

## 3

## STRENGTHENING HEALTH RESEARCH SYSTEMS

*“Research is a system involving people, institutions and processes. Its pursuit depends on systematic analysis, creativity and exploration.”*  
(Commission on Health Research for Development)

*“The health research system is the brains of the health system: it is a tool to organize, understand, operate and improve it.”*  
(Prawase Wasi)

### KEY MESSAGES

- Leadership, funding, researchers and institutions, and the capacity to utilize research findings are as important as new discoveries.
- National health research should focus on priority health problems in the country concerned, on health system challenges and on managing opportunities for future growth and development. International efforts should support strategic research opportunities in particular.
- Research agendas should be set up to succeed. This means adequate, sustainable and transparent funding, professional research managers, ethical standards, and accountability in the use of public funds.
- In addition to peer reviewed journal articles in large, international databases, other forms of research have potential value and should be recognized.
- Funds should also be invested in strengthening human and institutional research capacities to address complex health problems.
- Biomedical discoveries cannot improve

#### Interesting numbers

10%	Percentage of research outputs produced by health researchers surveyed in 13 low- and middle-income countries that were referenced in international databases of journal articles.
22,000	Estimated number of scientific journals in the world in 2002.
1/3	Proportion of researchers, policy-makers and other users of research in 13 low- and middle-income countries who said in a survey that there was either no rational process to set health research priorities in their countries, or that they were unaware of how priorities were identified or set.
20,000	Number of qualified professionals emigrating annually from Africa since 1990.
3%	Percentage of public sector funding from developing countries directed towards health research, as a proportion of total global spending on health research.

(Sources for these numbers are given on the report web site: [www.who.int/rpc/wr2004](http://www.who.int/rpc/wr2004))

people's health without research to find out how to apply these within different health systems, population groups, and diverse political and social contexts.

- The culture and practice of health research should be expanded beyond academic institutions and laboratories to include health service providers, policy-makers and civil society.

### 3.1 WHAT IS COMMONLY KNOWN ABOUT HEALTH RESEARCH ACTIVITIES?

#### WHAT SOME PEOPLE CAN COUNT EASILY

People interested in scientific performance often look at the number of scientific articles published in peer reviewed journals. This is easily done. Basic information and summaries of many articles are available in large reference databases covering scientific research from many countries on a wide range of topics. In 2000 alone, for example, the Thomson Institute for Scientific Information's (ISI) databases included over 365,000 articles that were published in more than 3,200 scientific journals addressing a broad range of health topics—not only biomedical research—written by scientists and health researchers working in 175 countries.

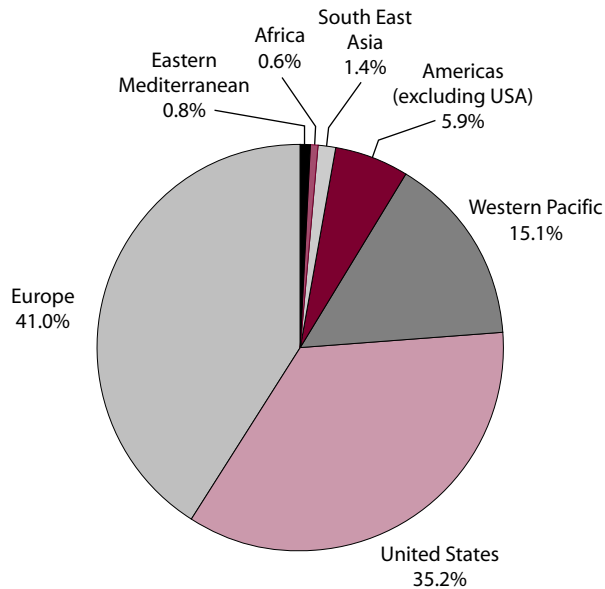
There are reasons for wanting to count the number of scientific publications. Firstly, such numbers can be linked to the research capacity and knowledge pool of an individual, institution, country, region or even the world as a whole. For example, using the ISI database, Figure 3.1 illustrates the proportion of scientific publications on health topics written by authors in seven regions of the world. This shows that Europe, the Western Pacific and the United States account for approximately 90% of scientific output on health (1).

Secondly, the number of scientific articles published in peer reviewed journals is an alluring figure because some argue that at the national level, the number of scientific articles, especially those addressing biomedical research topics, reflect financial investments in research and development within a country. But given the difficulties of estimating government, business, and foreign investments in health research and development, particularly in low- and middle-income countries, counting published articles alone is not a sufficient approach to estimate health research expenditure.

#### IS COUNTING ARTICLES ENOUGH TO SHAPE HEALTH RESEARCH POLICY AND INVESTMENT?

No. Although newspaper articles and scientific production in peer reviewed journals may provide some indication of research capacity or of the knowledge pool, the research process is far more complex. It spans the entire spectrum of policies related to knowledge creation as well as its diffusion and use. It cannot be captured by one figure or by quantitative measures alone. Particularly for low- and middle-income countries, focusing narrowly on the number of

**Figure 3.1** Proportion of scientific publications addressing health topics from different regions\* in the world, 2001



Source: World Health Organization, 2004, based on Institute for Scientific Information (ISI)'s Science Citation Index (SCI) database from 2001.

\* WHO regional structure, about 15% of these articles have authors working in more than one country, and in this case, each country gets part of the "credit" for the article.

peer reviewed research articles—or on some variation such as the proportion of highly-cited articles—has many pitfalls. There is much debate on whether reference databases are representative of all research articles that have been published globally. Another issue is whether journals tend to publish research on health topics primarily concerning high-income countries. Finally, there are questions as to whether the peer review process itself stifles innovation and is not necessarily a guarantor of quality.

In fact, peer reviewed journal articles referenced in large, international databases are only one type of research output. In an interview-based survey of almost 1,900 individuals identified as active health researchers in 13 low- and middle-income countries, a much wider range of research outputs were reported for the period 1998–2002 (2). Pooling data collected across countries, the expanded list includes peer reviewed journal articles referenced in international databases (about 10% of total research productivity); peer reviewed journal articles referenced in regional or national databases (about 20%); conference presentations (about 26%); books, non-peer reviewed articles and unpublished manuscripts (about 24%); as well as outputs that are not just for other researchers, such as policy reports, press releases and other media items (about 20%). Also, more than 10% of these researchers reported having registered a national or international patent. The majority of those with registered patents worked in clinical or biomedical research.

In addition to the various forms of “explicit” knowledge mentioned above, it is important to note that knowledge can/is also generated by a variety of players not strictly within formal research processes or as presented in publications. It is likely that a wealth of “tacit” knowledge already exists to be drawn upon during the research process. Also, much of the results of research are probably applied in practice without first having to publish them in the traditional manner. Timeliness, responsiveness to needs of users and a focus on coming up with strategic solutions are as important as precision, rigour and detailed analysis.

### THERE IS BASIC, THERE IS APPLIED AND THERE IS STRATEGIC RESEARCH

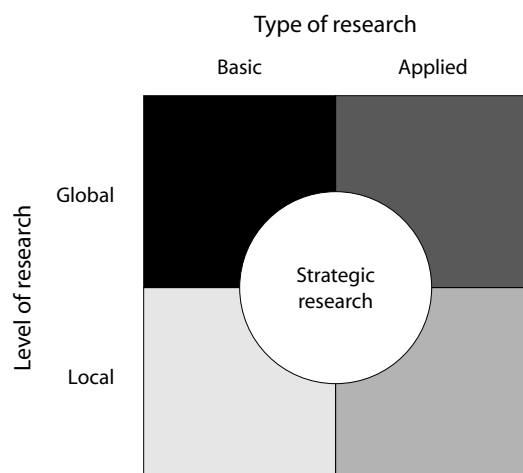
Most people know about basic and applied research. In truth, research spans a spectrum starting from basic, fundamental research to applied research and extends to operational and management research. In this report’s context, the question is: what type(s) of research are relevant and important in bridging the gap between what is known and what is actually being done?

Research has struggled with the goals of “knowing” and understanding (“basic” research) on the one hand, and with “doing” and using (“applied” research) on the other. There is also a perception that the former is more likely to be “universal” or “global” in nature and performed in the developed world, and the latter more “local” and focused on national priorities. In his landmark treatise (3), Stokes concluded that the traditional distinction between basic and applied research is inadequate and too limiting, and that a category called “strategic” research (“Pasteur’s quadrant”) needs to be added. This is research leading to “results of evident interest to a broad class of users, external to the research community, that can be identified at the time the research is funded; intended users of the research may also be within the research community”. Strategic research is also characterized by the fact that it draws on global knowledge for solving local problems (see Figure 3.2). It is also important to emphasize the rationale for having the local-applied quadrant, e.g. that a genomics institute is not needed in every country. The role of strategic research is revisited in Section 3.3. below.

The focus of strategic research on users may make it most relevant for translating knowledge into actions to improve health. The success of strategic research depends, to some extent, on maximizing the impact of explicit and tacit knowledge within health systems and can gain much from a “knowledge management” framework in public health. This is defined as a set of principles and tools to optimize and integrate the iterative processes of creating, developing, disseminating and applying knowledge for strategic problem-solving and organizational effectiveness in the field of public health. The scaling up of knowledge management efforts in public health will be important for translating research and evidence into policy, practice and social transformation.

### WHAT IS NEEDED TO PROVIDE A MORE COMPLETE PICTURE?

To understand whether research produces knowledge that improves health, it

**Figure 3.2** A view of strategic research

Darkness of quadrants indicate approximate, relative intensities of activity and levels of funding support. Global-basic quadrant funded primarily by developed countries; global-applied quadrant by industry; local-basic and local-applied by public and external donor agencies in developing countries. Strategic research straddles all four quadrants and combines global and local activities.

Source: A. Pablos-Mendez, Knowledge Management and Sharing, World Health Organization, Geneva.

is not enough to simply look at the number of papers produced. Other issues need to be considered, such as:

- How are research topics selected and by whom?
- How are research activities financed?
- Who are the people and institutions involved in producing and synthesizing research?
- What are the different values and objectives of those involved in health research?
- To what extent are potential beneficiaries involved in the research process?
- How are research results disseminated and to whom?
- How is research used to make products, interventions and generate information for better health?
- How are research activities evaluated and made accountable to society?

Most countries need to adopt a more comprehensive and participatory approach to health research in order to develop policies and strategies to better ensure that research produced attains its goal of improving health outcomes. This is the underlying premise of a “health research system”.

### 3.2 WHAT IS A SYSTEM FOR HEALTH RESEARCH AND WHY IS IT IMPORTANT?

The system for health research, which was introduced in Chapter 1, refers to

the people, institutions and activities involved in the generation and application of knowledge to promote, restore and/or maintain the health status of populations. It also includes the mechanisms that can be adopted to encourage the utilization of health research. While health research systems can operate at local, national, regional or global levels, this chapter focuses on national health research systems to highlight the importance of countries producing their own research and using existing research to identify and address their health problems.

The four main functions of a health research system are essential to attain the goals of knowledge for better health:

1. stewardship—strong leadership to direct, coordinate, manage and review health research;
2. financing—sustainable and transparent processes to mobilize and allocate funds for research;
3. resources—sufficient human and institutional capacities to produce and especially to use research;
4. producing and using research—producing research that addresses health challenges, synthesizing research results, and using the knowledge gained, particularly within health systems.

#### WHY IS A SYSTEMS APPROACH TO HEALTH RESEARCH IMPORTANT?

On a national scale, health research efforts are often hindered by insufficient coordination. Research activities in various health-related fields can be fragmented, isolated from each other and wastefully competitive. Moreover, there is often little communication and consultation between the producers of research and the users of research: policy-makers, health providers, civil society, the private sector, other researchers, and the general public.

A well-coordinated, systematic approach to health research involves all stakeholders. For instance, efforts to increase the quality, relevance and production of research also need to consider whether there is a demand for this research.

Countries need a health research system to identify priorities, mobilize resources and maximize the use of existing ones, develop and sustain the human and institutional capacity necessary to conduct research, disseminate research results to target audiences, apply research results in policy and practice, and evaluate the impact of research on health outcomes. More systematized approaches to these processes involved in the performance and production of health research would help to improve the transparency and accountability of health research activities.

The health research system and the health system cannot exist in separate worlds. The notion of “knowledge for better health” demands that the health research system should provide more direction to strengthen the health system. Health research can provide guidance on how to invest limited

resources allocated to health systems more effectively. Health research must also investigate a broad range of issues in addition to life sciences or clinical medicine, such as:

- what makes us healthy or ill, including a broad range of social, environmental and economic determinants;
- how to prevent illness, accidents, injuries, and how to treat these more effectively and efficiently;
- how to be responsive to people's needs and expectations;
- how to provide services for all kinds of peoples, groups and sub-populations, particularly those who have been chronically underserved or simply not covered at all;
- how to take into account that individuals live and experience health and illness within households, communities and social networks;
- how to organize health services given the existence of different administrative, geographic and political levels;
- how to obtain accurate and reliable basic health information;
- how to set health priorities and goals and develop strategies to implement them;
- how to train an appropriate mix of health professionals and health workers;
- how to finance the health system in an equitable and sustainable manner;
- how to mix preventive and curative services, private and public services, disease specific services and more comprehensive services;
- how to link the health research system with the non-health public and private sectors;
- how to involve people and institutions in the process;
- how to evaluate health systems.

These questions may not be exhaustive, but they are relevant to all countries and all health systems. All countries, especially those with relatively limited resources, need evidence and knowledge to shape health policy. Research on health systems, the topic of Chapter 2, should be viewed as an investment and not a cost.

#### **DOES A SYSTEM'S PERSPECTIVE NEED FURTHER DEVELOPMENT?**

Yes. The main conclusions of a recent review based on more than 45 case studies written since 2000—from some 35 low- and middle-income countries—underscored the need to regard health research as a functional system (4) with elements working towards a common goal. For example, poor coordination between research institutions at national, regional and international levels is the main obstacle to effective functioning of the health research system.

Studies show that many countries have no national health research agenda or mechanism to coordinate these activities. They show that stakeholders do not participate in the development or implementation of research policies. The studies also found that overall demand for research was low and that there was a lack of accessibility to research findings.

These case studies suggest the need for a systems approach to the organization of health research, irrespective of the national context. Yet these studies do not always provide enough guidance on which policy options would be more appropriate to strengthen national health research systems. Moreover, qualitative case studies may not cover all aspects of a health research system and make it difficult to see changes over time or across different national settings.

Many excellent reports and studies on health research activities include quantitative data (see Box 3.1). Most focus selectively on specific scientific fields, institutions or actors. This is partly because data that covers all health research activities—which is more than medical research and yet less than all scientific research and development—is often not readily available even in most high-income countries.

A summary of the functions and operational components of a health research system is presented in Table 3.1. Further details of each function—stewardship, finances, resources, and producing and using research—as well as approaches on how to understand and potentially strengthen each are explored in the following four sections of this chapter.

### Box 3.1 Evaluating biomedical research in the United States

In the United States, the National Academy of Sciences, the umbrella organization for the National Academy of Engineering, the Institute of Medicine and the National Research Council, released a report in 2003 entitled: *Large-Scale Biomedical Science*.

The report presented recommendations on how to improve the US government's approach to large-scale biomedical research, on how best to advance knowledge and on how to produce innovations that would benefit society. The report presented the following recommendations:

1. Assessing research proposals: The National Institutes of Health (NIH) have no formal mechanism for assessing opportunities for biomedical research by comparing, evaluating and ranking research programmes. Criteria to evaluate competing scientific initiatives were,

however, proposed in 1988. These were divided into three categories: scientific merit, social benefits and programmatic concerns.

The report takes these proposals a step further by recommending the implementation of an open and systematic method across the NIH for soliciting and reviewing biomedical research proposals. It said that this should be part of the priority-setting process to determine the allocation of federal funds.

2. Evaluating research outcomes: The White House Office of Management and Budget is trying to impose stricter performance criteria for federal research agencies which hope to receive funding for research projects. The *Large-Scale Biomedical Science* report explores the debate about whether or not basic

research can be evaluated. Critics of the evaluation of basic research argue that outcomes cannot be measured on a regular basis because they are unpredictable. Moreover, there is often a time lag between the generation of knowledge and its application in practice. On the other hand, proponents of the evaluation of biomedical research findings argue that at least some benchmarking of quality, relevance and leadership is needed to provide some indication of the potential usefulness of a research programme. The report also recommends that federal funding agencies should conduct a thorough analysis of their recent large-scale biomedical research initiatives once they are well established, to evaluate their effectiveness and efficiency in achieving their goals.



### 3.3 STEWARDSHIP: WHAT CAN GOOD LEADERSHIP DO?

Effective management and coordination are crucial for health research to address a country's health problems as well as other health challenges found around the world. Sound governance in health research is needed at the national level to connect health challenges, research priorities and practical approaches to improve health. Throughout the world, there are different systems for managing and coordinating research. For instance, in the Islamic Republic of Iran, the Department of Research and Technology at the Ministry of Health and Medical Education is the body that implements health research policies through the Medical Commission of the National Research Council. In Pakistan, it is the Pakistan Medical Research Council (PMRC) that performs stewardship functions on behalf of the Ministry of Health, which has administrative control of the PMRC.

No one organizational structure is appropriate for health research in all countries. But it is important for all countries to understand the current structures, strengths and potential challenges facing leadership in health research, as well as the range of stakeholders involved in the national health research process. An example of this is the many key stakeholders within the Malaysian health research system listed in Figure 3.3. The Philippines has also recently reviewed the way in which health research is organized in the country (see Box 3.2).

The following areas of leadership and management are essential regardless of the organizational structure of the health research system:

- Creating a vision for integrating national health research with the health system.

**Table 3.1** Summary of the functions and operational components of health research systems

<i>Functions</i>	<i>Operational components</i>
Stewardship	<ul style="list-style-type: none"> <li>■ Define and articulate vision for national health research system (HRS)</li> <li>■ Identify appropriate health research priorities and coordinate adherence to them</li> <li>■ Set and monitor ethical standards for health research and research partnerships</li> <li>■ Monitor and evaluate the HRS</li> </ul>
Financing	Secure research funds and allocate them accountably
Creating and sustaining resources	Build, strengthen, and sustain the human and physical capacity to conduct, absorb, and utilize health research
Producing and using research	<ul style="list-style-type: none"> <li>■ Produce scientifically valid outputs</li> <li>■ Translate and communicate research to inform health policy, strategies, practices, and public opinion</li> <li>■ Promote the use of research to develop new tools (drugs, vaccines, devices, and other applications) to improve health</li> </ul>

Source: Pang T et al. Knowledge for better health—a conceptual framework and foundation for health research systems. *Bulletin of the World Health Organization*, 2003, 81:815–820.

- Setting and adhering to appropriate health research priorities.
- Emphasizing strategic research and management of knowledge.
- Setting and monitoring ethical standards for health research and research partnerships.
- Monitoring and evaluating all the elements of the system to improve it.

Good leadership is required to coordinate and implement national priorities for health research. Given that resources for research are limited, particularly in low-income countries, it is important that they are directed towards research activities that would optimize health benefits, hence the notion of “knowledge for better health”. This means identifying health problems of greatest national interest where increased funds, capacities, and innovative approaches would attain better health in an equitable fashion. For example, Australia, Canada, New Zealand (see Box 3.3) and the United States have set specific health

**Figure 3.3** Key stakeholders within Malaysia’s national health research system

Funders	Producers	Evaluators/Monitors	Users
National	Government Research Institutions	Ministry of Health	Ministry of Health
Ministry of Health	Public Universities	Ministry of Science, Technology & Environment	Health Service Providers (public and private)
Other Ministries	Private Universities	Universities	Ministries
International	Ministry of Health Departments	International Agencies	Universities
Pharmaceutical Companies	Industries	National Committee on Clinical Research	International
Industries	Corporatized Government Research Institutions	Government Research Institutions	Pharmaceutical Companies
Professional Organizations	Professional Organizations	Corporatized Government Research Institutions	Researchers
NGOs	NGOs	Foreign Research Institutions	NGOs
General Public	Foreign Research Institutions	Private Medical Institutions	Professional Organizations
	Private Medical Institutions	Ethics Committees	General Public
			Media
			Industries

Source: Institute for Health Systems Research, Ministry of Health, Kuala Lumpur, Malaysia.

research priorities and strategies for indigenous populations who tend to suffer from worse health outcomes than the non-indigenous populations.

Various systematic approaches and tools have been created to coordinate health research priorities at national levels. One example of a mechanism for priority setting or coordination is the Essential National Health Research (ENHR) strategy. This strategy is based on consensus-building among a broad range of stakeholders, including: researchers, policy-makers, health-care providers and community representatives.

Another method is a matrix approach that combines economic and institutional perspectives in a single tool. This was developed by the Global Forum for Health Research, the NGO that has brought the 10/90 gap in health research to the fore. The matrix approach looks at disease burden, determinants for the persistence of that burden, present level of knowledge, cost-effectiveness, and resource flows. These are discussed in relation to individuals, families and

**Box 3.2** Creating a national health research system in the Philippines

The Philippines started to reorganize its health research system recently by creating a new body called the Philippine National Health Research System. Created by the Department of Health (DOH) and the Department of Science

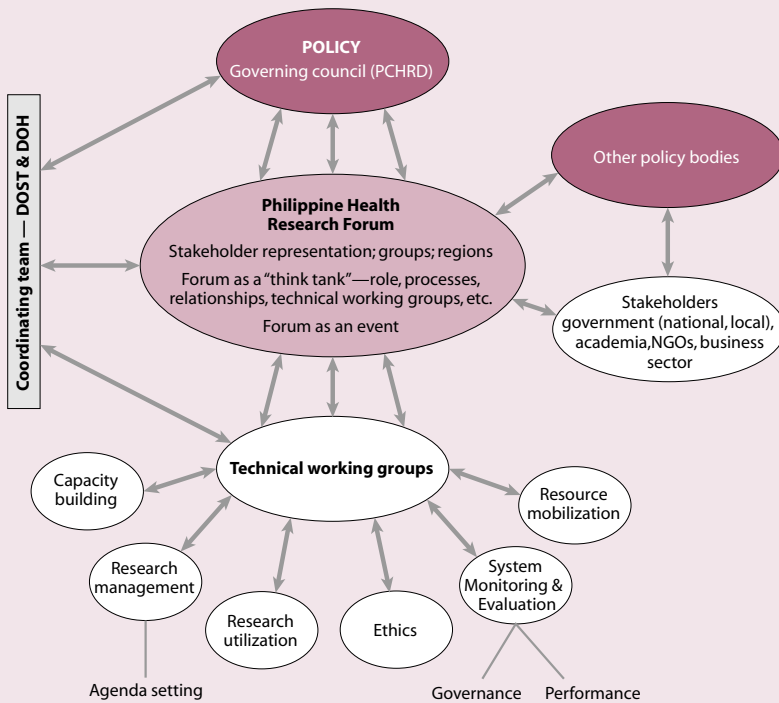
and Technology (DOST), the new body seeks to encourage other stakeholders such as universities, civil society groups and NGOs, business and foundations, and expatriate communities to play a greater role in health research.

This body replaced the Philippine Council for Health Research and Development (PCHRD) which was created in 1982 as the policy-making body of the national health research system. The PCHRD was the first major organization established in the Philippines to coordinate and lead national health research.

To create the country's new national health research system, a working group was set up to provide the framework for its structure, organization, and monitoring and evaluation. The working group recommended two options for reorganizing the national health research system. In the first model, its structure would be akin to a virtual organization, respecting the formal authority of the existing agencies that comprise the health research system. In the second model, called "nodal governance," the national health research system would identify natural nodes of research networks, interlink them, and lead them towards certain objectives. Both models built on existing health research structures to reduce bureaucratic hurdles entailed in the restructuring.

The working group finally proposed that all regions adopt the structure outlined to the left to reorganize the national health research system, to ensure that all sectors in this model are represented.

**Revised Structure of Health Research in the Philippines**



Source: Proceedings & Highlights of Philippine National Health Research System (draft), Philippine National Health Research System Monograph Series, Technical Working Group on System Structure, Organization, Monitoring and Evaluation, 2004.

### Box 3.3 New Zealand: health research for Maori by Maori

One in seven people in New Zealand identify themselves as being of Maori origin. The Health Research Council of New Zealand (HRC) recognizes that, as a governmental body, it has a role in ensuring that Maori, as *tangata whenua* or the indigenous people of New Zealand, have access to and are able to utilize the resources available to improve their health status. The founding document of New Zealand, the Treaty of Waitangi, recognizes that Maori tribes and sub-tribes have authority over their involvement in health research. This document also states that Maori should expect the same standard of health as non-Maori, and an equitable share of benefits from government spending on health care.

The HRC launched an initiative called the Health Research Strategy to Improve Maori Health and Well-being 2004–2008 with the goal of improving Maori health by funding high-quality health research based on Maori health priorities and needs. The present strategy builds on a previous initiative, called the Maori Health Research Strategic Plan for 1998–2002. Under the new scheme:

- The HRC identified Maori as a priority population and area for more investment. As a result, all nine HRC research

portfolios highlight health needs and relevance to Maori.

- The HRC developed a research portfolio that supports a “by Maori for Maori” *Kaupapa*\* and aims to build Maori capability to undertake health research, prioritize the development of Maori science, paradigms and methodologies, and ensure *Kaupapa* Maori-focused research is funded.
- Maori health research is also carried out through other health research portfolios.
- All applicants to the HRC for funding need to demonstrate that their research is responsive to the needs and diversity of Maori, which entails consultation with Maori representatives. If research is of interest to Maori, then the design and conduct of the research, the storage of samples or data and the dissemination of research findings will be undertaken in a manner that reflects Maori knowledge and values.
- The HRC Board includes two Maori members.
- The Maori Health Committee participates with the other Research Committees to develop policy and process recommendations to the HRC.
- Joint ventures have been established with other public entities to invest in

Maori development research as part of the HRC’s Partnership Programme.

- The HRC’s investment in Maori health research has increased and now represents more than 9% of its total investment in health research.

Additional areas in the present strategic plan include:

- developing the ability of indigenous people’s communities to undertake research projects;
- ensuring that Maori health research is innovative and opportunities to contribute to economic goals are exploited where appropriate;
- ensuring that Maori have the ability to engage in the debate on the development and implementation of new health research technologies;
- ensuring that research collaboration with other indigenous groups are fostered;
- ensuring that Maori ethical issues are part of the discussion on health ethics.

For more information, visit:

[www.hrc.govt.nz/assets/pdfs/policy/framework.pdf](http://www.hrc.govt.nz/assets/pdfs/policy/framework.pdf)

[www.hrc.govt.nz/assets/pdfs/publications/Strategic%20Plan%202004-2008.pdf](http://www.hrc.govt.nz/assets/pdfs/publications/Strategic%20Plan%202004-2008.pdf)

\* *Kaupapa* Maori research uses tools which are based on Maori paradigms and methodologies. This represents an important part of the development of Maori thought, culture and world-view.

Source: The Health Research Council of New Zealand, March 2004. Ngā Pou Rangahau Hauora Kia Whakapiki Ake Te Hauora Māori 2004–2008. The Health Research Strategy to Improve Maori Health and Well-being 2004–2008.

communities as well as ministries of health, research institutions and health systems. These areas are also discussed with regard to health; central government and macro-economic policies; and put in a global context.

A survey of more than 550 policy-makers and almost 1,900 researchers in 13 low- and middle-income countries in 2004 found that, on average, a greater proportion of policy-makers than researchers reported that more resources should be spent on health systems research such as health policy, service delivery, financing and surveillance as the best means of meeting the objectives of the national health research system (5). In contrast, a greater share of researchers said more should be spent on basic research to meet those goals. The amount

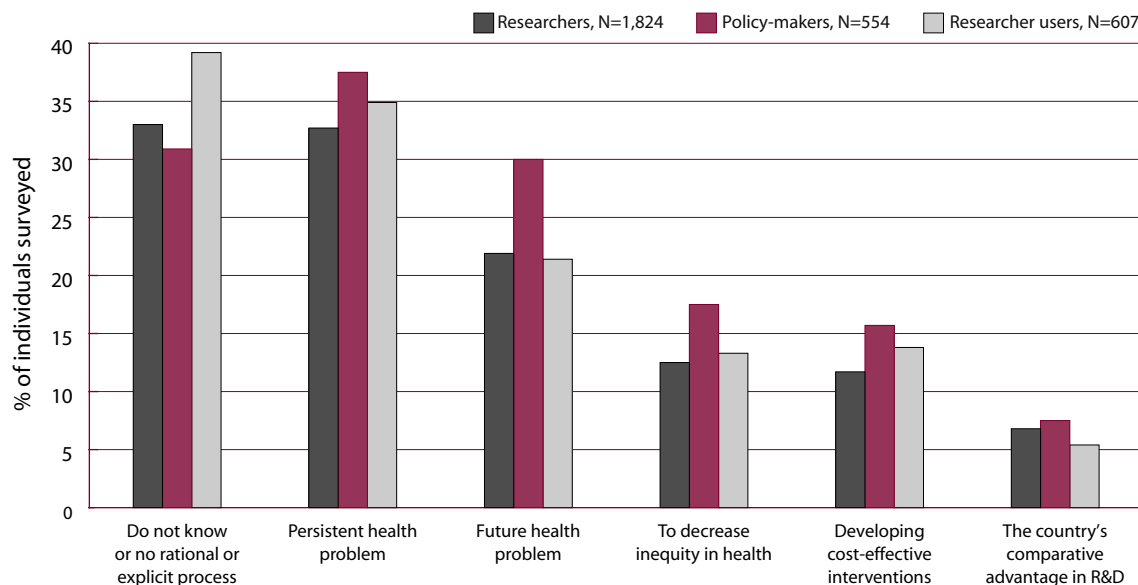
researchers said was needed was greater than the amount policy-makers said they would allocate.

Moreover, a greater share of policy-makers than of researchers surveyed wanted more funds spent on policy-driven or commissioned research based on identified priorities to meet the objectives of the national health research system in an efficient way. In contrast, researchers wanted to allocate a greater proportion on researcher-driven research, meaning research reflecting the researcher’s scientific interests, rather than with what policy-makers would allocate to this type of research to meet the same goals.

More striking is that about a third of policy-makers, researchers and users of research interviewed said that there was either no rational process to set health research priorities in their country or that they were unaware of how priorities were identified or set (see Figure 3.4). This finding supports case study findings mentioned earlier on the absence of mechanisms to coordinate health research. The message is clear: within each country, a better awareness and understanding of different perspectives may inform national dialogue and processes to identify and coordinate health research priorities and their implementation.

Another dimension to consider when coordinating priorities is the immediate focus of research, as this can differ considerably. For example, health research activities can address basic or fundamental questions, develop

**Figure 3.4** Perspectives on research priority setting processes



Current basis of identifying or setting priorities in health research across 13 low- and middle-income countries at the national levels (only selected categories are presented)

Source: Health Research Systems Analyses Initiative, World Health Organization, 2004.

applications and products, or concentrate on specific managerial and operational challenges. In fact, many ask what is the right mix of basic and applied research activities within a national health research system. Rather than getting bogged down in this traditional debate, good leadership and research management should promote strategic research (3) (see Figure 3.2). This means that from the start, not only are the relevant questions and appropriate methods convincing, but the potential health benefits and the people who would benefit are also clearly specified.

Moreover a clear vision and strong social pressure are needed to create incentives for public and private sectors to work more closely together towards mutual objectives (see Box 3.4). In fact, recent success with public-private partnerships looking at neglected diseases is an example of international strategic

### Box 3.4 Public-private partnerships for research and development

Public-private partnerships (PPPs) have proved to be an innovative approach to the discovery, development and provision of drugs and vaccines. There are mutual benefits for the public and private sectors in pooling their resources and technologies in research and development (R&D). The public sector stands to gain more business credibility and authority, increased resources and access to private sector skills and management talents (1). The private sector, in turn, may benefit from more corporate influence in national and global policy-making, tax breaks, market penetration, as well as brand and image promotion.

Four notable examples of PPPs are described below. While most of their activities relate to R&D, the ultimate goal of these partnerships is to ensure that these products reach poor patients in developing countries.

The Medicines for Malaria Venture was created in 1999 by WHO and IFPMA (International Federation of Pharmaceutical Manufacturers Associations). It seeks to bring together public, private and philanthropic partners to fund and manage the discovery, development and registration of affordable and appropriate antimalarial drugs for disease-endemic countries. Its strategy is to build on existing knowledge by combining the expertise of the pharmaceutical industry in drug discovery and development with that of the public sector in biology, clinical

medicine, field experience and its public responsibility.

The International AIDS Vaccine Initiative was established in 1996 and works to speed the development and worldwide distribution of AIDS vaccines. Its activities fall in four key categories: 1) a scientific programme, which seeks to accelerate the development of new and innovative AIDS vaccines; 2) education and advocacy programmes, to mobilize international support for an AIDS vaccine; 3) encouraging industrial participation in AIDS vaccine development; and 4) providing global access to AIDS vaccines.

The Global Alliance for TB Drug Development was launched in 2000 with the goal of providing better treatment for tuberculosis by 2010 and ensuring that access to treatment is equitable. It has adopted a two-pronged R&D strategy: 1) outsourcing the development of promising anti-TB compounds to public and private collaborators worldwide, and 2) identifying and supporting projects that address critical infrastructure gaps and help to streamline the process for the successful registration of anti-TB medicines.

The Malaria Vaccine Initiative is run by an international, non-profit organization, the Program for Appropriate Technology in Health, and was established in 1999. It seeks to promote the development of promising malaria vaccines and make them more accessible in the developing

world. Current projects include a deal with GlaxoSmithKline Biologicals to develop and test GSK Biologicals's malaria vaccine for children.

Five key issues have been identified that could affect the immediate and long-term credibility and performance of the PPPs described above (2). Two of these issues directly concern leadership: 1) the importance of effective managers with commercial experience and good decision-makers with scientific and political experience; and 2) governance, including the choice of projects and the choice of board members. The other three issues are the strategies for the R&D process, intellectual property policies, and financial viability of the PPPs. The general conclusion is that all four partnerships have successfully initiated research programmes. The main challenge that lies ahead is whether they can continue to raise funds and secure deals with industry to meet their product and cost targets.

*For more information visit the Initiative on Public-Private Partnerships for Health at: [www.ippph.org](http://www.ippph.org)*

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1. Buse K, Walt G. Global Public-Private Partnerships: Part II—What are the Health Issues for Global Governance? *Bulletin of the World Health Organization*, 2000, 78(5):699-708.
2. Kettler H, Towse A. *Public Private Partnerships for Research and Development: Medicines and Vaccines for Diseases of Poverty*, London, Office of Health Economics, 2002.

research. Part of the vision is to negotiate an acceptable balance between the goals of better health and health equity and those of economic competitiveness, market expansion and increased profits. Making explicit these differences can enhance policy discussions.

### 3.4 FINANCING: MORE FUNDS OR BETTER USE OF EXISTING FUNDS?

Both are needed. In many countries, the potential for research to address and solve health problems is hampered by a lack of funds. Many national governments allocate almost none of their health budgets towards health research on a systematic basis, even if other sources of public funding may exist. The Commission on Health Research for Development recommended in its 1990 report that all countries invest at least 2% of their national health budgets in health research and building health research capacity.

Some countries and regions have since made a concerted effort to increase health research funding. For example, within India's National Health Policy of 2002, the government pledged to increase the proportion of health spending allocated to health research from 0.5% to 2% by 2010. Similarly, WHO's Eastern Mediterranean Regional Office (EMRO) recommends that member states in the region allocate 2% to 3% of the health budget to national health research systems. This was supported by a Regional Committee resolution stating that 2% of national WHO budgets should be used for health research and is currently implemented in the countries of that region.

But what amount of resources needs to be invested and should this proportion be the same in all countries? This question is more difficult to answer, given competing national priorities, differences in the organization and efficiency of health research activities, and comparative advantages in research in each country.

The Global Forum for Health Research estimated a few years ago that total funding for health research, including public, private and private non-profit funding worldwide was about US\$73.5 billion or about 2.7% of total health expenditures (6). Public funding represented approximately 50% of the total—or about US\$37 billion in 2001—with only 3% coming from low- and middle-income countries. Increased government commitment for a systematic approach to research funding in low- and middle-income countries must be coupled with better use of existing funds.

There needs to be more transparency in the flow of health research funds. It is important to know who is funding health research, what topics and activities are being funded, and how much money is being pledged. For this reason policy discussions concerning the financing of health research must include the following three issues:

- securing research funds for the health research system;

- allocating these financial resources to projects and activities in a transparent way;
- achieving an appropriate balance between scientific curiosity and strategic needs.

#### TAPPING INTO NEW SOURCES OF FUNDS FOR HEALTH RESEARCH

Policy-makers can explore a range of potential tools and approaches to increase sustainable sources of finance for health research. For example, WHO recommends earmarking a portion of tax revenue on tobacco products to fund health promotion initiatives and research. Dozens of countries target tobacco taxes to that effect. An important example is the government of Australia's Tobacco Act 1987, which created the Victorian Health Promotion Foundation (VicHealth). Originally financed from earmarked tobacco taxes, VicHealth has invested about 20% of its funds in public health research since its inception, for the equivalent of about US\$70 million. VicHealth's major areas of investment include research fellowships and long-term research projects in tobacco control, mental health, physical activity, nutrition, ageing, sexually transmitted diseases, injury prevention, skin cancer prevention, and eye health.

Inspired by the Australian approach, the Thai government created the Thai Health Promotion Foundation (ThaiHealth) in 2001 which is funded from 2% of tobacco and alcohol taxes. ThaiHealth's priorities include tobacco control, alcohol control and traffic accident prevention where the production and transfer of knowledge are both key components. Other examples include Finland, which earmarks 0.45% of the estimated annual revenues from the tobacco tax for tobacco control, health education and research, and Portugal, which earmarks 1% for cancer research, prevention, diagnosis and treatment. Box 3.5 outlines innovative approaches to funding health research from Argentina and Brazil.

#### HOW TO INCREASE SYSTEMATIC ACCOUNTING OF HEALTH RESEARCH FLOWS

Some countries are already tracking their national health expenditures through a system called National Health Accounts (NHA) so that they have a clearer idea of how much funding is going into health research. This approach has been institutionalized in many countries, and covers spending on health care and health-related activities such as health research, environmental health and training of health personnel. All OECD countries, for example, compile national health accounts annually. Over 80 low- and middle-income countries have national health account estimates for at least one year.

The recording of resources invested in health systems in national health accounts is not perfect but it provides a good start and NHA has become the internationally accepted system for estimating national health expenditure. The NHA Producer's Guide is aimed at low- and middle-income countries (7) in particular and countries can use it as a tool to estimate funding flows. Demand for national health accounts has increased in recent years not least



**Box 3.5** Innovative financing schemes for health research**Sao Paulo, Brazil**

The Brazilian government introduced a novel scheme called sectoral funding in 1999. The aim was to increase research funding provided by the State of Sao Paulo Research Foundation (FAPESP) which already manages 1% of the state revenues for research purposes. Under this scheme, taxes from 12 sectors: oil and gas, electricity, mineral resources, water resources, space, transportation, aeronautics, health, agribusiness, biotechnology, telecommunications, and information technology and from two non-sectoral sources were funnelled into the National

Fund for Science and Technology Development (FNDCT). This strategy has significantly increased the FNDCT budget from US\$20 million in 1999 to US\$500 million in 2002.

**Argentina**

In July 2003 Tulio Del Bono, Argentina's Secretary of Science, presented the parliamentary science commission in his country with three novel proposals for science and technology funding:

- A scheme known as Debt for Knowledge envisages putting 1% of the interest owed to foreign creditors into

science and technology. Del Bono said this could be seen as a way of using science and technology as "motors of the country's development".

- The creation of a new risk capital fund for innovative technology companies was proposed. This envisaged an initial government investment of US\$6.2 million.
- Sectoral funding based on the Brazilian programme described above under which science and technology companies would pay a tax to support research in their own areas.

Sources:

Brazil: [www.fapesp.br/english](http://www.fapesp.br/english)

Argentina: [www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=934](http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=934)

as countries decentralize their public health services and expand coverage of national health insurance programmes. The NHA can also help countries to identify potential areas of health reform and to track the progress of reforms based on what is actually spent.

More can be done to improve the reporting of expenditure for health research in the NHA. At present health research is classified only as a health-related item in the NHA system and not considered part of the core health expenditures. Therefore, only a few countries using NHAs report health research and for those countries that do, the reported expenditure is incomplete. For example, health research expenditures by the private sector, such as pharmaceutical companies, are not included in the NHA. And some research and development activities are reported in other categories, rather than as health research.

WHO and the Global Forum for Health Research are currently working together with a range of low- and middle-income countries to develop and pilot a method for estimating resource flows for health research at the country level, based on expenditure of health research institutions. This approach will generate a more comprehensive estimate of health research funds. It will also provide information on how resources are being used in terms of the types and topics of research funded—information that is currently not available from the NHA system. One aim is to integrate the new methods tested into the NHA system, as has been done for other specialized areas within health systems—such as estimations of expenditures in reproductive health or HIV/AIDS. A successful integration would lead to a sustainable system for monitoring resource flows for health research.

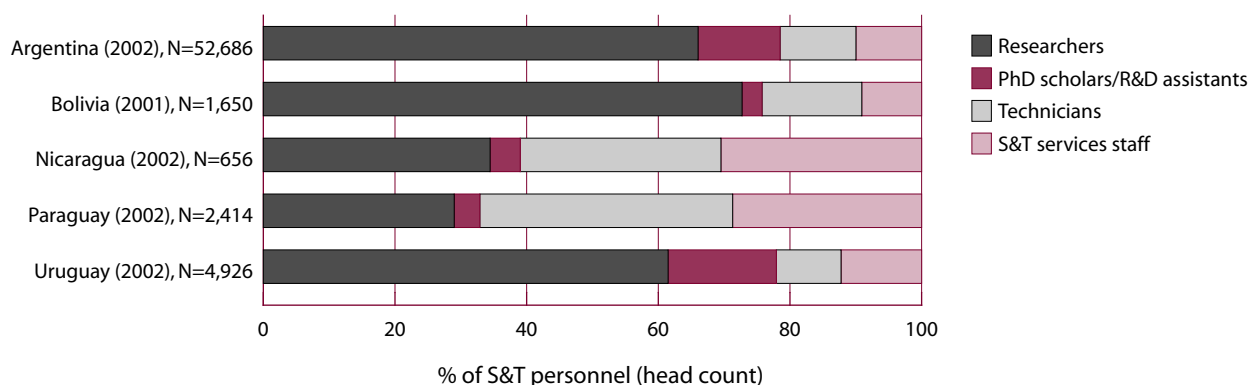
### 3.5 RESOURCES: PEOPLE AND ORGANIZATIONS MATTER

A wide range of skilled individuals is critical to create research and knowledge, and to serve as a link between knowledge gained and new approaches to improve health. It is vital to get a snapshot of the national “stock” of trained and active health research workers and the “flow” of these human resources within a country or geographic region, and to other countries over a defined period of time. Such information can help develop policies and interventions to strengthen capacities.

Many ways of analysing human resources issues are commonly used in science and technology (8). Selected national profiles on human resources from the Ibero-American and Inter-American Network on Science and Technology Indicators (RICYT) database illustrate some of these perspectives, and include:

- **Profile of the classes of science and innovation workers:** the mix of researchers, scholars with doctoral degrees and other research and development assistants, technicians, and other science and technology services staff found within a country (see Figure 3.5a) and the proportion of women in each class (see Figure 3.5b). For national health research systems, information on those who manage research, and synthesize, adapt and disseminate research or who integrate new knowledge within health systems would also be useful.
- **Profile of science and innovation workers in different sectors:** the mix in sectors of employment provides an understanding of the spread of human resources and potential for innovation across the economy. Four common groupings include government, business enterprise, higher education, and private non-profit sectors (see Figure 3.5c). Also informative for national

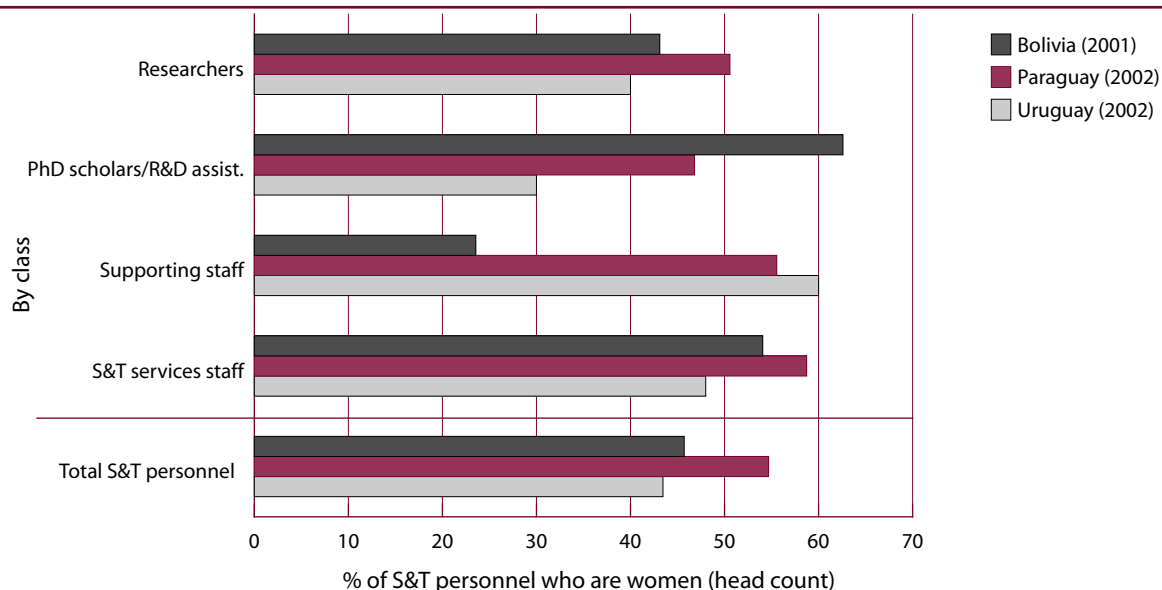
**Figure 3.5a** Percentage of researchers by types of science and technology personnel in selected Latin American countries



Source: Selected countries from the Ibero American Network on Science and Technology Indicators (RICYT) database, year of data indicated for each country.

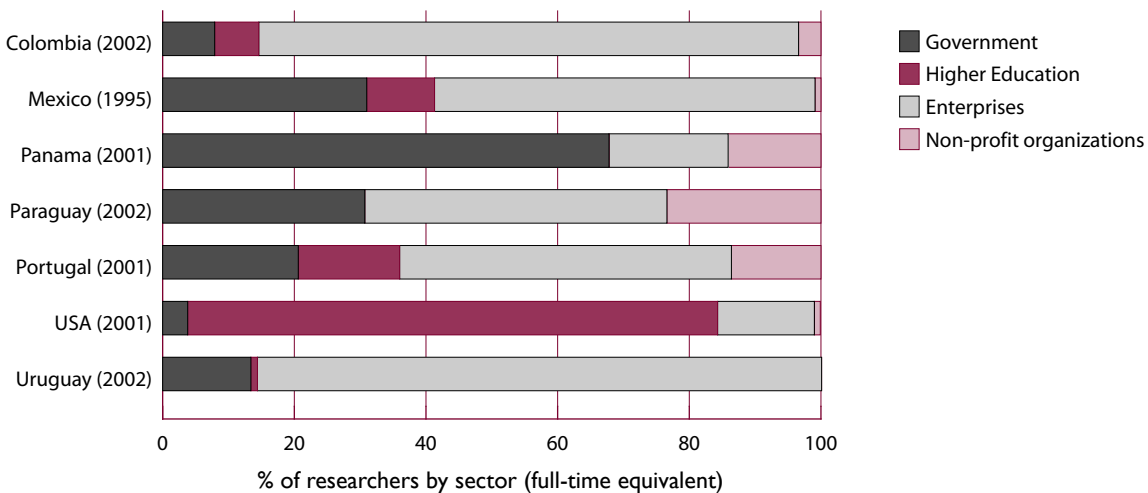
health research systems would be workers in international organizations located in the country and the rest of the world. The so-called “diaspora” refers to citizens of countries who work in another country. For example, they might be on secondment, or commuting regularly across national

**Figure 3.5b** Proportion of women within each class of science and technology personnel in selected Latin American countries



Source: Selected countries from the Ibero American Network on Science and Technology Indicators (RICYT) database, year of data indicated for each country.

**Figure 3.5c** Percentage of researchers by sector of employment in selected Latin American countries compared to the USA



Source: Selected countries from the Ibero American Network on Science and Technology Indicators (RICYT) database, year of data indicated for each country.

borders or working abroad on a more permanent basis but maintaining close links with home-based institutions. By one estimate, 80% of foreign students from China and India planned to stay in the United States on completion of their studies; 60% of them had definite job offers (9).

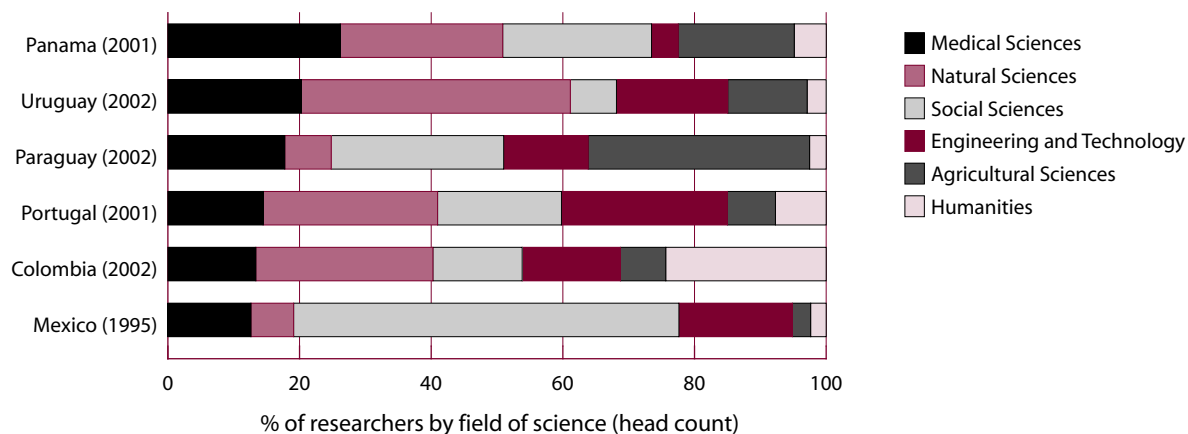
- **Profile of science and technology workers by different fields of science:** the mix of researchers addressing six major fields of science (see Figure 3.5d). For national health research systems, more detailed information on disciplines and fields that are relevant to health and health system challenges would be useful for planning purposes.

Medical and health research councils across South Asia have noted that there is a lack of expertise in health economics, epidemiology, anthropology and health policy (10). This is coupled with a shortage of staff with statistical, analytical and managerial skills. Limited capacities in these areas have severely reduced the ability to translate questions asked by policy-makers into research questions with appropriate methodologies, develop comprehensive research proposals or oversee complex research projects. What is also important is that these skills are also relevant to functions that need to be upgraded within the region's national health systems: disease surveillance, health and management information systems, quality assurance activities or vital registration systems.

It is necessary to find other ways to strengthen existing capacities or build up capacities in less developed areas. These should be tailored to each country, taking stock of reviews for capacity-building approaches from other countries (see Box 3.6 for an example from South Africa).

Health research priorities and human resources capacities differ from country to country. It is not surprising that there is much debate on whose capacities should be strengthened. Should it be traditional researchers, health

**Figure 3.5d** Percentage of science and technology personnel by field of science in selected Latin American countries



Source: Selected countries from the Ibero American Network on Science and Technology Indicators (RICYT) database, year of data indicated for each country

**Box 3.6** Building research capacity in South Africa

The South African National Department of Health, supported by South Africa's Essential National Health Research Committee, recently funded a review of health research capacity building in the country. It investigated a range of informal and formal health research capacity building initiatives in South Africa. The informal initiatives are those involving employees of the public health system—part of the non-traditional researcher community—in conducting research. It also included a review of initiatives that have been sponsored by international organizations or others outside the country, and discussed

the implications for South Africa. Several key factors considered necessary for the success of research capacity building initiatives were identified:

- Pursuing higher qualifications, particularly doctoral degrees, as a means to further develop independent thinking and increase productivity.
- Collaborating with other research programmes to further promote a culture of writing, of compiling statistical analyses and of using databases. This might involve mentoring by senior researchers and collaboration between experienced

and inexperienced people to increase confidence.

- Capacity building for skills that are relevant to local priorities and the health development needs of the country increases the likelihood that research results are used.
- Recognizing that developing research skills takes time and commitment so researchers should be involved in fields that interest them and where they can have influence.
- Recruiting motivated individuals as well as those with persistence, initiative and concern to improve public health.

Source: *Health Research Capacity Building in South Africa: current knowledge and practices*. Durban, Health Systems Trust, 2003.

services professionals, social scientists, or local health workers? Where and what type of training should be offered, and to what extent should capacity strengthening activities be integrated within “hands-on” research activities? Furthermore, many capacity strengthening activities are informal, often based on personal contacts developed through professional groups or collaboration among institutions.

How much should be spent on capacity strengthening within national health research systems? The Commission on Health Research and Development suggested in 1990 that international donors including aid agencies should commit at least 5% of health project aid for essential national health research and research capacity building. In a study of more than 3,000 people working in national health research systems in 13 low- and middle-income countries, respondents said that of the total financial resources devoted to health research, approximately 82% should be spent on research activities covering fundamental research, health conditions, risk factors, or health systems research. The balance should be spent on capacity building for health research to best achieve national health research priorities.

It also seems that some funders of capacity building initiatives focus on a relatively narrow range of traditional activities, whereas many successful projects and interventions also promote more innovative or experimental initiatives and partnerships. For example, in the area of technology transfers in biomedical and vaccine research, partnerships on the international and regional scale have forged successful approaches (see Box 3.7). This is yet another example of international strategic research.

**FOSTERING AN ENABLING ENVIRONMENT FOR PRODUCING RESEARCH**

In addition to strengthening human capacity, efforts must be made by countries to foster a supportive working environment for researchers (see Box 3.8).

### Box 3.7 Technology transfer to developing countries

#### Sustainable Sciences Institute

The Sustainable Sciences Institute (SSI) is a non-profit organization based in San Francisco in the United States that helps scientists in developing countries gain access to the resources needed to address local problems related to infectious diseases.

Dr Eva Harris and her colleagues at SSI have demonstrated by transferring technologies and adapting these to local conditions in developing countries, sophisticated molecular biology methods which were previously unattainable can contribute to the education, health and human rights of the population.

As part of its technology transfer programmes, SSI runs workshops to introduce researchers mainly from Latin American countries to the techniques of molecular biology, epidemiology and scientific writing. The aim is to sharpen the researchers' ability to initiate independent research. The workshops also adapt biomedical techniques to local research priorities and conditions to help countries build the necessary capability to conduct locally relevant research. This is an essential prerequisite for the development of public health programmes. These workshops address some of the major barriers faced,

including limited access to technologies, scientific isolation, a lack of information and the absence of technical training programmes and scientific career opportunities. The SSI workshops have been held in 12 countries in Latin America as well as in Egypt, sparking collaborative projects, locally funded proposals and scientific publications. So far, SSI has trained more than 600 scientists and health professionals in 20 developing countries.

SSI also runs a small-grants programme that funds some of the best proposals generated during the workshops. In addition, SSI facilitates the donation of scientific equipment and supplies from biotech companies and university laboratories in developed countries to trainee researchers in the developed world.

These programmes show that molecular technologies can be adapted to local conditions and disease priorities in developing countries to be more rapid, versatile, and sensitive than alternative methods. These methods can be cost-effective in low-budget situations, as demonstrated through the work of Bolivian investigator Nataniel Mamani, who created the blenderfuge. This combines a blender, an aluminium bowl and water-tap adapters to create a microcentrifuge, and the turn-

table shaker, where the circular rotation of a record player is transformed into a horizontal shaker for the laboratory.

For more information visit: [www.ssilink.org](http://www.ssilink.org)

#### A record player turntable becomes a laboratory shaker



Photo by Nataniel Mamani, Universidad Mayor de San Andrés, La Paz, Bolivia.

Source: Harris E, Tanner M. Health technology transfer. *British Medical Journal*, 2000, 321:817–820.

*continued*

Research has shown that pay is not the only concern of those within health research systems. According to data from across 13 low- and middle-income countries, those surveyed within national health research systems ranked transparency of the funding process before salary and benefits. They said these were the most important areas for further strengthening, followed by quality of the work space and facilities, training and ongoing training opportunities.

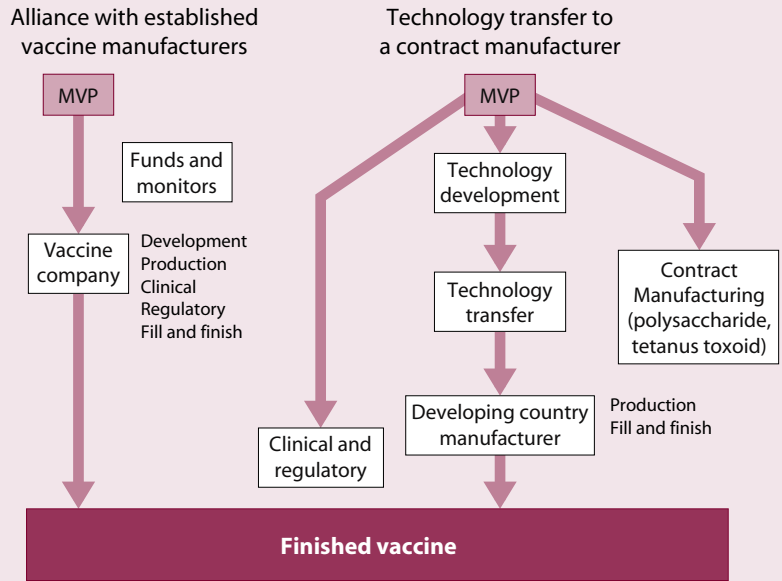
These areas for strengthening require a change in attitudes and a more performance-oriented culture, not just financial resources. This includes a change in the management and organization of research institutions, as well as a change in social attitudes towards research and health research in particular. For example, the social status attached to research and researchers varies greatly by scientific field, common methods used, institutional ties, or relevance to social problems as well as in relation to other professions. To produce and

**Box 3.7** Technology transfer to developing countries (continued)

**Meningitis Vaccine Project**

The Meningitis Vaccine Project (MVP), a partnership between the WHO and the Program for Appropriate Technology in Health (PATH), seeks to develop meningococcal conjugate vaccines for use in Africa ([www.meningvax.org](http://www.meningvax.org)). When looking for a partner, MVP decided against an established vaccine manufacturer in an industrialized country. Instead, it opted to transfer technology to a manufacturer in a developing country (see figure). The reason was that the manufacturer in the industrialized country viewed factors such as: capital investment for vaccine production, selling vaccines to Africa with a low profit margin and acquiring capacity that could be used to create other vaccines for profit as expensive. In contrast, the manufacturer in the developing country saw these as opportunities. By working with a manufacturer in a developing country, the vaccine would be developed as a high-priority product specifically for use in Africa rather than an adapted version of a vaccine developed for other markets (and possibly different strains). In early 2004, PATH entered into a long-term sub-license and supply agreement

**MVP's alternative approaches to vaccine development**



with the Serum Institute of India based in the Indian city of Pune to develop, test and produce clinical and commercial lots of group A meningococcal conjugate vaccine. The Phase I trial of this vaccine was due to begin by January 2005. The

vaccine has a target price of US\$0.40 per dose, one fifth of the cost of similar vaccines developed in the West.

For more information visit: [www.meningvax.org](http://www.meningvax.org)

Source: Jódar L et al. Meningococcal conjugate vaccine for Africa: a model for development of new vaccines for the poorest countries. *Lancet*, 2003, 361:1902–1904.

use knowledge for better health, the national health research system should develop approaches to put greater value on the social science disciplines (e.g. economics, demography, sociology, anthropology, and others), non-traditional research methods, and locations of research that have greater interface with the health system.

Studies (11) have shown that factors that contribute to migration of health researchers (and other health professionals) in many low-income countries include poor career opportunities at home (see Box 3.9). Information on the migration of health professionals, particularly doctors and nurses, for some countries, is becoming more available, yet there is almost no data specific to the migration of health researchers.

**PROMOTING COLLABORATION IN HEALTH RESEARCH**

One option for countries to strengthen research capacity is to increase health research collaboration between institutions, within countries as well as across national borders. Based on experiences from China and India, this is one

### Box 3.8 Creating an enabling working environment

Several low- and middle-income countries helped to identify 10 key areas that need to be addressed to create an enabling environment for health research workers. These emerged in a series of discussions as part of the WHO-sponsored health research systems analysis project. These areas relate to science, education and health systems:

**Range and breadth of health researchers:** establish teams of researchers who have a range of experiences and skills and who work in a variety of health research disciplines, from basic science to health systems and social science to epidemiology.

**Transparency of the funding process:** adopt a merit-based, accountable funding procedure with clear criteria and prompt processing.

**Quality of workspace and facilities:** provide functional workspaces with access to relevant technologies and materials.

**Encouragement of collaboration with others:** promote collaboration both home

and abroad among researchers as well as among researchers, health professionals, policy-makers, the media, civil society and the public.

**Opportunities to present, discuss, and publish results:** provide opportunities and incentives to discuss and present both work in progress and completed, as well as publish results in a diverse range of journals or other media. Opportunities to participate in international conferences are particularly important.

**Relevance of health research activities to health problems and health systems:** address priority areas of research, current or projected health problems, and health problems of disadvantaged or poor populations, both at national and global levels.

**Remuneration of health researchers:** provide adequate salary and benefits to recruit and retain trained health researchers.

**Nurturing of careers:** recognize work contribution and provide mentoring and

leadership opportunities for young and mid-level researchers.

**Training and ongoing training:** provide up-to-date training on the latest conceptual, methodological and technical advances in health research and establish a continuous education programme.

**Access and sharing of information:** ensure access to national, regional, and international publications, electronic information sources, and reference databases on a range of health research disciplines.

These research findings show that the chief concern of people working in the health research sector is not primarily pay. Health research workers surveyed in 13 low- and middle-income countries, ranked transparency of the funding process as one of the most important areas for further strengthening of the health research system. This was followed by quality of work space, facilities and training.

Source: Health Research Systems Analyses Initiative, World Health Organization.

way of maintaining productive ties between researchers who have migrated to other countries. More collaboration in health research would increase the flow of knowledge between researchers by bringing together people, ideas and technologies. Moreover, many national and regional science policies would benefit from greater integration in regional or international activities. For smaller countries or those with more limited research capacities, collaboration can be a powerful approach to gain access to external resources and reach a wider audience.

For example, collaboration patterns across institutions and countries can be estimated from international reference databases of research outputs if addresses of all co-authors are included. Based on articles addressing health topics in peer reviewed journals included within the Thomson ISI databases during 2001, Figure 3.6 provides the number of papers with at least one co-author from each of WHO's geographic regions.

Collaborations within a single institution, or across institutions within the same country, make up the largest portion of articles for countries with a relatively developed health research system. Less developed countries tend to have more international collaboration. Drawing from a survey of more



**Box 3.9 Brain drain or science gain?**

The migration of scientists presents a growing challenge for policy-makers in many developing countries as borders become increasingly fluid. According to a recent report from the French development agency Institut de recherche pour le développement (IRD), “roughly one-third of the total scientific and technical community of the Southern countries are working in the North,” and two-thirds of Southern expatriate students settle permanently in their host countries.

There are many factors driving scientists out of lower-income countries: low salaries; poor equipment and working conditions; lack of academic liberty and incentives to sustain research efforts; inadequate educational systems; failing economies; high unemployment rates; inadequate social services; excessive bureaucracy; oppressive political environments; discrimination and armed conflict

At the same time, higher-income countries have a growing demand for skilled professionals and offer many benefits such as: attractive pay packages, policies to ease visa applications, high standard of living, pensions, educational and career opportunities, and professional recognition.

Some view this as a brain drain particularly where the migration of health professionals may cause serious deficiencies in national health research, access and coverage. “The cost of training is borne by the poor country and the rich country reaps the benefits,” Vikram Patel wrote in the *British Medical Journal* in October 2003.

Others view this more as “brain circulation,” such as Jean-Baptiste Meyer from

France’s Institut de recherche pour le développement who wrote in an article on web-based health information service SciDevNet in May 2003: “The mobility of highly skilled manpower should be seen as a normal process that should not be stopped, and the real challenge is therefore to manage it as well as possible.”

**Policy options**

Countries have taken various measures to address staff shortages resulting from the migration of health researchers. Wisdom J. Tettey, professor at the Faculty of Communication and Culture of the University of Calgary, Canada, noted in an article in *SciDevNet* in May 2003 that some African countries, including South Africa, Senegal, Tanzania, Egypt, and Morocco, had national research grant schemes for professionals to pursue careers in their chosen field without having to leave the country.

“Establishment of endowed chairs—through state, private, bilateral, or multilateral partnerships—can also help to keep some top African experts in their countries, and even attract those currently elsewhere,” Tettey concluded.

Robyn Iredale, associate professor at the School of Geosciences of the University of Wollongong in Australia wrote in an article in *SciDevNet* in August 2003 that the former Committee on Science and Technology in Developing Countries of the International Council for Science had proposed the establishment of an Intellectual Resources Management Fund to address losses from brain drain and improve the standards of

science and technology professionals.

“Monies collected from receiving countries that benefit from skilled immigration would be used towards additional training, exchanges and collaboration, and better working conditions in the developing world,” Iredale said.

Jacques Gaillard, deputy director of the International Foundation for Science in Sweden and social anthropologist Anne Marie Gaillard write about another initiative to turn the brain drain into a chance for technology transfer.

In *SciDevNet* in May 2003 they wrote that the New Partnership for Africa’s Development (NEPAD) seems to endorse the “scientific diaspora option” by calling for the development of “scientific and technical networks to channel the repatriation of scientific knowledge to the home country, and establish co-operation between those abroad and at home.”

They argued that the diaspora model, however, would never be a low-cost, self-sufficient answer to Africa’s scientific needs because its effectiveness depends on the internal dynamics of the home-based scientific communities.

“After all, a network of expatriates is at best an extension of a national scientific community, not a substitute. Efforts should therefore, first and foremost, focus on strengthening national scientific capacity particularly training and recruiting the next generation of scientists,” they wrote.

*For more information visit: Institut de recherche pour le développement (IRD): [www.ird.fr](http://www.ird.fr)*

Source: Patel V. Recruiting doctors from poor countries: the great brain robbery? *British Medical Journal*, 2003, 327: 926–928.

than 3,000 individuals within national health research systems in 13 low- and middle-income countries, collaboration within countries is concentrated among academic and research institutions, university hospitals and national ministries of health. Significantly less collaboration is reported with patient and consumer groups, national technical and regulatory agencies, or alternative health-care providers (12).

Existing approaches to strengthen research collaboration span a wide range of activities, from sharing experiences and facilitating discussions at regular gatherings, to supporting cross-institutional and cross-border training

**Figure 3.6** Collaboration in health research production for WHO Regions, 2001

WHO Region	Number of papers from Thomson ISI database						Total
	AFRO	AMRO	EMRO	EURO	SEARO	WPRO	
AFRO	1,298	—	—	—	—	—	2,843
AMRO	589	119,750	—	—	—	—	144,755
EMRO	28	331	2,057	—	—	—	2,940
EURO	1,104	18,313	541	120,361	—	—	143,758
SEARO	25	596	41	523	3,885	—	5,175
WPRO	160	6,807	93	4,558	365	43,502	54,115

Note: The total number of papers for a region/country may not be equal to the sum of papers written in collaboration with regions, as some papers may be written in collaboration with more than one region/country.

WHO Regional Offices:

AFRO: WHO Regional Office for Africa

AMRO: WHO Regional Office for the Americas

EMRO: WHO Regional Office for the Eastern Mediterranean

EURO: WHO Regional Office for Europe

SEARO: WHO Regional Office for South-East Asia

WPRO: WHO Regional Office for the Western Pacific

Source: Health Research Systems Analyses Initiative estimations based on Thomson ISI Web of Science database, World Health Organization.

schemes. Box 3.10 shows three notable examples of cross-national collaboration initiatives and networks, from the Pasteur Institute, the Special Programme on Tropical Diseases Research (TDR) and Special Programme of Research, Development and Research Training in Human Reproduction (HRP).

### 3.6 PRODUCING, SYNTHESIZING, AND USING RESEARCH

#### ARE THE PRODUCTS OF RESEARCH BEING USED?

As noted in Section 3.1, there is a wide range of research outputs including scientific publications, policy publications, reports, books, discussion papers and patents. The fourth function of a health research system is not only to produce research but also to use research to improve health.

Research can be used in several ways: for developing new interventions (drugs, vaccines, devices and other applications) to improve health; and for translating, communicating, and promoting the use of research to inform health policies, strategies, and practices, particularly within health systems (see Chapter 4). Research can also be used to inform the population and change public opinion and practices.

Yet one major deficiency in health research systems across countries is that the research process and the policy process tend to exist in different worlds. The result is that research often has limited relevance to or impact on policy. It is also well recognized that much of public health decision-making and public health practices are neither based on evidence nor evaluated for effectiveness, efficiency, or equity. One of the major causes of this gap is the inability to

### Box 3.10 Fostering international collaboration

#### The Pasteur Institute

The Pasteur Institute is a private, non-profit foundation whose mission is to prevent and treat health conditions, particularly infectious diseases, through biological research, training and application to public health.

This foundation has an extensive international network composed of 25 independent Pasteur Institutes across the world (see map below). In addition to conducting scientific research, these provide services such as testing vaccines, training staff and external scientific researchers and they are involved in public health activities, with eight branches serving as WHO collaborating centres.

The Pasteur Institute also has an International Affairs division which seeks to promote collaboration in scientific research on a regional and global level. The division has several international collaboration initiatives (see map below) in the form of scientific partnerships, foundations or associations. An example of a

regional scientific partnership is Amsud, which is composed of the Mercosur countries: Argentina, Brazil, Uruguay, and Paraguay, plus Chile.

For more information about the Pasteur Institute and its activities, visit: [www.pasteur.fr](http://www.pasteur.fr)

#### Special Programme for Research and Training in Tropical Diseases (TDR)

The Special Programme for Research and Training in Tropical Diseases (TDR) is an independent programme of scientific collaboration, co-sponsored by the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the World Bank and WHO. This programme aims to improve research and development in neglected infectious diseases and strengthen capacity in developing countries to enable them to carry out the research needed to develop and implement disease control measures.

Known as the Tropical Disease Research programme or TDR, this initiative provides direction and grants for research priorities,

opportunities and training. It has formed research partnerships with several organizations, including national governments, research institutions, disease control programmes, NGOs, industry and academia. It has also supported capacity building efforts in over 400 institutions in about 80 countries.

Through its co-sponsors and networks that span many disciplines and sectors, the TDR programme provides technical expertise in a wide range of research in tropical diseases, from biomedical science and product development to more applied research such as clinical field research, capacity building and communication.

For more information about the TDR programme, visit: [www.who.int/tdr](http://www.who.int/tdr)

#### UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP)

The Human Reproduction Programme's mission is to help developing countries develop and implement national and regional research findings as well as programmes aimed at improving reproductive health. HRP seeks to review, develop and test methodologies for the planning and implementation of reproductive health services, and to provide technical support to assist countries to do so. Central to this are efforts to refine, promote and assist countries in implementation of the Strategic Approach, a set of guidelines agreed by the partners in the project, to promote reproductive health policy and programme development. Other activities related to HRP are highlighted in Boxes 3.13 and 4.10.

For more information about HRP visit: [www.who.int/reproductive-health/hrp/index.html](http://www.who.int/reproductive-health/hrp/index.html)

#### Centres that collaborate with or are part of the Pasteur Institute



synthesize existing research outputs and apply existing knowledge towards improving interventions and the performance of health systems. Gathering this evidence and knowledge for improving health is precisely one role of health systems and health policy research.

The process of conducting research studies and utilizing knowledge is a highly complex one. Far greater use must be made of systematic reviews that attempt to distil and synthesize the vast amount of research results in a manner that will help to inform researchers, policy-makers, practitioners, and members of the public. These research syntheses are important because of the cumulative nature of science, the knowledge “explosion”, and haphazard and biased publication or access to research (see also Section 1.5).

The impact of research on public opinion is receiving increasing attention, with particular interest in novel communication and dissemination approaches as a means of increasing public awareness and understanding, as well as the relevance of research results. But much more progress is needed. In a recent review of some 40 major newspapers across 13 low- and middle-income countries, it was found that very few articles on health research gave credit to the policies and activities that have allowed research to take place, or how new discoveries build on existing knowledge (12). Even fewer articles discuss how the new knowledge may be applied within health systems, for example to improve services to vulnerable groups or the public at large.

Active two-way engagement between the community and the health research system is seen to be increasingly important, with some communities and patient groups getting involved in guiding research priorities and participating in the conduct of research. Such involvement would help to ensure the effective application of research findings.

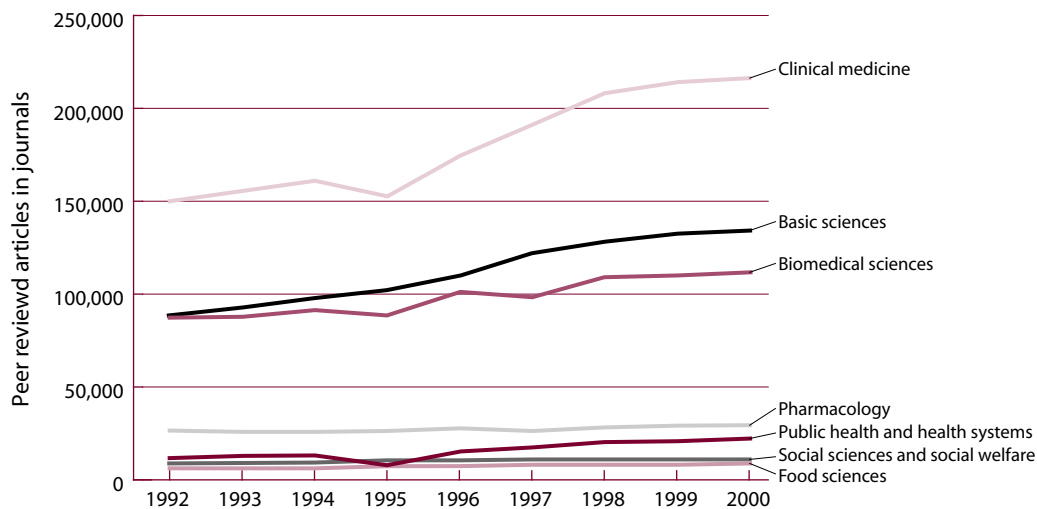
### FINDING THE RIGHT BALANCE

In terms of the production and use of research, a global health research system has to attempt to find a balance between three areas: (1) producing scientifically valid fundamental research outputs; (2) promoting the use of research to develop drugs, vaccines, devices and other applications to improve health; (3) translating, synthesizing and communicating research to inform health policy, health practice and public opinion (13). In most countries much of the emphasis is on the first, with some on the second, and almost none on the third. Articles addressing public health remain a low proportion of papers published in peer reviewed journals that are shared in international databases (see Figure 3.7). Moreover, less than a tenth of the Cochrane Collaboration’s reviews are on public health interventions. This low proportion is perhaps a key reason that led the Cochrane Collaboration to set up a “Health Promotion and Public Health Field” to improve the relevance of its systematic reviews to global public health priorities (14).

In addition, the research base addressing diseases that have the greatest burden is extremely thin. Systematic reviews are impossible if there are not enough articles to be synthesized. For instance, Figure 3.8 illustrates that systematic reviews on child health include almost no studies on the effectiveness of health interventions. With so few studies addressing interventions for populations in greatest need, it is difficult to develop evidence-based policies.

The challenge facing governments, the international community and an

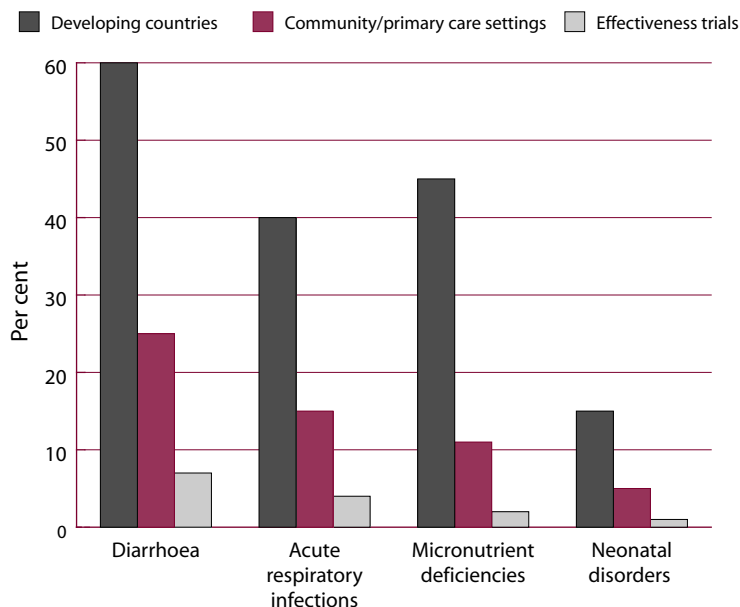
**Figure 3.7** Publications in journals addressing health topics by field, 1992–2001



Note: Journals are classified based on Thomson ISI categories and own selection of journals addressing broad range of health topics.  
 Source: Health Research Systems Analyses estimations based on Thomson ISI database 2001.

**Figure 3.8** Analysis of systematic reviews for selected health interventions

Proportion and topic of research articles included within systematic research syntheses addressing diarrhoea, acute respiratory infections (ARI), micronutrient deficiencies and neonatal disorders



Source: Bhutta et al. (2004, unpublished)

increasingly engaged public is to create an environment in which evidence is routinely used in health systems decision-making. It is with this perspective that one should understand the production and use of research in countries. With this in mind, WHO is working with 10 low- and middle-income countries to examine how research is used as an input to decision-making. Some of the specific topics include the prevention of malaria, oral rehydration therapy (ORT), DOTS strategy for tuberculosis control, and contraceptive method mix to increase women's choices for birth control. This project is being done with support from the Global Development Network and the Alliance for Health Policy and Systems Research. The results will be used to identify interventions to increase the use of research in decision-making.

### IMPROVING ACCESS TO INFORMATION

All these issues surrounding the use of research and improving communication among researchers, policy-makers, and consumers are discussed in more detail in Chapter 4. But before there can be any discussion about how to better share and use research, both the producers and users of research (i.e. the public, civil society/NGOs, patients, health professionals, health system managers, health insurers, the biomedical industry, and policy-makers) must be able to access information.

In recent years there have been some moves to dismantle some of the barriers to accessing research information. Recognizing that few researchers in developing countries can afford the high cost of journal subscriptions, several initiatives have been implemented using Internet gateways to give researchers free online access to the full text of health research papers published in journals. BIREME (serving researchers in Latin America and the Caribbean) was the first and is now one of the largest sources of such information (through the Scientific Electronic Library Online or SciELO). The Ptolemy project is helping to meet the information needs of researchers in Africa. HINARI (Health InterNetwork Access to Research Initiative), a partnership led by WHO involving more than 50 international publishers, Yale University and the National Library of Medicine, is another example (see Box 3.11). HINARI has been running since January 2002 and as of mid-2004 was offering researchers in 113 developing countries online access to nearly 2,400 journals.

Another opportunity to improve access to research may come from the "open access" movement, a global initiative that is challenging the traditional subscription-based model of journals. Open access is promoting an "author-pays" model where the author is charged a fee to recover the costs associated with peer review, production, and provision of an electronic article. In reality, however, the researcher's institution or funder will usually pay the charge in order to ensure wide dissemination of the research they have supported. The final paper is available free of charge via the Internet to anyone who wants to use it. Public Library of Science (PLoS) in the United States and BioMed Central in the United Kingdom are two examples of such initiatives.

Although systematic reviews often provide the most reliable evidence about

**Box 3.11** A new social contract: HINARI bridges the digital divide

Until recently, health researchers at the University of Yaounde I in Cameroon could not afford to subscribe to medical journals. Today they can download full-text articles from thousands of journals through the WHO's Health InterNetwork Access to Research initiative, better known as HINARI.

"We cannot find the words to express our satisfaction.... More than 10 years ago, we did not receive budget to acquire journals. And a few minutes ago we became rich by becoming part of HINARI," said Elisabeth Andong, from the University of Yaounde I in Cameroon, in a note of thanks to WHO.

Launched in 2002, HINARI is a WHO initiative that gives researchers, primary healthcare workers and health policy managers in developing countries free or low-cost access to a vast collection of medical journals online. Last year HINARI members downloaded more than one million articles. The HINARI database is only available in countries where the annual gross national product (GNP) per capita is less than US\$3,000 per year. Ethiopia, for example, is one of the countries where HINARI is used most.

HINARI offers full-text resources to a wide range of biomedical research institutions, professional schools (medicine, nursing, pharmacy, public health, dentistry),

teaching hospitals, research organizations, national universities, national medical libraries and government health ministries. All staff members and students have access to more than 2,400 journals from approximately 50 publishers—perhaps one of the most comprehensive online collections in the world—as well as access to PubMed (Medline) through the National Library of Medicine. More than 1,200 institutions in 103 out of the 113 eligible countries use HINARI.

The project started as a collaborative effort between the WHO and the British Medical Journal. The two identified six publishers who were willing to offer all of their medical information on health care as well as in primary research to institutions in the developing world. Most importantly, the six publishers: Blackwell Publishing, Elsevier, Harcourt Worldwide STM Group, Wolters Kluwer International Health & Science, Springer Verlag and John Wiley & Sons, agreed to provide online resources free of charge or at a very low cost. Yale University Library, another valuable partner in the project, offers not only the user identification system but also assistance in linking users and publishers.

"This project has probably had the most impact of any WHO project since the Oral Rehydration Therapy," said Dr Philip

Njemanze, chairman of the International Institutes of Advanced Research and Training at the Chidicon Medical Center in Imo State, Nigeria." It will have the most impact on the health of the developing world," Dr Njemanze said, adding that this had enabled his own institution to triple its literature base.

For the first time, everyone from physicians, surgeons, and dentists to pharmacists, veterinarians, biologists, and chemists now have access to extremely valuable and otherwise expensive healthcare information.

"It has been a very popular initiative here," said Warren Stevens of MRC Laboratories in The Gambia, adding: "Intellectual isolation is considered one of the factors African research centres cannot develop world class researchers. This can go some way to changing that."

Although HINARI is technically simple and offers authenticated users a simple gateway to their journal of interest, the problem is that many institutions in the developing world cannot afford an Internet connection or do not have a computer. A formal evaluation of HINARI will begin in 2005.

*For more information visit:  
[www.healthinternetwork.org](http://www.healthinternetwork.org)*

the effects of health-care interventions, the evidence must be made available, in an accessible form, to health-care decision-makers who have completely different information needs. They rarely access original research papers and policy-makers, for example, prefer a very concise assessment of the potential benefits of a course of action weighed against the potential harm and costs. They also want to know the applicability across groups. Some initiatives have recently been launched to meet the health information needs of those outside the research community (see Box 3.12).

Unfortunately, the digital divide in Internet access means that many people cannot benefit from these kinds of initiatives. Even when a computer is available, the cost of accessing information through the Internet remains beyond the reach of the majority of people living in developing countries. Therefore, the CD-ROM format may be the ideal platform in the short-to-medium term for material directed towards health workers. This is the approach that has been

### Box 3.12 WHO's Health Evidence Network

WHO launched an information service this year called Health Evidence Network (HEN) to provide policy-makers in the WHO European Region with the evidence they need to make key decisions on health.

"Our ambition is to provide each country in the region with analysis and information that is useful to decision-makers in Member States," said Dr Marc Danzon, WHO Regional Director for Europe. The network has two services: it provides a single point for easy access to relevant evidence and information, and it provides answers to questions to support the decision-making process.

In response to policy-makers' questions, HEN identifies and reviews relevant online resources and selects information related to public health such as publications in databases and from networks of experts.

HEN's answers to these requests are based on careful reviews of scientific

evidence and other relevant information. HEN provides information on what is and is not known about the issue as well as the current debate on the subject and finally sets out the policy options. This gives policy-makers a quick way to obtain evidence to back up their decisions.

HEN is advised by an international Editorial Board to ensure that the information it provides is reliable, up-to-date and relevant. The network's information is also dependent on that of partner institutions. That means, for instance, that HEN may map out online resources available from partners, which includes a content summary to show available public health evidence. With the help of the Editorial Board, HEN reviews questions posed by European health-care policy-makers and chooses which ones to respond to. Experts are then commissioned to produce evidence-based, peer reviewed and

concise responses, which are occasionally updated. Examples of questions answered by HEN include:

- What are the palliative care needs of older people and how might they be met?
- How effective are mental health services for the elderly?
- What are the best strategies for ensuring quality in hospitals?

The HEN web site also facilitates access to online resources, both publishing the reports and strengthening the network of collaborating agencies.

HEN currently works with more than 30 agencies and institutions in public health, all of which contribute by proposing questions and suggesting experts who can respond to them.

*For more information visit: [www.euro.who.int/HEN](http://www.euro.who.int/HEN)*

### Box 3.13 Essential evidence for better practice in reproductive health

The WHO Reproductive Health Library (RHL) is an example of a multifaceted dissemination strategy aimed at health workers. RHL is published annually on CD-ROM in English and Spanish and is currently in its seventh edition. This CD-ROM contains a specialist database providing systematic reviews of interventions in the field of reproductive health with commentaries from people with knowledge of how these can be applied in resource-poor settings.

RHL is a collaborative effort between the WHO's Department of Reproductive Health and Research, the Cochrane Collaboration, and Reproductive Health Library partner institutions in low- and middle-income countries.

Each issue includes editorials, systematic reviews, commentaries, practical aspects documents, audio-visual aids (video clips) to assist in implementing

practices, methodology papers, Internet links, list of NGOs active in reproductive health, register of donor agencies for reproductive health. Every year new content is added and about a third of evidence that has already been included is revised. In 2003 some 32,000 CD-ROMs were produced and made available free of charge to health workers in developing countries.

The WHO Department of Reproductive Health and Research has built up a subscriber base of more than 13,000 users, mostly in developing countries. In addition, an editorial team comprising seven country-based editors and the WHO secretariat regularly conducts presentations and workshops around the world. These workshops are often linked to regional or national conferences and are designed to demonstrate the use of RHL

as well as giving basic training in reading and appraising synthesized evidence on reproduction issues.

WHO has developed a formal four-day training course in evidence-based decision-making in the African Region. Similar strategies combining introductory workshops with interactive educational activities are also conducted in Asia and Latin America. A randomized controlled trial evaluating an interactive educational workshop programme is currently being conducted in 22 hospitals in Mexico and 18 hospitals in Thailand. The trial aims to assess improvements in obstetric practices as a result staff being trained to use evidence presented in the Reproductive Health Library.

*For more information visit: [www.rhlibrary.org](http://www.rhlibrary.org)*



adopted by WHO's Reproductive Health Library (see Box 3.13).

Wi-Fi, the wireless standard of communication also known as 802.11, is another promising technology for reaching isolated villages with minimal need for infrastructure in terms of telephones and electricity. Wi-Fi relies on inexpensive antennas rather than costly cables and receivers and may yet prove to be the answer to cheap and reliable Internet and email access (see Figure 3.9).

### Regional perspective 5

Research into ways to improve knowledge transfer and access in health systems should be a priority—it should address the major barriers of financial constraints, language skills, low quality scientific publications at the national and regional levels, and poor access to the Internet.

## 3.7 WHAT ELSE IS NEEDED TO IMPROVE HEALTH RESEARCH SYSTEMS?

The framework for a health research system introduced in Chapter 1 outlines a set of concepts to help map out key functions and areas for policy-making. The previous sections have elaborated on these functions and suggested various ways they could be developed and strengthened. But in order to improve health research systems, other areas that cut across all four functions also need attention.

**Figure 3.9** Bona Simanjuntak gives a Wi-Fi demonstration to students in Jakarta, Indonesia



Photo by Edy Purnomo/JiwaFoto.com

Source: Wagstaff J. Wi-Fi is aiming for the masses. *Far Eastern Economic Review*, 2004, June 17, 38-40.

Each country's national health research system varies in terms of the mix of different sectors, organizations, legal and regulatory frameworks, degree of decentralization, social values, historical context, health challenges, among other characteristics and processes. These are all unique to each country. This report proposes that the overall goals of a health research system are to produce and use knowledge for better health. But more specific national goals, policies and strategies are also needed to complement this overarching system goal, taking into account sub-national as well as the regional and international context.

#### ADDRESSING THE NEED TO UNDERSTAND AND SHARE EXPERIENCES ON HEALTH RESEARCH SYSTEMS

Benchmarking of national health research systems may provide one way to complement but not replace qualitative and other contextualized analyses. In general, international and regional benchmarking efforts assume that data and information from a range of countries point toward a new understanding of shared problems; toward new solutions to those problems; or to new mechanisms for implementing policy and improving performance, including cooperation across countries (15). Benchmarks are entry points to interpret and discuss the examples from around the world and often provide invaluable evidence of what works in practice. They can also help avoid either re-inventing the wheel or repeating others' mistakes. Policy- and decision-makers can also learn from the ways in which other governments undertake the process of policy-making itself despite differences in contexts.

Many high-income countries have conducted analyses of selected areas of national health research systems policies and activities, which incorporate benchmarking for the purpose of system improvement. For example, the New Zealand Ministry of Research, Science and Technology commissioned a study to evaluate the appropriateness of the government's strategic investment in the management of health research in order to better inform future policies and strategies (16). The 2004 report notes that there is "no single ideal comparator country" and comparisons are thus made with a range of selected countries: Australia, Canada, Ireland, the Netherlands, Sweden and the United States. Benchmarks, such as levels of financial investment funnelled through medical and health research councils, are discussed in relation to different management and organizational models for the health research system. Based on the analyses conducted, a series of recommendations to further strengthen the existing system are proposed for discussion. These span funding arrangements, performance indicators for health research, and international collaboration, among others.

A better understanding of national health research systems is one means towards recognizing the challenges and developing policies that improve the functioning of a national health research system. Part of this improvement requires that the health research system's various functions operate together to achieve a common set of goals. The reality is that in most countries, espe-

cially in low-income and many middle-income countries, data sources and organizational analyses on health research are limited. In such cases, existing reports and reviews do not provide a comprehensive view of health research as an input to strengthen the system. Even less attention is given to how to strengthen the links between the health research system and the health system to produce knowledge for better health.

Drawing on many of the previous experiences cited in this chapter, WHO in close collaboration with interested member states is developing and testing a policy-oriented benchmarking approach for low- and middle-income countries (see Box 3.14). This collective benchmarking aims to achieve two goals and is part of a strategy to build national capacity to investigate, discuss and analyse health research activities and policies. The first goal is to develop new ways of gathering good quality comparative information on a selected set of indicators that are relevant to health research goals in low- and middle-income countries. Besides quantitative indicators, this also includes qualitative information and

### Box 3.14 Collective benchmarking of health research systems

WHO's health research system analyses (HRSA) team is currently developing methods to analyse the processes involved in the management, production and utilization of health research. This initiative, in collaboration with many partners, also seeks to promote the notion that health research is organized in a system.

As part of the project, the HRSA is conducting a pilot study involving 13 low- and middle-income countries: Brazil, Cameroon, Costa Rica, Indonesia, Iran, Kazakhstan, Laos, Malaysia, Pakistan, the Russian Federation, Senegal, Tanzania, and Thailand (the focal points and national teams involved in this project are listed on the report's web site [www.who.int/rpc/wr2004](http://www.who.int/rpc/wr2004)). This group of 13 countries is referred to throughout the chapter, with some preliminary results provided from the pilot study. Although Australia and New Zealand are not among the 13 countries involved in the study, they contributed towards this benchmarking effort.

The pilot phase of this study has two goals. One is to develop a collective benchmarking approach to identify and test basic indicators that describe national health research systems across all partici-

pating countries. These indicators include not only quantitative data, but also qualitative information and processes specific to each national context. The second goal is to assemble or strengthen national task forces on health research, which ideally would include representatives with an array of perspectives, from both public and private sectors. Besides stimulating national, regional and international discussions among a broad range of stakeholders on the interpretation and policy relevance of the study for health research systems and health systems, the establishment of the task forces would serve as a means to further institutionalize the monitoring and evaluation of health research systems.

In an effort to establish a benchmarking system, a set of 14 core indicators and 42 descriptive variables were devised in 2002 building on existing approaches to evaluate research investments.\* Each of these indicators and variables relates to one of the four main functions of a health research system: 1) stewardship, 2) financing, 3) human and institutional capacity, and 4) producing and utilizing research.

For instance, core indicators that are part of the stewardship function include:

- Is there a national policy on health research that integrates the perspectives of all key stakeholders?
- Is there a forum or process to coordinate the setting of national health research priorities?
- Do ethical review boards exist?
- Are there monitoring and evaluation activities clearly linked with strengthening health research systems?

In addition to the collection of existing data, a portfolio of additional approaches to describing and analysing health research systems has been under development as part of the benchmarking initiative. This portfolio includes policy reviews, new approaches to analyse reference databases, media coverage assessments, focus group discussions and assessments of the utilization of health research. Workshops for the national teams to discuss progress on collective benchmarking were due to be held in September and October 2004.

\* European Commission 2001. *Indicators for benchmarking of national research policies: key figures 2001*. Unit for Competitiveness, Economic Analysis and Indicators, Research Directorate General, Brussels, Belgium. UNESCO 2002. *Science & technology statistics and indicators in developing countries: perspectives and challenges*, UIS/S&T/2/BD1, UNESCO Institute for Statistics, Montreal, Canada.

processes that are specific to each national context. The second is to further stimulate national, regional and international discussion with a broad range of stakeholders, on the interpretation of information as well as the policy relevance of the process for the health research system and the health system.

The indicators selected for further development and testing also build on the recommendations of the Commission on Health Research for Development. For example, based on the evidence presented in its 1990 Report, the Commission concluded that key areas for strengthening in low- and middle-income countries include the range of health research fields, range of outputs, capacities, quality of research, training, supporting environment, and research dissemination and use (17).

The benchmarking process and involvement of a wide range of stakeholders also recognizes and builds on subsequent activities stimulated by the Council on Health Research for Development and other organizations that have supported extensive discussions of ENHR (18) and research capacity building in low- and middle-income countries. For example, many WHO Regional Offices, including the Eastern Mediterranean and South-East Asian regions, have sponsored case studies and policy discussions on health research systems.

#### THE WAY FORWARD

Benchmarking and broad stakeholder discussions are examples of important tools and processes that could help improve health research systems if used to improve and inform policies. They are a means to an end, rather than an end in themselves. Other examples of what is needed to inform the health research system include:

- analysing the ways in which different parts of the system interact;
- promoting better links with the broader research system and science and technology in general;
- improving interaction with private sector and civil society research;
- creating innovative models of organization, such as networks of centres of excellence;
- reducing corruption by improving transparency and accountability.

But even the best-organized health research system must ultimately use knowledge to deliver improved health outcomes. This is the subject of Chapter 4.

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