	10.8	11.9
175 Tunisia	62.5	61.3	60.4 - 62.4	12.0	11.7 - 12.3	63.6	62.7 - 64.8	13.3	13.0 - 13.7	8.2	10.3	11.8	13.9
176 Turkey	62.0	61.2	60.3 - 62.2	12.8	12.5 - 13.0	62.8	61.7 - 64.0	14.2	13.8 - 14.6	6.			

Annex Table 5 Selected national health accounts indicators: measured levels of expenditure on health, 1997–2001

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Total expenditure on health as % of GDP					General government expenditure on health as % of total expenditure on health					Private expenditure on health as % of total expenditure on health					General government expenditure on health as % of total government expenditure				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
1 Afghanistan	5.6	5.5	5.5	5	5.2	50	52.8	53.1	53.8	52.6	50	47.2	46.9	46.2	47.4	14	14.6	14.8	13.5	11.8
2 Albania	3.8	3.4	3.6	3.8	3.7	61.2	61.9	62.3	63.9	64.6	38.8	38.1	37.7	36.1	35.4	7.8	6.9	6.9	7.7	7.3
3 Algeria	3.4	3.6	3.6	3.8	4.1	71.7	70.5	69.6	70.6	75	28.3	29.5	30.4	29.4	25	7.9	8.2	8.5	9.3	9.9
4 Andorra	5.7	7.8	5.9	5.5	5.7	71.5	78.6	71.6	70.1	71	28.5	21.4	28.4	29.9	29	32.5	39.2	31.8	32	26.3
5 Angola	3.9	3.5	3.3	3.5	4.4	45.2	39.8	44.3	55.8	63.1	54.8	60.2	55.7	44.2	36.9	4.6	2.5	2.4	3.3	5.5
6 Antigua and Barbuda	5.4	5.3	5.3	5.5	5.6	61.9	62.5	61.3	59.9	60.9	38.1	37.5	38.7	40.1	39.1	14.2	14.5	13.9	14.1	13
7 Argentina	8.1	8.2	9	8.9	9.5	55.5	55.2	56.2	55.2	53.4	44.5	44.8	43.8	44.8	46.6	22.9	22.6	23.3	22	21.3
8 Armenia	7.1	7.1	7.9	8	7.8	35.2	36.8	41	40.2	41.2	64.8	63.2	59	59.8	58.8	9.4	10.8	10.5	10.6	11.5
9 Australia	8.5	8.6	8.7	8.9	9.2	67.8	68.2	69.1	68.9	67.9	32.2	31.8	30.9	31.1	32.1	15.8	16.2	16.8	16.5	16.8
10 Austria	8	8	8	8	8	70.9	71.4	70	69.7	69.3	29.1	28.6	30	30.3	30.7	10.4	10.5	10.4	10.6	10.7
11 Azerbaijan	2.2	2.3	2	1.7	1.6	73.4	73.1	70.3	67.9	66.9	26.6	26.9	29.7	32.1	33.1	8.8	11	8	7.3	7.2
12 Bahamas	5.4	5.6	5.4	5.7	5.7	55.6	57.6	57.4	56.8	57	44.4	42.4	42.6	43.2	43	13.7	15.3	15	15.9	15.1
13 Bahrain	4.8	5	4.8	4.1	4.1	70.5	69.7	69.3	69.1	69	29.5	30.3	30.7	30.9	31	11.9	11.5	11.4	10.8	10.8
14 Bangladesh	2.9	2.9	3.1	3.6	3.5	33.7	36	36.9	45.3	44.2	66.3	64	63.1	54.7	55.8	5.6	5.9	6.3	8.6	8.7
15 Barbados	5.9	5.9	6.1	6.2	6.5	65.2	65.6	65.7	65.9	66.3	34.8	34.4	34.3	34.1	33.7	11.7	11.8	12	12	11.5
16 Belarus	6.1	5.7	5.8	5.4	5.6	87.2	86.1	85.5	85.4	86.7	12.8	13.9	14.5	14.6	13.3	11.6	11.9	11.7	13.1	14.2
17 Belgium	8.4	8.4	8.5	8.6	8.9	71.5	72	72.2	72.1	71.7	28.5	28	27.8	27.9	28.3	11.7	11.9	12.3	12.6	13
18 Belize	4.7	4.9	5.1	5	5.2	51	51.7	48.6	48	45.1	49	48.3	51.4	52	54.9	5.6	5.6	5.5	5.3	5
19 Benin	3.7	3.8	3.9	4.2	4.4	34	36.5	38.6	43.3	46.9	66	63.5	61.4	56.7	53.1	6.7	8.5	8.7	8.9	10.9
20 Bhutan	3.6	3.8	3.5	3.9	3.9	90.4	90.3	89.6	90.6	90.6	9.6	9.7	10.4	9.4	9.4	10.1	9.6	8.3	9.2	7.5
21 Bolivia	4.7	5	5.2	5.2	5.3	63.9	65.6	66.1	67	66.3	36.1	34.4	33.9	33	33.7	9.1	10	10.4	10.3	10.3
22 Bosnia and Herzegovina	6.7	7.9	7.7	7.7	7.5	52.4	40.2	39.4	39.7	36.8	47.6	59.8	60.6	60.3	63.2	12.6	11.7	9.4	9.1	9.6
23 Botswana	5.7	5.5	6	6	6.6	58.8	59.7	60.6	62	66.2	41.2	40.3	39.4	38	33.8	7.8	7.2	7.4	8.4	7.6
24 Brazil	7.4	7.4	7.8	7.6	7.6	43.5	44	42.8	40.8	41.6	56.5	56	57.2	59.2	58.4	9.1	9	9.3	8.4	8.8
25 Brunei Darussalam	2.8	3	3.2	3.1	3.1	79.4	81.3	79.4	80	79.4	20.6	18.7	20.6	20	20.6	4.5	5.1	5.1	5.2	5.1
26 Bulgaria	4.7	3.9	5	4.8	4.8	82.8	79.4	83.7	82.5	82.1	17.2	20.6	16.3	17.5	17.9	10	8.1	10.5	9.3	9.3
27 Burkina Faso	3.5	3.5	3.8	3.5	3	67.1	65.3	66.6	63.5	60.1	32.9	34.7	33.4	36.5	39.9	9.6	9.6	8.8	8.1	8.1
28 Burundi	3.1	3.2	3.2	3.5	3.6	50.3	53.8	55.3	55.6	59	49.7	46.2	44.7	44.4	41	7.5	7.7	8.4	7.1	8.1
29 Cambodia	10.9	10.8	10.8	11.8	11.8	10.2	10.1	10.1	14.2	14.9	89.8	89.9	89.9	85.8	85.1	12.5	11.8	11.3	15.7	16
30 Cameroon	3.7	3.4	3.1	3.1	3.3	21.2	19.2	22.8	33.7	37.1	78.8	80.8	77.2	66.3	62.9	5.2	4.1	4.4	7.9	7.8
31 Canada	8.9	9.1	9.1	9.1	9.5	70	70.7	70.4	70.9	70.8	30	29.3	29.6	29.1	29.2	13.9	14.4	15	15.5	16.2
32 Cape Verde	3.8	4.1	3.9	4.3	4.5	75.8	79.1	80.1	82.9	83.9	24.2	20.9	19.9	17.1	16.1	6.8	8.9	8.4	10.1	12.2
33 Central African Republic	3.6	4	4.1	4.3	4.5	37.9	44.4	48	49.2	51.2	62.1	55.6	52	50.8	48.8	8.4	9	10.1	13.9	18.5
34 Chad	2.8	2.3	2.7	3.1	2.6	78.1	72.7	75	78.7	76	21.9	27.3	25	21.3	24	12.5	10.8	11.2	12.2	15.2
35 Chile	6.6	6.9	6.8	6.8	7	37.8	39.6	40.8	42.6	44	62.2	60.4	59.2	57.4	56	12.1	12.4	11.8	11.9	12.7
36 China	4.6	4.8	5.1	5.3	5.5	40	39	38	36.6	37.2	60	61	62	63.4	62.8	14.2	13.3	11.8	10.8	10.2
37 Colombia	7.7	5.8	6.4	5.5	5.5	47.7	60.2	62	67.3	65.7	52.3	39.8	38	32.7	34.3	14.5	13	12.9	12.7	10.8
38 Comoros	3.1	3	3.1	3.1	3.1	60.3	58.6	59.6	59.7	60	39.7	41.4	40.4	40.3	40	5.9	5.1	5.8	5.7	5.8
39 Congo	3	3.1	2.6	2	2.1	70.3	76.9	70.6	73.3	63.8	29.7	23.1	29.4	26.7	36.2	5.7	5.6	5.7	5.6	5.7
40 Cook Islands	5.1	5.1	4.8	4.6	4.7	72.7	71.9	65.1	64.4	67.6	27.3	28.1	34.9	35.6	32.4	9.5	9.2	9.1	8.6	8.9
41 Costa Rica	6.7	6.7	6.5	6.9	7.2	70.7	67.6	68.5	68.5	68.5	29.3	32.4	31.5	31.5	31.5	20.8	20.5	20.1	20.4	19.5
42 Côte d'Ivoire	6.2	6.4	6.3	6.2	6.2	19	19.2	20	15.4	16	81	80.8	80	84.6	84	5.4	5.9	6.4	5.3	6
43 Croatia	8.1	8.8	8.9	9.4	9	80.5	81.8	82.6	83.2	81.8	19.5	18.2	17.4	16.8	18.2	13.2	13.7	13.4	14.4	12.8
44 Cuba	6.6	6.6	7.1	7.1	7.2	83.7	84.7	85.5	85.8	86.2	16.3	15.3	14.5	14.2	13.8	10	10.3	11.1	10.8	11.4
45 Cyprus	8.3	8.1	7.6	8	8.1	50.3	52	50.6	48.7	47.7	49.7	48	49.4	51.3	52.3	11.4	11.4	10.9	10.7	10.2
46 Czech Republic	7.1	7.1	7.1	7.1	7.4	91.7	91.9	91.5	91.4	91.4	8.3	8.1	8.5	8.6	8.6	14	13.6	13.9	13.9	14.1
47 Democratic People's Republic of Korea	2.2	2.8	2.6	2.4	2.5	71.4	76.9	75.3	73.5	73.4	28.6	23.1	24.7	26.5	26.6	3.5	3.3	3.2	2.9	3
48 Democratic Republic of the Congo	3.3	3	3.1	3.2	3.5	47.1	41.7	41.5	44.7	44.4	52.9	58.3	58.5	55.3	55.6	10.3	8.3	8.7	9.7	10.3
49 Denmark	8.2	8.4	8.5	8.2	8.4	82.3	82	82.2	82.5	82.4	17.7	18	17.8	17.5	17.6	11.7	11.9	12.4	12.6	12.8
50 Djibouti	7.3	7.2	7.1	7.1	7	58.1	58	58.4	58.4	58.8	41.9	42	41.6	41.6	41.2	11.8	12.5	12.4	12.5	13.7
51 Dominica	5.9	5.7	6.2	5.8	6	75	74.7	74.3	71.5	71.3	25	25.3	25.7	28.5	28.7	11.8	11.8	12.8	12.8	10.5
52 Dominican Republic	5.8	5.8	5.7	6.2	6.1	32	31.4	32.2	35.4	36.1	68	68.6	67.8	64.6	63.9	12.2	11.8	11.3	14.6	13.5
53 Ecuador	4.4	4.4	3.7	4.1	4.5	53.3	50.3	55.6	55.2	50.3	46.7	49.7	44.4	44.8	49.7	10.4	10.7	9	9.3	9.5
54 Egypt	3.9	3.9	3.9	3.8	3.9	45.9	46	46.4	46.1	48.9	54.1	54	53.6	53.9	51.1	5.9	6.5	6.2	6.5	7.4
55 El Salvador	8.1	8.2	8	8	8	38.7	42.5	43.5	45.1	46.7	61.3	57.5	56.5	54.9	53.3	22.6	24.2	25.1	25	24

Member State	External resources for health as % of total expenditure on health					Social security expenditure on health as % of general government expenditure on health					Out-of-pocket expenditure as % of private expenditure on health					Private prepaid plans as % of private expenditure on health				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
1 Afghanistan	9.1	3.7	4.4	14.8	11.2	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
2 Albania	9.4	7.4	5.1	7	3.4	20.6	24.2	22.5	18.5	19.3	65.1	61.2	63.3	65	65.3	34.1	38	36	34.3	33.9
3 Algeria	0.2	0	0.1	0.1	0.1	46.9	45.2	43.5	39.9	37.4	91.9	91.6	92	91.1	89.9	4.1	4.2	4	4.2	5.1
4 Andorra	0	0	0	0	0	78.6	60	87.5	88.1	86.2	95.5	95.2	95.6	96.1	92.6	n/a	n/a	n/a	n/a	n/a
5 Angola	9.4	5.6	8.7	14.3	14.2	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
6 Antigua and Barbuda	2.4	3.4	3.2	3.1	2.9	n/a	n/a	n/a	n/a	n/a	100	100	100	100	100	n/a	n/a	n/a	n/a	n/a
7 Argentina	0.3	0.3	0.3	0.3	0.3	61	60.2	59	59.5	58.6	63.2	63.8	64	63.3	62.4	33.4	32	31.9	32.6	31.1
8 Armenia	4.5	5.2	2.2	2	3.7	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
9 Australia	0	0	0	0	0	0	0	0	0	0	53.7	57.6	59.3	60.4	59.6	27.8	24	21.3	23.4	24.2
10 Austria	0	0	0	0	0															

Annex Table 5 Selected national health accounts indicators: measured levels of expenditure on health, 1997–2001

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Total expenditure on health as % of GDP					General government expenditure on health as % of total expenditure on health					Private expenditure on health as % of total expenditure on health					General government expenditure on health as % of total government expenditure				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
56 Equatorial Guinea	3	4.1	2.8	2.1	2	63.1	62	61.9	62.5	60.4	36.9	38	38.1	37.5	39.6	10.4	8.3	9.9	10	10
57 Eritrea	4.4	5	5.4	5.6	5.7	65.8	66.1	67.6	67.2	65.1	34.2	33.9	32.4	32.8	34.9	5.3	4.5	4.5	4.5	4.5
58 Estonia	5.5	6	6.5	5.9	5.5	86.7	86.4	80.4	76.8	77.8	13.3	13.6	19.6	23.2	22.2	12.6	13.4	12.7	12.4	12.1
59 Ethiopia	3.4	3.6	3.5	3.2	3.6	37.9	39.3	37.7	34.5	40.5	62.1	60.7	62.3	65.5	59.5	5.8	5.9	4.3	3.2	4.9
60 Fiji	3.9	4.1	3.7	3.9	4	66.7	65.4	65.2	65.2	67.1	33.3	34.6	34.8	34.8	32.9	7.4	6.9	7.5	7.2	6.9
61 Finland	7.3	6.9	6.9	6.6	7	76.1	76.3	75.3	75.1	75.6	23.9	23.7	24.7	24.9	24.4	9.8	10	10	10.3	10.7
62 France	9.4	9.3	9.3	9.4	9.6	76.2	76	76	75.8	76	23.8	24	24	24.2	24	13	13.1	13.2	13.4	13.7
63 Gabon	2.9	3.7	3.5	3.3	3.6	65.6	66.8	64.9	50.2	47.9	34.4	33.2	35.1	49.8	52.1	5.9	7.4	7.5	7.2	7.3
64 Gambia	6.1	7.1	6.7	6.3	6.4	47.2	42.9	46.9	46.8	49.4	52.8	57.1	53.1	53.2	50.6	11.3	13.2	13.8	13.3	13.6
65 Georgia	2.9	2.4	2.5	3.4	3.6	39.9	45.4	37.6	33.5	37.8	60.1	54.6	62.4	66.5	62.2	5.3	5.1	4.3	5.9	6.7
66 Germany	10.7	10.6	10.7	10.6	10.8	75.3	74.8	74.8	75	74.9	24.7	25.2	25.2	25	25.1	16.3	16.3	16.3	17.3	16.6
67 Ghana	4.1	4.3	4.2	4.3	4.7	47.6	53.8	53.9	55.9	59.6	52.4	46.2	46.1	44.1	40.4	9.4	9	9.2	8.1	8.6
68 Greece	9.4	9.4	9.6	9.4	9.4	52.8	52.1	53.4	56.1	56	47.2	47.9	46.6	43.9	44	10.8	10.5	11	10.8	11.2
69 Grenada	4.7	4.8	4.8	4.9	5.3	66.1	65.8	69.7	70.1	71.9	33.9	34.2	30.3	29.9	28.1	10.6	11.3	12.3	12.3	12.4
70 Guatemala	3.8	4.4	4.7	4.7	4.8	37.2	47.4	48.3	47.6	48.3	62.8	52.6	51.7	52.4	51.7	11.3	14	15.5	16.3	15.7
71 Guinea	3.6	3.3	3.6	3.4	3.5	56.3	51.4	55.3	53.4	54.1	43.7	48.6	44.7	46.6	45.9	9.3	9.6	9.4	10.9	11.3
72 Guinea-Bissau	5.4	5.5	5.9	6.1	5.9	43.2	44.5	48.5	55.3	53.8	56.8	55.5	51.5	44.7	46.2	7.3	9.8	9.1	7.7	7.4
73 Guyana	4.8	5	4.8	5.1	5.3	83.5	83.4	84	82.7	79.9	16.5	16.6	16	17.3	20.1	9.3	9.3	9.1	9.3	9.3
74 Haiti	4.9	5.1	4.9	4.8	5	51.7	49.9	51	50.7	53.4	48.3	50.1	49	49.3	46.6	12	11.7	11	12.3	14.1
75 Honduras	5.4	5.6	5.6	6	6.1	53	53.8	51.8	53.5	53.1	47	46.2	48.2	46.5	46.9	13.7	14.6	13.7	13.6	13.8
76 Hungary	7	6.9	6.8	6.7	6.8	81.3	79.4	78.1	75.5	75	18.7	20.6	21.9	24.5	25	11.4	10.1	11.4	11.7	11.5
77 Iceland	8.2	8.6	9.5	9.3	9.2	83.1	83	84	83.7	82.9	16.9	17	16	16.3	17.1	16.3	16.8	18.3	18	17.5
78 India	5.3	5	5.2	5.1	5.1	15.7	18.4	17.9	17.6	17.9	84.3	81.6	82.1	82.4	82.1	3.2	3.5	3.3	3.1	3.1
79 Indonesia	2.4	2.5	2.6	2.7	2.4	23.7	27.2	28	23.7	25.1	76.3	72.8	72	76.3	74.9	2.8	3.2	3.6	3.2	3
80 Iran, Islamic Republic of	5.9	6	6.5	6.4	6.3	45	43.9	41.9	41.5	43.5	55	56.1	58.1	58.5	56.5	10.5	10.8	11.2	11.8	12
81 Iraq	3.4	3.3	3.3	3.3	3.2	32.7	31.7	31	31.2	31.8	67.3	68.3	69	68.8	68.2	4.2	4.3	4.5	4.5	4.6
82 Ireland	6.4	6.2	6.2	6.4	6.5	74.6	76.5	72.8	73.3	76	25.4	23.5	27.2	26.7	24	12.9	13.6	13.1	14.6	14
83 Israel	8.1	8.1	8.2	8.2	8.7	74	72	71	69.8	69.2	26	28	29	30.2	30.8	12.1	11.4	11.8	12.1	11.5
84 Italy	7.7	7.7	7.8	8.2	8.4	72.2	71.8	72	73.4	75.3	27.8	28.2	28	26.6	24.7	10.9	11.1	11.5	12.8	13
85 Jamaica	6.5	6.5	6.1	6.2	6.8	56.2	59.5	50.9	47	42.1	43.8	40.5	49.1	53	57.9	7.7	7.7	5.9	5.3	4.4
86 Japan	6.8	7.1	7.5	7.7	8	77.2	77.4	78.1	77.7	77.9	22.8	22.6	21.9	22.3	22.1	14.9	13.2	15.3	15.5	16.4
87 Jordan	8.2	8.1	8.6	9.2	9.5	54.5	57	50.8	46.5	47	45.5	43	49.2	53.5	53	11.7	12.4	12.4	12.5	12.8
88 Kazakhstan	3.2	3.5	3.5	3.3	3.1	72.9	70	63.5	62.9	60.4	27.1	30	36.5	37.1	39.6	8.9	9.4	9.6	9	8
89 Kenya	8	8.4	7.9	8.7	7.8	21.7	24.1	18.7	23.8	21.4	78.3	75.9	81.3	76.2	78.6	6.1	7.2	5.1	8.6	6.2
90 Kiribati	8.7	8.3	7.8	8.3	8.6	99.1	99	98.9	98.8	98.8	0.9	1	1.1	1.2	1.2	11.2	10.9	9.7	10	9.3
91 Kuwait	3.7	4.4	3.9	3.5	3.9	79.5	78.8	78.7	78.7	78.8	20.5	21.2	21.3	21.3	21.2	8.4	8	8.2	8.9	8.1
92 Kyrgyzstan	5.7	5.6	5	4.2	4	48.4	49.5	48.3	48.3	48.7	51.6	50.5	51.7	51.7	51.3	10.5	10.1	10.2	9.5	9
93 Lao People's Democratic Republic	2.9	2.5	3	2.9	3.1	62.1	48.6	49.4	53.3	55.5	37.9	51.4	50.6	46.7	44.5	9.8	5.7	8.8	7.6	8.7
94 Latvia	6.8	6.8	6.9	6.3	6.4	56.8	60.7	59.7	55.8	52.5	43.2	39.3	40.3	44.2	47.5	10.1	10.6	10	8.8	9.1
95 Lebanon	11.8	12.4	12.1	12.6	12.2	31.1	27.2	26.7	29.3	28.1	68.9	72.8	73.3	70.7	71.9	8.6	9.8	9	8.3	9.5
96 Lesotho	5.3	5.9	6.1	6.1	5.5	76	78.3	80.9	80.8	78.9	24	21.7	19.1	19.2	21.1	12.4	11.5	11.9	12	12
97 Liberia	3.2	3.5	4	4.2	4.3	69.1	73.4	76.5	76.2	75.9	30.9	26.6	23.5	23.8	24.1	9.3	10.1	10.8	10.7	10.6
98 Libyan Arab Jamahiriya	3.4	3.7	3.5	2.8	2.9	47.9	49.6	49.1	51.5	56	52.1	50.4	50.9	48.5	44	6.2	5.3	5.6	4.9	5
99 Lithuania	6	6.4	6.3	6.2	6	76.2	75.1	73.5	70.7	70.5	23.8	24.9	26.5	29.3	29.5	13.6	14.8	11.7	13.9	14
100 Luxembourg	6	5.9	6	5.5	6	91.1	90.9	89.4	89.3	89.9	8.9	9.1	10.6	10.7	10.1	12.5	12.7	12.9	12.3	13.3
101 Madagascar	1.8	2.7	2.5	2.4	2	78.4	64.4	58.5	64.8	65.9	21.6	35.6	41.5	35.2	34.1	9	10.3	8.4	9.2	7.7
102 Malawi	8.7	8.5	8.7	8.2	7.8	35.6	35.5	37.8	36.9	35	64.4	64.5	62.2	63.1	65	12.2	12.9	13.9	12.2	12.3
103 Malaysia	2.8	3	3.1	3.3	3.8	53.5	51.6	52.9	53.1	53.7	46.5	48.4	47.1	46.9	46.3	6.1	5.1	6	6.1	6.5
104 Maldives	6.5	6.4	6.8	6.9	6.7	81.9	81.8	82.5	84	83.5	18.1	18.2	17.5	16	16.5	10.9	10.1	10.4	10.9	10.3
105 Mali	4.2	4.2	4.1	4.7	4.3	43.3	37.5	32.6	38.9	38.6	56.7	62.5	67.4	61.1	61.4	8.2	7	5.7	7.8	6.8
106 Malta	8.6	8.4	8.3	8.8	8.8	67.9	69.3	67.5	68.5	68.5	32.1	30.7	32.5	31.5	31.5	11.7	11.9	11.8	13.2	12.8
107 Marshall Islands	9.9	9.7	9.5	9.8	9.8	70.5	66.4	65.2	65	64.7	29.5	33.6	34.8	35	35.3	10.7	10.9	10.8	9.6	9.6
108 Mauritania	3.4	3.6	3.6	3.7	3.6	74.5	71.1	71.9	73.5	72.4	25.5	28.9	28.1	26.5	27.6	10.2	10.1	10.5	11	10.3
109 Mauritius	3	3.2	3.1	3.3	3.4	61.2	62.6	62	58.7	59.5	38.8	37.4	38	41.3	40.5	6.8	7	7.2	6.6	7.6
110 Mexico	5.5	5.6	5.7	5.7	6.1	45.3	46.6	46.9	45.7	44.3	54.7	53.4	53.1	54.3	55.7	15	16.8	17.2	16.6	16.7

Member State	External resources for health as % of total expenditure on health					Social security expenditure on health as % of general government expenditure on health					Out-of-pocket expenditure as % of private expenditure on health					Private prepaid plans as % of private expenditure on health				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
56 Equatorial Guinea	23.6	29.2	14.9	17.2	10.6	0	0	0	0	0	95.1	95.1	89.3	70.5	52.3	0	0	0	0	0
57 Eritrea	48.1	41.5	49.8	51.1	52.3	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
58 Estonia	1.7	1.5	3.5	0.9	0	84.6	77.1	82	85.9	86	97.9	96.6	71.3	84.9	84.7	0	0	4.1	4.1	4.8
59 Ethiopia	9.3	23.5	27.6	29.6	34.3	0.7	0.7	0.8	1	0.8	86.2	85.7	85.4	84.6	84.7	0	0	0	0	0
60 Fiji	4.2	7.7	11.1	10.9	10.1	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
61 Finland	0	0	0	0	0	18.7	19.4	19.8	20.5	20.8	82.4	81.9	82.2	81.9	82.7	11	11.1	10.8	10.5	8.3
62 France	0	0	0	0	0	96.8	96.8	96.7	96.7	96.5	43.5	43.1	43	43.1	42.6	52.2	52.6	52.6	52.6	53.1
63 Gabon	3.7	4	4.6	1.3	1.8	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
64 Gambia	29.4	25	28.2	26.1	26.6	0	0	0	0	0	89.2	86.3	88.6	88.9	90	0	0	0	0	0

Annex Table 5 Selected national health accounts indicators: measured levels of expenditure on health, 1997–2001

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Total expenditure on health as % of GDP					General government expenditure on health as % of total expenditure on health					Private expenditure on health as % of total expenditure on health					General government expenditure on health as % of total government expenditure					
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	
111	Micronesia, Federated States of	8.3	8	7.9	7.9	7.8	73.7	72.6	71.8	71.8	72	26.3	27.4	28.2	28.2	28	9.8	7.9	7.9	8.5	8.5
112	Monaco	7	7.2	7.4	7.4	7.6	54.7	53.6	52.7	54.5	56.1	45.3	46.4	47.3	45.5	43.9	15.9	16.1	16.3	16.8	17.7
113	Mongolia	5	6.2	6.1	6.3	6.4	62.7	65.4	66.5	70.3	72.3	37.3	34.6	33.5	29.7	27.7	9.1	9	9.8	10.5	10.5
114	Morocco	4.3	4.4	4.4	4.7	5.1	26	28.3	29.1	34	39.3	74	71.7	70.9	66	60.7	3.7	4	3.9	4.7	5.3
115	Mozambique	5	4.9	5	5.7	5.9	60.5	62	64	66.6	67.4	39.5	38	36	33.4	32.6	15.1	15.5	16.5	18.2	18.9
116	Myanmar	2.1	2	2	2	2.1	14.3	10.6	11.7	17.1	17.8	85.7	89.4	88.3	82.9	82.2	2.7	2.5	3	5	5.7
117	Namibia	6.8	6.8	7	6.9	7	72.8	72.2	73.3	68.9	67.8	27.2	27.8	26.7	31.1	32.2	13.1	13	13.1	12.4	12.4
118	Nauru	7.6	7.9	7.7	7.7	7.5	89.1	89	89.1	88.9	88.7	10.9	11	10.9	11.1	11.3	9.1	9.1	9.2	9.2	9.1
119	Nepal	5.4	5.5	5.3	5.2	5.2	31.3	33.3	29.8	30.1	29.7	68.7	66.7	70.2	69.9	70.3	9.3	9.9	9	9	8.1
120	Netherlands	8.2	8.6	8.7	8.6	8.9	67.8	64.4	63.3	63.4	63.3	32.2	35.6	36.7	36.6	36.7	11.5	11.7	11.7	12.1	12.2
121	New Zealand	7.5	7.9	8	8	8.3	77.3	77	77.9	78	76.8	22.7	23	22.1	22	23.2	12.7	13.5	14.1	14.5	14.8
122	Nicaragua	6.2	6	5.8	7.1	7.8	53.8	60.3	54	52.5	48.5	46.2	39.7	46	47.5	51.5	18.7	20.2	13.8	17	17.9
123	Niger	3.4	3.3	3.2	3.6	3.7	41.7	43	43.6	43.1	39.1	58.3	57	56.4	56.9	60.9	8.9	8.3	7.8	8.6	7.7
124	Nigeria	2.8	3.1	3	3	3.4	11.7	15.4	16	14.1	23.2	88.3	84.6	84	85.9	76.8	2.1	2.3	1.7	1.7	1.9
125	Niue	7.6	7.4	7.9	8	7.7	97.1	97	97	97	97	2.9	3	3	3	3	13	13.9	15.3	15.4	14.8
126	Norway	7.8	8.5	8.5	7.6	8	84.3	84.7	85.2	85.2	85.5	15.7	15.3	14.8	14.8	14.5	14	14.5	15.1	14.9	15.2
127	Oman	3.4	3.8	3.5	3	3	81.9	82.3	82.2	81.1	80.7	18.1	17.7	17.8	18.9	19.3	7.4	7.6	7.7	7	6.5
128	Pakistan	3.8	3.9	4	4.1	3.9	27.2	29.1	25.6	24.5	24.4	72.8	70.9	74.4	75.5	75.6	3.8	4.2	3.7	3.3	3.5
129	Palau	8.5	8.9	9	9	9.2	91.6	92.9	91.4	91.7	92	8.4	7.1	8.6	8.3	8	10.7	11.3	11.3	11.3	11.6
130	Panama	7.4	7.4	7.6	7.6	7	68.3	70.2	69.9	69.2	69	31.7	29.8	30.1	30.8	31	18.7	18.5	18.5	18.4	18.4
131	Papua New Guinea	3.2	3.8	4.2	4.3	4.4	89	90.9	89.9	89.7	89	11	9.1	10.1	10.3	11	9.6	12.3	13.3	12.9	13
132	Paraguay	7.6	7.3	7.9	7.9	8	32.8	37.4	39.4	38.3	38.3	67.2	62.6	60.6	61.7	61.7	13.6	14.9	17.4	16.8	16.9
133	Peru	4.4	4.6	4.9	4.7	4.7	51.4	54.8	55.9	55.4	55	48.6	45.2	44.1	44.6	45	11.6	12.9	13	12.7	12.1
134	Philippines	3.6	3.5	3.5	3.4	3.3	43.4	43.4	44.8	48.2	45.2	56.6	56.6	55.2	51.8	54.8	6.7	6.6	6.5	7.1	6.2
135	Poland	6.1	6.4	6.2	5.8	6.1	72	65.4	71.1	70	71.9	28	34.6	28.9	30	28.1	9.5	9.4	10.6	10.2	10.9
136	Portugal	8.6	8.6	8.7	9.1	9.2	64.8	65.5	67.6	68.5	69	35.2	34.5	32.4	31.5	31	12.4	12.8	13	13.7	13.7
137	Qatar	3.9	4.5	3.8	2.8	3.1	76.8	76.9	76	74.2	73.5	23.2	23.1	24	25.8	26.5	7	7.6	7.5	6.7	6.5
138	Republic of Korea	5	5.1	5.6	5.9	6	41	46.2	43.1	44.4	44.4	59	53.8	56.9	55.6	55.6	9	9.3	9.7	10.7	9.5
139	Republic of Moldova	8.6	7.2	5.7	5.9	5.7	70.7	60.3	50.5	49.8	49.7	29.3	39.7	49.5	50.2	50.3	12.2	10.1	8.3	8.5	9.4
140	Romania	5	6.6	6.8	6.6	6.5	66.7	74.2	77.8	78.9	79.2	33.3	25.8	22.2	21.1	20.8	9.9	13.7	14.1	14.2	15.9
141	Russian Federation	5.8	5.8	5.4	5.3	5.4	72.9	68.9	64.7	69.9	68.2	27.1	31.1	35.3	30.1	31.8	9.3	9.8	9.4	10.8	10.7
142	Rwanda	5	5	5.5	5.6	5.5	48.8	51.3	54	52.9	55.5	51.2	48.7	46	47.1	44.5	12.5	13.8	13.5	14.8	14.2
143	Saint Kitts and Nevis	4.8	4.8	4.7	4.7	4.8	66.3	66.7	66.2	66.3	66.3	33.7	33.3	33.8	33.7	33.7	10.9	11	10.6	10.6	10.9
144	Saint Lucia	4.2	4.3	4.1	4.2	4.5	62.3	65.6	65.3	65.2	64.6	37.7	34.4	34.7	34.8	35.4	9	8.8	8.3	8.2	8
145	Saint Vincent and the Grenadines	6.1	5.9	6	6	6.1	63.8	62.5	62.7	65.1	63.5	36.2	37.5	37.3	34.9	36.5	9.2	8.7	9.1	9.3	9.3
146	Samoa	5.4	5.8	6.2	5.8	5.8	73.6	73.5	74.1	76.9	82.2	26.4	26.5	25.9	23.1	17.8	11.5	13.1	12.9	14.7	15.7
147	San Marino	5.9	6.1	6.3	6.7	6.8	75.1	75.4	75.8	77.1	78	24.9	24.6	24.2	22.9	22	11	12	12.4	13.4	13.8
148	Sao Tome and Principe	3	2.9	2.3	2.4	2.3	66.7	67.9	67.9	67.8	67.7	33.3	32.1	32.1	32.2	32.3	2.9	3.6	3.6	3.6	3.5
149	Saudi Arabia	5.3	5.2	4.5	4.4	4.6	77.3	76.3	73.7	74.4	74.6	22.7	23.7	26.3	25.6	25.4	11.4	11.5	11	9.9	10
150	Senegal	5.1	4.9	4.7	4.6	4.8	54.8	57.5	56.1	56.6	58.8	45.2	42.5	43.9	43.4	41.2	14.4	15	13	13.6	12.9
151	Serbia and Montenegro	11	9.9	9.2	7.6	8.2	74	71.3	70.9	77.6	79.2	26	28.7	29.1	22.4	20.8	21.1	17.5	15.9	14.7	15
152	Seychelles	6.7	6.4	6.2	5.9	6	72.3	69.4	68.8	66.5	68.2	27.7	30.6	31.2	33.5	31.8	8.1	7.5	7.4	6.7	7
153	Sierra Leone	3.3	3	3.7	4.3	4.3	46.8	44.2	53.8	60.4	61	53.2	55.8	46.2	39.6	39	8.9	9.4	9.4	9.3	9.4
154	Singapore	3.7	4.2	4	3.6	3.9	39	41.6	38.3	35.2	33.5	61	58.4	61.7	64.8	66.5	8.4	8.7	8.2	6.7	5.9
155	Slovakia	5.9	5.8	5.8	5.7	5.7	91.7	91.6	89.6	89.4	89.3	8.3	8.4	10.4	10.6	10.7	8.5	8.8	9.2	8.2	8.9
156	Slovenia	7.8	8.3	8.2	8	8.4	79.2	75.7	75.5	76	74.9	20.8	24.3	24.5	24	25.1	14.3	14.3	14	14.5	14.6
157	Solomon Islands	3.7	4.5	4.9	4.9	5	92	93	93.4	93.4	93.5	8	7	6.6	6.6	6.5	11.4	11.4	11.1	11.4	11.5
158	Somalia	2.6	2.7	2.7	2.6	2.6	45.5	46.1	45	44.8	44.6	54.5	53.9	55	55.2	55.4	4.4	4.4	4.2	4.2	4.2
159	South Africa	9	8.7	8.8	8.7	8.6	46.1	42.4	42.6	41.8	41.4	53.9	57.6	57.4	58.2	58.6	12.4	11.3	11.1	11.2	10.9
160	Spain	7.5	7.5	7.5	7.5	7.5	72.5	72.2	72.1	71.7	71.4	27.5	27.8	27.9	28.3	28.6	13	13.1	13.4	13.4	13.6
161	Sri Lanka	3.2	3.4	3.5	3.6	3.6	49.5	51.3	49	49.2	48.9	50.5	48.7	51	50.8	51.1	6	5.8	5.7	6.1	6.1
162	Sudan	3.5	3.7	3.7	3.9	3.5	19.6	24.4	22.9	28.7	18.7	80.4	75.6	77.1	71.3	81.3	9.1	12	9.5	9.3	4.6
163	Suriname	9.5	9.9	9.8	9.9	9.4	52.4	61.7	59.6	63.3	60.2	47.6	38.3	40.4	36.7	39.8	17.1	18.2	17.6	18.9	17
164	Swaziland	3.1	3.2	3.3	3.4	3.3	71.6	70.8	67.7	69.9	68.5	28.4	29.2	32.3	30.1	31.5	7.9	7.7	7	7.8	7.5
165	Sweden	8.2	8.3	8.4	8.4	8.7	85.8	85.8	85.7	85	85.2	14.2	14.2	14.3	15	14.8	11.2	11.8	12	12.4	13

Member State	External resources for health as % of total expenditure on health					Social security expenditure on health as % of general government expenditure on health					Out-of-pocket expenditure as % of private expenditure on health					Private prepaid plans as % of private expenditure on health								
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
111	Micronesia, Federated States of	n/a	n/a	22.5	22.1	16.2	0	0	0	0	0	35.7	35.7	35.7	35.7	35.7	0	0	0	0	0			
112	Monaco	0	0	0	0	0	94.3	94.6	94.9	95.2	95.7	100	100	100	100	100	0	0	0	0	0			
113	Mongolia	4.2	9	18.9	17.2	15.4	36.8	39.9	39.3	40.2	40.3	73.3	74.5	74.1	73.9	73.4	0	0	0	0	0			
114	Morocco	2.6	2.2	1.5	1.7	1.4	9.8	9	9	7.6	5.8	74.3	74.4	74.3	74.3	74.1	22.8	22.5	22.7	22.6	22.7			
115	Mozambique	53.1	44.2	40.3	38.2	36.9	0	0	0	0	0	42.8	40.5	39.2	39.3	39.3	0.6	0.5	0.6	0.5	0.5			
116	Myanmar	0.4	0.4	0.3	0.4	0.2	3.6	3	2.1	2	1.8	99.6	99.7	99.8	99.6	99.6	0	0	0	0	0			
117	Namibia	2.6	2.5	2.5	3.8	3.8	1.5	1.4	1.2	1.8	1.9	22	2											

Annex Table 5 Selected national health accounts indicators: measured levels of expenditure on health, 1997–2001Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Total expenditure on health as % of GDP					General government expenditure on health as % of total expenditure on health					Private expenditure on health as % of total expenditure on health					General government expenditure on health as % of total government expenditure					
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	
166	Switzerland	10.4	10.6	10.7	10.7	11	55.2	54.9	55.3	55.6	57.1	44.8	45.1	44.7	44.4	42.9	15.3	15.4	11.9	12.5	13.2
167	Syrian Arab Republic	5.5	5.6	5.8	5.4	5.4	37.4	38.4	39	40.8	43.9	62.6	61.6	61	59.2	56.1	7.2	7.1	7.2	7.3	7
168	Tajikistan	3.2	3.6	3.4	3.3	3.3	39	32.4	30.6	28.2	28.9	61	67.6	69.4	71.8	71.1	7.4	7.4	6.3	6.5	6.5
169	Thailand	3.7	3.9	3.7	3.6	3.7	57.2	61.2	57.6	56.8	57.1	42.8	38.8	42.4	43.2	42.9	10.2	13.3	11.6	11.6	11.6
170	The former Yugoslav Republic of Macedonia	6.1	7.6	6.4	6	6.8	83.9	87.1	85.4	84.5	84.9	16.1	12.9	14.6	15.5	15.1	14.5	19	16.3	15.6	17.4
171	Timor-Leste	9.4	6.4	9.6	7.4	9.8	90.5	85.4	88.6	74	59.5	9.5	14.6	11.4	26	40.5	9	5.8	9	5.8	9
172	Togo	3	3.5	4	3	2.8	50.2	59.6	62.8	48.7	48.6	49.8	40.4	37.2	51.3	51.4	8.3	9.7	12.8	7.9	9.3
173	Tonga	5.5	5.5	5.4	5.3	5.5	59.8	61.2	60.7	60.5	61.6	40.2	38.8	39.3	39.5	38.4	7.8	9.6	12.7	11.6	10.9
174	Trinidad and Tobago	4.5	4.8	4.5	3.9	4	43	46.5	46.5	45.9	43.3	57	53.5	53.5	54.1	56.7	6.6	6.7	6.7	6.7	6.4
175	Tunisia	6.4	6.3	6.3	6.2	6.4	77.7	76.7	75.9	74.3	75.7	22.3	23.3	24.1	25.7	24.3	15.5	15	14.9	14.2	15.1
176	Turkey	4.2	4.8	4.9	5	5	71.6	71.9	71.1	71.1	71	28.4	28.1	28.9	28.9	29	10.8	11.5	9.1	9	9.1
177	Turkmenistan	4.7	5	5	4	4.1	75.6	70.3	68	74.5	73.3	24.4	29.7	32	25.5	26.7	12	14.4	17.5	11.5	18.2
178	Tuvalu	5.3	5.2	5.4	5.5	5.4	59.1	59.3	57.3	53.5	53.4	40.9	40.7	42.7	46.5	46.6	5.4	3.7	3.6	3.3	2.9
179	Uganda	3.9	4	4.1	5.6	5.9	29.1	38	40.9	56.1	57.5	70.9	62	59.1	43.9	42.5	6.5	8.1	8.4	16.4	16.4
180	Ukraine	5.4	5	4.3	4.2	4.3	75	71.7	68.3	68.2	67.8	25	28.3	31.7	31.8	32.2	9.3	8	8.3	7.6	7.6
181	United Arab Emirates	3.6	4	3.7	3.5	3.5	76.7	77	75.8	75.9	75.8	23.3	23	24.2	24.1	24.2	28.9	28.8	27.9	31.5	32.3
182	United Kingdom	6.8	6.9	7.2	7.3	7.6	80.1	80.2	80.5	80.9	82.2	19.9	19.8	19.5	19.1	17.8	13.4	13.9	14.8	15	15.4
183	United Republic of Tanzania	4.1	4.4	4.3	4.4	4.4	45.9	47.1	43.4	47.1	46.7	54.1	52.9	56.6	52.9	53.3	14.4	13.1	12.4	12.1	12.1
184	United States of America	13	13	13	13.1	13.9	45.3	44.5	44.2	44.2	44.4	54.7	55.5	55.8	55.8	55.6	16.8	16.9	16.9	17.2	17.6
185	Uruguay	10	10.2	10.7	10.9	10.9	40.8	41	48.2	46.6	46.3	59.2	59	51.8	53.4	53.7	12.1	12.5	14.9	14.9	14.9
186	Uzbekistan	4.2	3.9	3.6	3.7	3.6	72.7	75.1	74	74.9	74.5	27.3	24.9	26	25.1	25.5	9.3	8.8	8.6	9.6	9.2
187	Vanuatu	3.4	3.5	3.7	3.8	3.8	65.5	65.4	63.6	60.9	59.2	34.5	34.6	36.4	39.1	40.8	10.2	8.7	10.3	10.1	9.7
188	Venezuela, Bolivarian Republic of	5.4	5.4	5.6	5.9	6	57.1	54.4	53.9	57.1	62.1	42.9	45.6	46.1	42.9	37.9	12.5	12.4	13.6	13.8	14.7
189	Viet Nam	4.4	4.9	4.9	5.2	5.1	31.5	32.7	32.7	28.5	28.5	68.5	67.3	67.3	71.5	71.5	5.6	7.1	6.7	6.1	6.1
190	Yemen	3.8	4.4	4	4	4.5	30.4	39.5	32.5	34.6	34.1	69.6	60.5	67.5	65.4	65.9	3.5	4.8	4.8	3.9	4
191	Zambia	6	6	5.7	5.5	5.7	55.1	56.9	54.8	52.5	53.1	44.9	43.1	45.2	47.5	46.9	13.1	12.5	13.7	13.6	13.5
192	Zimbabwe	9.3	11.4	7.9	7.4	6.2	59.1	55.9	48.9	50.7	45.3	40.9	44.1	51.1	49.3	54.7	15.4	12.2	10	7.1	8

^a See explanatory notes for sources and methods.

n/a Used when the information accessed indicates that a cell should have an entry but no estimates could be made.

0 Used when no evidence of the schemes to which the cell relates exist. Some estimates yielding a ratio inferior to 0.04% are shown as 0.

Member State	External resources for health as % of total expenditure on health					Social security expenditure on health as % of general government expenditure on health					Out-of-pocket expenditure as % of private expenditure on health					Private prepaid plans as % of private expenditure on health					
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	
166	Switzerland	0	0	0	0	0	71.6	72.3	72.1	72.6	70.4	72	72.6	74.5	74.1	73.9	25.7	25.2	23.3	23.6	23.8
167	Syrian Arab Republic	0.3	0.2	0.1	0.1	0.3	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
168	Tajikistan	5.6	6.2	3.1	7.6	7.4	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
169	Thailand	0.3	0.4	0.5	0.5	0.1	30.2	25.8	26.9	27	26.8	86.2	84.9	84.9	85	85	8.6	9.6	9.6	9.6	9.6
170	The former Yugoslav Republic of Macedonia	2.6	2.6	2.6	3.1	3.5	96.3	96.8	94.8	91.9	87.5	100	100	100	100	100	0	0	0	0	0
171	Timor-Leste	41.8	66.7	87.2	64.6	53.8	0.9	1.2	n/a	n/a	n/a	93	88.6	75.8	43.1	20.8	0	0	0	0	0
172	Togo	8.1	9.8	5.3	31.2	8.1	0	0	0	0	0	100	100	100	100	100	n/a	n/a	n/a	n/a	n/a
173	Tonga	6.3	5.9	8.8	10.2	20.7	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
174	Trinidad and Tobago	5.2	4.6	4.4	4.2	3.8	0	0	0	0	0	86.9	87.1	86.4	85.7	86.5	6.2	6.2	6.7	7.6	7.1
175	Tunisia	0.6	0.6	0.6	0.6	0.6	45.3	52.7	54.9	57.3	53.4	77.2	76	77.1	78	77.6	22.8	24	22.9	22	22.4
176	Turkey	0.4	0.4	0.1	0.1	0	38.8	43.8	28.4	28.4	28.6	99.6	99.6	99.8	99.9	98.8	0.2	0.2	0.2	0.1	1.2
177	Turkmenistan	2.1	2.6	1.4	0.9	0.6	8.4	16.2	23.5	26.4	26.8	71.4	76.6	78.1	72.6	73.7	28.6	23.4	21.9	27.4	26.3
178	Tuvalu	6.9	7.1	6.4	6.4	29.4	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
179	Uganda	24.4	41.7	22.9	41.2	24.8	0	0	0	0	0	54	54	55.4	55.6	53.4	0.5	0.5	0.5	0.5	0.5
180	Ukraine	0.6	0.4	0.3	0.7	0.7	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
181	United Arab Emirates	0	0	0	0	0	0	0	0	0	0	69.4	69.5	67	66	65.6	16.4	16.9	19	19.1	19.1
182	United Kingdom	0	0	0	0	0	0	0	0	0	0	53.5	55.1	54.7	55	55.3	17	17.2	16.7	16.7	17.2
183	United Republic of Tanzania	16	22	35.3	30	29.5	0	0	0	0	0	87	87.5	83.5	83	83.1	0	0	4.5	4.4	4.4
184	United States of America	0	0	0	0	0	32.1	33.3	33.3	33.9	32.9	27.6	28	27.6	27.2	26.5	61.2	61	61.7	62.8	64.1
185	Uruguay	0.6	0.6	0.1	0.5	0.8	45.6	46.8	37.6	34.7	35.8	33.5	32.9	33.2	31.2	30.4	66.5	67.1	66.8	68.8	69.6
186	Uzbekistan	1	1.3	1.5	0.9	1.7	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
187	Vanuatu	20	30.4	28.7	28.5	8.4	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0
188	Venezuela, Bolivarian Republic of	1.3	1.2	1	0.4	0.1	20.9	18.6	25	24.7	20.2	78.6	77.9	79.9	73.8	95.4	4.6	4.8	4.4	4	4.6
189	Viet Nam	5.6	2.8	3.4	2.7	2.6	13	11.5	9.5	10.9	10.9	93.5	89.7	86.5	87.7	87.6	0	3.4	3.7	4.2	4.2
190	Yemen	6.2	5.2	5.1	4.1	3.7	0	0	0	0	0	87.4	87.9	88.2	87.8	88.7	0	0	0	0	0
191	Zambia	23.5	26.1	40.1	33.5	48.7	0	0	0	0	0	70.9	74.1	70.7	71.1	71.8	0	0	0	0	0
192	Zimbabwe	2.3	17.2	13	12.5	7.8	0	0	0	0	0	67	75.2	44.9	48	52.2	21	16.4	39.6	39.2	34.8

Annex Table 6 Selected national health accounts indicators: measured levels of per capita expenditure on health, 1997–2001

Figures computed by WHO to assure comparability,^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Per capita total expenditure on health at average exchange rate (US\$)					Per capita total expenditure on health at international dollar rate					Per capita government expenditure on health at average exchange rate (US\$)					Per capita government expenditure on health at international dollar rate				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
1 Afghanistan	n/a	n/a	n/a	9	8	34	35	38	40	34	n/a	n/a	n/a	5	4	17	19	20	22	18
2 Albania	28	34	43	46	48	108	108	125	144	150	17	21	27	30	31	66	67	78	92	97
3 Algeria	57	59	59	68	73	122	133	138	151	169	41	42	41	48	55	87	94	96	106	127
4 Andorra	1328	1670	1285	1200	1233	1601	2021	1610	1723	1821	950	1313	920	841	875	1145	1589	1152	1208	1292
5 Angola	26	19	17	26	31	56	51	48	55	70	12	8	7	14	19	25	20	21	30	44
6 Antigua and Barbuda	448	464	485	509	531	484	496	526	581	614	278	290	297	305	323	300	310	322	348	374
7 Argentina	668	680	700	683	679	1014	1065	1140	1099	1130	371	376	394	377	363	563	588	641	607	604
8 Armenia	36	42	46	49	54	171	190	224	246	273	13	16	19	20	22	60	70	92	99	112
9 Australia	1909	1709	1870	1808	1741	1978	2093	2230	2363	2532	1293	1165	1293	1246	1182	1341	1427	1542	1629	1718
10 Austria	2027	2100	2086	1873	1866	1881	1972	2070	2236	2259	1438	1500	1461	1305	1293	1334	1409	1450	1559	1566
11 Azerbaijan	11	13	11	11	11	44	50	46	46	48	8	9	8	8	8	32	37	32	31	32
12 Bahamas	701	754	807	863	864	829	922	1057	1117	1220	390	434	463	490	492	461	531	606	635	695
13 Bahrain	484	480	479	484	500	702	715	670	568	664	341	335	332	334	345	495	498	464	393	458
14 Bangladesh	10	10	11	13	12	40	41	47	56	58	3	4	4	6	5	13	15	17	26	26
15 Barbados	495	531	569	603	613	775	783	839	881	940	323	348	374	397	406	505	514	551	581	623
16 Belarus	82	67	63	56	68	375	391	415	424	464	71	58	54	48	59	327	337	355	362	402
17 Belgium	2016	2059	2095	1916	1983	1988	1969	2105	2272	2481	1441	1481	1512	1382	1421	1422	1417	1519	1639	1778
18 Belize	130	133	149	156	167	228	236	257	257	278	66	69	72	75	75	116	122	125	123	125
19 Benin	14	15	15	15	16	28	29	31	35	39	5	5	6	7	8	9	11	12	15	18
20 Bhutan	8	8	8	9	9	48	52	52	61	64	7	7	7	8	8	43	47	47	55	58
21 Bolivia	48	53	53	52	49	104	114	120	122	125	31	35	35	35	33	66	75	79	81	83
22 Bosnia and Herzegovina	69	89	94	87	85	192	237	241	259	268	36	36	37	34	31	100	95	95	103	99
23 Botswana	169	158	164	173	190	260	260	294	309	381	100	95	100	107	126	153	155	178	192	252
24 Brazil	362	348	246	265	222	528	526	560	556	573	157	153	105	108	92	229	231	240	227	238
25 Brunei Darussalam	429	463	484	479	453	525	570	607	617	638	340	376	384	383	359	416	464	482	493	507
26 Bulgaria	58	60	80	75	81	227	200	272	283	303	48	47	67	62	67	188	159	227	233	248
27 Burkina Faso	7	8	8	6	6	25	26	30	29	27	5	5	5	4	3	17	17	20	18	16
28 Burundi	5	5	4	4	4	15	17	16	18	19	2	3	2	2	2	8	9	9	10	11
29 Cambodia	30	26	28	30	30	146	146	152	174	184	3	3	3	4	4	15	15	15	25	27
30 Cameroon	23	23	19	19	20	45	38	36	39	42	5	4	4	7	8	9	7	8	13	16
31 Canada	1864	1835	1949	2102	2163	2187	2288	2433	2580	2792	1305	1297	1372	1490	1533	1532	1617	1713	1828	1978
32 Cape Verde	46	52	54	54	57	108	123	128	153	165	35	41	43	45	47	82	97	102	127	138
33 Central African Republic	10	12	12	12	12	41	47	50	55	58	4	5	6	6	6	16	21	24	27	30
34 Chad	6	5	5	5	5	17	14	16	19	17	5	4	4	4	4	13	10	12	15	13
35 Chile	371	369	331	336	303	643	699	686	681	792	140	146	135	143	133	243	277	280	290	348
36 China	33	36	40	45	49	135	155	176	200	224	13	14	15	17	18	54	60	67	73	83
37 Colombia	205	140	133	108	105	497	373	395	350	356	98	84	82	73	69	237	225	245	236	234
38 Comoros	10	10	10	9	9	28	27	27	26	29	6	6	6	5	6	17	16	16	16	17
39 Congo	23	19	19	18	18	33	34	28	20	22	16	14	13	13	12	23	26	20	15	14
40 Cook Islands	258	216	214	196	198	430	452	442	444	598	188	155	139	126	134	312	325	288	286	404
41 Costa Rica	236	254	268	280	293	445	477	496	533	562	167	171	184	192	201	315	323	339	365	385
42 Côte d'Ivoire	48	54	51	42	41	107	117	119	123	127	9	10	10	6	7	20	22	24	19	20
43 Croatia	373	429	402	388	394	569	637	651	715	726	300	351	332	323	322	458	521	538	595	593
44 Cuba	137	143	163	175	185	166	170	188	193	229	114	121	139	150	160	139	144	161	166	198
45 Cyprus	909	991	862	909	932	938	948	917	905	941	457	516	436	443	445	472	493	464	441	449
46 Czech Republic	364	392	380	358	407	930	944	972	1031	1129	334	360	347	327	372	853	867	889	942	1031
47 Democratic People's Republic of Korea	10	16	19	21	22	27	47	54	41	44	7	12	14	15	16	19	36	40	30	32
48 Democratic Republic of the Congo	4	4	8	10	5	13	12	11	11	12	2	2	4	5	2	6	5	5	5	5
49 Denmark	2629	2725	2769	2474	2545	2099	2238	2344	2398	2503	2163	2234	2276	2042	2097	1727	1835	1927	1979	2063
50 Djibouti	60	59	58	58	58	90	89	88	89	90	35	34	34	34	34	52	52	51	52	53
51 Dominica	190	193	214	200	203	274	278	305	291	312	143	144	159	143	145	205	208	227	208	222
52 Dominican Republic	111	114	121	145	153	262	279	298	345	353	35	36	39	51	55	84	88	96	122	127
53 Ecuador	88	85	50	52	76	168	167	131	149	177	47	43	28	29	38	89	84	73	82	89
54 Egypt	47	48	52	52	46	121	125	134	139	153	21	22	24	24	22	56	57	62	64	75
55 El Salvador	153	165	163	169	174	332	347	348	364	376	59	70	71	76	81	128	148	151	164	175

Member State	Per capita total expenditure on health at average exchange rate (US\$)					Per capita total expenditure on health at international dollar rate					Per capita government expenditure on health at average exchange rate (US\$)					Per capita government expenditure on health at international dollar rate				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
56 Equatorial Guinea	36	44	42	56	76	58	99	73	65	106	23	27	26	35	46	36	61	45	40	64
57 Eritrea	9	10	11	9	10	5	29	31	32	36	6	7	7	6	6	17	19	21	22	23
58 Estonia	182	223	244	222	226	430	494	548	551	562	158	193	196	170	176	373	427	440	423	438
59 Ethiopia	4	4	3	3	3	12	11	11	11	14	1	1	1	1	1	5	4	4	4	6
60 Fiji	106	82	85	80	79	187	189	184	213	224	71	54	56	52	53	125	124	120	139	150
61 Finland	1737	1734	1713	1550	1631	1543	1528	1614	1696	1845	1322	1323	1290	1164	1233	1174	1165	1215	1274	1395
62 France	2261	2307	2285	2067	2109	2028	2079	2204	2382	2567	1723	1754	1738	1568	1603	1546	1581	1676	1806	1951
63 Gabon	131	137	131	130	127	178	228	204	176	197	86	91	85	65	61	116	152	132	88	94
64 Gambia	22	24	23	20	19	62	74	73	73	78	10	10	11	9	9	29	32	34	34	39
65 Georgia	19	16	13	20	22	71	60	65	95	108	8	7	5	7	8	28	27	25	32	41
66 Germany	2753	2773	2731	2408	2412	2458	2515	2621	2766	2820	2073	2075	2043	1807	1807	1851	1882	1961	2075	2113
67 Ghana	15	17	17	11	12	44	49	49	52	60	7	9	9	6	7	21	26	27	29	36
68 Greece	1092	1087	1149	1015	1001	1326	1407	1523	1553	1522	577	566	614	570	560	701	732	813	872	852
69 Grenada	179	205	225	245	262	298	331	372	416	445	118	135	157	171	188	197	218	259	291	320
70 Guatemala	64	78	78	79	86	140	167	186	190	199	24	37	38	38	41	52	79			

Annex Table 6 Selected national health accounts indicators: measured levels of per capita expenditure on health, 1997–2001Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

Member State	Per capita total expenditure on health at average exchange rate (US\$)					Per capita total expenditure on health at international dollar rate					Per capita government expenditure on health at average exchange rate (US\$)					Per capita government expenditure on health at international dollar rate					
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	
111	Micronesia, Federated States of	170	167	169	169	172	315	304	302	296	319	125	121	121	121	124	232	221	217	212	230
112	Monaco	1689	1783	1812	1610	1653	1516	1608	1751	1863	2016	924	956	955	878	927	829	862	923	1016	1131
113	Mongolia	22	24	21	23	25	84	106	110	118	122	14	16	14	16	18	52	69	73	83	88
114	Morocco	52	56	54	54	59	147	160	159	171	199	13	16	16	18	23	38	45	46	58	78
115	Mozambique	10	11	11	12	11	29	32	35	40	47	6	7	7	8	8	18	20	23	27	32
116	Myanmar	81	109	147	162	197	21	21	22	23	26	12	12	17	28	35	3	2	3	4	5
117	Namibia	141	128	127	126	114	305	307	323	330	342	103	92	93	87	77	222	221	236	228	232
118	Nauru	719	640	705	643	588	981	987	941	921	1015	640	570	628	571	521	874	878	839	819	900
119	Nepal	12	11	12	12	12	58	60	59	61	63	4	4	3	4	3	18	20	18	18	19
120	Netherlands	1968	2151	2191	2012	2138	1951	2164	2305	2358	2612	1335	1385	1386	1275	1354	1323	1393	1458	1495	1654
121	New Zealand	1301	1125	1169	1054	1073	1357	1440	1534	1611	1724	1005	867	911	822	823	1049	1109	1195	1257	1323
122	Nicaragua	45	44	44	55	60	117	110	113	147	158	24	27	24	29	29	63	66	61	77	77
123	Niger	6	7	6	6	6	21	22	22	21	22	3	3	3	2	2	9	9	9	9	9
124	Nigeria	35	37	10	12	15	23	26	26	26	31	4	6	2	2	3	3	4	4	4	7
125	Niue	344	330	335	290	289	945	910	990	1068	1041	334	321	325	281	280	917	883	961	1036	1010
126	Norway	2797	2867	3025	2817	2981	2193	2438	2550	2755	2920	2357	2428	2576	2400	2550	1848	2065	2172	2347	2497
127	Oman	229	219	221	230	225	348	392	357	316	343	187	180	182	187	181	285	322	294	256	277
128	Pakistan	19	19	18	18	16	73	77	80	85	85	5	6	5	4	4	20	22	20	21	21
129	Palau	498	502	447	454	426	695	789	823	835	886	456	466	408	416	392	636	733	753	766	816
130	Panama	231	244	252	260	258	398	411	434	452	458	158	171	176	180	178	272	289	303	313	316
131	Papua New Guinea	32	29	28	27	24	107	121	144	145	144	28	26	25	24	21	95	110	129	130	128
132	Paraguay	143	121	115	112	97	320	305	326	323	332	47	45	45	43	37	105	114	129	124	127
133	Peru	106	105	99	97	97	207	216	231	228	231	54	57	55	54	53	107	118	129	126	127
134	Philippines	41	31	36	34	30	168	162	165	169	169	18	14	16	16	14	73	70	74	81	77
135	Poland	228	264	249	245	289	461	543	558	572	629	164	173	177	171	208	332	355	397	400	452
136	Portugal	903	956	986	938	982	1339	1370	1457	1512	1618	586	626	666	642	677	868	898	985	1036	1116
137	Qatar	813	819	824	860	885	842	1006	874	720	782	624	630	626	638	650	647	773	665	534	574
138	Republic of Korea	520	352	484	577	532	657	628	762	893	948	213	163	209	256	236	270	290	329	396	421
139	Republic of Moldova	38	28	16	18	20	159	125	99	106	112	27	17	8	9	10	112	76	50	53	56
140	Romania	79	124	108	109	117	320	409	424	428	460	53	92	84	86	93	214	303	330	338	365
141	Russian Federation	167	112	71	95	115	390	382	378	420	454	122	77	46	66	78	284	263	245	293	310
142	Rwanda	16	15	14	13	11	39	39	41	43	44	8	8	8	7	6	19	20	22	23	24
143	Saint Kitts and Nevis	304	323	335	364	393	464	495	507	535	576	202	216	222	241	260	307	330	336	355	382
144	Saint Lucia	169	187	192	195	199	240	257	254	263	272	105	123	125	127	129	150	169	166	171	176
145	Saint Vincent and the Grenadines	155	161	170	170	178	295	302	324	341	358	99	101	106	111	113	188	189	203	222	227
146	Samoa	79	76	84	80	74	167	185	210	219	199	58	56	62	61	61	123	136	156	168	164
147	San Marino	1188	1252	1286	1196	1222	1275	1391	1511	1610	1711	892	944	974	922	953	957	1049	1145	1240	1334
148	Sao Tome and Principe	10	8	8	7	7	26	25	21	22	22	6	6	5	5	5	17	17	14	15	15
149	Saudi Arabia	432	368	340	376	375	680	680	583	565	591	334	281	251	280	280	526	519	430	421	441
150	Senegal	25	25	24	22	22	53	53	56	58	63	14	14	14	12	13	29	30	31	33	37
151	Serbia and Montenegro	198	149	185	89	103	621	542	601	528	616	147	106	131	69	82	460	386	426	409	488
152	Seychelles	490	500	491	444	450	732	752	746	733	770	355	347	338	295	307	529	522	513	487	525
153	Sierra Leone	7	5	6	6	7	23	21	23	25	26	3	2	3	4	4	11	9	13	15	16
154	Singapore	936	902	851	826	816	834	926	947	925	993	365	375	327	291	274	325	385	363	326	333
155	Slovakia	230	235	218	208	216	608	636	664	642	681	211	215	196	186	192	558	583	595	574	608
156	Slovenia	712	813	829	765	821	1097	1223	1299	1421	1545	564	616	626	582	615	868	927	981	1080	1157
157	Solomon Islands	45	40	42	39	40	100	106	113	141	133	41	37	39	37	37	92	99	106	132	124
158	Somalia	5	6	7	6	6	19	18	18	15	15	2	3	3	3	3	9	8	8	7	7
159	South Africa	315	270	264	253	222	622	604	623	633	652	145	114	113	106	92	287	256	265	265	270
160	Spain	1067	1115	1140	1048	1088	1273	1347	1428	1505	1607	773	805	822	751	778	922	973	1030	1078	1148
161	Sri Lanka	27	29	30	32	30	91	102	112	121	122	13	15	15	16	15	45	52	55	60	60
162	Sudan	13	14	12	14	14	31	39	38	41	39	2	3	3	4	3	6	9	9	12	7
163	Suriname	207	194	104	186	153	371	404	402	407	398	108	120	62	118	92	194	249	239	258	240
164	Swaziland	45	43	43	45	41	137	146	152	163	167	32	30	29	31	28	98	103	103	114	115
165	Sweden	2300	2336	2395	2268	2150	1855	1903	2053	2195	2270	1975	2005	2053	1929	1832	1592	1633	1760	1866	1935

Member State	Per capita total expenditure on health at average exchange rate (US\$)					Per capita total expenditure on health at international dollar rate					Per capita government expenditure on health at average exchange rate (US\$)					Per capita government expenditure on health at international dollar rate					
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	
166	Switzerland	3759	3909	3875	3574	3779	2841	2952	3080	3160	3322	2073	2145	2144	1988	2159	1567	1619	1704	1758	1897
167	Syrian Arab Republic	59	60	63	64	65	427	452	473	439	427	22	23	25	26	29	160	174	184	179	188
168	Tajikistan	6	8	6	5	6	38	36	36	38	43	2	3	2	2	2	15	12	11	11	12
169	Thailand	95	73	75	73	69	247	234	233	241	254	54	45	43	41	39	141	143	134	137	145
170	The former Yugoslav Republic of Macedonia	114	135	117	106	115	263	340	303	302	331	96	118	100	90	98	221	296	259	255	281
171	Timor-Leste	46	32	30	28	42	n/a	n/a	n/a	n/a	n/a	41	27	27	20	25	n/a	n/a	n/a	n/a	n/a
172	Togo	11	12	13	8	8	40	51	55	45	45	5	7	8	4	4	20	30	34	22	22
173	Tonga	97	87	87	81	73	192	194	203	209	223	58	53	53	49	45	115	119	123	126	138
174	Trinidad and Tobago	203	229	238	248	279	332	378	379	360	388	87	106	111	114	121	143	175	176	165	168
175	Tunisia	132	133	139	126	134	360	367	398	417	463	102	102	106	94	101	280	282	302	310	350
176	Turkey	125	149	137	148	109	272	301	291	311	294	90	107	98	105	77	195	217	207	222	209
177	Turkmenistan	28	34	42	42	57	170	195													

Annex Table 7 Millennium Development Goals: selected health indicators in all WHO Member States, 2000 (unless specified)

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods

Member State	Children under five years of age underweight for age		Under-five mortality rate (per 1000 live births)	Infant mortality rate (per 1000 live births)	One-year-olds immunized against measles (%) (2001)	Maternal mortality ratio (per 100 000 live births)	Births attended by skilled health personnel (%)	HIV prevalence among 15-49-year-olds (%)	Malaria mortality rate (per 100 000)	Tuberculosis prevalence (per 100 000)	Tuberculosis cases		Population using solid fuels (%)	Population with sustainable access to an improved water source (%)		Population with access to improved sanitation (%)			
	(%)	Year									Detected under DOTS (2001)	Cured under DOTS		Urban	Rural	Urban	Rural		
1 Afghanistan	49.3	1997	257	189	46	1900	n/a	1	<0.1	10	708	96	15	86	>95	19	11	25	8
2 Albania	14.3	2000	27	23	95	55	99.1	2	<0.1	0	30	3	20	n/a	76	99	95	99	85
3 Algeria	6	2000	51	42	83	140	92	3	0.1	23	48	2	100%	87	<5	94	82	99	81
4 Andorra	n/a	n/a	5	4	90	n/a	n/a	4	0.7	0	20	1	34	50	<5	100	100	100	100
5 Angola	30.5	2001	262	153	72	1700	22.5	5	1.6	383	577	64	...	...	>95	34	40	70	30
6 Antigua and Barbuda	n/a	n/a	21	16	97	n/a	100	6	0.7	0	9	1	52	100	<5	95	89	98	94
7 Argentina	5.4	1995-96	19	17	94	70	97.5	7	0.7	0	68	2	39	55	<5	85	30	89	48
8 Armenia	2.6	2000-01	37	31	93	55	96.9	8	0.1	0	94	6	22	87	66	n/a	n/a	n/a	n/a
9 Australia	0	1995-96	6	5	93	6	100	9	0.1	0	6	0	14	74	<5	100	100	100	100
10 Austria	n/a	n/a	6	5	79	5	n/a	10	0.2	0	9	1	46	73	<5	100	100	100	100
11 Azerbaijan	16.8	2000	75	61	99	94	87.5	11	<0.1	0	112	10	0	91	37	93	58	90	70
12 Bahamas	n/a	n/a	18	15	92	60	99	12	3.7	0	50	3	...	...	<5	98	86	100	100
13 Bahrain	8.7	1995	13	10	98	33	98.4	13	0.3	0	38	2	59	73	<5	100 ^b	n/a	100 ^b	n/a
14 Bangladesh	47.7	1999-00	82	63	76	380	12.1	14	<0.1	9	479	56	26	83	>95	99	97	71	41
15 Barbados	5.9	1981	19	17	92	95	91	15	1.4	0	20	0	30	n/a	57	100	100	100	100
16 Belarus	n/a	n/a	14	10	99	36	n/a	16	0.4	0	114	8	...	...	11	100	100	n/a	n/a
17 Belgium	n/a	n/a	6	5	75	10	n/a	17	0.2	0	15	1	75	n/a	<5	n/a	n/a	n/a	n/a
18 Belize	6.2	1992	41	33	93	140	76.9	18	1.9	0	72	14	n/a	78	<5	100	82	71	25
19 Benin	22.9	2001	161	96	65	850	59.8	19	2.3	190	122	10	...	...	89	74	55	46	6
20 Bhutan	18.7	1999	98	75	78	420	15	20	<0.1	12	223	19	26	90	<5	86	60	65	70
21 Bolivia	9.5	1998	80	63	79	420	59.3	21	<0.1	0	322	36	81	79	61	95	64	86	42
22 Bosnia and Herzegovina	4.1	2000	18	15	92	31	99.5	22	<0.1	0	76	6	71	94	74	n/a	n/a	n/a	n/a
23 Botswana	12.5	2000	93	60	90	100	98.5	23	37.5	8	288	28	75	77	65	100	90	88	43
24 Brazil	5.7	1996	41	37	95	260	87.6	24	0.6	0	103	9	8	73	27	95	53	84	43
25 Brunei Darussalam	n/a	n/a	14	11	99	37	99	25	<0.1	0	39	3	100	63	70	n/a	n/a	n/a	n/a
26 Bulgaria	n/a	n/a	16	14	90	32	n/a	26	<0.1	0	67	4	15	n/a	31	100	100	100	100
27 Burkina Faso	34.3	1998-99	225	117	46	1000	31	27	4.2	223	269	30	15	60	>95	66	37	39	27
28 Burundi	45.1	2000	190	116	75	1000	24.9	28	6.4	149	445	50	39	80	>95	91	77	68	90
29 Cambodia	45.2	2000	134	106	59	450	31.8	29	2.8	24	743	91	41	91	>95	54	26	56	10
30 Cameroon	22.2	1998	155	91	62	730	56.1	30	7.4	116	232	25	...	...	77	78	39	92	66
31 Canada	n/a	n/a	6	5	96	5	98	31	0.3	0	5	1	56	80	<5	100	99	100	99
32 Cape Verde	13.5	1994	40	32	72	150	53.2	32	<0.1	20	402	44	40	n/a	<5	64	89	95	32
33 Central African Republic	24.3	2000	179	120	35	1100	44	33	12.8	132	461	51	8	57	>95	89	57	38	16
34 Chad	28	2000	193	112	36	1100	16.2	34	4.9	232	370	41	...	...	95	31	26	81	13
35 Chile	0.8	1999	16	14	99	30	100	35	0.3	0	23	4	97	82	15	99	58	96	97
36 China	10	2000	37	31	79	56	89.3	36	<0.1	0	250	21	29	95	80	93.7	66.1	68.5	25.8
37 Colombia	6.7	2000	24	22	90	130	86.4	37	0.4	1	62	6	...	...	36	99	70	96	56
38 Comoros	25.4	2000	82	65	70	480	61.8	38	0.1	65	125	9	...	...	<5	98	95	98	98
39 Congo	23.9	1987	106	68	35	510	n/a	39	5.5	54	322	36	10	69	67	71	17	14	n/a
40 Cook Islands	n/a	n/a	23	18	84	n/a	100	40	<0.1	0	56	6	67	n/a	<5	100	100	100	100
41 Costa Rica	5.1	1996	11	10	82	25	98.2	41	0.6	0	16	2	89	76	58	99	92	89	97
42 Côte d'Ivoire	21.2	1998-99	167	113	61	690	46.9	42	9.7	118	520	57	10	n/a	93	92	72	71	35
43 Croatia	0.6	1995-96	8	7	94	10	n/a	43	<0.1	0	73	4	n/a	n/a	16	n/a	n/a	n/a	n/a
44 Cuba	3.9	2000	9	7	99	33	100	44	<0.1	0	16	1	85	93	42	95	77	99	95
45 Cyprus	n/a	n/a	8	7	86	47	n/a	45	0.3	0	8	1	...	...	24	100	100	100	100
46 Czech Republic	1	1991	5	4	97	9	n/a	46	<0.1	0	13	1	59	70	<5	n/a	n/a	n/a	n/a
47 Democratic People's Republic of Korea	27.9	2000	55	43	n/a	67	n/a	47	0.1	0	346	31	n/a	91	68	100	100	99	100
48 Democratic Republic of the Congo	31	2001	212	127	37	990	69.7	48	4.3	452	511	57	n/a	78	>95	89	26	54	6
49 Denmark	n/a	n/a	6	5	94	7	n/a	49	0.2	0	12	1	...	...	<5	100	100	n/a	n/a
50 Djibouti	18.2	1996	150	94	49	730	n/a	50	5.1	114	534	61	65	62	6	100	100	99	50
51 Dominica	n/a	n/a	14	11	99	n/a	100	51	0.3	0	26	5	...	...	<5	100	90	86	75
52 Dominican Republic	4.6	2000	37	31	98	150	95.5	52	1.8	0	149	19	7	79	48	90	78	70	60
53 Ecuador	14.3	1998	36	26	99	130	68.7	53	0.3	1	239	32	5	n/a	28	90	75	92	74
54 Egypt	10.7	1998	45	38	97	84	60.9	54	<0.1	8	42	4	39	87	23	99	96	100	96
55 El Salvador	9.5	1998	37	28	82	150	58	55	0.6	0	91	10	58	80	65	91	64	89	76

Annex Table 7 Millennium Development Goals: selected health indicators in all WHO Member States, 2000 (unless specified)

Figures computed by WHO to assure comparability;^a they are not necessarily the official statistics of Member States, which may use alternative rigorous methods

Member State	Children under five years of age underweight for age (%)		Under-five mortality rate (per 1000 live births)	Infant mortality rate (per 1000 live births)	One-year-olds immunized against measles (%) (2001)	Maternal mortality ratio (per 100 000 live births)	Births attended by skilled health personnel (%)	HIV prevalence among 15-49-year-olds (%)	Malaria mortality rate (per 100 000)	Tuberculosis prevalence (per 100 000)	Tuberculosis mortality rate (per 100 000)	Tuberculosis cases		Population using solid fuels (%)	Population with sustainable access to an improved water source (%)		Population with access to improved sanitation (%)		
	Year	Year										Detected under DOTS (2001)	Cured under DOTS		Urban	Rural	Urban	Rural	
56 Equatorial Guinea	n/a	n/a	156	97	51	880	n/a	56	9.2	165	350	40	...	83	45	42	60	46	
57 Eritrea	43.7	1995-96	112	65	84	630	20.6	57	2.9	68	361	44	15	76	>95	63	42	66	1
58 Estonia	n/a	n/a	11	9	95	38	n/a	58	1.0	0	61	8	67	70	34	n/a	n/a	93	n/a
59 Ethiopia	47.2	2000	179	114	52	850	9.7	59	5.0	80	440	52	42	80	>95	81	12	33	7
60 Fiji	7.9	1993	28	22	90	75	n/a	60	<0.1	0	49	6	59	86	<5	43	51	75	12
61 Finland	n/a	n/a	4	4	96	5	n/a	61	<0.1	0	16	3	...	...	<5	100	100	100	100
62 France	n/a	n/a	6	5	84	17	n/a	62	0.3	0	16	2	...	...	<5	n/a	n/a	n/a	n/a
63 Gabon	11.9	2000-01	91	64	55	420	85.5	63	5.0	74	444	49	...	...	34	95	47	55	43
64 Gambia	17	2000	128	81	90	540	51	64	1.3	58	499	55	...	...	>95	80	53	41	35
65 Georgia	3.1	1999	23	21	73	32	96.4	65	<0.1	0	93	13	48	63	71	90	61	100	99
66 Germany	n/a	n/a	5	4	89	9	n/a	66	0.1	0	10	1	46	77	<5	n/a	n/a	n/a	n/a
67 Ghana	24.9	1998-99	105	62	81	540	44.3	67	3.2	66	381	42	45	50	95	91	62	74	70
68 Greece	n/a	n/a	7	6	88	10	n/a	68	0.2	0	24	1	...	...	<5	n/a	n/a	n/a	n/a
69 Grenada	n/a	n/a	23	17	96	n/a	100	69	1.1	0	8	0	...	...	<5	97	93	96	97
70 Guatemala	24.2	1998-99	56	45	91	240	40.6	70	1.0	1	113	13	39	86	73	98	88	83	79
71 Guinea	23.2	1999	163	94	52	740	34.8	71	2.5	206	344	38	...	...	>95	72	36	94	41
72 Guinea-Bissau	25	2000	215	128	48	1100	34.7	72	3.4	139	281	33	...	...	95	79	49	95	44
73 Guyana	13.6	2000	58	45	92	170	95	73	2.7	5	142	7	21	91	<5	98	91	97	81
74 Haiti	17.3	2000	136	92	53	680	24.2	74	5.5	2	444	58	31	73	82	49 ^b	45 ^b	50 ^b	16 ^b
75 Honduras	16.6	2001	44	35	95	110	62	75	1.4	2	120	11	100	89	66	95	81	93	55
76 Hungary	2.2	1980-88	11	9	99	11	n/a	76	<0.1	0	33	4	35	64	26	100	98	100	98
77 Iceland	n/a	n/a	3	3	88	0	n/a	77	0.2	0	4	1	69	n/a	<5	n/a	n/a	n/a	n/a
78 India	46.7	1998-99	96	77	56	540	42.3	78	0.8	3	431	41	23	84	81	95	79	61	15
79 Indonesia	27.3	2002	50	39	76	230	55.8	79	<0.1	4	742	67	21	87	50	90	69	69	46
80 Iran, Islamic Republic of	10.9	1998	45	36	96	76	n/a	80	<0.1	1	39	4	33	85	<5	98	83	86	79
81 Iraq	15.9	2000	118	93	90	250	n/a	81	<0.1	11	216	30	26	92	<5	96	48	93	31
82 Ireland	n/a	n/a	7	6	73	4	n/a	82	0.1	0	15	1	...	...	<5	n/a	n/a	n/a	n/a
83 Israel	n/a	n/a	7	5	94	13	n/a	83	0.1	0	10	2	63	n/a	<5	n/a	n/a	n/a	n/a
84 Italy	1.5	1975-77	6	5	70	5	n/a	84	0.4	0	7	1	10	74	<5	n/a	n/a	n/a	n/a
85 Jamaica	3.8	1999	16	13	85	87	94.6	85	0.7	0	9	1	84	46	47	98	85	99	99
86 Japan	3.7	1978-81	5	3	98	10	100	86	<0.1	0	46	4	28	70	<5	n/a	n/a	n/a	n/a
87 Jordan	5.1	1997	28	25	99	41	96.7	87	<0.1	0	7	1	47	90	10	100	84	100	98
88 Kazakhstan	4.2	1999	36	33	96	210	99.1	88	<0.1	0	153	21	69	79	51	98	82	100	98
89 Kenya	21.2	2000	113	79	78	1000	44.3	89	12.3	67	462	49	47	80	85	88	42	96	82
90 Kiribati	12.9	1985	77	54	76	n/a	85	90	<0.1	1	90	7	n/a	91	<5	82	25	54	44
91 Kuwait	10.5	1994-95	11	9	99	12	98.2	91	<0.1	0	28	1	...	...	<5	n/a	n/a	n/a	n/a
92 Kyrgyzstan	11	1997	63	52	99	110	98.1	92	<0.1	0	156	20	n/a	82	>95	98	66	100	100
93 Lao People's Democratic Republic	40	2000	143	107	50	650	21.4	93	<0.1	22	373	29	40	82	95	61	29	67	19
94 Latvia	n/a	n/a	14	12	98	61	100	94	0.4	0	85	13	77	72	19	n/a	n/a	n/a	n/a
95 Lebanon	3	1996	34	27	94	150	88	95	<0.1	0	17	2	54	92	<5	100	100	100	87
96 Lesotho	17.9	2000	149	94	70	550	59.7	96	29.9	65	310	36	...	...	85	88	74	72	40
97 Liberia	26.5	1999-00	232	136	78	760	n/a	97	4.7	164	485	55	...	...	83	n/a	n/a	n/a	n/a
98 Libyan Arab Jamahiriya	4.7	1995	20	16	93	97	94.4	98	0.2	0	22	2	...	...	<5	72	68	97	96
99 Lithuania	n/a	n/a	11	9	97	19	n/a	99	<0.1	0	107	11	30	92	42	n/a	n/a	n/a	n/a
100 Luxembourg	n/a	n/a	5	4	91	28	n/a	100	0.2	0	12	1	40	n/a	<5	n/a	n/a	n/a	n/a
101 Madagascar	40	1997	139	89	55	550	47.3	101	0.2	138	471	54	60	70	>95	85	31	70	30
102 Malawi	25.4	2000	197	117	82	1800	55.6	102	16.0	212	439	49	40	73	>95	95	44	96	70
103 Malaysia	20.1	1995	10	8	92	41	96.2	103	0.4	0	128	15	...	...	29	n/a	94	n/a	98
104 Maldives	45	1997-98	50	37	99	110	n/a	104	<0.1	5	68	5	88	95	<5	100	100	100	41
105 Mali	33.2	2001	233	131	37	1200	23.7	105	1.9	260	661	73	...	...	>95	74	61	93	58
106 Malta	n/a	n/a	7	6	65	n/a	n/a	106	0.1	0	7	1	25	100	<5	100	100	100	100
107 Marshall Islands	n/a	n/a	44	32	89	n/a	94.9	107	<0.1	2	113	13	76	91	<5	n/a	n/a	n/a	n/a
108 Mauritania	31.8	2000-01	173	105	58	1000	40	108	0.4	103	498	55	...	...	69	34	40	44	19
109 Mauritius	14.9	1995	18	16	90	37	n/a	109	0.1	0	135	1	24	93	75	100	100	100	99
110 Mexico	7.5	1998-99	29	25	95	83	85.7	110	0.2	0	49	4	95	76	22	95	69	88	34

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Member State	Children under five years of age underweight for age		Under-five mortality rate (per 1000 live births)	Infant mortality rate (per 1000 live births)	One-year-olds immunized against measles (%) (2001)	Maternal mortality ratio (per 100 000 live births)	Births attended by skilled health personnel (%)	HIV prevalence among 15-49-year-olds (%)	Malaria mortality rate (per 100 000)	Tuberculosis prevalence (per 100 000)	Tuberculosis mortality rate (per 100 000)	Tuberculosis cases		Population using solid fuels (%)	Population with sustainable access to an improved water source (%)		Population with access to improved sanitation (%)		
	(%)	Year										Detected under DOTS (2001)	Cured under DOTS		Urban	Rural	Urban	Rural	
111 Micronesia, Federated States of	n/a	n/a	60	47	84	n/a	92.8	111	<0.1	1	116	13	17	93	<5	n/a	n/a	n/a	n/a
112 Monaco	n/a	n/a	5	4	99	n/a	n/a	112	0.5	0	3	0	...	...	<5	100	100	100	100
113 Mongolia	12.7	2000	79	57	95	110	96.6	113	<0.1	0	305	38	73	87	67	77	30	46	2
114 Morocco	9.5	1992	46	38	96	220	39.6	114	<0.1	3	104	11	81	89	11	98	56	86	44
115 Mozambique	26.1	1997	206	146	58	1000	44.2	115	11.9	263	473	52	68	75	87	81	41	68	26
116 Myanmar	35.3	2000	108	83	73	360	56.4	116	0.9	15	255	33	59	82	>95	89	66	84	57
117 Namibia	24	1992	85	56	58	300	75.7	117	20.8	39	411	45	98	53	83	100	67	96	17
118 Nauru	n/a	n/a	16	11	95	n/a	n/a	118	0.4	0	52	4	n/a	25	<5	n/a	n/a	n/a	n/a
119 Nepal	48.3	2001	95	72	71	740	11.9	119	0.3	20	299	27	60	86	>95	94	87	73	22
120 Netherlands	0.7	1980	6	5	96	16	99.9	120	0.2	0	7	1	56	76	<5	100	100	100	100
121 New Zealand	n/a	n/a	8	6	85	7	100	121	0.1	0	8	1	37	30	<5	100	n/a	n/a	n/a
122 Nicaragua	9.6	2001	38	32	99	230	64.6	122	0.2	1	96	10	94	83	72	91	59	95	72
123 Niger	40.1	2000	255	122	51	1600	15.7	123	1.7	329	330	37	...	...	>95	70	56	79	5
124 Nigeria	30.7	1999	183	103	40	800	41.6	124	5.7	209	491	54	16	79	67	78	49	66	45
125 Niue	n/a	n/a	28	22	99	n/a	100	125	<0.1	0	67	7	n/a	n/a	<5	100	100	100	100
126 Norway	n/a	n/a	5	4	93	10	n/a	126	<0.1	0	8	1	50	70	<5	100	100	n/a	n/a
127 Oman	17.8	1998	18	15	99	87	91	127	0.1	1	13	1	100	93	<5	41	30	98	61
128 Pakistan	37.4	2001-02	110	86	57	500	20	128	<0.1	9	415	48	6	75	76	95	87	95	43
129 Palau	n/a	n/a	24	20	91	n/a	100	129	<0.1	0	180	13	...	...	<5	100	20	100	100
130 Panama	8.1	1997	25	19	95	160	90	130	0.6	0	65	6	71	67	37	99	79	99	83
131 Papua New Guinea	29.9	1982-83	99	75	58	300	53.2	131	0.3	17	648	57	9	63	>95	88	32	92	80
132 Paraguay	3.7	1990	33	26	77	170	58.1	132	0.3	0	112	13	5	77	64	93	59	94	93
133 Peru	7.1	2000	42	32	97	410	56.4	133	0.4	0	275	26	95	90	40	87	62	79	49
134 Philippines	31.8	1998	40	28	75	200	56.4	134	<0.1	1	582	61	58	88	85	91	79	93	69
135 Poland	n/a	n/a	9	8	97	10	n/a	135	<0.1	0	55	3	3	72	37	n/a	n/a	n/a	n/a
136 Portugal	n/a	n/a	7	6	87	8	99.7	136	0.5	0	41	4	84	79	<5	n/a	n/a	n/a	n/a
137 Qatar	5.5	1995	15	14	92	7	n/a	137	<0.1	0	69	6	100	66	<5	n/a	n/a	n/a	n/a
138 Republic of Korea	n/a	n/a	7	5	97	20	100	138	<0.1	0	140	10	...	...	<5	97	71	76	4
139 Republic of Moldova	n/a	n/a	29	24	81	36	99.1	139	0.2	0	213	17	37	83	72	97	88	100	98
140 Romania	5.7	1991	22	19	98	58	97.9	140	<0.1	0	189	10	11	80	45	91	16	86	10
141 Russian Federation	n/a	n/a	19	16	98	65	n/a	141	0.7	0	170	21	5	68	7	100	96	n/a	n/a
142 Rwanda	24.3	2000	182	111	69	1400	30.8	142	7.0	186	500	55	32	61	>95	60	40	12	8
143 Saint Kitts and Nevis	n/a	n/a	22	18	94	n/a	100	143	0.3	0	23	4	n/a	n/a	<5	n/a	n/a	n/a	n/a
144 Saint Lucia	13.8	1976	14	12	89	n/a	100	144	0.3	0	30	4	55	100	<5	n/a	n/a	n/a	n/a
145 Saint Vincent and the Grenadines	n/a	n/a	23	19	98	n/a	100	145	1.7	0	42	1	n/a	100	<5	n/a	n/a	n/a	n/a
146 Samoa	n/a	n/a	26	20	92	n/a	100	146	<0.1	1	42	5	50	92	<5	95	100	95	100
147 San Marino	n/a	n/a	5	5	74	n/a	n/a	147	0.3	0	7	0	n/a	0	<5	n/a	n/a	n/a	n/a
148 Sao Tome and Principe	12.9	2000	90	59	75	n/a	86	148	<0.1	57	299	33	...	...	<5	n/a	n/a	n/a	n/a
149 Saudi Arabia	n/a	n/a	29	24	94	23	91.4	149	<0.1	4	61	5	40	73	<5	100	64	100	100
150 Senegal	22.7	2000	138	73	48	690	50.5	150	0.8	71	416	46	85	52	79	92	65	94	48
151 Serbia and Montenegro	n/a	n/a	15	13	90	9	n/a	151	0.2	0	65	4	n/a	n/a	70	99	97	100	99
152 Seychelles	5.7	1987-88	14	11	95	n/a	n/a	152	0.1	3	60	1	77	82	<5	n/a	n/a	n/a	n/a
153 Sierra Leone	27.2	2000	316	181	53	2000	41.7	153	2.0	321	573	63	39	77	92	75	46	88	53
154 Singapore	2.9	2000	4	3	89	15	100	154	0.2	0	28	3	21	85	<5	100	n/a	100	n/a
155 Slovakia	n/a	n/a	10	8	99	10	n/a	155	<0.1	0	34	1	38	82	24	100	100	100	100
156 Slovenia	n/a	n/a	6	5	94	17	n/a	156	<0.1	0	23	1	68	84	<5	100	100	n/a	n/a
157 Solomon Islands	21.3	1989	81	65	78	130	85	157	<0.1	1	111	13	67	81	<5	94	65	98	18
158 Somalia	25.8	2000	219	130	36	1100	34.2	158	0.7	82	747	115	32	83	<5	n/a	n/a	n/a	n/a
159 South Africa	9.2	1994-95	71	49	72	230	84.4	159	19.6	0	483	46	72	66	28	99	73	93	80
160 Spain	n/a	n/a	6	4	96	5	n/a	160	0.5	0	33	1	...	...	<5	n/a	n/a	n/a	n/a
161 Sri Lanka	32.9	1995	20	16	99	92	94.1	161	<0.1	6	97	9	74	77	89	98	70	97	93
162 Sudan	40.7	2000	110	71	67	590	86.3	162	3.0	70	363	53	35	79	<5	86	69	87	48
163 Suriname	13.2	1999-00	31	24	90	110	84.5	163	1.3	2	111	13	...	...	69	93	50	99	75
164 Swaziland	10.3	2000	135	86	72	370	55.4	164	31.2	0	856	92	88	n/a	n/a	n/a	n/a
165 Sweden	n/a	n/a	4	3	94	8	n/a	165	<0.1	0	5	1	54	80	<5	100	100	100	100

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	(%)	Year										Detected under DOTS (2001)	Cured under DOTS		Urban	Rural	Urban	Rural	
166 Switzerland	n/a	n/a	6	5	81	7	n/a	166	0.5	0	9	1	...	<5	100	100	100	100	
167 Syrian Arab Republic	6.9	2000	27	24	93	160	76	167	<0.1	0	60	5	27	79	19	94	64	98	81
168 Tajikistan	n/a	n/a	63	51	86	100	76.8	168	<0.1	1	163	19	...	>95	93	47	97	88	
169 Thailand	17.6	1995	31	27	94	44	85	169	1.9	7	225	18	75	69	72	95	81	96	96
170 The former Yugoslav Republic of Macedonia	5.9	1999	19	16	92	13	n/a	170	<0.1	0	68	5	51	86	58	n/a	n/a	n/a	n/a
171 Timor-Leste	42.6	2003	126	88	n/a	n/a	n/a	171	<0.1	4	798	101	n/a	n/a	>95	n/a	n/a	n/a	n/a
172 Togo	25.1	1998	141	83	58	570	50.5	172	4.8	46	661	63	...	>95	85	38	69	17	
173 Tonga	n/a	n/a	21	17	93	n/a	92.1	173	<0.1	1	43	4	53	93	<5	100	100	n/a	n/a
174 Trinidad and Tobago	5.9	2000	21	18	91	110	99	174	2.9	0	26	3	...	<5	n/a	n/a	n/a	n/a	
175 Tunisia	4	2000	30	24	92	120	89.9	175	<0.1	0	28	2	73	91	29	92	58	96	62
176 Turkey	8.3	1998	44	36	90	70	80.6	176	<0.1	0	55	6	...	11	81	86	97	70	
177 Turkmenistan	12	2000	59	51	98	31	97.2	177	<0.1	0	169	13	36	70	50	n/a	n/a	n/a	n/a
178 Tuvalu	n/a	n/a	65	49	99	n/a	99	178	<0.1	0	67	6	...	<5	100	100	100	100	
179 Uganda	22.8	2000-01	147	89	61	880	37.8	179	5.8	151	544	61	52	63	>95	80	47	93	77
180 Ukraine	3.2	2000	21	16	99	38	99	180	1.1	0	118	10	n/a	n/a	56	100	94	100	98
181 United Arab Emirates	n/a	n/a	10	8	94	54	99.2	181	0.1	0	28	2	29	74	<5	n/a	n/a	n/a	n/a
182 United Kingdom	1.3	2001	7	6	85	11	99	182	0.1	0	12	1	...	<5	100	100	100	100	
183 United Republic of Tanzania	29.4	1999	156	109	83	1500	35.8	183	7.1	181	439	47	47	79	>95	90	57	99	86
184 United States of America	1.4	1988-94	9	7	91	14	99	184	0.6	0	4	0	90	76	<5	100	100	100	100
185 Uruguay	4.4	1992-93	16	14	94	20	99	185	0.3	0	30	2	78	85	<5	98	93	95	85
186 Uzbekistan	18.8	1996	36	30	99	24	96	186	<0.1	0	140	13	8	81	79	94	79	97	85
187 Vanuatu	19.7	1983	44	35	94	n/a	89.1	187	<0.1	2	126	14	60	89	<5	63	94	100	100
188 Venezuela, Bolivarian Republic of	4.4	2000	23	19	98	78	95	188	0.1	0	40	3	68	76	<5	85	70	71	48
189 Viet Nam	33.8	2000	39	31	97	130	69.6	189	0.2	6	264	25	85	92	>95	95	72	82	38
190 Yemen	46.1	1997	110	86	79	570	22	190	0.1	8	178	13	47	75	66	74	68	89	21
191 Zambia	25	1999	185	111	85	750	46.5	191	16.8	158	852	89	...	...	87	88	48	99	64
192 Zimbabwe	13	1999	108	71	68	1100	72.5	192	24.8	1	412	50	47	n/a	67	100	73	71	57

^aSee explanatory notes for sources and methods.^bEstimates from the 1990s.

... Countries not implementing DOTS or not reporting to WHO.

n/a Data not available.



List of Member States by WHO region and mortality stratum

To aid in cause-of-death and burden-of-disease analyses, the 192 Member States of the World Health Organization have been divided into five mortality strata on the basis of their levels of mortality in children under five years of age (5q0) and in males 15–59 years old (45q15). This classification was carried out using population estimates for 1999 (using United Nations Population Division data) and estimates of 5q0 and 45q15 based on WHO analyses of mortality rates for 1999.

Quintiles of the distribution of child mortality for both sexes combined (5q0) were

Definitions of mortality strata used to define subregions

Mortality stratum	Child mortality	Adult mortality
A	Very low	Very low
B	Low	Low
C	Low	High
D	High	High
E	High	Very high

sub-Saharan Africa where HIV/AIDS has had a very substantial impact.

The adjacent table summarizes the five mortality strata. When these mortality strata are applied to the six WHO regions, they produce 14 subregions, which are used in the Annex Tables to present results. The WHO Member States in each region are grouped by subregion as listed opposite. This classification has no official status and is for analytical purposes only.

The total number of WHO Member States is 192, the latest addition being Timor-Leste, which is classified in the high-mortality developing region of Sear-D. In 2003, the Fifty-sixth World Health Assembly endorsed the reassignment of Cyprus to the European Region from the Eastern Mediterranean Region.

used to define some countries as **very low child mortality** (1st quintile), some as **low child mortality** (2nd and 3rd quintiles) and others as **high child mortality** (4th and 5th quintiles). Adult mortality (the risk of death between ages 15 and 60 years, i.e. 45q15) was regressed on 5q0 and the regression line used to divide countries with high child mortality into **high adult mortality** (stratum D) and **very high adult mortality** (stratum E). Stratum E includes the countries in

WHO Member States, by region and mortality stratum

Region and mortality stratum	Description	Broad grouping	Member States
Africa			
Afr-D	Africa with high child and high adult mortality	High-mortality developing	Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Togo
Afr-E	Africa with high child and very high adult mortality	High-mortality developing	Botswana, Burundi, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Americas			
Amr-A	Americas with very low child and very low adult mortality	Developed	Canada, Cuba, United States of America
Amr-B	Americas with low child and low adult mortality	Low-mortality developing	Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela (Bolivarian Republic of)
Amr-D	Americas with high child and high adult mortality	High-mortality developing	Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru
South-East Asia			
Sear-B	South-East Asia with low child and low adult mortality	Low-mortality developing	Indonesia, Sri Lanka, Thailand
Sear-D	South-East Asia with high child and high adult mortality	High-mortality developing	Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, Nepal, Timor-Leste
Europe			
Eur-A	Europe with very low child and very low adult mortality	Developed	Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
Eur-B	Europe with low child and low adult mortality	Developed	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Serbia and Montenegro, Slovakia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Uzbekistan
Eur-C	Europe with low child and high adult mortality	Developed	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine
Eastern Mediterranean			
Emr-B	Eastern Mediterranean with low child and low adult mortality	Low-mortality developing	Bahrain, Iran (Islamic Republic of), Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates
Emr-D	Eastern Mediterranean with high child and high adult mortality	High-mortality developing	Afghanistan, Djibouti, Egypt, ^a Iraq, Morocco, Pakistan, Somalia, Sudan, Yemen
Western Pacific			
Wpr-A	Western Pacific with very low child and very low adult mortality	Developed	Australia, Brunei Darussalam, Japan, New Zealand, Singapore
Wpr-B	Western Pacific with low child and low adult mortality	Low-mortality developing	Cambodia, ^b China, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, ^b Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, Niue, Palau, Papua New Guinea, ^b Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam

^a Following improvements in child mortality over recent years, Egypt meets criteria for inclusion in subregion Emr-B with low child and low adult mortality. Egypt has been included in Emr-D for the presentation of subregional totals for mortality and burden to ensure comparability with previous editions of *The World Health Report* and other WHO publications.

^b Although Cambodia, the Lao People's Democratic Republic, and Papua New Guinea meet criteria for high child mortality, they have been included in the Wpr-B subregion with other developing countries of the Western Pacific Region for reporting purposes.

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