The 10/90 Report on Health Research 2001-2002

Health research and global security

Overview of the Global Forum

Governance of health research

Progress in priority-setting

Priorities in health research

Monitoring financial flows

Research capacity strengthening

Networks in priority research areas

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Glossary

10/90 gap: less than 10% of global spending on health research is devoted to diseases or conditions that account for 90% of the global disease burden.

Burden of disease: an indicator that quantifies the loss of healthy life from disease and injury.

Combined approach matrix: a methodology proposed by the Global Forum to help priority setting for health research. The matrix incorporates and summarizes all information obtained through a variety of processes (ENHR, VHIP and the five-step process).

Cost-effectiveness (of a health research intervention): analysis of the net gain in health or reduction in disease burden resulting from a health intervention in relation to the cost of the research that permitted the discovery and development of that intervention. Cost-effectiveness analysis helps identify interventions that are likely to produce the greatest improvements in health status for the available resources.

DALY: Disability Adjusted Life Year, an indicator developed for the calculation of disease burden which quantifies, in a single indicator, time lost due to premature death with time lived with a disability.

Five-step process: a practical framework for priority setting developed by the Ad Hoc Committee on Health Research.

Forum: the annual meeting of the Global Forum for Health Research.

Genome: the sum total of the genetic material present in a particular organism.

Genomics: the study of the genome and its action.

Global public good: a public good with benefits that are strongly universal in terms of countries (covering more than one group of countries), people (accruing to several, preferably all, population groups) and generations (extending to both current and future generations without foreclosing development options for future generations).

Initiatives/networks: projects that bring together a wide range of partners, both institutionally and geographically, in a concerted effort to find solutions to key health problems of such magnitude that they are beyond the capacity of any single institution to resolve and require the concerted efforts of a coalition of partners.

Orphan disease: disease accounting for high burden, for which interventions are limited and not commensurate with the disease burden.

Priority-setting: process by which policy-makers rank health problems and research topics by order of priority and hence the allocation of funds.

Research capacity development: process by which individuals, organizations, institutions and societies develop abilities (individually and collectively) to perform functions effectively, efficiently and in a sustainable manner to solve problems.

Resource flows: total funds invested in health research by public or private sources.

Risk factor/determinant: an attribute or exposure that increases the probability of occurrence of disease or other specified outcome.

Abbreviations and acronyms

ACHR . . . . . Advisory Committee on Health Research
ALRI . . . . . acute lower respiratory infections
AOCP . . . . . African Onchocerciasis Control Programme
ARROW . . . Asian-Pacific Resource & Research Centre for Women
ASTMH . . . . American Society of Tropical Medicine and Hygiene
C/E . . . . . cost-effectiveness
CAH . . . . . Child and Adolescent Health, WHO
CDC . . . . . Centers for Disease Control and Prevention, USA
CHD . . . . . Child Health and Development, WHO
CHNRI . . . . Child Health and Nutrition Research Initiative
CHOICE . . . Choosing Interventions that are Cost-Effective
COHRED . . Council on Health Research for Development
ComDT . . . community directed treatment
COPD . . . . . chronic obstructive pulmonary disease
CRA . . . . . comparative risk assessment
CSO . . . . . civil society organization
CVD . . . . . cardiovascular disease
DANIDA . . . Danish International Development Agency
DFID . . . . . Department of International Development, UK
DOTS . . . . . directly observed short course strategy
DRC . . . . . disease research coordinator
EIP . . . . . Evidence and Information for Policy, WHO
ENHR . . . . . Essential National Health Research
ENRECA . . . Enhancing Research Capacity in Developing Countries
FCTC . . . . . Framework Convention on Tobacco Control
FIC . . . . . Fogarty International Center
GBD . . . . . global burden of disease
GDP . . . . . gross domestic product
GIN . . . . . global issues network
GNP . . . . . gross national product
GSK . . . . . GlaxoSmithKline
HIV/AIDS . . . human immunodeficiency virus/acquired immune deficiency syndrome
HPSR . . . . . health policy and systems research
HRP . . . . . Special Programme for Research and Research Training in Human Reproduction
IAP . . . . . indoor air pollution
IAVI . . . . . International AIDS Vaccine Initiative
IBDN . . . . . International Burden of Disease Network
IDRC . . . . . International Development Research Centre, Canada
IFPMA . . . . . International Federation of Pharmaceutical Manufacturers Associations
IGI . . . . . inherently global issues
IMCI . . . . . Integrated Management of Childhood Illnesses
INCLEN . . . . International Clinical Epidemiology Network
IOM . . . . . Institute of Medicine, US Academy of Sciences
IPRs . . . . . intellectual property rights

IRENE . . . . . Intelligent Research Network
IT . . . . . information technology
IWP . . . . . interim working party
LBW . . . . . low birth weight
LSHTM . . . . London School of Hygiene and Tropical Medicine
MDR-TB . . . . multidrug-resistant TB
mhGAP . . . Mental Health Global Action Programme
MMV . . . . . Medicines for Malaria Venture
MoH . . . . . ministry of health
NCD . . . . . noncommunicable disease
NGO . . . . . nongovernmental organization
NHA . . . . . national health accounts
NHD . . . . . Nutrition for Health and Development, WHO
NIAID . . . . . National Institute of Allergy and Infectious Diseases
NIDI . . . . . Netherlands Interdisciplinary Demographic Institute
NIH . . . . . National Institutes of Health, USA
NIMR . . . . . National Institute of Medical Research, Tanzania
NLM . . . . . National Library of Medicine, USA
NORAD . . . Norwegian Agency for Development Cooperation
OCP . . . . . onchocerciasis control programme
ODA . . . . . official development assistance
OECD . . . . . Organisation for Economic Cooperation and Development
PAHO . . . . . Pan American Health Organization
R&D . . . . . research and development
RCS . . . . . research capacity strengthening
RFP . . . . . request for proposals
RICYT . . . . . Red Iberoamericana de Ciencia y Tecnologia
RPC . . . . . Research Policy and Cooperation, WHO
RTI . . . . . road traffic injuries
S&T . . . . . science and technology
SAREC . . . . Swedish Agency for Research Cooperation with Developing Countries
SDC . . . . . Swiss Agency for Development and Cooperation
SHARED . . . Scientists for Health and Research for Development
STD . . . . . sexually transmitted disease
SVAW . . . . . sexual violence against women
TB . . . . . tuberculosis
TDR . . . . . UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases
UNAIDS . . . . Joint United Nations Programme on HIV/AIDS
UNFPA . . . . United Nations Population Fund
UNGASS . . . United Nations General Assembly Special Session
USAID . . . . . United States Agency for International Development
VAW . . . . . violence against women
VHIP . . . . . Visual Health Information Profile
WHF . . . . . World Heart Federation
WHO . . . . . World Health Organization
WTO . . . . . World Trade Organization

Executive Summary

Background

The Global Forum for Health Research was established in 1998 to help correct the 10/90 gap in health research, the fact that only about 10% of funding is targeted to the diseases which account for 90% of the global disease burden. The human and economic costs of such misallocation of resources are enormous, particularly for the poor. In pursuit of this central objective, the Global Forum has adopted the following strategies:

- support to public and private sector networks/partnerships focusing research efforts on diseases representing the heaviest burden on the world's health;
- support to better priority-setting methodologies;
- the organization of an Annual Forum meeting;
- dissemination of findings; and
- measurement of results.

The *10/90 Report on Health Research 2001-2002* is the third report of the Global Forum for Health Research summarizing the efforts undertaken by a wide variety of actors in helping to correct the 10/90 gap. Some of these efforts were supported by the Global Forum for Health Research, others were not.

Chapter 1 draws attention to the central role of health and health research for development, the fight against poverty and global security.

Chapter 2 gives an overview of the objective, strategies and activities of the Global Forum for Health Research since its inception in 1998.

Chapter 3 explores the rationale for the so-called "health research governance" and reviews the efforts undertaken over the past few years in this field, particularly since the 2000 Bangkok Conference on Health Research and Development.

Chapter 4 reviews the progress made in the field of priority-setting methodologies, including the recent applications of the "Combined Approach Matrix".

Chapter 5 gives an overview of research priority areas.

Chapter 6 summarizes the most recent information on the public and private resources invested in health research worldwide and recommends activities to be undertaken under a second phase.

Chapter 7 draws attention to the urgent need for making further progress in the crucial field of research capacity strengthening in low-and middle-income countries.

Finally, **Chapter 8** reviews the results of the efforts to build networks and partnerships in some of the priority areas recommended in Chapter 5.

Chapter 1: Health research, health, development, poverty and global security

Chapter 1 draws attention to:

- the central importance of health for development
- the central importance of health for the fight against poverty
- the central importance of development and a reduction in poverty for global security, and
- the central importance of health research for health.

At the country level, poor health tends to increase poverty in two ways: (a) indirectly, through its negative impact on growth and development; (b) directly, through the vicious circle of poverty, i.e. malnutrition, disease, unemployment or underemployment, low income, poor housing, low level of education, low productivity, no access to clean drinking water, no access to health care services, larger number of children, unwanted pregnancies, substance abuse. In addition, the poor are more likely to suffer as a result of degradation of the environment and discrimination.

Once trapped in the vicious circle of poverty, the chain of causality is very difficult to break. In order to do so, the following measures have been recommended:

- revisit the functioning of the public and private components of the primary health care system;
- create employment at low cost per job;
- look at poverty and poor health from a gender perspective;
- support and ally with the civil society organizations (CSOs);
- undertake multidisciplinary actions (environment, education, water supply, etc.);
- build social safety nets;
- increase the effectiveness of foreign aid;
- focus on country-level efforts and capacity strengthening, particularly in the sector of health and health research;
- develop partnerships in the promotion of global public goods, particularly in the field of health;
- revisit the global, national and local budget allocations;
- develop the political will and the empowerment of the people.

The role of research is to ensure that the measures proposed above are based as far as possible on evidence, so that the resources available to finance these measures are used in the most effective way in the fight against ill health and poverty. Health research can be made more effective by taking the following measures:

- help correct the 10/90 gap in health research, by reallocating some health research funds from lower- to higher-priority projects, from projects benefiting the few to those benefiting a large proportion of the world's population;
- increase overall funding for health research;
- improve the efficiency of health research funding;
- improve collaboration between the various actors by developing partnerships;
- decrease the isolation of research and increase its impact on people's health.

In conclusion, good health is central for (a) the promotion of development; (b) the fight against poverty; and (c) global security. This is not surprising, as good health (and education) are key to building up the human capital which is necessary for the efficient creation and use of the physical capital of a nation. In turn, health research is central for the efficient and effective promotion of health. But it must be made more effective and brought out of its ivory tower.

Chapter 2: An overview of the Global Forum for Health Research

Health research is essential to improve the design of health interventions, policies and service delivery. Every year more than US$70 billion is spent worldwide on health research and development by the public and private sectors. An estimated 10% of this is used for research into 90% of the world's health problems. This is what is called 'the 10/90 gap'.

The Global Forum's central objective is to help correct the 10/90 gap by focusing research efforts on diseases representing the heaviest burden on the world's health and facilitating collaboration between partners in both the public and private sectors. A reallocation of one per cent of research spending would provide US$700 million for priority research.

The Global Forum believes that solutions to current health challenges will depend on the strength of the partnerships created between governments (policy-makers), multilateral and bilateral development agencies, international foundations, civil society organizations (CSOs), women's organizations, research institutions, private sector companies and the media, which are all partners in the Global Forum.

The strategies of the Global Forum include the following:

- support to public and private sector networks/partnerships focusing research efforts on neglected diseases;
- support to better priority-setting methodologies (including a "combined approach matrix", measurement of resource flows into health research, cost-effectiveness analysis and burden of disease measurement);
- the organization of an Annual Forum meeting;
- dissemination of findings; and
- measurement of results.

Correcting the 10/90 gap constitutes a major contribution to growth, development and the fight against poverty. Correcting the 10/90 gap is possible, but requires the individual and concerted efforts of thousands of institutions. The Global Forum works as a catalyst to spur such efforts.

Chapter 3: Governance of health research

Much has been said and written in recent years about "health research governance". This term may cover different concepts for different persons or institutions, ranging broadly from ***formal coordination agreements*** between a limited number of institutions to informal ***collaborative principles*** discussed and gradually agreed upon by a widening circle of institutions at the global, regional and national levels. These arrangements of very different nature are often referred to as ***partnerships***. The sum of these partnerships at the global, regional and national levels can be referred to as ***the system of health research governance***.

The objective of this chapter is to:

- explore the rationale for the so-called "health research governance";
- review the main recommendations made over the past ten years in this field (by the 1990 Report of the Commission on Health Research for Development, the 1996 Report of the Ad Hoc Committee on Health Research, the 1997 Advisory Committee on Health Research, and, in particular, the

2000 International Conference on Health Research for Development in Bangkok);
- review the efforts since the Bangkok Conference.

Section 1 concludes that the need for health research partnerships and governance is real for a number of reasons: first, the magnitude of the problems to be solved is such that they are beyond the capacity of any single institution to resolve and require the concerted efforts of a coalition of partners; second, provided they are well managed, the benefit-cost ratio of joint undertakings may be very high; third, partnerships can help ensure an interdisciplinary approach to a problem; finally, partnerships can play a significant role in helping to correct the general under-investment in global public goods, as partners identify the benefits accruing to them as a group.

Sections 2 and 3 review the recommendations made since 1990 in the field of "health research governance".

Section 4 reviews the efforts undertaken since the 2000 Bangkok Conference in this sector, in particular at the country level (for example with the creation of the Tanzania National Health Research Forum or the ENHR efforts undertaken by COHRED), at the regional level (with the planned African Health Research Forum, the planned Asian and Pacific Health Research Forum and the preparatory meetings held in Latin America and the Caribbean), and at the global level (preparation of the planned 2004 World Health Research Summit). These partnerships and forums can be considered as the building blocks of the overall health research governance system, as each partnership can make a contribution to the better allocation of the resources invested in health research.

Finally, Section 5 draws some preliminary conclusions on the future of health research governance. The overall health research governance should ideally be the result of a bottom-up approach starting at the national level and relayed by the regional efforts. With the thousands of sovereign and autonomous institutions involved, the efforts could focus on a set of collaborative principles which could contribute much to the allocation of health research funds to the priority public health needs.

Chapter 4: Progress in priority-setting methodologies

Priority setting is as critical as conducting the research itself. Yet there is no simple way to set priorities. Failure to establish a process for this has contributed much to a situation in which only about 10% of health research funds from public and private sources are devoted to 90% of the world's health problems.

This chapter reviews progress in the development and implementation of priority-setting methodologies developed since the 1990 Commission on Health Research for Development. Three important changes have been observed in health research management since the work of the Commission: (i) there is a better understanding that health research can play a crucial role in policy decisions; (ii) there is a better recognition of the need for a sound scientific basis for selecting the topics to be researched; and (iii) the lack of methodologies to select and recommend research priorities have stimulated the pace of development of these tools and processes in recent years.

In an attempt to differentiate between the process of priority selection and the tools used for that purpose, the chapter reviews progress in both approaches.

Process: Priority setting must include a multidisciplinary and participatory process. Progress in the Essential National Health Research (ENHR) process conducted by countries supported by COHRED is reviewed, at both country and regional levels. At the country level, progress has been achieved in a number of countries by ensuring broad participation in the identification of research priorities. Similarly, regional networks have been strengthened to contribute to this process.

Tools: Progress has also been made on priority-setting methodologies and tools. The strength of the five-step approach (which is part of the Global Forum Combined Approach Matrix for priority-setting) lies in its ability to relate research on burden of disease with determinants, cost-effectiveness and financial flows. Problems with these methods and potential ways to solve them are reviewed.

The chapter also describes practical experiences in the use of the Combined Approach Matrix applied in the priority-setting exercise conducted by the TDR Programme in WHO. The tool was used and modified to be part of an exercise for priority setting in that programme. The chapter provides instructions on how to make use of the tool. In addition, it describes for the first time the application of the Combined Approach Matrix to identify research priorities for one of the important determinants of disease burden (indoor air pollution).

Chapter 5: Priorities in health research

Section 1 of this chapter revisits the concept of the 10/90 gap and concludes that the direct transferability of findings from high- to low- and middle-income countries is limited due to the following factors:

- Communicable diseases not prevalent in the high-income countries continue to account for a large share of disease burden in lower income countries.
- Vaccines developed for industrialized country markets may not be effective against the different types of viruses and bacteria prevalent in poorer countries.
- Determinants of ill health can vary greatly between regions.
- Performance of health systems and services vary greatly between countries.
- Access to treatment and medicines is very different between and within countries.
- Interventions for noncommunicable diseases available in more advanced countries may not be directly adaptable, appropriate or cost-effective in lower income countries due to costs and infrastructure requirements.

Therefore, the 10/90 gap in health research remains a reality and prioritization in health research funding at the global and national levels an absolute necessity if we want the limited health research funds to have the greatest impact possible on the level of world health.

Section 2 underlines that priorities in health research have traditionally been formulated in terms of diseases and conditions. It is now realized that this is only one dimension of health research and that health determinants themselves have to be prioritized and are competing for the same funding as disease-focused priorities. But, to make things more difficult, there are at least two more dimensions to health research which have to be prioritized against the others, i.e. methodologies for priority-setting and cross-cutting issues in health research, such as policies, poverty and health, gender and health, and research capacity strengthening.

It is therefore proposed that the prioritization exercise in health research take into account

all four dimensions mentioned above, i.e.:

1. Research on diseases and conditions
2. Research on proximate determinants and risk factors
3. Research on priority-setting methodologies
4. Research on policies and cross-cutting issues affecting health and health research.

Section 3 reviews key recommendations made in the past 12 years regarding research priorities on diseases and conditions and concludes that there has been very broad consensus in these recommendations around the following conditions with the highest levels of morbidity and mortality but very low levels of investment: acute respiratory infections, diarrhoeal diseases, cardiovascular diseases, mental health, tuberculosis, tropical diseases, perinatal conditions and HIV/AIDS. Of the 1233 drugs that reached the global market between 1975 and 1997, only 13 were for tropical infectious diseases that primarily affect the poor in low- and middle-income countries. Given this consensus, the focus should now be shifted to the identification of priorities *within each of these diseases*. This is discussed in Chapter 8.

Section 4 reviews key recommendations made in the past 12 years for research priorities on determinants and risk factors. It concludes that broad consensus also exists around priorities in determinants. For details on priorities *within some of these determinants*, see Chapter 8.

Dimension 3 (research on priority-setting methodologies) is reviewed in Chapters 4 and 6.

Finally, dimension 4 (research on policies and cross-cutting issues) is discussed in Chapter 1 (poverty, gender), Chapter 7 (research capacity strengthening) and Chapter 8 (research on policies and systems, public-private partnerships, genomics and health).

Chapter 6: Monitoring financial flows

Tracking financial flows into health research is key to identifying the degree of funding for priority research and for the analysis of the 10/90 gap. Yet, the information on health research financing is very fragmented.

The Commission on Health Research for Development drew attention to the importance of health research as the "essential link to equity in development" and recommended that governments in low- and middle-income countries review their current spending on health research and strive to meet recommended goals (2% of national health expenditures and 5% of foreign aid in the health sector). Since most low- and middle-income countries were not actively tracking the pattern of spending on health research, it was difficult to know how close they were to the target and what trends were occurring over time. One major obstacle was the lack of tested methodologies for monitoring spending on health research at the country level.

Beginning in 1999, the Global Forum for Health Research supported efforts to develop and implement a system for tracking and reporting investments in health research. This chapter aims to provide a summary of the first results of this project and the progress with the methods developed.

The study did not attempt to do a comprehensive review of all high-, middle- and low-income countries' investments in health research. The total figure for worldwide investments into health research was estimated to be about US$73.5 billion for 1998 from both the public and the private sectors combined, as compared to an estimated US$56 billion in 1992 (in current terms). Governments in high-income

countries, countries in transition, and low- and middle-income countries invested at least US$37 billion (50%), and the pharmaceutical industry US$30.5 billion (42%). Private, non-profit and university funds provided the remaining US$6 billion (8%). It is estimated that about one-third of the increase between 1992 and 1998 is in real terms. While none of the low- and middle-income countries studied matched the 2% figure recommended by the Commission for Health Research and Development, Brazil and Cuba were quite close to that level of investment in 1998.

This study proposes a classification method based on the Frascati family of manuals which can be used to incorporate information from low- and middle-income countries, countries in transition and high-income countries. The classification suggested here distinguishes between the following five categories:

(a) non-oriented, fundamental research;
(b) research into health conditions, diseases or injuries (classified by disease);
(c) research into exposures, risk factors that impact on health (determinants);
(d) health systems research;
(e) research capacity building.

The chapter describes obstacles encountered in data collection and gaps identified. It also reviews the usefulness of various data sources for the measurement of resource flows for future exercises. Activities for a second phase of resource flows measurement incorporating a large number of institutions are recommended.

During the late 1990s and early 2000s, there has been greater involvement of national research institutions, foundations, CSOs and the pharmaceutical industry in international health. This translated into an increase in investments in health research globally. The implications of this transition to improve the health of the majority of the world's population, a global public good, are not clear and have yet to be documented.

Chapter 7: Progress in research capacity strengthening

Health research is increasingly recognized as one of the driving forces behind development. Over the past two decades, there has been considerable investment in research capacity strengthening (RCS) in lower-income countries. However, this has not been matched by efforts to evaluate the outcome and impact of this investment in RCS. This kind of evaluation is critical for identifying best practices, highlighting constraints, justifying further investment in this area and providing guidelines for future development. This chapter focuses on the need for evaluation of the outcome and impact of RCS, starting with a review of the factors critical to success in RCS and the major challenges identified, and continuing with a review of work done during 2000-2001. Most evaluations so far have focused on measuring inputs, process and some outcomes of RCS in a number of lower-income countries. Critical issues which RCS evaluation needs to address include:

- the extent to which policy-makers commission research to provide evidence for decision-making
- use of national scientists by policy-makers for research to meet national needs
- the extent to which research findings are used for disease control in the country
- the extent to which research results are translated into policy
- the evolution of the national budget for research capacity development
- impact of research capacity strengthening on the country's health situation.

The chapter ends by calling for more studies in these critical areas, particularly of the impact of RCS on health research and its role in correcting the 10/90 gap.

Chapter 8: Some networks in the priority research areas

The chapter reviews some of the priority areas recommended in Chapter 5, describing the size of the problem and the results of efforts to build networks which focus on these priority areas (including their objectives, partners, governance, strategies and activities).

Since it would be impossible to review all research efforts currently under way, this chapter describes the efforts undertaken by international networks in only some of the priority research areas. Some of these efforts were supported by the Global Forum for Health Research, others were not. They are categorized into the following four groups:

A. Networks focusing on diseases and conditions

Section 1. Global Alliance for TB Drug Development
Section 2. HIV/AIDS
Section 3. Initiative for Cardiovascular Health Research in Developing Countries
Section 4. Multilateral Initiative on Malaria
Section 5. Medicines for Malaria Venture
Section 6. Mental Health and Neurological Disorders

B. Networks focusing on determinants (risk factors)

Section 7. Reproductive Health
Section 8. Road Traffic Injuries
Section 9. Child Health and Nutrition Research Initiative
Section 10. Initiative on Sexual Violence Against Women

C. Networks focusing on priority-setting methodologies (see Chapters 4 and 6)

D. Networks focusing on policies and cross-cutting issues affecting health research

Section 11. Alliance for Health Policy and Systems Research
Section 12. Genomics and Health Research
Section 13. Initiative on Public-Private Partnerships for Health.

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Chapter 1

Health research, health, development, poverty and global security

For a summary of this chapter, see the Executive Summary, page xiv.

Section 1

The vicious circle of ill health and poverty

Achievements in the field of health over the past 50 years have been greater than in any other period in history. They include a rise in life expectancy of 20 years in lower-income countries (from 44 to 64 years), a 50% reduction in infant mortality, an 80% increase in elementary school enrolment, a doubling of access to safe drinking water, the eradication of smallpox and the near-eradication of polio. And all this was achieved at a time when the population more than doubled over the same period.

But today the very foundations of these achievements are threatened by factors both within and outside the health field. They include: the HIV/AIDS epidemic (which may reverse all the development gains made in many sub-Saharan African countries over recent decades), the development of antimicrobial resistance, the sharp increase in tuberculosis, the steady rise in substance abuse, the explosion of noncommunicable diseases and the further degradation of the environment, with direct consequences for people's health.

With the weakening of the basis for further progress in the health field or even, in certain countries, a marked decrease in people's health status, the foundation of development in general is being threatened, as underlined by Walter Fust[1] at the Forum 5 meeting of the Global Forum for Health Research: "Without progress in health and development, there will be no global security, and industrialized countries will in turn be confronted with all the negative consequences of preventable man-made disasters."

The aim of this chapter is to draw attention to:
- the central importance of health for development
- the central importance of health for the fight against poverty
- the central importance of development and a reduction in poverty for global security, and
- the central importance of health research for health.

1. The central role of health for development

There is a strong and direct link between people's health and the development of their country. At Forum 5 in October 2001, Richard Feachem[2] summarized these links in the following way:

- poor health reduces healthy life expectancy and educational achievement;
- it reduces investment and returns from investment (as production, productivity and employment decrease);

[1] Walter Fust, Director, Swiss Agency for Development and Cooperation. Paper presented at Forum 5, Global Forum for Health Research, October 2001.

[2] Richard Feachem, Director, Institute for Global Health, University of California. Paper presented at Forum 5, Global Forum for Health Research, October 2001.

- it reduces parental investment in children (and increases the fertility rate);
- it increases health inequity and poverty; and
- it reduces social and political stability.

These factors affect the very core of growth and development.

2. The central role of health to fight poverty: a two-way street

The negative effect of poor health on growth and development summarized above will of course negatively affect the situation of the poorer population through lower production and employment, lower social budgets, lower educational achievements, and so on. This may be called the indirect effect.

But there is a more devastating, more direct and self-reinforcing effect of poor health on poverty, through the vicious circle of poverty, i.e. malnutrition, disease, unemployment or underemployment, low income, poor housing, low level of education, low productivity, no access to drinking water, no access to health care services, larger number of children, unwanted pregnancies, substance abuse. In addition, poor people are more likely to suffer from the degradation of the environment and from discrimination. Once trapped in this vicious circle, the chain of causality is very difficult to break, as pointed out by numerous reports, including the People's Charter for Health[3] and the World Bank reports[4,5,6].

3. Three country examples

Mozambique

In his keynote address to Forum 5, Pascoal Mocumbi[7], Prime Minister of Mozambique, summarized the worsening health situation in his country (as well as in other countries with similar characteristics) in the following way:

- life expectancy, already low, is predicted to decrease to 36 years by 2010, due to the HIV/AIDS epidemics;
- maternal and infant mortality rates may increase by 20% by 2005;
- 58% of the population is undernourished;
- only about one third of the population has access to clean water;
- some 60% of the population does not have access to health services.

In his analysis, the Prime Minister underlined the strong causality link between poor health and poverty (and vice versa). The most vulnerable of all, he said, were those persons cumulating the highest risk factors, which he identified as (a) being poor, (b) being female and (c) being adolescent.

India

The catastrophic two-way link between poverty and ill health is underlined by the results of the United Nations Children's Fund survey of 90 000 women and children in India during 1998-99, which focused on health and nutrition. The survey found that 52% of married women (aged 15-49) and

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[3] Ravi Narayan, Community Health Adviser, People's Health Assembly, India. Paper presented at Forum 5, Global Forum for Health Research, October 2001.

[4] World Bank, Health, Nutrition and Population, Poverty Thematic Group, ***Socioeconomic Differences in Health, Nutrition and Population in 44 Countries***, November 2000.

[5] World Bank, ***Voices of the Poor (Can Anyone Hear Us?, Crying for Change, From Many Lands)***, Oxford University Press for the World Bank, December 2000.

[6] World Bank, ***Attacking Poverty***, World Development Report 2000-2001.

[7] Pascoal Mocumbi, Prime Minister of Mozambique. Keynote address at Forum 5, Global Forum for Health Research, October 2001.

74% of young children were anaemic. In the poorer states of Haryana, Rajasthan, Bihar and Punjab, at least 80% of children were anaemic. These results are devastating as anaemia in young children can impair cognitive performance, behavioural and motor development, school achievements and susceptibility to infectious diseases. The survey also found that only 18% of illiterate women had heard of AIDS, as compared to 92% of women with secondary school education.

USA

A 2001 publication[8] on the relationship between income, socioeconomic status and health in the United States comes to the same conclusion: that income inequality and socioeconomic status are the most significant factors affecting health in this country too. The researchers highlight six areas which are crucial for the improvement of health inequalities in the United States:

- investing in young children
- providing services to the neediest
- improving the work environment
- strengthening the support provided by the local community
- creating a more equal economic environment
- assessing the impact of economic and social actions on health.

4. The vicious circle at the macroeconomic level

In summary, at the microeconomic level, the poor person has less knowledge, fewer resources and less power to defend his/her health. At the macroeconomic level, the poorer the country, the less it spends on protecting and promoting the health of its population. This was presented at Forum 5 in Insert 1.1.

Insert 1.1

Health spending per capita by level of development[9]

Development category	Tax revenue (% of GDP)	Health spending per capita			
		Total	*Public*	*By donors*	*Private*
Least developed countries	14	$11	$6	$2.3	$2.7
Other low-income countries		$25	$13	$0.9	$11.1
Lower middle-income countries	19	$93	$51	$0.6	$41.4
Upper middle-income countries	22	$241	$125	$1.1	$114.9
High-income countries	31	$1,907	$1,356	$0.0	$551.0

[8] James A. Auerbach and Barbara Krimgold, ***Income, Socioeconomic Status, and Health: Exploring the relationships***, National Policy Association, January 2001

[9] Richard Feachem, Director, Institute for Global Health, University of California. Paper presented at Forum 5, Global Forum for Health Research, October 2001.

The Commission on Macroeconomics and Health estimated that the minimum level of health spending in low income countries to cover essential interventions is US$30-40 per person per year (as compared to the estimated present level of US$11 and 25 respectively in the least developed and the low-income countries). This means that the level of health in these countries may continue to deteriorate in the coming years unless urgent and massive actions are undertaken in the very near future. A summary of the "key findings" and the "Action Plan" proposed by the Commission on Macroeconomics and Health is presented below in Section 4 of this chapter.

Section 2

How to break the vicious circle of "ill health and poverty"?

In September 2000, at the conclusion of the Millennium Summit, world leaders adopted the "United Nations Millennuim Declaration" which contained the following key development targets:

- a 50% reduction in the proportion of people living in extreme poverty by 2015
- demonstrated progress towards equality of the sexes and the empowerment of women by eliminating disparity between the sexes in education by 2005
- universal access to primary education by 2015
- a reduction by two-thirds in mortality among children aged under 5 by 2015
- a reduction by three quarters in maternal mortality by 2015
- universal access to reproductive health services by 2015
- implementation of national strategies for sustainable development in all countries by 2005
- a 25% reduction in HIV infection rates among 15-24 year-olds in the worst affected countries by 2005 and globally by 2015
- a 50% reduction in mortality from tuberculosis and malaria by 2010.

These targets have a direct bearing on the health-poverty vicious circle mentioned in Section 1 above. They are very ambitious and will require the mobilization of thousands of institutions in each country and dramatically increased financial resources, both at the country and at the international level, in order to succeed. As underlined in the People's Charter for Health of December 2000, "to combat the global health crisis, we need to take action at all levels – individual, community, national, regional and global – and in all sectors."

A summary of some of the main recommendations made in numerous studies and papers (including at Forum 5 in October 2001 and at the International Conference on Health Research and Development in Bangkok in October 2000) is presented below.

No attempt is made to present this list by order of priority. As pointed out in Section 1 above, breaking out of the health crisis requires breaking out of the vicious circle of poverty – an immense and complex task. The solution is unlikely to come from any single intervention, but rather from a combination of many different interventions, bearing on the political, social, economic, physical and cultural causes of poor health.

Some of the main recommendations made in the past two years are as follows:

1. In all countries, revisit the functioning of the public and private components of the primary health care system

The objective of this measure is to make them more effective and comprehensive; appropriate and diversified indicators have to be further developed and progress measured on a regular basis in all countries, particularly with respect to the effectiveness of the system in delivering services to the poorer segments of the population.

The performance of primary health care systems varies in different countries. But even in countries considered to have the better functioning systems, surveys have shown that populations in most of these countries are not satisfied with the results, and in particular with their inability to function as a "health safety net" for the poor.

This means that the principles of universal, comprehensive primary health care, enshrined in the 1978 Alma Ata Declaration, combining medical with social interventions, are far from being implemented today.

2. Create employment at low cost per job

The vicious circle of poverty and ill health draws attention to the need to create jobs for the young and for those entering the labour market as agriculture becomes increasingly efficient. In India alone, more than 10 million jobs have to be created each year. A small proportion will be created in the modern industrial sector or the service sector, at a cost of *a few thousand dollars per job*. However, as resources are short, most will have to be created *at a few hundred dollars per job*, in the small-scale handicraft and service sectors, i.e. at one tenth (or less) of the cost per job in the so-called modern sector. This underlines the importance of the role of the banking system and financial intermediaries, particularly the micro-credit sector. The public sector has an important policy role to play at the country and international levels (i.e. bilateral and multilateral development agencies) because it is more expensive to make micro-loans and small loans than bigger loans, and therefore the private market rules favour the bigger projects in the modern sector at relatively high costs per job created. As a result, there is a discrepancy between the private interest (making loans available at low cost to the bank) and the public interest (creating jobs at low cost per job). This discrepancy must be addressed by appropriate government policies.

3. Look at poverty and poor health problems from a gender perspective[10]

In recent years, gender issues have been highlighted by most organizations concerned with the promotion of development, justifying this with two main arguments:

- *Efficiency and effectiveness* require that both women and men are at the heart of

[10] Based on Annex 1.1 to this chapter.

development. So long as artificial constraints prevent the full participation of both sexes, societies will be unable to reach their potential for meeting the needs of their citizens.

- *Equity* requires that women and men should have the same opportunity to be active citizens, participating in the development process and having equal access to its benefits. Unless this is achieved, individuals will not be able to realize their potential for health and well-being.

These arguments are increasingly accepted in the international health arena. Policies and practices are gradually being reshaped in recognition of the need for gender sensitivity. Though they have many health problems and health care needs in common, women and men are also divided both by their biological sex and their social gender. Unless these differences are taken seriously, the delivery of medical and public health services will be severely constrained in their efficacy and their equity. Under these circumstances, it is likely to be women in the poorest communities who will be worst affected. These issues are therefore of particular relevance in debates about health and poverty. A fuller discussion of these issues is presented in Annex 1.1.

4. Support, and ally with, civil society organizations

The role of government and public sector institutions in general (including the United Nations and the multilateral international public organizations) is to defend public interest. The private-sector actions are based on the market system and private interests. The civil society organizations (CSOs) are private organizations with a public interest goal. Each sector has its role/responsibility and all three sectors are crucial for the global functioning of society.

In many countries, CSOs are well developed and play an important and, in some cases, even central role in complementing the role of government in the defence of public interests, particularly in the poverty-related sectors such as health, nutrition, water supply, micro-credit, adult education and small productive activities.

Because of their link to poverty and their public-interest orientation, CSOs are natural allies of governments, the United Nations and multilateral international public organizations in their quest for better health for the poor.

CSOs are often not well known by the public sector agencies and collaboration between CSOs and the public sector is fragmented and unsystematic. The CSO resource base, both human and financial, is often fragile. Many very effective examples of collaboration exist and have been illustrated, but the potential for further progress is considerable, both at the country and international levels.[11] In his intervention at Forum 5, David Nabarro called for "networks with common purpose, shared values and open processes".[12] The benefits of such a collaboration would include participation of people and people's organizations in:

- formulation of policies and programmes for the better health of the poor
- implementation of such programmes
- evaluation of the results of such policies and programmmes.

[11] In 2001, the World Health Organization launched a "Civil Society Initiative", led by Eva Wallstam, and located in the External Relations and Governing Bodies Cluster.

[12] David Nabarro, Executive Director, World Health Organization. Remarks made in the Closing Plenary Session of Forum 5, Global Forum for Health Research, October 2001.

In summary, such participation by CSOs (including the most vulnerable, i.e. the poor, women and adolescents, as identified by Prime Minister Mocumbi) could play a crucial role in the effectiveness of such policies and the scaling up of programmes, in both the health sector and in sectors other than health (see also Section 4 below: Recommendations of the Commission on Macroecomics and Health).

5. Undertake multidisciplinary actions in sectors other than health, but having a crucial role to play in the promotion of health (environment, education, water supply and sanitation, housing, macroeconomic policies, etc.)

To fight poverty and ill health, it is necessary to act in all the following sectors:

(a) *Environment*

Water and air pollution, toxic chemicals, deforestation and soil erosion have a negative impact on people's health, particularly that of the poor. Strategic and collaborative actions between the public and private sectors, as well as with CSOs, could bring important benefits for the health of the poorer populations.

(b) *Education*

Many studies point to the strongly positive correlation between health and education[13]. Actions should include:

- primary education and alphabetization for all over the next two to three decades;
- specific health and hygiene education programmes in all elementary school curricula and alphabetization classes.

(c) *Water supply and sanitation*[14]

Some 1.1 billion people do not have access to safe drinking water and about 2.4 billion live without adequate sanitation. As a result, about 250 million people suffer from water- and sanitation-related diseases each year, and over three million die annually, most of them women and children. Actions in the field of water supply and sanitation can make key contributions to the reduction of cholera, typhoid, dysentery, skin and eye infections (including trachoma) and worm infections (including guinea worm disease and schistosomiasis).

(d) *Macroeconomic policies*

Although often considered remote from the everyday life of the poorer people, macroeconomic policies have profound implications for people's health, particularly that of the poor. These include budget allocations, all aspects of governance in the running of the government, structural adjustment programmes, research policies and trade agreements.

There is a need for a systematic evaluation of the impact of macroeconomic policies, budget allocations and governance decisions on people's health.

6. Build social safety nets

As pointed out in the 2000-2001 World Development Report,[15] measures to reduce poverty must include "social safety nets" when the efforts undertaken to reduce the risk of economic crises, epidemics, natural disasters or conflicts prove to be insufficient to protect the very poor. It is important that social safety nets become a standard and permanent instrument in the hands of the public sector, with budgetary rules ensuring their financing when the need arises.

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[13] As pointed out by Derek Yach (Executive Director, Noncommunicable Diseases, World Health Organization), tobacco use by women in Bombay shows a rate of 72% for illiterates, 52% for primary school graduates, 24% for secondary school graduates, going down to 10% for college graduates. NCD Conference, December 2001.

[14] Source: publications of the Water Supply and Sanitation Collaborative Council, c/o WHO, Geneva.

[15] World Bank, ***Attacking Poverty***, World Development Report 2000-2001.

7. Increase the effectiveness of donor agencies

Considerable efforts were deployed in the 1990s by the multilateral and bilateral donor agencies to increase the efficiency, effectiveness and relevance of aid programmes. In a first effort, principles have been developed inside the Development Aid Committee of the OECD regarding donor collaboration and coordination, project appraisal, technical cooperation, programme assistance, procurement, impact assessment and evaluation. In a second wave of efforts, very important principles were developed and agreed upon in the field of participatory development and good governance, including the rule of law, public-sector management, democratization and the defence of human rights.

Significant progress has been made in the application of these principles, but it is generally admitted that ***much remains to be done***, particularly in the following fields: (a) the setting of priorities (to include global public goods) as pointed out by Walter Fust[16]; (b) the integration of aid efforts in national priorities and budgets; (c) the development of national and local capacities; (d) the development of collaboration and partnerships; and (e) the streamlining of aid procedures.

8. Focus on country level efforts and capacity strengthening

Foreign aid represents 0.3% of GNP of the higher income countries. It is clear that it can only play a small supportive role for the development efforts of the lower income countries and that the major development efforts can only take place and be financed by these countries themselves. In these efforts, an important function of the external support provided is in the field of capacity development of the national and local institutions in the low-income countries, so as to enable them to confront their priority problems.

A discussion of this crucial issue for development and the fight against poverty is presented in **Chapter 7** of this report, which summarizes the efforts undertaken over the past two years regarding research capacity strengthening.

9. Develop and support the development of partnerships in the fight against the "global public bads"[17]

All three sectors of society, i.e. the public sector, the private sector and the CSOs, have a crucial role to play in the global functioning of society. However, many problems, particularly those which go beyond national boundaries (referred to above as the "***global public bads***") are beyond the capacity of any single sector to resolve and require the concerted efforts of actors in the public, private and CSO sectors.

J.F. Rischard[18] points to the "inherently global issues" (IGI), which, by definition, require

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[16] As pointed out by Walter Fust, Director, Swiss Agency for Development and Cooperation, "Donor agencies need to reflect more on setting their priorities with a long-term perspective and not to change them every two years". Paper presented at Forum 5, Global Forum for Health Research, October 2001.

[17] A "global public good" is a public good with benefits that are strongly universal in terms of countries (covering more than one group of countries), people (accruing to several, possibly all, population groups) and generations (extending to both current and future generations). By analogy, the term "global public bads" refers to a situation where a problem does not only affect the persons directly concerned, but its negative effects are strongly universal or are felt directly or indirectly by a majority of the world's population and over more than one generation (hard drugs, bad health, illiteracy, loss of biodiversity, sea pollution, etc.).

[18] J.F. Rischard, Vice-President, World Bank Europe. Personal reflections presented in Geneva on 17 November 2000. See also: J.F. Rischard, "High Noon: We Need New Approaches to Global Problem Solving, Fast," *Journal of International Economic Law*, Vol 4, No.3, September 2001 pp 507-527.

"global action", and compares the "arithmetic development of human institutions" with the "exponential growth of population and global problems". He distinguishes between four types of IGIs:

- IGIs affecting the global environment: loss of biodiversity, climate warming, deforestation, water depletion, depletion of fish stocks, sea pollution, toxic wastes, etc.
- IGIs whose size and urgency require "global commitment": ill health, illiteracy, conflicts, etc.
- IGIs requiring a "global regulatory approach": hard drugs, trade rules, IPRs, taxation, global financial architecture, etc.
- IGIs in the field of universal values: human rights, democratization, etc.

To find joint solutions to these global problems, he proposes the creation of "global issues networks, or GINs", in a system of "networked governance". He draws attention to the specific advantages and value added of these global issues networks:

- speed
- legitimacy
- diversity
- compatibility with traditional institutions.

A fuller discussion of the partnerships and governance issues (as a key requisite for development and the fight against poverty) is presented in **Chapter 3** which focuses on the "health research governance" issues and the recent efforts in this field. **Chapter 8** summarizes the functioning and results of a few partnerships in the field of health research.

10. Revisit the global, national and local budget allocations

Public budgets are voted by the legislative branch of governments at the global, national and local levels to defend public interests, i.e. to solve the problems affecting the people as a whole at the respective levels. ***Ideally, budget allocations should be in proportion to the size of the problems to be solved.*** In practice, as mentioned above, global problems are receiving scant attention and little budget allocation as there is no equivalent of a world government which would request the budget needed to attack global problems. The United Nations agencies take a global view but they cannot obtain the resources which would be commensurate with the size of the global problems (or sufficiently influence decisions at the country level to ensure the integration of a global perspective at that level).

It is therefore important to compare the size of the public problems to be solved at the local, national and global levels with the budget allocations at these levels. It is likely that the sum total of budgetary allocations for "global public bads" represents only a very small proportion of "total public budgets", while these global problems account for a much larger proportion of the sum of all the problems affecting the world's citizens. The challenge for the coming years is to: (a) start measuring this gap; and (b) identify ways and means to act upon it with policy- and decision-makers.

As a result, solutions to world development and poverty problems will necessarily include a major reallocation of funding from the "national and local" problems to the "global" problems, particularly in high-income countries.

11. Develop the political will and empowerment of people

In his keynote address to Forum 5, the Prime Minister of Mozambique concluded that "In the final analysis, we need to do much more to build and maintain political will both to generate funds for research and capacity building, and to ensure that the focus of

research, its agenda, funds, organization and dissemination will be oriented to the needs of the disadvantaged majority, particularly the poor, women and adolescents. Despite rhetorical commitment to improve the health conditions of these vulnerable groups, public and private institutions fall far short of their promises."

The parallel to political will by governments is the empowerment of the poor to increase their say in the management of society. Some of the measures proposed in the World Development Report 2000-2001[19] include the following:

- a public feedback mechanism (community-based mechanism to make bureaucracies more accountable)
- increased access to the legal system
- a decrease in state arbitrariness
- access to property for women
- subsidies for girls' education
- mandatory joint titling of land for couples
- making political systems more inclusive and participatory.

Section 3

What is the role of health research? How to make research more effective?

1. What is the role of health research?

In summary, the 11 recommendations outlined above can be more or less efficient and more or less effective in breaking the circle of poverty and ill health, depending on whether they are evidence-based. The role of research is therefore to ensure that the proposed measures are, as far as possible, evidence-based, so that the resources available to finance these measures are used in the most effective way in the fight against poor health and poverty.

Under each of the measures proposed, this requires investigating every facet of the problems, i.e. the objectives and strategies pursued, the design of the activities envisaged, the human and financial resources needed and the definition of the indicators needed to measure results. It covers all sectors and actors involved, as only a multisectoral and multi-actor approach is likely to deliver the best results.

[19] World Bank, ***Attacking Poverty***, World Development Report 2000-2001.

Unfortunately, health research has been beset by a number of problems, including misallocation of funds, insufficient funding, inefficiencies, lack of priority setting, insufficient collaboration and failure to ensure that the results of research have an impact on the health problems of the population (the "ivory tower" problem).

2. How to make health research more effective?

(a) Help correct the 10/90 gap

As first pointed out by the Commission on Health Research for Development[20] in 1990, only about 10% of health research funding is allocated to 90% of the world's health problems. Since then, many efforts have been undertaken to help correct this serious misallocation of resources, including efforts to develop priority-setting methodologies (see **Chapter 4**: Progress in priority-setting methodologies) and to better identify the priorities for health research (see **Chapter 5**: Priorities in health research). A continuation of these efforts will contribute much to making health research more effective in the coming years.

(b) Increase funding for health research

This recommendation was also made by the Commission on Health Research for Development in its 1990 Report and repeated in many reports since then, the latest appearing in the Commission on Macroeconomics and Health (see Section 4 below), which published its report in December 2001 (see also **Chapter 6** below: Monitoring financial flows in health research).

(c) Improve the efficiency of health research funding

This is part of the efforts undertaken to improve "priority-setting methodologies" (see **Chapter 4** below).

(d) Improve collaboration between the various actors by developing partnerships

For a fuller discussion, see **Chapter 3** (Health research governance) and **Chapter 8** (Some networks in the priority research areas).

(e) Decrease the isolation of research and increase its impact on people's health

The above-mentioned problems, which have plagued research and the researchers for a long time, are partly due to the fact that research is typically seen as an "ivory tower" by politicians, policy-makers and the people themselves.

To decrease the isolation of research and increase its impact on people's health, the advocates of research must demonstrate a commitment to the following eight factors:

- focus on the diseases or determinants causing the highest burden of mortality and morbidity;
- distinguish between the determinants at (i) the individual/family/community level; (ii) the bio-medical level; (iii) the level of sectors other than health (education, environment, employment, housing, water/sanitation, etc.); (iv) the level of the macroeconomic policies of the central government (budget allocations, research policies, governance issues, etc.);
- show that the best existing knowledge is being applied in the search for the new intervention;
- demonstrate the multisectoral approach of the research undertaken (including behavioural and cultural factors; bio-medical factors; environmental and educational factors; political and macroeconomic factors) and aim at selecting the project with the more

[20] Commission on Health Research for Development, *Health Research, Essential Link to Equity in Development*, 1990.

promising cost-effectiveness (i.e. in terms of expected healthy life years saved);
- transform the new knowledge into policies;
- measure the effectiveness of the new policies and revisit the policies, if necessary, based on the results;
- measure the degree of absorption of the new knowledge by the people, particularly the poor;
- measure the improvement in the health status of the population, particularly the poor.

Section 4

Recommendations of the Commission on Macroeconomics and Health

The Commission on Macroeconomics and Health (CMH) was instituted by the World Health Organization in January 2000 and published its work in December 2001. Its preliminary findings were summarized by Commissioner Richard Feachem, Co-Chair of Working Group 2 on Global Public Goods for Health, at the Forum 5 meeting of the Global Forum in October 2001.

Its main message is the following: "Although health is widely understood to be both a central goal and an important outcome of development, the importance of investing in health to promote economic development and poverty reduction has been much less appreciated. We have found that extending the coverage of crucial health services, including a relatively small number of specific interventions, to the world's poor could save millions of lives each year, reduce poverty, spur economic development, and promote global security. This report offers a new strategy for investing in health for economic development, especially in the world's poorest countries." "Such an effort would require two important initiatives: a significant scaling up of the resources currently spent in the health sector by poor countries and donors alike; and tackling the non-financial obstacles that have limited the capacity of poor countries to deliver health services. We believe that the additional investments in health – requiring of donors roughly one-tenth of one percent of their national income – would be repaid many times over in millions of lives saved each year, enhanced economic development, and strengthened global security."[21] Insert 1.2 summarizes the "Key Findings" and Insert 1.3 the "Action Plan" proposed by the Commission. The financial proposals of the Commission are summarized in Insert 1.4.

[21] World Health Organization, *Macroeconomics and Health: Investing in Health for Economic Development*, Report of the Commission on Macroeconomics and Health, December 2001.

Insert 1.2

Key findings of the Commission on Macroeconomics and Health, December 2001

1. **Importance of investing in health:** the importance of investing in health has been greatly underestimated by analysts, governments in developing countries and the international donor community; increased investments in health would translate into hundreds of billions of dollars per year of increased income in the low-income countries.

2. **A few health conditions are responsible for a high proportion of the health deficit:** HIV/AIDS, malaria, TB, childhood infectious diseases, maternal and perinatal conditions, tobacco-related illnesses, and micronutrient deficiencies.

3. **The HIV/AIDS pandemic:** it is an unparalleled catastrophe and requires special consideration.

4. **Reproductive health:** investments in reproductive health, including family planning, are crucial accompaniments of investments in disease control.

5. **Health spending in low-income countries:** it is insufficient to address the health challenges they face (minimum financing needed is estimated at US$30-40 per person/year to cover essential interventions).

6. **Financing by low-income countries:** poor countries can increase the domestic resources that they mobilize for the health sector and use those resources more efficiently.

7. **Donor finance:** donor finance will be needed to close the financing gap, in conjunction with best efforts by the recipient countries.

8. **Health coverage for the poor:** this would require greater financial investments in specific health-sector interventions, as well as a properly structured health delivery system that can reach the poor.

9. **Global public goods and poverty:** an assault on diseases of the poor will also require substantial investments in global public goods.

10. **Coordinated actions:** by the pharmaceutical industry, governments of low-income countries, donors and international agencies are needed to ensure that the world's low-income countries have reliable access to essential medicines.

Insert 1.3

Action agenda proposed by the Commission on Macroeconomics and Health, December 2001

1. Establishment of National Commissions on Macroeconomics and Health (NCMH): each low- and middle-income country should establish a NCMH, to formulate a long-term programme for scaling up essential health interventions as part of their Poverty Reduction Strategy.

2. Country financing: the financing strategy should envisage an increase in domestic budgetary resources for health of 1% of GNP by 2007 and 2% of GNP by 2015.

3. Donor financing: the international donor community should commit adequate grant resources for low-income countries to ensure universal coverage of essential interventions, scaled-up R&D for diseases of the poor, and other global public goods. Insert 1.4 summarizes the costs of this proposal. Where funds are not used appropriately, credibility requires that funding be cut back and used to support capacity building and NGO programmes.

4. New funding mechanisms: the international community should establish new funding mechanisms:

   - the Global Fund for AIDS, TB and Malaria (US$8 billion by 2007)
   - the Global Health Research Fund (US$1.5 billion by 2007)
   - additional outlays (US$1.5 billion for TDR, IVR, HRP, Global Forum for Health Research, various public-private partnerships aiming at new drug and vaccine development)
   - country programmes should direct at least 5% of outlays to operational research.

5. Other global public goods: financing should be bolstered through additional financing of relevant international agencies such as WHO and the World Bank (US$1 billion/year by 2007 and US$2 billion/year by 2015).

6. Orphan drug legislation: to support private-sector incentives, existing orphan drug legislation in the high-income countries should be modified to cover diseases of the poor.

7. Pharmaceutical industry: in cooperation with low-income countries and WHO, the international pharmaceutical industry should ensure access of the low-income countries to essential medicines through commitments to provide essential medicines at the lowest viable commercial price in the low-income countries, and to licence the production of essential medicines to generics producers as warranted by cost and/or supply conditions.

8. WTO member governments: should ensure sufficient safeguards for the developing countries, and in particular the right of countries that do not produce the relevant pharmaceutical products to invoke compulsory licensing for imports from third-country generics suppliers.

9. IMF and World Bank: should work with recipient countries to incorporate the scaling up of health and other poverty-reduction programmes into a viable macroeconomic framework.

Insert 1.4

Donor financing required for universal coverage of essential interventions, R&D for diseases of the poor and provision of other global public goods

as proposed by the CMH (in billions of US$/year)

Components	By 2007	By 2015
Country-level programmes	22.0	31.0
R&D for diseases of the poor	3.0	4.0
Provision of other global public goods	2.0	3.0
Total	**27.0**	**38.0**

Section 5

Conclusions

In summary:

- Good health is central for (a) the promotion of development, (b) the fight against poverty and (c) global security. This is not surprising, as good health, together with education, correspond to building up the human capital which is necessary for the efficient creation and use of the physical capital of a nation.
- The promotion of development and the fight against poverty have to be looked at separately, as development by itself has not been a very efficient tool to fight poverty, and poverty has persisted in many cases in the face of rapid growth and development.
- Over the past 50 years, health and education have been defined as the "social sectors". As a result, politicians and finance ministers do not consider them as "economic sectors". However, they may possibly be the most "economic" sectors, given their contribution to development in general and the fight against poverty in particular. This labelling of "social sector" may explain the under-investment in both health and education in most countries. Investing in health (and education) is good economics for the promotion of development and the fight against poverty.
- Health research is central for the efficient and effective promotion of health. But health research has to be made more

effective and brought out of its ivory tower through the measures identified under Section 3 above.
- The often mentioned conflict between horizontal and vertical approaches to health (and health research) is a false problem. Both are needed in a multisectoral and multi-actor approach to delivering health (and the results of health research) to the people, in particular the poor.

Annex

Poverty and health from a gender perspective*

1. Putting gender on the international agenda

In recent years, gender issues have been highlighted by most organizations concerned with the promotion of development and the enhancement of human well-being, justifying this with two main arguments:

- *Efficiency and effectiveness* require that both women and men are at the heart of development. So long as artificial constraints prevent the full participation of both sexes, societies will be unable to reach their potential for meeting the needs of their citizens.
- *Equity* requires that both women and men should have the same opportunity to be active citizens, participating in the development process and having equal access to its benefits. Unless this is achieved, individuals will not be able to realize their potential for health and well-being.

These arguments are increasingly accepted in the international health arena. Policies and practices are gradually being reshaped in recognition of the need for gender sensitivity. Though they have many health problems and health care needs in common, women and men are also divided both by their biological sex and their social gender. Unless these differences are taken seriously, the delivery of medical and public health services will be severely constrained in their efficacy and their equity. Under these circumstances, it is likely to be women in the poorest communities who will be worst affected. These issues are therefore of particular relevance in debates about the 10/90 problem.

* This text was contributed by Lesley Doyal, School for Policy Studies, University of Bristol.

2. Understanding sex and health

The biological differences between women and men are reflected in the health problems they experience. Some of these stem from male and female reproductive functioning, with women facing major hazards as a result of their capacity for pregnancy and childbearing. This gives them 'special needs' for care which have to be met if they are to realize their potential for health. Other conditions are not directly connected with sexual or reproductive functioning but are nonetheless sex specific because they affect particular organs: cancers of the prostate and cervix for example.

There are also marked sex differences in the incidence, symptoms and prognosis of a wide range of diseases and conditions that affect both males and females. These are evident in noncommunicable diseases such as coronary heart disease and lung cancer and also in a wide variety of communicable diseases including tuberculosis and malaria. Recent studies suggest that these differences are due in large part to previously unrecognised genetic, hormonal and metabolic differences between men and women. More research is needed to map these differences in greater detail. However the following facts give some indication of why biological differences between the sexes need to be taken more seriously in all areas of health research:

- Men typically develop heart disease ten years earlier than women.
- Women's enhanced immune systems make them more resistant than men to some kinds of infection
- Women are around 2.7 times more likely than men to develop an auto-immune disease.
- Male-to-female infection with HIV is more than twice as efficient as female-to-male infection.

3. Understanding gender and health

Biological differences are not the only ones shaping variations in male and female patterns of health and illness. Women and men often lead very different lives and this can have a major effect on their well-being. Differences in their living and working conditions and in the nature of their duties and their entitlement to resources will put women and men at differential risk of developing some health problems while protecting them from others.

There is now an extensive literature documenting the relationship between economic, cultural and social factors and women's mental and physical well-being. The gender divisions in domestic work have been highlighted as a potential risk, especially when they are combined with paid work outside the home. Women's vulnerability to violence in the home and their high rates of depression have also received considerable attention. The UNDP ***Human Development Report 1998*** pointed out that there are no societies in which women are treated as equals with men. However it is clear that many of the most extreme gender inequalities are to be found in the world's poorest countries. If the determinants of women's health are to be properly understood and appropriate interventions developed, the impact of these gender inequalities will need to be central to the research agenda.

As the problems faced by women are increasingly recognized, the links between masculinity and well-being are also beginning to emerge. At first glance, maleness might seem to be

straightforwardly beneficial to men because it offers them privileged access to a range of potentially health-promoting resources. But being a man may also require the taking of risks which can be damaging to health. In many societies the traditional role of breadwinner continues to put men at greater risk than women of dying prematurely from occupational injuries. In order to demonstrate their masculinity they are also more likely to engage in dangerous and/or violent activities including smoking, drinking to excess, driving too fast and indulging in unsafe sex.

Again, these examples of gendered behaviour may be most pronounced in the poorest societies and researchers need to take them into account if they are to offer policy-makers appropriate evidence. A brief indication of the importance of gender as a determinant of the health of both women and men is given in the facts below:

- In most countries, men are more likely than women to commit suicide but women are more likely to attempt it.
- Both community-based studies and research on treatment seekers indicates that women are two to three times more likely than men to be affected by Common Mental Disorders (CMD) such as depression or anxiety.
- Men are more likely than women to die of injuries but women are more likely to die of injuries sustained at home.
- The large differential between male and female smoking rates is beginning to narrow as young women take up the habit more frequently than young men.

4. Sex, gender and health care

As well as being a major determinant of health, gender also influences the access of individuals to health care. This operates through a number of different routes. In many households there is evidence of gender bias in the allocation of resources. Females of all ages may be assigned a lower status and will have less entitlement to food and health care. This bias will be especially damaging in poor communities where there is little state provision and care has to be bought with cash. Alongside the cultural and material obstacles to care, individuals themselves may feel unable to seek the help they need. In the case of women, this may reflect their socialization into a culture of sacrifice which means that they see themselves as being of little value. In the case of men, access to health care may be limited by the desire to appear 'strong'. In order to appear masculine they cannot admit weakness and this may prevent them from seeking necessary help.

There is also evidence that once they have accessed a service, women and men may receive treatment of differing quality. Many women have spoken of the lack of respect they experience from workers in reproductive health care and this seems to be especially severe among poor women. Research in the developed countries has also indicated that women may be offered care which is less effective than that received by men with the same condition. More research is therefore needed to explore both the gendered obstacles to care and the quality of the services received by women and men in different settings.

Recent studies relating to the HIV/AIDS epidemic have highlighted the continuing importance of these issues. Evidence about poor women in rich countries, such as the United States, as well as those in sub-Saharan Africa suggests that they have a shorter life expectancy than their male

compatriots. This reflects a range of barriers they face in accessing care as well as inequalities in the treatment itself. Studies in a number of countries have shown that women are much less likely than men to be given antiretroviral drugs for instance, even when their need is at least as great.

5. How can researchers be sex- and gender-sensitive?

Sex and gender are major determinants of health in both women and men. They are closely linked with other variables such as age, race and socioeconomic status in shaping biological vulnerability, exposure to health risks, experiences of disease and disability and access to medical care and public health services. Researchers who ignore these differences run the risk of doing bad science. Failure to incorporate sex and gender in research designs can result in failures of both effectiveness and efficiency. Practice based on incomplete or misleading evidence is likely to lead to avoidable mortality, morbidity and disability as well as wasted expenditure of scarce resources. It will also perpetuate existing gender inequalities. Lost opportunities of this kind are obviously unacceptable especially in the context of the existing 10/90 problem.

Strategies for ensuring that research is gender sensitive will vary depending on the type of study being undertaken. However the overall principle should be to make sure that both sex and gender are key variables in all research designs unless there are clear reasons for assuming that they are not relevant to the problem under investigation. The population of subjects needs to include comparable numbers of women and men so that any sex or gender differences can be identified in the analysis. These differences need to be presented in the findings and their implications discussed. In the context of clinical trials this will include an assessment of the significance of any differences for future practice with male and female patients.

As the relevance of both sex and gender to health becomes increasingly clear, new strategies are being devised to ensure that they are mainstreamed into all research activities. At present many of these initiatives are confined to the higher income countries but if the 10/90 problem is to be solved they will need to be included in the reshaping of priorities and practices around the world. The following policies will be central to this process:

- sex/gender sensitivity in research design to be included in funding criteria
- guidelines to be developed to encourage greater gender awareness among health researchers
- multidisciplinary research to be encouraged across the biological/social divide
- a range of methods to be supported including both qualitative and quantitative approaches to data collection
- strategies to be devised for ensuring a more equal gender balance among health care researchers
- policies to be devised for ensuring that women are more actively involved in the determination of research priorities.

Insert A *Developing gender-sensitive evaluation strategies*

Some of the most important work on developing gender-sensitive care has been done by CSOs working on reproductive health issues in low- and middle-income countries. This was reflected at Forum 5 in a workshop discussion of an action research project undertaken by the Malaysia-based CSO ARROW. The study was carried out in six countries in Asia and was designed to explore the gender dimensions of access and quality of care among both governmental and non-governmental service providers. The findings revealed certain commonalities in the ways in which women were constrained by their domestic circumstances and also in the obstacles they faced in accessing care. However the study also demonstrated important differences between countries and communities, highlighting the need for service providers and researchers to be sensitive to the social and cultural specificity of gender issues in different settings.

As part of the study, an in-depth analysis was undertaken of women attending a public hospital in the Philippines. A number of indicators were used to explore the women's access problems and experiences of quality of care itself. These included waiting time, cost of travel and distance, spousal consent issues, regulatory barriers, satisfaction with services and with quality of interpersonal relationships. The study also explored the levels of knowledge and understanding of health care workers about gender issues and their implications. It revealed that many faced serious obstacles including a heavy workload and inadequate facilities which militated against the provision of appropriate and effective care.

Discussion in the workshop centered on how to operationalize the concept of gender sensitivity in the planning, delivery and evaluation of care. A number of methodological issues were discussed including the need for appropriate indicators and outcome measures, the importance of including the voices of all stakeholders in evaluative research and the challenges faced in using the findings from small-scale qualitative studies to identify and disseminate good practice.

Insert B *Sex, gender and tropical infectious diseases*

Until recently, researchers had paid little attention to either sex or gender differences in the field of tropical diseases. However this gap is beginning to be filled. It is now clear that biological factors influence male and female susceptibility to these diseases. Gender roles and relations shape both the degree of exposure to the relevant vectors and also access to the resources needed to protect individuals from the consequences of infection.

Biological differences mean that women and men may experience the same disease in different ways. In the case of malaria for instance, men may be slightly more susceptible to the disease than women. However women's biological immunity is compromised during pregnancy, making them more likely to become infected and worsening the effects. Malaria is an important cause of maternal mortality, spontaneous abortion and stillbirths and contributes to the development of chronic anaemia among pregnant women. These findings highlight the importance of sex differences in the 'natural history' of tropical diseases but much more research is needed to identify their extent and their implications.

Gender differences in living and working conditions also lead to variations in male and female exposure to infection from tropical diseases. Women who are in seclusion are less likely to be exposed to mosquitos and their more extensive clothing may also have protective effects. However their domestic labours may increase exposure to other vectors. A recent study in Nigeria showed that the prevalence of schistosomiasis in girls is highest at the age of 15 when they are maximally involved in water-related domestic work such as agricultural tasks and clothes washing. While the rate drops in males after late adolescence, that of females remains stable, reflecting the fact that men grow out of playing around water while women's domestic duties may require continued exposure.

Diagnosis of tropical diseases and the effectiveness of their treatment may also be affected by gender. Women are often constrained in their use of appropriate health services by lack of transport or inability to pay the fees. These problems may be compounded by the social interpretation of particular diseases. In the case of disfiguring problems, such as leprosy for instance, women may be especially reluctant to expose themselves to health care providers, fearing subsequent stigmatization. Similarly, some cultures have a double standard, equating diseases such as schistosomiasis with virility in men but promiscuity in women. These gender differences in illness behaviour and in societal responses to female and male patients mean that the progress of tropical diseases can sometimes be accelerated in women, especially those with the least resources and lowest levels of support.

Chapter 2

An overview of the Global Forum for Health Research

For a summary of this chapter, see the Executive Summary, page xv.

Overview

1. The problem

Health research is essential to improve the design of health interventions, policies and service delivery. Every year more than US$70 billion is spent worldwide on health research and development by the public and private sectors. But only about 10% of this is used for research into 90% of the world's health problems. This is what is called "the 10/90 gap".

2. Central objective

The Global Forum's central objective is to help correct the 10/90 gap by focusing research efforts on diseases representing the heaviest burden on the world's health and facilitating collaboration between partners in both the public and private sectors. A reallocation of one per cent of research spending would provide US$700 million for priority research.

3. Our partners

The Global Forum believes that solutions to current health challenges will depend on the strength of the partnerships created between members of the following constituencies, which are all represented in the Global Forum:

- governments (policy-makers)
- multilateral organizations
- bilateral aid donors
- international foundations
- national and international civil society organizations (CSOs) and community organizations
- women's organizations
- research-oriented institutions and universities
- private-sector companies
- the media.

4. The nature of the Global Forum

In summary, the Global Forum for Health Research (and other networks with similar characteristics) can play an important role in the overall governance of health research, contributing to the integration of the whole. Its specific nature includes the following characteristics:

- a network of networks, linking the efforts of very diverse institutions which have an impact in reducing the 10/90 gap
- catalyst (no substitute for the efforts of other institutions)
- promoter of participation in joint efforts
- informal contact point between partners
- non-bureaucratic decision-making mechanism: response to opportunities; seed money.

5. Our strategies

(a) The annual meeting (Forum)

Throughout the year and especially at its annual meeting, the Global Forum acts as a marketplace where problems can be examined by a variety of policy-makers and researchers. Presentations at the Forum address the latest thinking on the 10/90 gap and act as a catalyst for action during the coming year.

- Forum 4 was held in Bangkok in October 2000, as part of the International Conference on Health Research for Development.
- Forum 5 took place in Geneva in October 2001.
- Forum 6 is scheduled to take place in Arusha, Tanzania, on 12-15 November 2002.

(b) Priority-setting methodologies

Selecting research priorities is as important as conducting research itself. The Global Forum aims to stimulate the discussion of methodologies to help set priorities in health research. The ultimate aim of the discussions is to better relate the resources invested into various areas of health research to the magnitude of the disease burden and its determinants, resulting in a measurement of the 10/90 gap.

In particular, the Global Forum stimulates discussion and networking in the following areas:

- priority-setting methodologies (including a "combined approach matrix")
- resource flows in health research
- burden of disease and health determinants
- cost-effectiveness of health interventions.

(c) Support to networks

The Global Forum supports networks in health research bringing together a wide range of partners in a concerted effort to find solutions to priority health problems, thus attracting new financing to these areas. Current examples include:

- Alliance for Health Policy and Systems Research: the identified priorities for the Alliance are the mapping of health systems research, identification of gaps, development of tools and methodologies, and capacity building.
- Initiative on Cardiovascular Health Research in Developing Countries: the research priorities of this initiative are assessment of existing capacity, access to knowledge, surveillance system, etiological research, health promotion, hypertension, tobacco and capacity development.
- Child Health and Nutrition Research Initiative: the objectives of this initiative include the definition of disease burden, the identification of priority research areas and the dissemination of information.
- Medicines for Malaria Venture (one of the five strategies of the Roll Back Malaria Programme led by WHO) is aimed at R&D for the discovery, development and marketing of new antimalarials.
- Initiative on Public-Private Partnerships for Health (IPPPH): the priorities of this initiative are the analysis of existing public-private partnerships and the promotion of effective new partnerships.
- Research initiatives in the area of tuberculosis research, such as the Global Alliance for TB Drug Development.
- Sexual Violence against Women: the objective of this initiative is to develop a framework for measuring the magnitude of the problem and developing a better understanding of its determinants and interventions.

A detailed review of the objectives, strategies, activities over the past two years and expected results over the coming two years for each of the initiatives listed above is presented in Chapter 7.

At its annual meeting, the Global Forum welcomes presentations and discussions of efforts undertaken by all networks active in the correction of the 10/90 gap. It is ready to study various other forms of support based on proposals from its partners. Discussions are under way, for example, in the field of road traffic accidents, mental health and neurological disorders, and child abuse.

6. Operations and financing

- The Global Forum for Health Research is an independent international foundation established in 1998. It is managed by a 20-member Foundation Council, assisted by a Strategic and Technical Advisory Committee.
- The small Secretariat is based in Geneva.

- The Global Forum is supported financially by donations from the Rockefeller Foundation, World Bank, World Health Organization and the governments of Canada, the Netherlands, Norway, Sweden and Switzerland. In addition, individual networks supported by the Global Forum receive funding from the Bill and Melinda Gates Foundation, the Institute of Medicine of the US Academy of Sciences, the Department for International Development of the United Kingdom, and others.
- Assessing progress in the correction of the 10/90 gap is an integral part of the Global Forum's work.

7. Perspectives on the 10/90 gap

- Correcting the 10/90 gap constitutes a major contribution to growth, development and equity.
- Correcting the 10/90 gap is possible: it requires the individual and concerted efforts of thousands of institutions.
- The Global Forum works as a catalyst to spur such efforts.
- Between 1997 and 2001, the Global Forum :
  - held five annual Forum meetings to review past achievements and define future joint actions in helping to correct the 10/90 gap;
  - supported various research initiatives in priority areas;
  - stimulated discussion and networking in the field of priority-setting methodologies.
- Future progress on the road to correcting the 10/90 gap depends on both individual efforts and real and effective partnerships.
- In each research area, the Global Forum emphasizes research capacity strengthening and gender issues.

Insert 2.1
Selected documents and publications

Global Forum for Health Research

*Monitoring financial flows for health research** (October 2001)

Interventions against antimicrobial resistance: a review of the literature and exploration of modelling cost-effectiveness by Richard D. Smith ***et al.*** (October 2001)

2000 Operations Report and Audited Financial Statements (April 2001)

Workplan and Budget, 2001-2002 (December 2000)

*The 10/90 Report on Health Research 2000** (April 2000)

Economic analysis of malaria control in sub-Saharan Africa by Catherine Goodman, Paul Coleman & Anne Mills (March 2000)

*The 10/90 Report on Health Research 1999** (March 1999)

Supported networks

Child Health Research: a foundation for improving child health. Publication of WHO/CAH and the Global Forum for Health Research/Child Health and Nutrition Research Initiative (March 2002)

Annual Report 2000: Medicines for Malaria Venture (May 2001)
see also www.mmv.org

Alliance for Health Policy and Systems Research: Report 2000 & Workplan 2001-2003 (February 2001)
see also www.alliance-hpsr.org

Cardiovascular Health in Developing Countries: Workplan and Budget 2000-2003 (December 2000)
see also www.ichealth.org

Eliminating sexual violence against women: towards a global initiative. Report on the Consultation on Sexual Violence Against Women, The University of Melbourne, 18-20 May 2000 (September 2000)
Sexual violence against women: a working bibliography. Consultation on Sexual Violence Against Women, The University of Melbourne, 18-20 May 2000. CDRom (September 2000)

Creating global markets for neglected drugs and vaccines: a challenge for public-private partnerships. Consensus statement. Carmel Valley, California, February 2000.
see also www.ippph.org

For the work of the Global Alliance for TB Drug Development, see also www.tballiance.org

Work specifically supported by the Global Forum

Small Arms and Global Health, WHO Contribution to the UN Conference on Illicit Trade in Small Arms and Light Weapons 9-20 July 2001, WHO, Geneva, 2001

Neurological, Psychiatric and Development Disorders: Meeting the Challenge in the Developing World, Institute of Medicine, National Academy Press, USA, 2001

Gendered Health Research for Development: A Vital Contribution to Health Equity, Latin American and Caribbean Women's Health Network (LACWHN), 2000

Report of the Consultation on Child Abuse Prevention 29-31 March 1999, WHO, Geneva, 1999

*available on the website www.globalforumhealth.org

Chapter 3

Governance of health research

For a summary of this chapter, see the Executive Summary, page xv.

Introduction

Much has been said and written in recent years about "health research governance". This term may cover different concepts for different persons or institutions, ranging broadly from *formal coordination agreements* between a limited number of institutions to informal *collaborative principles* discussed and gradually agreed upon by a widening circle of institutions at the global, regional and national levels. These arrangements of a very different nature are often referred to as *partnerships*. The sum of these partnerships at the global, regional and national levels can be referred to as *the system of health research governance*.

The objective of this chapter is to (a) explore the rationale for the so-called "health research governance", (b) review the main recommendations made in the past 10 years in this field (by the 1990 Report of the Commission on Health Research for Development[1], the 1996 Report of the Ad Hoc Committee on Health Research[2], the 1997 Advisory Committee on Health Research[3] and, in particular, the 2000 International Conference on Health Research for Development in Bangkok[4]) and (c) review the efforts since the Bangkok Conference.

Section 1

Is there a need for "health research governance" and "partnerships"?

In the field of health research, thousands of public and private institutions make decisions every day that affect the overall allocation of resources between the various health problems. The outcome of all these decisions is that, due to "externalities" (i.e. factors that are not taken into account in the decision-making process of any institution but have important positive or negative effects on the community as a whole), only about 10% of the resources are allocated to 90% of the world's health problems. An attempt to visualize this multiplicity of actors and partnership arrangements in relation to the 10/90 gap in health research is made in the Insert 3.1[5]:

[1] Commission on Health Research for Development, *Health Research, Essential Link to Equity in Development*, 1990.

[2] Ad Hoc Committee on Health Research, *Investing in Health Research and Development*, WHO, September 1996.

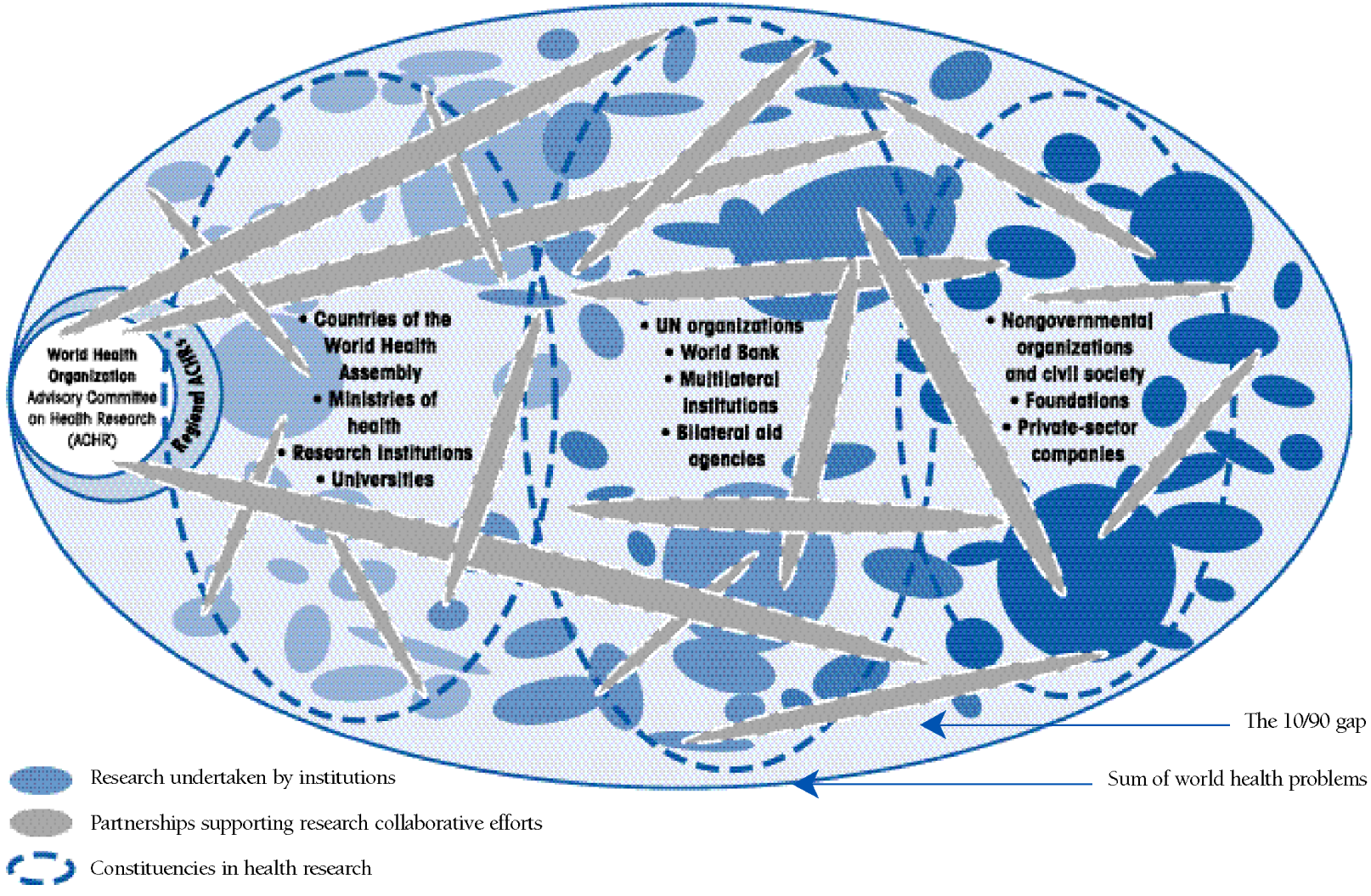
[3] Advisory Committee on Health Research, *A Research Policy Agenda for Science and Technology to Support Global Health Development, A Synopsis*, WHO, December 1997.

[4] International Conference on Health Research for Development, Bangkok, 10-13 October 2000, *Conference Report*.

[5] Based on a first visualization in Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, April 2000 (page15).

Insert 3.1

A visual representation of (a) institutions and partnerships active in health research and (b) the 10/90 gap



In this illustration, the outer ellipse represents all the health research problems to be solved in order to attain perfect health for all in the world. The institutions responsible for undertaking this research are the national governments, health research institutes and universities, multilateral and bilateral development agencies financing research, national and international civil society organizations, foundations and private-sector companies. But, as indicated by the 10/90 gap, research presently undertaken by the above-mentioned institutions represents only about 10% of the outer ellipse.

The objective therefore is to gradually fill the outer ellipse or, to put it another way, to gradually reduce the space between the research actors, as they integrate more and more of the world's health research needs. There are two ways to do this:

- each research institution can take actions to internalize some of the "externalities" within its immediate sphere of influence (corresponding to an enlargement of the small blue-shaded capsules representing the activities of each institution);
- an expansion of the collaborative arrangements and partnerships linking the different actors, thereby responding to research needs which have so far been considered as "externalities" from the point of view of the individual actors but which are high priority research areas from a world public health point of view (represented by the grey-shaded ellipses in Insert 3.1).

Both approaches are in fact needed to solve the important health research challenges in the years to come.

The first approach, i.e. the decision by each institution to internalize some of the "externalities" in health research, is the responsibility of the governing body in each institution. As the evidence of interdependence grows in the world, there has been a gradual movement within institutions towards "more global thinking" (i.e. internalization of some externalities). Although progress coming from this direction is difficult to predict, it is very important to help correct the 10/90 gap.

The second approach, i.e. the development of health partnerships linking the efforts of several (or many) actors around priority areas of health research (thus gradually reinforcing the global "health research governance") is, in the view of the Global Forum, equally indispensable for the following reasons:

1. The magnitude of the problems to be solved

The magnitude of the problems is such that they are beyond the capacity of any single institution to resolve and require the concerted efforts of a coalition of partners. The magnitude of the global problems can be described in terms of the number of cases (reaching into the hundreds of millions), the number of countries (often more than half the countries in the world are affected), the complexity of the diseases, the development of antimicrobial resistance and the complexity of the interventions, which very often go beyond the capacity of the primary or secondary care unit, and so on.

These characteristics indicate that solutions can only be found by the joining of forces of hundreds or even thousands of institutions (i.e. partnerships), at the global, regional, national and local levels. By acting together, the probability of finding solutions increases markedly. But bringing together so many institutions in a joint effort is a major challenge in itself.

2. The efficiency argument

The question is whether it is more cost-effective for these thousands of actors to collaborate (on what subject matters and to

what extent) than to act individually, i.e. whether the results of acting together would be greater than the sum of the individual actions, for the same amount of time and resources invested. It is basically a question of benefit-cost analysis, based on the following:

On the benefit side of the equation, discussions among the partners may permit:

- better definition and understanding of the problem
- better identification of the priority research areas
- better identification of more effective strategies for reaching solutions
- better focus of research efforts on the most promising areas
- decrease in the duplication of efforts
- more effective solutions.

On the cost side of the equation:

- a substantial amount of time invested, on the part of each partner, for each of the elements mentioned above.

In the view of the Global Forum, with good management of the partnership, the benefit-cost ratio of the joint undertaking may be very high and the effectiveness of the partnership a multiple of the sum of each institution's efforts. However, with poor management, the estimated benefit-cost ratio may fall below "one" (in which case the costs tend to become bigger than the benefits) and even approach "zero" (in which case the benefits are very limited and may approach zero, while the costs of collaboration remain high).

Clearly, the benefit-cost ratio of a specific partnership is rarely calculated. It is an estimation made by the partners as to whether the time invested in the partnership yields results beyond what they could have reached individually with the same time and resources invested. Experience in the past few years has shown that the following ten factors play a key role in determining the success of a partnership[6]:

(i) clear definition of the problem to be attacked

(ii) "grey" matter comes before "green" matter: this means that much thinking and preparation time must be invested by the partners in the development of a partnership before spending much money on it (as illustrated by the points itemized below)

(iii) clear definition of the central objective of the network

(iv) clear definition of the strategies chosen to reach the objective

(v) identification of the partners in the network and their respective comparative advantages/responsibilities

(vi) preparation of a detailed workplan and budget (including financial and human resources needed) and its submission for approval by the partners

(vii) clear definition of decision-making mechanisms and organization: legal entity, governance, organigram, secretariat, responsibilities

(viii) ensuring financing by ***all partners*** if possible (in cash and in kind)

(ix) clear definition of the indicators of progress/success

(x) adjustment of workplan and budget based on experience and reality check.

[6] Presentation by Louis J. Currat, Global Forum for Health Research, at the WHO Noncommunicable Diseases Research Partners Meeting, Geneva, 10-12 December 2001.

3. The interdisciplinarity argument

Most institutions active in the field of health research, whether at the national, regional or global levels, are necessarily specialized and focus on a limited number of interventions. However, the effectiveness of a given intervention often depends on the presence of other actions or interventions in other disciplines which are necessary or at least mutually supportive. As often underlined in the field, the end result depends on the weakest link in the chain of actions.

In this sense, partnerships can play a key role in ensuring the solidity in the chain of interdependent and interdisciplinary actions by a large number of institutions.

4. The global public goods argument

It is increasingly recognized that ***better health for anyone, anywhere on earth, benefits everybody else.*** As such, health is part of what is called the global public goods[7], i.e. those goods which benefit not only the person or nation where the improvement takes place but the world community at large.

Conversely, poor health anywhere in the world fits the definition of a *global public "bad"*. For example, infectious diseases can rapidly affect millions of individuals around the globe and, in some countries, the burden of noncommunicable diseases is passed on (at least to some extent) to the national community through medical insurance charges. More importantly, poor health leads to lower productivity and production and therefore has a generally negative impact on growth and development worldwide, through lower savings, lower investments, higher social charges, etc., and a very negative impact on poverty (see Chapter 1).

To the extent that ***health research*** is a key determinant of health improvements, it is also a global public good. Like other public goods, global health and global health research suffer from insufficient investment – both overall and particularly for those diseases which account for the highest global disease burden (as underlined by the 10/90 gap in health research).

Partnerships have a key role to play in helping to correct this under-investment in global public goods, as partners identify the benefits accruing to them as a group.

In conclusion, the Global Forum believes that there is an urgent need for better health research governance and for health research partnerships. It is likely that future solutions to the public health challenges of today will depend to a large extent on the strength of the partnerships between the actors identified in Insert 3.1.

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[7] Inge Kaul, *Global Public Goods and the Missing Link*, Politica Internazionale, January/April 2001; Inge Kaul, Isabelle Grunberg, Marc A. Stern, *Global Public Goods, International Cooperation in the 21st Century*, UNDP, Oxford University Press, March 1999. See in particular the article by Lincoln C. Chen, Tim G. Evans and Richard A. Cash, Health as a Global Public Good (pages 284-304).

Section 2

Recommendations on "health research governance" made by the 1990 Commission on Health Research for Development, the 1996 Ad Hoc Committee on Health Research and the 1997 Advisory Committee on Health Research

1. Recommendations of the Commission on Health Research for Development (1990)[8]

As early as 1990, the Commission displayed a strong commitment to "health research governance" and envisaged a pluralistic, worldwide health research system that would nurture productive national scientific groups linked together in transnational networks to address both national and global health problems.

Specific recommendations of the Commission on Health Research for Development in the field of health research governance at the national, regional and global levels are summarized in Insert 3.2.

2. Recommendations of the Ad Hoc Committee on Health Research (1996)[9]

The Ad Hoc Committee on Health Research made four recommendations in the field of management of health research. A summary is presented in Insert 3.2, which demonstrates close parallels with the recommendations of the 1990 Commission.

8 Commission on Health Research for Development, ***Health Research, Essential Link to Equity in Development***, 1990.

9 Ad Hoc Committee on Health Research, ***Investing in Health Research and Development***, WHO, September 1996.

Insert 3.2

Health research governance:
Recommendations of the 1990 Commission and the 1996 Ad Hoc Committee

Key problems and questions	Key recommendations	
	Commission Report (1990)	Ad Hoc Committee Report (1996)
1. National level	Essential National Health Research • Countries should vigorously undertake *"essential national health research"* to ensure that resources available for the health sector achieve maximum results. • This includes sectors other than health but having a major impact on health. • It also includes the socioeconomic determinants of health.	Develop national agendas for health research, with the active involvement of all relevant actors (policy-makers, research institutions, community leaders, health care providers, etc.) dealing with major national health issues, including: • capacity building • translation of research results into policies and interventions • development of competitive procedures for staffing and allocation of funds among institutions • development of links between national and international institutions.
2. Regional level	Establish networks linking the national, regional and global efforts • National efforts of less developed countries should be joined together with efforts in industrialized countries in *"international partnerships"* that mobilize and focus the world's scientific capacity on the highest priority health problems.	
3. Global level	Establish an international mechanism • To monitor progress and promote financial and technical support for research on health problems of developing countries. • Envisage a pluralistic, worldwide health research system that would nurture productive national scientific groups linked together in transnational networks to address both national and global health problems.	Create a Forum for investors in international health research (governments, donors and the research community) to provide a mechanism for the review of needs and opportunities, making use of data on: • disease burden • level of ongoing efforts (resource flows in health research) • R&D opportunities.
4. Regarding public-private partnerships		Develop new instruments for collaboration (beyond the current patents system) for engaging the skills and energy of the private sector in the development of vaccines, drugs, diagnostic tests and equipment for the use of low-income populations, through for example: • subsidies • guaranteed markets • streamlined regulatory requirements.
5. Financing of health research	Allocate at least 2% of national health expenditures and 5% of health project aid in ENHR studies and capacity building.	Reallocate health resources to health research as a means to bring substantial gains, particularly for the health of poor populations.

3. Recommendations of the 1997 Advisory Committee on Health Research[10]

The main recommendations of the 1997 Report of the Advisory Committee on Health Research can be summarized as follows:

(a) At the national level

- apply the Visual Health Information Profile (VHIP) to identify the health status of the country and the research priorities
- this includes sectors other than health (water, land pollution, etc.), healthy behaviour and research capacity strengthening.

(b) At the regional level

- establish scientific research networks (called IRENEs: Intelligent Research Networks) linking the scientific community, governments, NGOs, the private sector and all partners in public health.

(c) At the global level

- adopt a strategic concept and design for a dynamic research planning system, which consists of a Planning Network for Health Research (Planet HERES) and Intelligent Research Networks (IRENEs), making optimal use of the available and evolving information and communication technologies. The role of WHO is seen as "facilitator" of a process that belongs to all.

(d) Regarding public/private partnerships

- the private sector is explicitly mentioned as a necessary partner in the IRENEs.

Section 3

Recommendations of the International Conference on Health Research for Development (Bangkok, 2000)

The recommendations of the Bangkok Declaration and the Bangkok Action Plan in the field of health research governance are summarized in Insert 3.3.

[10] Advisory Committee on Health Research, ***A Research Policy Agenda for Science and Technology to Support Global Health Development, A Synopsis***, WHO, December 1997.

Insert 3.3

Health research governance: Recommendations of the 2000 Bangkok Conference

Level	Recommendations
1. National	*Knowledge production* • assessment of research quality • dissemination of knowledge • involvement of all stakeholders • build capacity for information and communications (IC) technologies • conduct research synthesis • support national burden of disease (BoD) studies • develop research policies and priorities • promote multidisciplinary research. *Capacity development* • management training programmes • viable research careers • include all stakeholders. *Governance* • take stock of current status of national health research system • strengthen national governance structures • involve all stakeholders in a National Health Research Forum. *Public-private partnerships* • foster public-private partnerships. *Financing (national level)* • allocation of 2% of national health budgets and 5% of the health projects financed by foreign aid • establish a Central Planning Unit (with government, donors and NGO representatives) to monitor funding for health research to ensure it is aligned with national priorities • negotiate with donors long-term funding of health research.
2. Regional	*Knowledge production* • identify gaps in knowledge; establish regional clearing houses for projects, funding, best practices and networks for data exchange; develop regional organizations to promote health research; enhance existing regional mechanisms; promote South/North and South/South collaboration in priority research areas (TB, malaria, road traffic injuries, traditional medicine); promote publication of regional research journals. *Capacity development* • study and develop existing models of regional collaboration regarding research capacity development • promote political commitment • map centres of excellence for regional capacity development. *Governance* • mapping of regional capacity building networks • develop appropriate governance • establish regional Health Research Forums • regional structures should be based on country needs. *Public-private partnerships* • foster public-private partnerships. *Financing* • urge regional organizations to reserve a percentage of their funds for health research • regional priorities should be based on country priorities and determined by burden of disease, social and economic determinants, gender and social equity • establish database to identify resource needs, track results and leverage resources.
3. Global	*Knowledge production* • strengthen role of universities; foster public-private partnerships. *Capacity development* • funding agencies to integrate capacity development in each project • develop guidelines and tools • develop access to literature/database • develop strategic partnerships. *Governance* • establish a Working Party with WHO, COHRED, Global Forum, regional networks, national and international research institutions, private sector and donors (hosted by WHO) to address concrete global partnership issues (developing norms, IPRs, code of conduct for N/S health research cooperation; results to be discussed at the next global conference (2004). *Public-private partnerships* • foster public-private partnerships. *Financing* • generate funds for health research (debt for health research, travel tax) • urge international agencies to reserve a percentage of funding for health research in the South • stimulate public-private partnerships • develop tools for the monitoring of resource flows for research.

Section 4

Efforts since the Bangkok Conference

Since the Bangkok Conference in October 2000, there has been a considerable response to the need to improve the governance of health research, at the global, regional and country levels. Some examples are given below.

1. At the global level[11]

The Bangkok Conference recommended that an international working party be established to address concrete global partnership issues (for example: development of norms, intellectual property rights (IPR) issues, code of conduct for North/South health research cooperation) and that the results be discussed at the next global conference (scheduled for 2004). It was recommended that the working party include the four co-sponsors of the 2000 Bangkok Conference (WHO, World Bank, COHRED and the Global Forum), bilateral and multilateral aid agencies, global and regional networks, national and international research institutions, the private sector and donors.

At a meeting held during Forum 5, it was decided that an interim working party (IWP) be created from the existing nucleus of interested institutions. Proposals for the activities of the IWP included the following:

- examine governance issues in the field of health research;
- serve as a platform for ensuring communication, networking and feedback;
- suggest follow-up actions in response to the recommendations made in the pre-Bangkok meetings and in the Bangkok Action Plan;
- respond to the current challenges; for example, follow up on the recommendations of the Commission on Macroeconomics and Health;
- begin the planning process for the World Health Research Assembly planned for 2004 in Mexico.

As mentioned in the Bangkok Action Plan, the IWP secretariat is hosted by WHO.

2. At the regional level: the planned African Health Research Forum[12]

One of the key recommendations of the African consultation that preceded the Bangkok Conference was the establishment of an African Health Research Forum. The idea was pursued at the Bangkok Conference and became part of the Bangkok Plan of Action. As a result, a Steering Committee was constituted and held its first meeting in Arusha, Tanzania in December 2001. The main characteristics of the planned African Health Research Forum include the following:

(a) Overall goals

- promotion of health research development in Africa
- strengthening the African voice in setting and implementing the overall research agenda.

[11] Marian Jacobs, University of Cape Town. "The Future of Health Research Collaboration, Strategies and Actions Post-Bangkok", Paper presented at Forum 5, October 2001.

[12] Paper presented by Mutuma Mugambi at COHRED Board Meeting, December 2001.

(b) Functions and strategies

To reach these goals, the Steering Committee identified the following functions and strategies:

- articulation of the African voice on health research
- development of a health research policy framework for accelerated research development
- strengthening of health research networking in the region (creating mechanisms for strengthening the conduct, collaboration and coordination of health research in Africa)
- provision of technical support to countries
- conduct of analytical work to support health research development
- promotion of effective collaboration with partners
- promotion of adherence to and funding of local priorities
- enhancing effective health research communication
- promotion of ethics in health research on the continent
- development of health research leadership
- promotion of the utilization of health research for development
- reduction of the current inter-country and global imbalances in health research.

(c) Activities

Under the strategies mentioned above, the Steering Committee recommended the following three sets of activities:

- Analytical work: study of regional health research networks; analysis of South/South collaboration; study of North/South collaboration; documentation of existing national health research mechanisms.
- Flagship projects: establishment of a clearinghouse; situation analysis of ethical clearance systems; leadership development in health research and capacity retention.
- Communication and advocacy programme directed at target audiences: national stakeholders, regional political and economic organizations, civil society groups, international organizations and partners.

(d) Organizational arrangements

The Steering Committee nominated an Executive Committee comprising a Chairperson (Raphael Owor), a Vice-Chairperson (Martyn Sama), Secretaries (Mutuma Mugambi and N'Diaye Absatou Soumare) and five sub-regional representatives (Taiwo Adewole, Nigeria; Ahmed Elhassan, Sudan; Romilla Maharaj, South Africa; Andrew Kitua, Tanzania; Martinho Dgedge, Mozambique; to be identified, Central Africa).

The Secretariat of the Steering Committee will be undertaken by Mutuma Mugambi, assisted by N'Diaye Absatou Soumare (francophone Africa). It is foreseen that the African ENHR Network will operate as part of the African Health Research Forum.

A follow-up meeting of the Steering Committee is scheduled for the first week of July 2002 in Bamako. The launch of the African Health Research Forum is proposed to coincide with Forum 6, the sixth Annual Meeting of the Global Forum for Health Research, in Arusha on 12-15 November 2002.

3. At the regional level: the planned Asian and Pacific Health Research Forum[13]

(a) Background

The first meeting of the Asian and Pacific Health Research Forum took place in Manila in February 2000, in preparation for the Bangkok Conference, where further discussions took place among the regional representatives. The last meeting took place in Bali on 13-15 November 2001, with the following objectives:

[13] Paper presented by Chitr Sitthi-Amorn at COHRED Board Meeting, December 2001.

- to review the experiences and lessons learnt from the ENHR movement in the light of the Action Plan adopted in the Bangkok Conference
- to examine the evolving framework of the national health research system
- to interact with global development agencies about ways to assess national health research systems
- to define the next steps to be undertaken by the Asian and Pacific Health Research Forum.

The Bali meeting endorsed the need for a regional forum where countries in the region can plan strategies to move forward the notion of health research systems for the effective promotion of health in the region.

(b) Roles of the planned Asian and Pacific Forum
The possible roles of the planned Forum were identified as follows:

- to serve as a platform for exchange of ideas and strategies to give a bigger voice to countries in Asia and the Pacific Islands (this platform must: stress the flexibility of interaction without a rigid structure; be inclusive and ensure continuity of dialogue within and between constituencies in the Asian and Pacific region; and keep up with developments in other parts of the world);
- to address regional challenges;
- to set priorities to tackle the regional challenges, in particular through the strengthening of health research systems, rather than through projects and programmes;
- to share experiences and promote learning;
- to facilitate the mobilization of resources for regional and national efforts;
- to promote advocacy targeted to national governments, donors and international organizations;
- to link the sub-regions in the Asian and Pacific continent
- to enhance research capacity development in the fields of technical capacity, resource management and the management of health research systems (in order to decrease the amount of "research which is not used" and better answer the "research needs which are not researched").

(c) Organizational arrangements
Indonesia is serving as the interim focal point for the Asian and Pacific Health Research Forum. In the coming months, the focal point will recruit about 10-15 members who will serve on the Steering Committee. Efforts will then be undertaken to develop a process to clarify constituencies, to develop plans for resource mobilization and to promote effective national health research systems, finding a balance between constructive process and evidence-based actions.

4. At the regional level: Latin and Central America

Numerous regional meetings were held in Latin and Central America in 2001 and are planned for 2002 on issues including mechanisms for regional collaboration, the functioning of national health research systems and the setting of health research priorities at the regional level.

5. At the country level

(a) *The case of the Tanzanian National Forum for Health Research*
The Tanzanian National Forum for Health Research was launched by the Minister of Health in February 1999. It is composed of 20 member institutions including the ministries of health, children, education and community development and women's affairs. Its specific objectives are to:

- promote and support health research in Tanzania
- develop and periodically revise essential national health priorities
- approve the work of the National Health Research Coordinating Committee and the

National Health Research Ethics Committee
- develop and update guidelines for the conduct of scientifically and ethically sound research in Tanzania
- promote the establishment of networking and coordination of funds for health research
- provide guidelines for partnership in health research
- promote and enhance the use of health research results for planning, policy and decision-making.

As a result, the Tanzanian National Health Research Forum has been a major instrument for the definition of national health research priorities, the coordination of research, the dissemination of research results and the translation of research findings into practice.

(b) The ENHR network

A number of other countries have made significant efforts to develop mechanisms of collaboration within their health research systems at the national level and to link them with actions in sectors other than health which have an important impact on health. In many cases, these efforts have been supported by COHRED and its network of partners. A summary of the activities undertaken by COHRED in this respect is presented in Chapter 4.

(c) Assessment of the National Health Research Systems Performance

Under the leadership of WHO, major efforts are under way to assess the performance of national health research systems. The results of this initiative will be the main theme of the 2004 ***World Health Report***. The study will be an important tool for each country to evaluate the strengths and weaknesses of its own health research system and to design the next steps in research capacity strengthening. This underlines the importance of the 2004 ***World Health Report*** and of this joint effort between the countries and their international partners, given the fact that research capacity strengthening at the country level has been considered as the cornerstone for improving the effectiveness of health research for the poorer populations.

Section 5

Preliminary conclusions and perspectives

- For a number of reasons (magnitude of the problems to be solved, efficiency, interdisciplinarity, global public goods), partnerships are needed to help solve the major health research problems ahead.
- Partnerships can be considered as the building blocks of the overall health research governance system, as each partnership can bring its contribution to a better allocation of the resources invested in health research.

- However, partnerships can also be expensive in terms of the time invested by each partner and it is justified to apply the principles of benefit-cost analysis to partnerships. In the view of the Global Forum, with good management, the benefit-cost ratio of partnerships may be very high and the effectiveness of the partnership be a multiple of the sum of each institution's efforts.
- But building a partnership is a difficult undertaking which requires much time and effort. One of the reasons, besides the human element, is that there is an incentive for people to be supportive of their own institution and not of the partnerships, even if the partnership can be a win/win venture for each participating institution.
- Some very important efforts have been undertaken in launching new partnerships and collaborative forums in the past decade and, in particular, since the 2000 Bangkok Conference.
- The respective roles to be played at the national and regional levels regarding research governance and partnerships have been summarized in the following way by the representatives of the planned African Health Research Forum: "While it is not debatable that countries should be the focus of health research development, it needs to be noted that, to develop effective national health research systems, a broader perspective of health research beyond national borders is essential."[14]
- Along the same lines, it is also important that regional efforts have the opportunity to share experiences periodically in meetings at the global level. But in linking the efforts at the national, regional and global levels, the principle of subsidiarity should be applied, i.e. the regional level should only undertake what cannot be done at the country level and the global level should concentrate on issues which go beyond the regional level.
- In this sense, overall health research governance could be the result of a bottom-up approach starting at the national level and relayed by the regional efforts. With the thousands of sovereign and autonomous institutions involved, the efforts could focus on a set of collaborative principles which could contribute much to the allocation of health research funds to priority public health needs.

[14] Mutuma Mugambi, Kenya Methodist University. "National and Regional Efforts in Priority-Setting: African Health Research Forum", Paper presented at Forum 5, October 2001.

Chapter 4

Progress in priority-setting methodologies

For a summary of this chapter, see the Executive Summary, page xvi.

Section 1

About priority setting

1. Why priority setting?

Priority setting is as critical as conducting the research itself. Funding for research is limited and a rational priority-setting process is therefore required. This should be based on sound methods, scientific process and in-built mechanisms to facilitate subsequent utilization of findings.

2. Deficiencies in priority setting

There is no simple way to set priorities. However, failure to establish a process for priority setting has led to a situation in which only about 10% of health research funds from public and private sources are devoted to 90% of the world's health problems (measured in DALYs).[1] This extreme imbalance in research funding has a heavy economic and social cost. To make matters worse, even the 10% of funds allocated to the 90% of the world's health problems are not used as effectively as possible, as health problems are often not prioritized using a defined methodology.

Reasons for this imbalance in health research funding include the following:

(a) In the public sector

- Over 90% of research funds are in the hands of a small number of countries (see Chapter 6) which, understandably, have given priority to their own health research needs.
- Decision-makers are often unaware of the magnitude of the problems outside their own national borders. In particular, they are unaware of the impact on their own country of the health situation in the rest of the world both directly (rapid growth in travel, re-emerging diseases, development of antimicrobial resistance) and indirectly (lower economic growth, migration).
- The decision-making process is influenced by factors including the personal preferences of influential scientists or decision-makers, competition between institutions, donor preferences, career path ambitions and tradition.
- There is insufficient understanding of the role the public sector could play in supporting the private sector in the discovery and development of drugs for 'orphan' diseases.

(b) In the private sector

- Decision-makers in the private sector are responsible for the survival and success of their enterprise and for the satisfaction of their shareholders.
- Their decisions are based largely on profit perspectives which inevitably limit investment in diseases prevalent in low- and middle-income countries, as market potential is often limited or underestimated.

[1] Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, April 2000.

Section 2

Approaches to priority setting: an overview

Research into methodologies to help set priorities in health research is a recent development which can be traced back to the 1990 Commission on Health Research for Development.[2] Since the Commission's recommendations, there has been substantial progress in the development and testing of priority-setting methods.

It is important to differentiate between the process of priority selection and the *tools* used for that purpose. The process is the mechanism by which constituencies are involved and decide upon research priorities. The tools are the instruments which facilitate the collection, processing and presentation of the information needed for reaching a decision on priorities on a scientific basis. Tools can be used in a variety of circumstances to ensure that the information collected will lead to a set of priorities for the country or community in which the process took place.

Insert 4.1 summarizes the characteristics of the major priority-setting approaches for health research which have emerged since the Commission's report.[3] Sections 3, 4 and 5 will review in greater detail recent progress in the respective methods.

Section 3

Recent progress in Essential National Health Research

1. Principles and essentials

In 1990, the Commission on Health Research for Development[4] proposed a set of strategies through which the potential of research could be harnessed to accelerate health improvements and to overcome health inequities throughout the world, summarized as Essential National Health Research

[2] Commission on Health Research for Development, ***Health Research, Essential Link to Equity in Development***, 1990.

[3] Global Forum for Health Research: ***The 10/90 Report on Health Research 2000*** (pages 34-35).

[4] Commission on Health Research for Development, ***Health Research, Essential Link to Equity in Development,*** 1990.

(ENHR). ENHR encompasses two research approaches: (i) research on country-specific health problems and (ii) contributions to regional and global health research. The Commission recommended that each country should adopt the principles of ENHR as a strategy for planning, prioritizing and managing national health research.

The goal of ENHR is health development on the basis of social justice and equity. The content is the full range of biomedical and clinical research, as well as epidemiological, social and economic studies. The mode of operation is inclusiveness, involving all stakeholders, including research scientists, policy-makers, programme managers and representatives of civil society.

Since its creation in 1993, the Council on Health Research for Development (COHRED) has focused its efforts on facilitating the implementation of the ENHR strategy in low- and middle-income countries. In doing so, it has gained much experience and evolved within a global environment that has been, and continues to be, in a state of rapid change. Many of these changes were reflected in two major events that took place in October 2000 and were of special significance for COHRED:[5]

(a) The first meeting of COHRED Constituents (October 2000)

The Constituents' meeting was attended by representatives from some 40 countries. The meeting confirmed the continuing relevance of ENHR and identified four roles for COHRED in support of the strategy:

- as advocate for the ENHR strategy
- as broker, assisting countries with links to donors, agencies, private-sector groups and global networks
- as learning community
- as "collegium", bringing together colleagues to encourage and support each other in implementing the ENHR spirit.

(b) The International Conference on Health Research for Development (October 2000)

The International Conference, jointly organized by WHO, the World Bank, Global Forum for Health Research and COHRED, stressed the importance of building effective national health research systems, and identified the primary functions of such systems as:

- knowledge production, management and use
- stewardship
- financing
- capacity development.

In the light of these discussions, the COHRED Board confirmed, in November 2000, that the organization's major role is to provide support to countries. In particular, while continuing to foster the promotion of ENHR as a general strategy, this support should aim at the development of effective national health research systems, with due attention to the functions specified by the International Conference.

2. Country-level support

(a) Criteria for setting priorities

The ENHR strategy seeks the inclusion of a wide range of partners to identify research priorities at the country level. In the documents reviewed and in the national ENHR priority-setting exercises undertaken in a number of countries, the following criteria appear most often for the selection of priority research areas:

- Demand-driven process by four major stakeholders at the country level: (i)

[5] Sylvia Dehaan. Paper prepared on COHRED's activities, December 2001.

Insert 4.1

Comparison of various priority-setting approaches

Characteristics	Essential National Health Research Approach	Ad Hoc Committee on Health Research Approach	Advisory Committee on Health Research Approach	Global Forum Combined Approach Matrix
1. Objective of priority setting	Promote health and development on the basis of equity. Help decision-makers make rational choices in investment decisions.	Help decision-makers make rational choices in investment decisions so as to have the greatest reduction in the burden of disease for a given investment (as measured by number of DALYs averted).	Address problems of critical significance for global health: population dynamics, urbanization, environment, shortages of food and water, new and re-emerging infectious diseases.	Help decision-makers make rational choices in investment decisions so as to have the greatest reduction in the burden of disease for a given investment (as measured by number of DALYs averted), on the basis of the practical framework for priority setting in health research (matrix presented in Insert 4.8).
2. Focus at the global or national level?	Focus on situation analysis at country level; residual problems to be studied at global level.	Focus on situation analysis at the global level; method also applicable at the country level.	Priority to "significant" and "global" problems, requiring "imperative" attention.	Method applicable at both global and national level.
3. Strategies/ principles	Priorities set by all stakeholders. Process for priority setting should be iterative and transparent. Approach should be multidisciplinary.	Five- step process. Process should be transparent.	Priorities should be set by all stakeholders. Process should be transparent and comparative. Multidisciplinary approach.	Priorities should be set by all stakeholders. Transparent and iterative process. Approach should be multidisciplinary (biomedical sciences, public health, economics, environmental sciences, education sciences, social and behavioural sciences).
4. Criteria for priority setting				
Burden of disease	Based on an estimate of severity and prevalence of disease.	Measured by DALYs (number of years of healthy life lost to each disease).	Allocate resources to the problems deemed of "greatest global burden".	Measured by DALYs (number of years of healthy life lost to each disease) or other appropriate indicators.
Analysis of determinants of disease burden	Analysis of multidisciplinary determinants (biomedical, economic, social, behavioural, etc.).	Analysis of mostly biomedical determinants. Other determinants implicit.	Analysis of multidisciplinary determinants (biomedical, economic, social, behavioural, etc.).	Analysis of determinants at following intervention levels: – individual/family/ community – health ministry and research institutions – sectors other than health – government macro-economic policies.
Cost-effectiveness of interventions (resulting from planned research)	Some attempts at measurement in terms of impact on severity and/or prevalence.	Cost-effectiveness measured in terms of DALYs saved for a given cost.	Implicit reference to cost-effectiveness analysis.	Cost-effectiveness measured in terms of DALYs saved for a given cost.

Insert 4.1

Comparison of various priority-setting approaches (continued)

Characteristics	Essential National Health Research Approach	Ad Hoc Committee on Health Research Approach	Advisory Committee on Health Research Approach	Global Forum Combined Approach Matrix
4. Criteria for priority setting (continued)				
Effect on equity and social justice	Central criterion in ENHR approach (not directly measured).	Inbuilt equity orientation, based on same weights given to year of healthy life saved for poor and rich population (effect on equity not directly measured as yet).	A number of indicators in the VHIP draw attention to the situation of the poorer segments of the population.	Inbuilt equity orientation, based on same weights given to year of healthy life saved for poor and rich population (effect on equity not directly measured as yet).
Ethical, political, social, cultural acceptability	This criterion is present, although in varying degrees, in various approaches, either explicitly (particularly in the ENHR approach) or implicitly.			
Probability of finding a solution	Specifically mentioned in the ENHR approach.	Part of the cost-effectiveness analysis (step 4).	Implicit.	Part of the cost-effectiveness analysis.
Scientific quality of research proposed	Pre-condition in all approaches.			
Feasibility (availability of human resources, funding, facilities)	Specifically mentioned in the ENHR approach.	Implicit.	Implicit.	Feasibility is part of the list of criteria.
Contribution to capacity strengthening	Explicitly mentioned in the ENHR approach.	Not mentioned. Could be integrated in the cost-effectiveness analysis.	Not mentioned. Could be integrated.	Can be integrated in the cost-effectiveness analysis.
5. Critical problems and priority research areas	Will depend on each country's situation.	Infectious diseases, malnutrition and poor maternal/child health. New and re-emerging infectious diseases due to antimicrobial resistance (TB, STD, HIV/AIDS, malaria). Increase in NCD and injuries. Inequities and inefficiencies in delivery of health services.	Infectious diseases: TB, vaccine-preventable childhood diseases, STD, HIV/AIDS, tropical diseases, maternal and child health. Noncommunicable diseases: cardiovascular diseases, diabetes, cancer, injuries, mental disorders, substance abuse. Health policies and health systems. Environment, nutrition, behaviour.	Health system research (efficiency and equity of health systems). Child health and nutrition (diarrhoea, pneumonia, HIV, malaria, vaccine-preventable diseases, nutritional deficiencies, TB). Maternal and reproductive health (mortality, STDs and HIV, nutrition, family planning). Noncommunicable diseases (cardiovascular, mental and neurological conditions). Injuries.
6. Implementation tools	Essential national health research plans.	Forum for investors in international health research. National agendas. Public/private collaboration.	Under preparation.	Analytical work for priority setting. Research networks (initiatives) for priority diseases. Annual meeting of partners to help correct the 10/90 gap.

researchers, (ii) decision-makers at different levels, (iii) health service providers, (iv) communities.
- Economic impact, including both the severity of the problem (urgency, seriousness, degree of incapacitation) and the magnitude/prevalence of the problem (number of persons affected).
- Effect on equity and social justice.
- Ethical/political/social/cultural acceptability.
- Feasibility of the research: probability of finding a solution.
- Avoidance of duplication.
- Contribution to capacity strengthening.

Not all these criteria have been systematically applied in ENHR priority-setting exercises in all countries. However, basic criteria such as economic impact, the effect on equity, and acceptability are present in most cases.

(b) Progress in the support given by COHRED to country activities are listed in Insert 4.2

3. Regional and sub-regional cooperation

Developing regional mechanisms as optimal intermediaries between the global and country level has become important for more focused country-level support. COHRED's support for regional and subregional networks plays a crucial role as a catalyst in steering effective health research operations at country levels within regions. Selected regional Health Research Forums have been described in Chapter 3 (the planned African Health Research Forum and Asian and Pacific Health Research Forum). The following are examples of recent progress on regional consultation:

Eastern Mediterranean/Middle East

An informal regional consultation for the Eastern Mediterranean/Middle East region was held in Tehran, Iran, to focus on the ENHR competencies for priority setting, research into action, and capacity development. The regional network will facilitate sharing of information on various aspects of national health research systems; organize the training, planning and implementation of joint projects; convene periodic meetings of focal points; and promote the establishment of national networks.

The network meeting of francophone African ENHR

Teams from six French-speaking African countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Guinea and Mali) met in Ouagadougou, Burkina Faso, to discuss national developments, future plans for the implementation of the ENHR strategy and the development of health research in general. The group plans to develop a research profile which will enable the identification of gaps in research studies and available health information.

Insert 4.2

COHRED's recent country-level support

In 2001, COHRED recorded notable achievement in the provision of technical and financial support for the country work on priority setting, coordination networks and research capacity development. An overview of selected country examples includes the following:

Mali: health research priority setting for development of health systems

The first national workshop on health research priority setting in Mali was held in August 2001 and provided a unique opportunity for two major reasons: (i) the relevance of health research in the development of health systems in Mali was recognized for the first time; (ii) a consultative process involving both national and international partners set out

Insert 4.2

COHRED's recent country-level support (continued)

to define the health research priorities based on a set of basic values and principles toward long-term decisions and actions for improving the health of the Malian population.
Based on dialogue at both the regional and sub-regional level, different priorities among health problems were identified. The outcome is a list of priorities which include a wide range of options, from the control of communicable diseases to the need to make health delivery systems more effective and efficient.

Ghana: informed decision-making – a prerequisite for health policy

The Health Research Unit of the Ministry of Health in Ghana conducted a study to address the information and communication needs in health policy decision-making. The objectives of the study were three-fold: (i) to assess the context in which health professionals, health policy-makers and health researchers seek information; (ii) to examine the type of information sources they access; (iii) to establish the factors that influence the use of information resulting from health research. An interesting finding was the paradox between the recognition of the relevance of research information in the decision-making process and the limited or non-use of research as a basis for policy formulation. The reasons reported by different respondents include: lack of relevant research for policy-making; non-availability of research findings and difficulties in accessing data and research findings when available.

Cameroon: the priority-setting process

Cameroon is involved in efforts to set a national health research agenda. Based on the recommendations from a Promotion and Advocacy workshop, which was organized in Yaounde, three working groups were formed to carry out the priority-setting work. The objectives of the study have been spelt out as follows: (i) to identify country-specific health problems, to design and evaluate action programmes for dealing with them and to join international efforts to find new knowledge, methods and technologies for addressing global health problems that are high priority to the country; (ii) to channel resource allocation, as well as donor investment in health, to areas of highest priority in order to meet the needs of the most vulnerable groups of the population (women, children and the poor). Data collection will be implemented in 2002.

Malawi: development of country-level health priorities

Since the establishment of a research unit in the Ministry of Health and Population in Malawi, the Government of Malawi has increasingly become committed to health research. In view of the obstacles to the advancement of health research in Malawi, the research unit organized a three-day workshop aimed at developing a national health research agenda based on the ENHR strategy. Specific objectives were: (i) to identify health research priority areas; (ii) to discuss ways of promoting health research in Malawi; (iii) to build consensus among stakeholders on health research matters. Based on discussions involving a broad range of participants and the use of the priority-setting methodology developed by COHRED, the workshop drew up a provisional list of health research priorities.

Pakistan: preparation for a health research agenda and implementation of ENHR strategy

In 2001, the Pakistan Medical Research Council (PMRC) organized a priority-setting seminar to focus on the role of health research in development and to define the role of the Council in promoting health research for development in the country. The participants included policy- and decision-makers from the ministries of Health and Science and Technology and the Planning Division, researchers and academics and representatives from nongovernmental organizations and the private sector. An important and recurring theme throughout the discussions was the need for capacity development to improve the health research environment in Pakistan. The seminar participants concluded that the priority-setting process needs to be backed up by evidence and national data. The remaining challenge, as pointed out by participants, was the inadequacy, both in terms of the quality and quantity of such information in Pakistan.

Chile: strategic direction towards strengthening national health research

In 2001, the National Council of Research and the Ministry of Health in Chile organized a seminar to address the need for a national health research strategy in the country. The seminar addressed diverse issues ranging from health problems in Chile, which need technical and scientific research, the consensus-building process among different stakeholders such as the Ministry of Health, universities, the private sector and parliament. Among other topics addressed during the seminar was the discussion on available human resources for health research in terms of technical and scientific research capacity in the biomedical sector, clinical medicine, public health and social sciences. The seminar identified the following questions to be addressed in the process of establishing the national health research strategy: (i) the type of national health policy needed for the formation of human resources for health research in Chile; (ii) the kind of funding policy guidelines to be adopted for national health research; (iii) the type of health research policies needed to reduce inequity in health.

Section 4

Recent progress in the 'five-step process for priority setting' (the approach of the Ad Hoc Committee on Health Research)

In its 1996 report, the Ad Hoc Committee presented the five-step process (Insert 4.3), a tool to be used by policy-makers to help make more rational and transparent decisions.[6]

The five-step process was a response to the key issue of how to allocate limited resources efficiently and effectively between a large number of possible research projects so as to have the largest possible impact on the health of the largest possible number of people.

The objective of this section is to review the recent progress in each of the five steps advocated by the Ad Hoc Committee for priority setting.

1. Magnitude of the disease burden (Step 1): recent developments and challenges

(a) Developments

Disease burden is an important measure of the degree of morbidity and mortality in a given population. This measure uses evidence-based information to provide a quantitative measurement of health status and relies on information from public health branches of quantitative disciplines, including epidemiology and demography.

Summary measures of population health are measures that combine information on mortality and non-fatal health outcomes to represent the health of a particular population as a single number. One of these types of summary measure, disability-adjusted life years (DALYs), has been used in the Global Burden of Disease Study[7] and since, in a number of national burden of disease studies. The DALY is a health gap measure. One DALY can be thought of as one year of healthy life lost and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability.

Other summary measures which have been developed to assess ways of measuring the benefits of implementing specific interventions include the QALYs (quality-adjusted life years), changes over time in HEALYs (healthy life years), DALYs as DALE (disability-adjusted life expectancy) and HALE (health-adjusted life expectancy). The QALYs differ from the DALYs in that QALY is a period of time adjusted using a ***quality weighting***, and may be used to measure an observed stream of life years (say, in a population or after an intervention). Conversely, the DALY involves calculation of lost years of healthy life for a population measured against a normative standard for years of good health that people could expect to have in an ideal case. The health state valuations used in HALE

[6] Ad Hoc Committee on Health Research, *Investing in Health Research and Development*, WHO, September 1996.

[7] C.J. Murray & A. Lopez. *Global Burden of Diseases and Injuries*. Volume 1, WHO, 1996.

Insert 4.3

The five-step process proposed by the Ad Hoc Committee on Health Research (1996)

Step 1 Magnitude (disease burden)
Measure the disease burden as years of healthy life lost due to premature mortality, morbidity or disability. Summary measures, such as the DALY (disability-adjusted life year), can be used to measure the magnitude (but other methods can be used as well).

Step 2 Determinants (risk factors)
Analyse the factors (determinants) responsible for the persistence of the burden, such as lack of knowledge about the condition, lack of tools, failure to use existing tools, or factors outside the health domain.

Step 3 Knowledge
Assess the current knowledge base to solve the health problem and evaluate the applicability of solutions, including the cost and effectiveness of existing interventions.

Step 4 Cost-effectiveness
Assess the promise of the R&D effort and examine if future research developments would reduce costs, thus allowing interventions to be applied to wider population segments.

Step 5 Resources
Calculate the present level of investment into research for specific diseases and/or determinants (see Chapter 6).

calculations represent average population assessments of the overall health levels associated with different states.

Summary measures have specific potential applications (Insert 4.4).

The World Health Organization is currently undertaking a Global Burden of Disease (GBD) project for the year 2000 (Insert 4.5). The GBD attempts to assemble a vast body of epidemiological estimates of diseases, injuries and risk factors, and uses DALYs as a summary measure. The primary objective of the GBD is the development of comparable, valid and reliable epidemiological information on a wide range of diseases, injuries and risk factors.

(b) Challenges and further research

(i) Contextual measurement

While there is good progress in the establishment of burden of disease measurement in countries, there has been a relative lag in evaluating how social, cultural and environmental factors affect the severity of a disease in different contexts. This failure to take account of contextual considerations has important implications, as a study funded by the Global Forum has highlighted.[8] Using

[8] Daniel Reidpath, Deakin University, Australia. Paper presented at Forum 5, October 2001.

Insert 4.4
Potential application of summary measures

- Comparing the health of one population to the health of another population
- Comparing the health of the same population over time
- Identifying and quantifying overall health inequalities within populations
- Measuring the effects of non-fatal health outcomes on overall population health
- Informing debates on priorities for health service delivery and planning
- Informing debates on priorities for research and development in the health sector
- Improving professional training curricula in public health
- Analysing the benefits of health interventions for use in cost-effectiveness analyses.

qualitative and quantitative techniques, the study examined the impact of two health conditions (epilepsy and paraplegia) on people living in different contexts. The contexts were varied by country (Australia and Cameroon) and by environment (urban and rural); the effects of gender and socioeconomic status were also examined. Participants completed a variety of tests and interviews.

Both qualitative and quantitative tools revealed that people with paraplegia in Australia were substantially better off than people in Cameroon. The lack of infrastructure in Cameroon in general and in the rural areas in particular made coping with paraplegia extremely difficult. Indeed, in Cameroon paraplegia is generally regarded as a terminal condition. Facilities in Australia made it easier to cope with this condition. In addition, it was evident that participants who were financially better off could buy the equipment and services they required to improve their quality of life.

The study underlined the importance of distinguishing summary measurement of health (using measures such as DALYs which attempt to quantify average levels of health in the population) from measurement of broader quality of life or well-being. Ignoring the context in which health conditions occur may reinforce existing inequalities in health.

(ii) Co-morbidity

Co-morbidity deals with the quantification of the effect of more than one disease or condition affecting the same individual. The GBD 1990 used an additive model in which, for the same individual, the average time spent in two different health states were combined. The GBD 2000 work being undertaken at WHO is examining co-morbidity in more detail, particularly for mental disorders.

(iii) Measuring the impact of a health problem on third parties

A condition affecting one individual can also affect others. An example of this would be a relative or close contact of an alcoholic or a violent drug addict. While the measurement of disease burden would estimate the impact of alcohol or drugs on morbidity, disability and mortality, it would not estimate the effect

Insert 4.5
The Global Burden of Disease 2000 Project

The World Health Organization is currently undertaking a new global burden of disease assessment for the year 2000 (the so-called GBD 2000 Project).[9] The three goals articulated for the GBD 1990 remain central:

(i) to decouple epidemiological assessment of the magnitude of health problems from advocacy by interest groups of particular health policies or interventions
(ii) to include in international health policy debates information on non-fatal health outcomes along with information on mortality
(iii) to undertake the quantification of health problems in time-based units that can also be used in economic appraisal.

The specific objectives for GBD 2000 are similar to the original objectives:

- to develop internally consistent estimates of mortality from 135 major causes of death, disaggregated by age and sex, for the world and major geographic regions
- to develop internally consistent estimates of the incidence, prevalence, duration and case-fatality for over 500 sequelae resulting from the above causes
- to describe and value the health states associated with these sequelae of diseases and injuries
- to quantify the burden of premature mortality and disability by age, sex and region for 135 major causes or groups of causes
- to analyse the contribution to this burden of major physiological, behavioural and social risk factors by age, sex and region (see below under 'research into determinants')
- to develop alternative projection scenarios of mortality and non-fatal health outcomes over the next 30 years, disaggregated by cause, age, sex and region.

The GBD 2000 aims to produce the best possible evidence-based description of health, the causes of lost health and likely future trends in health. To the extent possible, the GBD 2000 aims to utilize and synthesize within a consistent and comprehensive framework all relevant epidemiological evidence on population demography and health for the various regions of the world. Where the evidence is uncertain or incomplete, the GBD 2000 attempts to make the best possible inferences based on the knowledge base that is available, and to assess the uncertainty in the resulting estimates.

on third parties through events such as stress, time investment, financial implications, violence or accidents at home.

In this case, alcohol consumption or drug abuse by others is a risk factor for disease burden and, in principle, could be taken into account in the estimation of the attributable burden for certain risks and exposures. The GBD 2000 is assessing the burden attributable to around 20 major risk factors in an attempt to deal with this problem (see point 2 below).

(c) Conclusions and future steps

Over the past decade, information on the global burden of disease has had a powerful influence on policy-makers and proved to be an effective tool for advocacy. The work has

[9] Global Programme on Evidence for Health Policy Discussion Paper No. 36, WHO, November 2001.

informed a large number of national and global initiatives and the accounting of healthy life years lost as a consequence of morbidity and mortality has led to a renewed interest in a wide range of conditions.

The challenge now is to continue promoting and improving these methods as a quantitative tool, and to use the information to guide research priorities and funding allocation. Continued work is needed to improve the usefulness of these summary measures, in particular with respect to contextual measurement, co-morbidity and measuring the impact of ill health on third parties. Ignoring this context may reinforce already existing inequalities in health.

2. Research into determinants (Step 2): recent developments and challenges

Research into determinants can identify interventions to prevent disease or premature death. For example, reducing malnutrition in a given population is likely to have a large impact on a variety of diseases. In some cases, determinants may not only be relevant to prevent disease but also be part of its treatment, as is the case of reducing salt intake for high blood pressure.

(a) Comparative risk assessment

The comparative risk assessment (CRA) module of the GBD study is a systematic evaluation of the changes in population health which result from modifying the population distribution of exposure to a specific risk factor or a group of risk factors. CRA is distinct from intervention analysis which seeks to estimate the benefits of a given intervention or group of interventions in a specific population at a particular time.

(i) Objective of CRA

The aim of CRA is to produce:

- a "meta-level" analysis which demonstrates the contribution of each risk factor or group of risk factors to disease burden, relative to other risk factors;
- a mapping of alternative population health scenarios with changes in distribution of exposure to risk factors over time.

While intervention analysis is a valuable input to cost-effectiveness studies, CRA can provide guidance for research and policies designed to lower disease burden by changing population exposure to risk factors. CRA can provide information on the magnitude of the burden associated with risk factor(s), the expected magnitude of burden avoidable as a result of modifying exposure distribution, and the distribution of both exposure and burden of disease in the population, all relative to other risk factors.

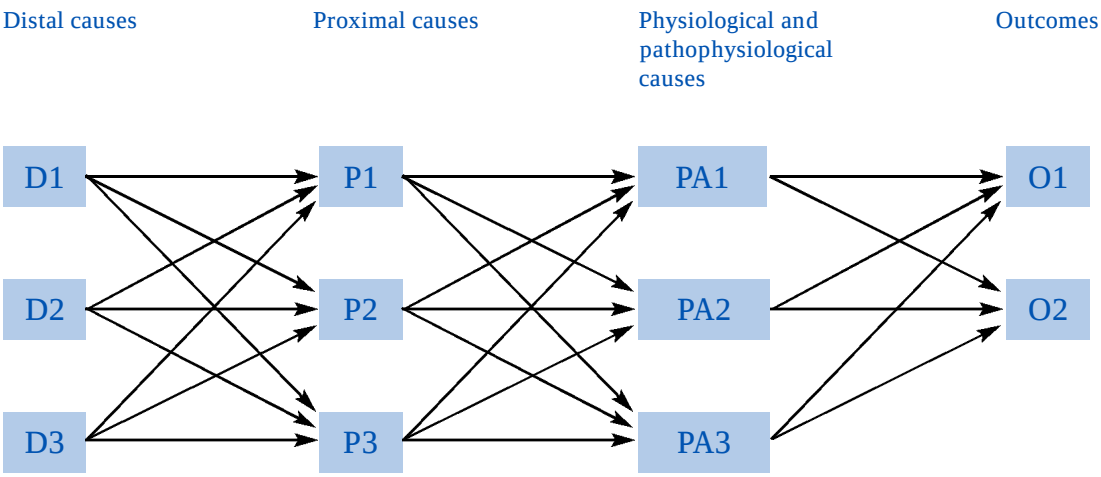
(ii) Addressing some of the shortcomings of CRA

Since past exposure to determinants may lead to current burden of disease, it is not easy to estimate the temporal dimensions at a given point in time. The GBD comparative risk assessment module provides a framework to address some of these challenges as follows:

- The burden of disease and injury is converted into a summary measure of population health which allows comparison between fatal and non-fatal outcomes, also taking into account severity and duration.
- The burden due to the observed exposure distribution in a population is compared with that from a hypothetical distribution or series of distributions (rather than a single reference level such as non-exposed).
- Multiple stages in the causal web of interactions between risk factor(s) and disease outcome are considered (Insert 4.6) to enable analysis of some combinations of risk factor interactions or exposure levels for which epidemiological studies have not been conducted.
- Health loss due to risk factor(s) is calculated as a time-indexed ***stream*** of disease burden

Insert 4.6

A causal web illustrating various levels of disease causality



Insert 4.7

Risk factors included in the comparative risk assessment component of the Global Disease Burden 2000 Study

1. Alcohol
2. Blood pressure
3. Cholesterol
4. Climate change
5. Illicit drugs
6. Indoor smoke from biofuels
7. Lead
8. Childhood and maternal under-nutrition
9. Obesity and overweight
10. Lack of fruit and vegetable intake
11. Selected occupational risks
12. Ambient air pollution
13. Physical inactivity
14. Tobacco
15. Unsafe injection practices in medical settings
16. Unsafe sex and unplanned pregnancies
17. Unsafe water, sanitation and hygiene
18. Non-breastfeeding
19. Childhood sexual abuse
20. Distribution of risk factors by poverty.

due to a time-indexed ***stream*** of exposure. In particular, in introducing the comparative risk assessment framework, Murray and Lopez[10] provide a temporal dimension for the burden of disease due to a risk factor by introducing the concepts of ***attributable burden*** (the reduction in the ***current or future burden*** of disease if the past exposure to a risk factor had been equal to some counterfactual distribution[11]) and ***avoidable burden*** (the reduction in the ***future burden*** of disease if the ***current or future exposure*** to a risk factor were reduced to a counterfactual distribution).

(b) Conclusions and future steps

The expansion of the focus from disease burden to risk factors (determinants) is an important step for future improvements in policies. However, this shift produces other challenges of its own, the main one being the selection of the risk factors to be studied. Insert 4.7 details the selected risk factors to be studied in the GBD 2000.

The GBD 2000 study selected risk factors (determinants) on the basis of the following criteria:

(i) among the leading causes of disease burden
(ii) neither too specific nor too broad
(iii) high likelihood of causality
(iv) reasonably complete data
(v) potentially modifiable.

These characteristics are more likely to fit ***proximal determinants*** in the causal web rather than ***distal determinants***. Poverty is an example of a distal determinant (see Chapter 1, Section 1.2 on the vicious circle of poverty and ill-health). In the GBD 2000 the distribution of risk factors by level of poverty has been attempted and may lead to new approaches to tackle these problems. The challenge now is to expand this analysis and to obtain better estimates of the contribution of risk exposure to disease.

3. Present knowledge and cost-effectiveness analysis of health interventions (step 3): recent developments and challenges

Cost-effectiveness analysis is a useful tool to help policy-makers and programme managers decide between different ways of spending scarce resources to improve population health. It provides information on which interventions are likely to provide the greatest improvements in health for the available resources, a key input to decision-making, together with information on factors such as health inequities.

Cost-effectiveness analysis values "life years" similarly amongst individuals. As a result, a life year gained in a rich country is equivalent to a life year gained in a poor country. Cost-effectiveness analysis can identify whether a new tool or product is likely to lead to larger number of healthy life years gained for a given cost.

The challenges in the coming years are the following:

(a) Little information available from low- and middle-income countries

Cost-effectiveness analysis requires the following information:

- the extent to which current and potential interventions improve population health (i.e. effectiveness or number of healthy life-years gained)
- the resources required to implement the interventions (i.e. costs).

[10] C.J. Murray & A. Lopez. ***Epidemiology*** (1999), vol 10:594-605.

[11] A counterfactual exposure distribution is an alternative distribution scenario other than the current exposure levels. It is used as a standard for comparison to estimate what disease or mortality level would be expected under this alternative scenario.

There is a dearth of information on cost-effectiveness of interventions in low- and middle-income countries. Transfer of findings from high- to low- and middle-income countries is difficult given the extensive differences in infrastructure, costs and capacity.

Economic evaluation has acquired significant prominence among decision-makers, and many ministries of health in low- and middle-income countries have expressed an interest in designing a national package of essential health services using this method. Given the high cost of many economic evaluations in low- and middle-income countries, interest has also been generated in pooling data and the results of previously published studies.

A review of published literature demonstrated that very few economic evaluations of communicable disease interventions in low- and middle-income countries were published during 1984-1997.[12] While increasing over this period of time, there was concern at the lack of a universally accepted outcome measure for comparing cost-effectiveness across health interventions.

(b) Need for comparative data

Why is it necessary to compare a wide variety of health interventions? Policy-makers are concerned with two questions requiring evidence on costs and effects:

- *Do the resources currently devoted to health achieve as much as they could?*
  To answer this question, the costs and effects of all interventions currently employed must be compared with the costs and effects of alternatives. Reallocating resources from inefficient to efficient interventions can increase population health with no change in costs.
- *How best to use additional resources if they become available?*
  This type of analysis is critical for ensuring that, as societies become wealthier, additional resources are well used. But it is pointless to ask this type of question if the current mix of interventions is inefficient. Both questions need to be asked together.

(c) Developing tools for generalized cost-effectiveness analysis

In order to tackle the difficulties stated above, WHO has initiated the WHO-CHOICE project (CHO*sing* I*nterventions that are* C*ost*-Effective). WHO-CHOICE is an *Aid to Policy* which provides information on intervention costs and effects. The aim is to improve health systems performance. Health systems with very similar levels of health expenditure per capita show wide variations in population health outcomes. This is partly explained by variation in non-health system factors, such as the level of education of the population. But it is also due to the fact that some systems devote resources to expensive interventions with little impact on population health, while at the same time low-cost interventions with potentially greater benefits are not fully implemented.

WHO seeks to provide the evidence decision-makers need to set priorities and improve the performance of their health systems. WHO's Global Programme on Evidence for Health Policy has contributed to this question by:

(i) developing tools and methods for generalized cost-effectiveness analysis
(ii) assembling regional databases on the costs, impact on population health and cost-effectiveness of key health interventions.

The CHOICE project is currently assembling regional databases on the cost and effectiveness

[12] D. Walker & J. Fox-Rushby, "Economic evaluation of communicable disease interventions in developing countries: a critical review of the published literature." ***Health Economics***, 2000: 9(8) 681-698.

of approximately 500 preventive, promotive, curative and rehabilitative health interventions using a standardized methodology. Regional databases containing raw data on cost and effect are being developed for analysts from different countries to use and, if required, modify the base assumptions to make them consistent with their own settings. Completed examples of the use of CHOICE will be available from WHO in 2002.

The impact of interventions on population health is vital. But it is also important to determine the role of different interventions in contributing to other socially desirable goals, such as reducing health inequalities. This dimension can be introduced in the cost-effectiveness analysis by attaching higher weights to health benefits accruing to the poorer population of a country.

4. Cost-effectiveness of future interventions (step 4)

The same reasoning and challenges apply to the calculation of the cost-effectiveness of future interventions, although the level of complexity and uncertainty is increased by the fact that, on the cost side, one must estimate the costs of research for the discovery, development and delivery of the intervention and, on the benefit side, one must estimate the likely number of healthy life-years saved by the new intervention.

5. Analysis of resource flows for health research

Developments and challenges under this topic are presented in Chapter 6.

6. Conclusions

The importance of the five-step approach as a tool to help set priorities for health research lies in its ability to relate research on burden of disease and determinants, cost-effectiveness, and financial flows. The method is useful to improve health research financing and can help decide which projects will have the greatest impact on the health of the largest possible number of people. There has been some progress over the last two years in the development and application of the tools. This process has also thrown up new methodological challenges which need further research and the refinement of currently available tools.

Section 5

Progress in the application of the Global Forum Combined Approach Matrix

This section focuses on the Combined Approach Matrix which incorporates the criteria and principles for priority setting defined in the ENHR approach, the Visual Health Information Profile proposed by the Advisory Committee on Health Research, and the five-step process of the Ad Hoc Committee on Health Research. The five steps are linked with the four broad groups of actors and factors determining the health

status of a population to form a proposed matrix for priority setting (Insert 4.8).[13] During 2000-2001, the Combined Approach Matrix has undergone piloting and testing. A summary of progress is presented below.

The information will inevitably be partial in the first exercises, probably even sketchy in some cases, but it will progressively improve and even limited information is sometimes sufficient to indicate promising avenues for research.

1. Overview of the Global Forum Combined Approach Matrix

The Combined Approach Matrix is useful to incorporate and summarize all information obtained through a variety of processes (ENHR, VHIP and the five-step process). Information used in priority-setting exercises conducted at country, regional and global levels can be introduced into the Combined Approach Matrix and thus contribute to priority-setting in this broader context.

A summary of how to make use of the matrix is presented in Insert 4.9. Institutions using this tool can incorporate their specific information into the matrix. The priority research agenda at the global, regional or country level will then be defined for each disease or determinant, and across them. It will comprise those research projects which have the greatest impact in lowering the burden of disease in the country. Although this is a long-term effort, the tool should demonstrate its usefulness at an early stage by highlighting the most important gaps in the information needed to make evidence-based decisions and by enabling some decisions to be made despite the limited availability of information.

Insert 4.8

The Global Forum Combined Approach Matrix to help priority setting for health research

Five Steps in Priority Setting	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
I. What is the burden of the disease/risk factor?				
II. Why does the burden of disease persist? What are the determinants?				
III. What is the present level of knowledge?				
IV. How cost-effective could future interventions be?				
V. What are the resource flows for that disease/risk factor?				

[13] Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, April 2000 (pages 37-41).

2. Experiences with the application of the 'Global Forum Matrix' in the UNDP/ World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)[14]

(a) Context

TDR is an international research programme co-sponsored by the United Nations Development Programme, the World Bank and the World Health Organization. It has been successfully promoting research and research capacity strengthening in low- and middle-income countries for 26 years, and currently receives financial backing from over 20 sources, including bilateral development agencies and private foundations, in addition to the co-sponsors. In 1999, a strategic review was undertaken with the aim of "developing a long-term vision and a strategic plan that would set the overall context for TDR's priorities"[15]. This was in response to major changes in both the internal and external environments.

The strategy emphasizes that TDR remain focused on generation of new knowledge and development of new approaches applicable, acceptable and affordable by low- and middle-income countries to prevent, diagnose, treat and control neglected infectious diseases. The strategy broadens the concept of "products from methods and tools" to "solutions to public health problems", thereby including research into areas such as delivery of effective services, appropriate structure of health systems and policies. The strategy proposes a completely new way of deciding on priorities and sets out to fundamentally restructure the interaction between research and disease control. It also acknowledges that significant research capacity has been developed in low- and middle-income countries over the past 26 years and concludes that the time has come to adjust TDR's research capacity-building approach to capitalize on the research capacity that is now available.

An immediate result was to re-emphasize the importance of the diseases within TDR's management system by creating Disease Research Coordinators (DRCs) from among

Insert 4.9

How to use the Combined Approach Matrix to identify research projects

(i) Define the disease or determinant to be explored.

(ii) Fill in the combined matrix with all the information available and relevant to your location.

(iii) Complete the matrix with information available from other sources.

(iv) Identify research 'boxes' for which information is missing or insufficient.

(v) Discuss in your group which of these identified areas of research should be examined according to your possibilities and comparative advantages.

(vi) Identify research projects which can fill these gaps.

[14] Paul Nunn, Erik Blas, Carlos Morel (TDR). Paper presented at Forum 5. October 2001.

[15] TDR. *Strategy 2000-2005*. TDR/GEN/SP/00.1

the experts on staff or new recruitments. In an early decision, tuberculosis and dengue fever were added to the TDR disease portfolio.

As part of the focus on outputs, TDR classified its expected results into the following categories:

(i) new basic knowledge
(ii) new and improved tools
(iii) new and improved intervention methods
(iv) new and improved policies for large-scale implementation of disease control strategies
(v) partnerships and research capacity building
(vi) provision of technical information, research guidelines and advice.

The challenge then was to establish new links with the control community and to define TDR's priorities in each disease.

(b) The tools

Brought to bear on this problem were the results of several bodies of work. First, the analyses carried out by TDR, WHO and the World Bank between 1993 and 1996 which culminated in the Ad Hoc Committee Report *Investing in Health Research and Development*[16], which in turn owed much to the work of the Commission on Health Research for Development[17]. Second, the analysis of research needs carried out by the Global Tuberculosis Research Initiative of the former Global Tuberculosis Programme (GTB) of WHO[18]. Third was the Global Forum Combined Approach Matrix for setting priorities in health research which came into being as a result of the work carried out since the Commission report in 1990.[19]

(c) The approach

The first step was to ask the Disease Research Coordinators (DRCs), together with disease control experts from within WHO and country programme managers, to analyse rationally and transparently the current situation of control for each disease. They were then asked to analyse the status of research, define research needs and opportunities, apply their knowledge of TDR's competitive advantages and make recommendations for the strategic emphases that TDR should adopt for the next six years. Insert 4.10 provides an example of lymphatic filariasis using the TDR matrix. Areas (v) and (vi) cut across the other areas and other staff were challenged to establish new mechanisms to actively support the priorities in (i) to (iv).

In order to standardize the reports of each DRC and to expand the focus of the process, they were asked to complete the Combined Approach Matrix and a matrix summarizing comparative advantages across each of TDR's expected results areas.

(d) The results: problems and solutions

The Global Forum Combined Approach Matrix was considered ambitious in this first exercise: it not only asked technical questions about the status of the disease and research, but also demanded awareness, knowledge and analysis of the factors determining health at the various levels (from the individual and the family to global macroeconomic policies). Although this was considered a major

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16 Report of the Ad Hoc Committee on Health Research Relating to Future Development Options: ***Investing in Health Research and Development.*** 1996. TDR/Gen/96.1

17 Commission on Health Research for Development. ***Health Research: Essential Link to Equity in Development***. 1990. Oxford University Press, New York, USA.

18 P. Nunn and J. Linkins. 1998. ***The Global Tuberculosis Research Initiative: Research to Make a Difference.*** WHO/TB/98.248.

19 Global Forum for Health Research: ***The 10/90 Report on Health Research 2000,*** April 2000, pages 37-41.

Insert 4.10 Lymphatic filarisis

Strategic emphasis matrix for lymphatic filariasis research (TDR)

	(i) New basic knowledge	(ii) New and improved tools	(iii) New and improved intervention methods	(iv) New and improved policies	(v) Partnerships and capacity building	(vi) Information, guidelines, instruments and advice
Questions	Is current knowledge sufficient to develop new tools, methods, policies, etc?	Are existing tools sufficient?	Are methods for applying existing tools optimal?	Are existing policies and strategies effective? And are they used in control?	Is the current number of partners sufficient? Do they have sufficient capacity to address i-iv?	Are information and guidelines sufficient and accessible to support the R&D agenda?
Answers	No. More information needed, especially on: • Pathogenesis: progression and reversibility of disease manifestations, especially after treatment • *W. Bancrofti* genome	No. Priority needs are as follows: • Current drugs mainly micro-filaricidal, requiring repeated treatment for many years • Macro-filaricide curative treatment: management of hydrocele • Diagnostics for monitoring/ surveillance	No. • Efficacy/ safety of albendazole combinations and exclusion criteria • Diagnostic for Brugia • Morbidity management	Major limitations of the current strategies are: • Uncertainty on key elements in the elimination strategy • Drug delivery strategies need major improvement • Cost-effectiveness and feasible morbidity management strategies need to be developed • Mapping methods to be evaluated and improved	• More researchers required from endemic countries, increasing partnerships in some countries. • No other organizations addressing iii, iv. Some partners for (i), collaboration on (ii).	• Need for major improvement in com-municating results to the end-users. • Information to be more targeted to audience. TDR relies too much on scientific publications.
TDR comparative advantage	• Genome network *Brugia* • Pathogenesis research	• Macrofilaria experience, links with industry, main actor in drug development, link with clinical trial sites	• Extensive experience in Phase IV trials of drugs for lymphatic filariasis and onchocerciasis • Network of researchers	• Principal research agency addressing this • Extensive experience in implementation research • Network of researchers	• TDR PhDs play active role in clinical trials • Focused research capability strengthening in support of R&D activities	• WHO link / prestige • TDR interest / prestige.

advantage, in that it forces the users to think broadly and inclusively, not all DRCs or disease control experts had the relevant skills or knowledge, and some responses could not be answered in a small box.

The following are problems and questions identified during this process for each of the five steps.

Step 1. What is the burden of the disease/risk factor?
To this question we needed to add the distribution and the trend of disease burden. In Chagas disease, for example, the fact that transmission had been interrupted in Uruguay in 1997, Chile in 1999 and most of Brazil by 2000, is of crucial importance to the research directions to be taken in South America. Similarly, on trends, the relative lack of impact of control measures on the disease incidence in Central America and the Andean countries was fundamental to take into account.

Step 2. Why does the burden of disease persist? What are the determinants?
For a programme like TDR, focused on reduction of disease burden, it is essential to first establish what is/are the major control strategy/ies. Only then can the issues surrounding constraints to control be addressed as determinants of the persistent burden.

Step 3. What is the present level of knowledge? What is known about existing interventions? How cost-effective are they?
This step caused the most controversy. The "present level of knowledge" is too vague and impractical a term. As is the question about existing interventions. Most DRCs and disease control experts consulted had major reservations about the primacy of cost-effectiveness as the sole criterion for judgement on a control strategy. Applicability, acceptability and affordability were all considered to be essential qualifications. The real-life effectiveness in the field is also crucially important. Management of the sick child, for example, may be potentially the most important single measure for reducing disease burden, but if drugs are consistently not delivered to health centres, or malaria treatment cannot be obtained by those children who need it, then the theoretical cost-effectiveness counts for little. Thus, the constraints to better performance in the field are an essential part of the analysis for research priorities.

Step 4. How cost-effective could future interventions be?
While the need to estimate the likely cost-effectiveness of a future intervention before embarking on major research is not in dispute, it is fraught with difficulty. This detailed definition is part of the research process and, ideally, the components should be measured in the real world, through at least a pilot research project. Similarly, the affordability and feasibility of likely intervention methods also need to be assessed, ideally in the field.

Step 5. What are the resource flows for research into that disease/risk factor?
The need for such information is clear, although little disease-specific information exists. Collection of disease-specific data would benefit from an agreed common approach. Methods range from the very detailed approach taken by the Wellcome Trust in assessing research efforts in malaria[20], to the rapid method used by the WHO Global Tuberculosis Programme.

(e) Results
Each DRC completed the Combined Approach Matrix after the necessary modifications taking account of the issues described above. The resulting examples for malaria can be seen in Insert 4.11 and for onchocerciasis in Insert 4.12.

[20] PRISM Unit, Wellcome Trust, 1996.

Insert 4.11 Malaria

*Combined Approach Matrix applied by TDR to malaria**

Actors/factors determining the health status Five steps in priority setting**	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
II. Why does the burden still persist? What are the determinants?	1. Ignorance about the nature, presentation and transmission of malaria 1.1. insufficient personal protection against mosquito 1.2. non-compliance with drug treatment 1.3. non-immune exposure to parasite (e.g. immigrant workers, displaced populations, soldiers, travellers) 1.4. inappropriate care-seeking behaviour and practices, e.g. use of traditional healers to treat severe malaria 1.5. poor detection of epidemics 2. Environmental changes leading to higher transmission potential 2.1 bio-environmental consequences of development projects 2.2 antimalarial drug resistance 3. Breakdown of social, economic, environmental infrastructure (economic crises, war, man-made or natural disasters), poverty	1. Problems of service quality (in areas where basic services exist) 1.1. lack of supervision of programme staff 1.2. failure of early diagnosis and disease management 1.3. failure to decentralize responsibility to districts, hospitals 2. Lack of integrated malaria control and treatment services 2.1. lack of treatment facilities 2.2. lack of trained manpower 2.3. lack of resources, including drugs 2.4. unavailability of tools 3. Lack of integrated malaria information systems for control programmes 3.1. lack of timeliness 3.2. over-reliance on quantitative information 3.3. failure to decentralize information systems 3.4. failure of early detection and containment or prevention of malaria epidemics	1. Exposure of unprotected populations with little immunity in high transmission areas (high land, forest, desert-fringe areas) 2. Disregard for bio-environmental consequences of development projects 3. Inappropriate housing 4. Insufficient education 5. Inappropriate water and drainage systems 6. Lack of political commitment leading to absence of national malaria programmes 7. Cross-border actions 8. War and social unrest	1. Lack of sustained political commitment 2. Insufficient linkage across sectors 2.1. lack of evidence linking health and development 3. Lack of technical and managerial expertise 4. Lack of proper strategic analysis and assessment (e.g. inability to pick and choose between donors/aid)

	3.1 inappropriate and unaffordable tools 3.2 competing problems 4.Poor access to health care and to skilled care providers 4.1 poor referral opportunities 4.2 delay in treatment or referral 4.3 no treatment for severe disease where people get sick 4.4 unavailability of services within reach			
III. What is the present level of knowledge? **a) Interventions currently available**	1. Prevention of infection 1.1. personal protection 1.1.1. protective clothing 1.1.2. repellents 1.1.3. house spraying with chemical insecticides 1.1.4. insecticide-treated material including bednets 1.1.5. chemoprophylaxis 1.2. control of bio-environmental consequences of development projects 1.3. identification of groups at high risk of infection (migrant workers, displaced populations, etc) 2. Prevention of development of disease in infected individual 2.1. motivation of people to seek treatment 2.2. promotion of compliance with drug or herbal regimens	1. Development of national antimalarial drug policies, with regard to: 1.1. geographical distribution of parasite 1.2. parasite resistance to the drug 1.3. characteristics of health services (quality and coverage) 1.4. risks and benefits of different drug regimens (pre-packaging) 1.5. costs of and compliance with drug regimens 2. Treatment of individuals 2.1. chemotherapy 2.2. chemoprophylaxis 2.3. herbal remedies (this term, however, is poorly defined) 3. Early diagnosis and disease management	1. Political commitment for the effective control of malaria 2. Vector control 2.1. epidemiological stratification (according to vectorial transmission capacity; environmental, social, economic conditions) 2.2. techniques to detect insecticide resistance mechanisms 3. Appropriate housing 4. Environmental management 4.1. reduction/elimination of mosquito breeding sites 4.2. appropriate planning of development projects 4.3. environmental impact assessment in proposed development projects 5. Emergency preparedness	1. Give malaria control highest priority 2. Promote awareness for problem and action 3. Arrange for appropriate funding (external & internal) 4. Subsidize treatment

Insert 4.11 Malaria

Combined Approach Matrix applied by TDR to malaria (continued)*

Actors/factors determining the health status Five steps in priority setting**	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
III. What is the present level of knowledge? *(continued)*	3. Health education 3.1. promotion of acceptance of interventions (treatment seeking for malaria) 3.2. teaching about the nature of malaria (risks, interventions, symptomatic identification of malaria in the home and in PHC clinics)	3.1. development of guidelines for the management of patients with fever by people at different levels of health care 3.2. equipment of relevant services with the means to diagnose malaria microscopically or use of rapid diagnostic tests 3.3. quality control of drugs, insecticides, diagnostics 3.4. monitoring of treatment failure to assess frequency, degree, distribution of drug resistance 4. Early detection, containment or prevention of malaria epidemics 5. Health education 6. Provision of the community with information on the risks of malaria, its prevention, and action to be taken when it occurs	5.1. emergency relief organizations should include malaria into their planning (e.g. malaria control among refugees and displaced populations) 6. Health education programmes (in schools, workplace, media)	
b) How cost-effective are current interventions? (refer to numbers under IIIa)	1. Prevention of infection 1.1. personal protection 1.1.1. no convincing (if any) evaluation of effectiveness. 1.1.2. no convincing (if	1. Development of national antimalarial drug policies: evidence is poor. Some work on whether a switch to higher level drugs is C/E.		

any) study of impact on incidence or severity of disease.

1.1.3. no convincing (if any) study. Costs assessment might be easy.

1.1.4. C/E in all medium levels of transmission in Africa.
No studies of impact in very intense transmission areas where mortality is, apparently, lower. Also question marks on long-term impact on reduction in immunity. But the general belief is that they are C/E in most areas of Africa.

1.1.5. C/E in pregnant women in many parts of Africa at least.

1.2. no evidence on effects.

1.3. by itself, this is not an intervention.

2. Prevention of development of disease in infected individual

2.1. in-depth literature search might lead to results. The emphasis should be on severe malaria, not on uncomplicated malaria.

2.2. limited evidence of low costs and effectiveness

3. Health education

3.1. no good evidence. Behaviour changes may/may not be linked to health outcomes

3.2. see 3.1

2. Treatment of individuals

2.1. on an individual basis, treatment is clearly very effective and cheap. However, there are no good studies at the population and system levels. What are the overall costs of current patterns of use of antimalarials, and what is prevented by this? But appropriate treatment is C/E in many settings. In areas where there is no access to treatment, it might be expensive to get treatment to the population and to ensure it was used appropriately.

2.2. C/E in pregnant women in many parts of Africa at least.

2.3. certainly very ineffective for severe malaria.

3. Early diagnosis and disease management

3.1. no really good evaluations.

3.2. Comparison of microscopes vs. dipsticks has been done. Microscopes will not be cost saving in many settings. Unclear if they will save any lives as people tend to treat all cases as malaria.

3.3. there is still a cost to someone, so no different to earlier comments on treatment

3.4. no evidence

4. No evidence that this is measurable, let alone evidence on the impact

5. No evidence on hard outcomes

6. No evidence on hard outcomes

Insert 4.11 Malaria

*Combined Approach Matrix applied by TDR to malaria** (continued)

Actors/factors determining the health status Five steps in priority setting**	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
IV. Possible future interventions a) What types of interventions are under consideration?	1. Unit-dose pre-packaging of antimalarials 2. Rectal artesunate 3. Drug combinations, fixed-dose combinations 4. Improving access by having a more inclusive network of antimalarial treatment outlets, e.g. shopkeepers, chemical sellers, drug peddlers, community-based agents, etc. 5. Strategies for organizationally and financially sustaining use of insecticide-treated bednets (ITNs) 6. Working with traditional healers to improve referral for very ill children 7. Introducing malaria into school curricula	1. Operational research 1.1. implementation 1.2. tools 2. Access-related issues 2.1. cost of drugs 2.2. availability 2.3. economics/health economics (to justify engagement) 3. Multinational research 3.1. new drugs 3.2. vaccines 3.3. improved vector control (tools, methods) 3.4. genetic manipulation of malaria vectors 3.5. new and safe insecticides 4. Improved targeting of interventions based on risk mapping	1. Underground irrigation 2. Involvement of private, industrial and other sectors in malaria control 3. Harnessing space research (satellite imagery) for predicting epidemics.	Creating investment in health for human development.
b. How cost-effective could future interventions be?	Not yet assessed	This is available for malaria vaccines only. It could be done for drugs. The limitation is that no analysis can really take into account impact on transmission because transmission models are not well developed.		

		For malaria vaccine, if it had the same impact as nets on all cause mortality (i.e. at least 20% reduction), it would be very cost-effective regardless of duration of protection or how it had to be delivered. A combination of effectiveness, price, duration of protection and treatment mechanisms can be described at which it would be cost-effective.		

* Sections on a blue background are areas in which TDR has particular comparative advantages. Sections with text written in blue are areas in which TDR has a specific interest.

** Disease burden (Step I) and resource flows (Step V) are not included in the table. Malaria disease burden was estimated in the year 2000 to account for 2.7% of the global burden of disease, or 40.2 million DALYs (*World Health Report 2001*). There is little information on resource flows for malaria research (see Chapters 5 and 6).

Insert 4.12 Onchocerciasis

Combined Approach Matrix applied by TDR to onchocerciasis

Actors/factors determining the health status Factors determining impact of interventions on control	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
I. What is the burden of disease? How is it distributed? What are the trends?	18 million infected, 99% in Africa. Disease patterns vary with parasite strain. DALYS: 1083 (40% blindness/ visual impairment, 60% severe itching). Extreme blindness rates led to collapse of communities in savanna. Important psychosocial and economic impact of skin disease and itching. Estimates of disease burden are outdated. Onchocerciasis is eliminated as a public health problem in the countries covered by the Onchocerciasis Control Programme (OCP) and infection virtually eliminated from central OCP area. Burden in the countries covered by the African Ochocerciasis Control Programme (APOC) maybe already reduced by 25%-30%.	Health care seeking tended to be limited to traditional medicine and drug sellers for skin disease (cases spend US$20 a year) and the public health care system was not much involved. This changed with the start of the control programmes which resulted in an increasing demand on the public health care system for support to ComDT and surveillance in OCP countries, and to ensure sustained control and maintenance of achievements.	Depopulation of fertile river valleys had negative impact on rural development and agriculture. Education: school drop-out rates twice as high in households with onchocercal skin disease.	Impact on development: • Depopulation of relatively fertile river valleys in Sahel • Negative impact on food production in these countries • Reduced productivity and diminished income-generation activities
II. What are the major control strategies?	**1. Large-scale treatment with ivermectin** Africa: once-yearly Community Directed Treatment (ComDT) to eliminate the disease as a public health problem. Americas: six-monthly to eliminate morbidity/transmission	**1. Large-scale treatment with ivermectin** Africa: ComDT (annual) to eliminate PH problem. Americas: six-monthly to eliminate morbidity/ transmission **2. Vector control to interrupt transmission** Aerial (OCP) or ground larviciding (isolated foci in AOPC)	ComDT: Community development and support/ involvement of community-based organizations (CBOs) Monitoring of the environmental impact of vector control in the OCP	Inter-country collaboration and coordination of oncho control Political commitment to OCP, APOC.

		3. Combination vector control and ComDT: extension areas of OCP **4. Surveillance + recrudescence control** (with ivermectin): post vector control in OCP area		
III. Why does the burden persist? **a. What are the major problems and challenges with the current control strategies?**	• Sustained community involvement in ComDT • Overloading of ComDT with other interventions, community incentives, impact of cost recovery • ComDT in conflict areas • Parasite susceptibility to ivermectin	• Extension ComDT to all APOC areas (including conflict zones) • Integration of ComDT in health system and sustained support to CDTI • Cost-effective strategy for Loa loa areas • Effective implementation of onchocerciasis surveillance after cessation of OCP	• Rural development/ overpopulation in liberated river valleys in OCP countries • Integration of community development/CBOs in ComDT	• Political support and priority for oncho control and surveillance during the post-OCP/ APOC period
b. How applicable, acceptable, affordable are current strategies?	• Community Directed Treatment Initiative (CDTI) highly applicable, acceptable and affordable • Issue of incentives • Severe adverse reactions in Loa loa areas	• CDTI is an effective strategy but needs support. • Vector control only applicable to savanna and isolated foci	• Fits well in community development strategies. Support to ComDT (e.g. CBOs etc)	• OK but need for political support • Vector control not affordable by countries
c. How cost effective are current strategies?	Both OCP and APOC have a high Economic Rate of Return (ERR). For OCP the ERR > 11% (not including impact on skin disease). For APOC the ERR > 17% (includes only control of ocular disease and severe itching) assuming that ComDT can be sustained. These ERRs are as high as those of the better development projects in energy/agriculture/telecommunications.			
d. What significant determinants are there?	• Community involvement in planning and decision-making • Social stability • Experience with other health programmes • Interaction with health system	• Level of development, coverage and effectiveness of the health services • Priority and resources for support to ComDT • Effect of long-term treatment on transmission and parasite reservoir	• Human migration and environmental changes affecting geographic distribution of onchocerciasis	• Political commitment to ComDT and to sustaining control/surveillance efforts after the cessation of OCP/APOC/OEPA

Insert 4.12 Onchocerciasis

Combined Approach Matrix applied by TDR to onchocerciasis (continued)

Actors/factors determining the health status Factors determining impact of interventions on control	1. Level of the individual, family and community	2. Level of the health ministry, health research institutions and health systems and services	3. Level of sectors other than health	4. Level of central government, macroeconomic policies
IV. How effective would approaches* under investigation be? a. What types approaches* are under consideration?	• Macrofilaricide • Multi-disease ComDT • Community self-monitoring • Enhancements of ComDT to improve sustainability • Rapid assessment method for Loa loa	• Resistance detection test • Advocacy strategy • Multi-disease and integrated approaches to ComDT	• Communication/advocacy strategy • Integration of ComDT with other community development activities	• Advocacy strategy
b. How cost-effective could these future approaches* be?	• Macrofilaricide would shorten duration of control and thus reduce costs • Cost of ComDT enhancements probably not very different from current costs which then would enhance sustainability • RAP would be cost-effective compared to costs of monitoring requirements in areas potentially endemic for Loa loa.	• Advocacy would enhance sustainability but costs and who would cover them not yet defined • Multi-disease ComDT would presumably improve cost-effectiveness	• Advocacy would enhance sustainability but costs and who would cover them not yet defined	• Advocacy would enhance sustainability but costs and who would cover them not yet defined
V. What extra knowledge is needed to develop new approaches* to effective control?	• Multi-disease applications of ComDT • Onchocerca genome • Reasons for differences in compatibility between vector and parasite species	• Alternative models for health-sector development that would lead to improved outreach capability • Impact of cost-recovery • Multi-disease, community-based interventions	• Community development and health care	• Political commitment to low priority or controlled diseases • Costs of support to ComDT and surveillance

VI. What are the research resource flows?	• TDR funds R&D on macrofilaricide, ivermectin resistance detection, and diagnostics; implementation research on drug delivery and ComDT, focusing on integration and sustainability, rapid assessment of Loa loa, and support to Onchocerca genome research. • The Edna McConnel Clark Foundation has stopped funding onchocerciasis vaccine research. • NIH and EC provide some funding on immunology. Additional funding on operational research from APOC (use of remote sensing for mapping Loa loa, country-level operational research), OCP (Onchosim, diagnostics, larvicide screening, environmental monitoring, etc.) and OEPA (evaluation of impact on transmission)

* Approaches = tools, methods, strategies and policies, as defined in the new TDR Strategy.

Insert 4.13

TDR checklist for strategic analysis of health research needs (adapted from Global Forum Combined Approach Matrix)

1. What is the size and nature of the disease burden?
   - What are the epidemiological trends?
   - What are the current or likely future factors that impact on burden at the following levels, and in what way:
     – individual, community and household
     – health sector (health ministry, systems and service delivery)
     – non-health sectors
     – government and international?
2. What is the control strategy?
   - Is there an effective package of control methods assembled into a "control strategy" for most epidemiological settings?
   - What are its current components (stratify by geographical areas if necessary)?
   - If such a control strategy exists, how effective is it (based on observation), or could it be (based on epidemiological modelling) at:
     – reducing morbidity
     – preventing mortality
     – reducing transmission
     – reducing burden?
   - What is known of the cost-effectiveness, affordability, feasibility and sustainability of the control strategy?
3. Why does the disease burden persist?
   What are the constraints to better control at the following levels:
   – individual, community and household (e.g. male dominance, poverty, access to services)
   – health sector (e.g. political commitment to control, inadequate human resources, poor management and organization of service delivery, poor financing or drug supply systems, lack of knowledge of how to control the disease, lack of effective tools, or lack of resources to implement effective tools and strategies)
   – non-health sectors (e.g. negative or positive impact on disease of social and agricultural policies, etc.)
   – government and international (e.g. impact of structural adjustment programmes, poverty alleviation strategies, macroeconomic policies)?
4. What is needed to address these constraints effectively?
   (include both control and research aspects)
   - Which of these constraints could be addressed by research?
   - Which of the research-addressable constraints, if addressed, could:
     – improve the control/service delivery system
     – ultimately, lead to a reduction in disease burden
     – be addressed by affordable research
     – be completed within 5 years?
   - What are the potential pitfalls or risks of such research?
5. What can be learnt from past/current research?
   - From current/past research – both TDR-supported and outside TDR.
   - What is known about existing research resource flows?
6. What are the opportunities for research?
   - What is the state-of-the-art science (basic and operational) for this disease and what opportunities does it offer?
   - What is the current status of institutions and human resources available to address the disease?
7. What are the gaps between current research and potential research issues which could make a difference, are affordable and could be carried out in a) 5 years or b) in the longer term?
8. For which of these gaps are there opportunities for research?
   - Which issues can only be realistically addressed with increased financial support or investment in human and institutional capacity?
   - Which issues are best suited to the comparative advantage of TDR?

The application of the Combined Approach Matrix to all TDR diseases met with varying levels of success, due both to the shortcomings of the method and to the technical training and experience of the DRCs. After much discussion, the revisions of the disease-specific research analyses will be undertaken using the checklist (Insert 4.13) with the aim of preparing a four to five page analysis of each disease which is highly comparable. The resulting framework is a modification of the Global Forum Combined Approach Matrix adapted to the needs of TDR.

(f) Lessons learned

The contribution of the Combined Approach Matrix was to:

- bring home to researchers the need to select priorities on a rational basis
- highlight to those involved in the process that this selection must incorporate the impacts on health and health interventions of the social, economic and political context (i.e. the information placed in columns 1, 3 and 4 of the Combined Approach Matrix)
- standardize the reporting of research priorities by each DRC.

Disease research strategies need to be revised and updated as new results become available. This will be almost continuous in a disease such as malaria for which research is ongoing. The priority-setting process is therefore iterative and should not be set in stone. The TDR analysis will now be revised annually and a scientific working group meeting will be held for each disease every five to six years to carry out a thorough review of global research priorities.

The priority-setting process should ideally engage a variety of actors. Researchers need to recognize that they are not the sole voice in defining research policies. Global and national level policy-makers must have a key voice, together with disease control experts in the field, epidemiologists, sociologists/anthropologists, economists and surveillance experts.

In summary, while the Combined Approach Matrix was a helpful tool for TDR, it required adaptation to the particular needs of the programme. This adaptation needs to be continuous as the debate on priorities proceeds.

3. Application of the Combined Approach Matrix to identify priorities for research on risk factors (determinants)

To explore its effectiveness in assessing the impact of determinants of disease (Step 2), the framework was applied to the problem of indoor air pollution (IAP). While the effects of IAP manifest themselves on health outcomes, the interventions to deal with it are rooted in sectors other than health. This observation led to the application of the Global Forum Combined Approach Matrix to identify gaps in research.

A paper presented at Forum 5[21] represents the first attempt to formally apply the combined framework to a risk factor rather than a disease condition. The objectives were to summarize the research priorities identified through this approach and to identify the strengths and weaknesses of its use.

IAP, which derives mainly from the use of simple biomass fuels (wood, dung and crop wastes) by the poor, is a major public health problem – accounting for about 4% of the total global disease burden. It is therefore an important risk factor requiring priority research.

(a) Disease burden (Step 1)

There is consistent evidence to show that

[21] Nigel Bruce. Paper presented at Forum 5, October 2001.

exposure to biomass smoke increases the risk of a range of common and serious diseases of both children and adults, in particular related to lung health (Insert 4.14).

Reviewing the published literature and using various methods to produce estimates, IAP in low- and middle-income countries may account for about 53 million DALYs (amounts to approximately 4% of the global total for low- and middle-income countries). There is marked variation when comparing continents.

(b) Determinant/risk factor (Step 2)

Around three billion people and up to 80% of homes in low- and middle-income countries are still dependent on biofuels for household energy needs. Often used indoors on simple stoves with inadequate ventilation, the practice leads to high levels of indoor exposure, especially for women and young children. Current trends in fuel use and poverty indicate that this problem will persist unless more effective action is urgently undertaken.

Health and development issues associated with the use of household energy and IAP in low- and middle-income countries include gender issues, poverty, the environment and quality of life. With development, there is generally a transition up the so-called 'energy ladder' to fuels which are progressively more efficient, cleaner, convenient and more expensive. Households typically use a combination of fuels, for example wood for cooking and heating, some kerosene for lighting and perhaps charcoal for making hot drinks.

(c) Application of the Combined Approach Matrix to indoor air pollution

The Global Forum Combined Approach Matrix was applied to identify research gaps in Indoor Air Pollution research.

(d) Conclusions of this first attempt

- This exercise has shown that it is possible to apply the matrix to determinants of health, such as indoor air pollution.
- Even when first attempts serve more to identify gaps in knowledge than to help set priorities, identification of these gaps is crucial for setting priorities in health research.
- The combined framework is valuable in that it encourages assessment of the actions, roles and needs of the different sectors. This helps to emphasize the role of all non-health sectors listed.
- Whereas costs and benefits are often difficult to define, cost-effectiveness needs to be addressed.

An important aspect in future work will be to obtain locally relevant information and views on the issues discussed in this section.

(e) Research recommendations

The application of the Combined Approach Matrix in the field of indoor air pollution identified a need for a broad range of multidisciplinary research. This in turn requires coordination and the development of better intersectoral collaboration in research, policy development and implementation; and well developed mechanisms to ensure the dissemination and application of new research knowledge.

The following research priorities were identified:

(i) Research to strengthen evidence on population exposure, health effects and potential for risk reduction

- Develop community assessment methods for assessing risk (fuel use, pollution, exposure, household energy systems, etc.), and options for change.
- Develop and test instruments to provide practical and well-standardized measures of exposure, health- and development-related outcomes.
- Evaluate direct effects arising from the use

Insert 4.14

Evidence of health effects of IAP exposure in low- and middle-income countries

Condition	Nature and extent of evidence
• Acute lower respiratory infections (ALRI) in young children • Chronic bronchitis and chronic obstructive pulmonary disease (COPD) in adults • Lung cancer (coal-related only)	About 20 studies; fairly consistent across studies; supported by studies of ambient air pollution and to some extent by animal studies.
• Cancer of nasopharynx and larynx • Cataract • TB	Few (2-3) studies; consistent across studies; supported by evidence from smoking and animal studies.
• Low birth weight • Perinatal mortality	One study for each condition from a low-income country; supported by studies of smoking and outdoor pollution.
• Acute otitis media • Cardiovascular disease	No studies, but an association may be expected from studies of ambient air pollution and/or studies of wood smoke in high-income countries.
• Asthma	Several studies, but results inconsistent. Support from studies of ambient air pollution.

of household energy, not resulting from indoor air pollution, including burns, scalds, kerosene poisoning, fires, etc.
- Evaluate less direct health consequences including opportunity costs of women's time.
- Research to help understand and estimate secondary impacts of interventions on cooking time, fuel gathering and crop production.
- Obtain new evidence on health risks of indoor air pollution to demonstrate the effect of a measured reduction in exposure on the most important health outcomes.
- Exposure-response relationship of indoor air pollution for key outcomes such as ALRI in young children.

(ii) Research on interventions

- Distil and disseminate experience of interventions from existing household energy implementation efforts.
- Conduct economic assessment of specific interventions.
- Evaluate new interventions and policy developments on health benefits.
- Evaluate a range of criteria reflecting the context and impacts of household energy, including sustainability.
- Identify effective models of collaboration (case studies) in field of household energy.
- Develop and assess methods which allow locally specific arrangements for collaboration.

Insert 4.15 Indoor air pollution

Global Forum Combined Approach Matrix applied to indoor air pollution

Actors/factors determining the health status Five steps in priority setting*	Individual, family and community	Health ministry, health research institutions, health systems and delivery	Sectors other than health	Central government, macroeconomic policies
II Why does the burden persist? What are the determinants?	**Poverty**: Individuals, including gender-related; family; population (including effects of drought, war, debt, etc.). **Awareness**: Lack of awareness of health risks and/or options for change. **Culture**: Preferences, e.g. for taste of food cooked on biofuel stove; uses of smoke, e.g. food preservation; spiritual issues relating to hearth. **Access**: Limited access to cleaner fuels and appliances due to poverty, and inadequate or unreliable supply. **Participation**: Lack of opportunities for participation in change.	**Ministry**: Lack of awareness, hence weak health policy response; inadequate collaboration with other sectors. **Research institutions**: Relatively low priority as health research issue; limited funding; lack of population surveys of exposure (health risk); exposure assessment difficult in settings where problem worst (cost, technical expertise required). **Health systems**: Focus on case finding and treatment; uncertain about role in reducing environmental exposure; lack of mechanisms and experience for collaboration with other sectors.	**Development/Civil Society Organizations (CSOs)**: Focus has been on technology for energy conservation and cost saving. **Non-health ministries**: Environment, housing, etc., tended to operate in own fields without collaboration with health CSOs. **Donors**: Projects often driven and funded by donors, rather than being participatory and market-led. **Finance**: Lack of suitable local micro-credit or other ways to assist with costs of appliances. **Evidence**: History of poor projects, together with lack of evidence of successful initiatives, has reduced interest.	**Awareness**: Lack of awareness of health impacts of indoor air pollution specifically and more generally of inter-relationships between household energy, gender, health and development. **Policy**: Lack of policy and strategy to address household energy and poverty, consequently minimal capacity. **Economic**: Distortions in energy sector, fuel subsidy policy not benefiting the poor. **Collaboration**: Inadequate support/facilitation of inter-sectoral collaboration at national and other levels.
III Interventions currently available	**Community development**: Allows participation in needs assessment and planning interventions. **Poverty reduction**: Opportunities for income generation, uptake of credit where available. Note that	**Role**: Health sector tends to view role as limited, so this needs to be clarified. Role includes: - collection and provision of data on health and exposures - raising awareness of health effects and need for prevention	Many options currently exist for these sectors, but implementation is mostly patchy and uncoordinated. **Energy supply**: Distribution of cleaner fuels (e.g. oil sector); other clean fuels (biogas, gelfuels)	**National policy**: Integrated national policies on household energy, health and development are required, but mostly lacking.

		adoption of interventions (below) includes ability to pay. **Improved stoves**: Adoption of stoves which reduce emissions, save fuel, vent pollution to exterior. **Cleaner fuels**: Use of kerosene, gas, electricity where available. **Housing**: Improvements to ventilation, insulation (cold areas). **Behaviour**: Action to reduce fuel use, reduce exposure of family members.	- provision of education at points of contact with the health system (in clinical or community settings). - collaboration with other sectors. **Research**: Tools and methods for obtaining valid information on: exposure and health outcomes; effectiveness of education via health sector; role in collaborative initiatives with other sectors.	**Local commercial sector**: Artisans (e.g. stoves); distributors and suppliers of fuels and appliances **Education**: School and adult education on health risks, role of community, options for change. **Housing**: Integrate environmental health into design and building **Finance**: Targeted subsidies for development, local micro-credit **Forestry, environment:** Renewable wood fuel resources and protection of the local environment.	**Specific programmes**: Some examples of national initiatives, including China (rural stove programme), India (improved stove programme), and Brazil (promotion of gas). In general, few strategic national examples. **Poverty reduction**: Rural and urban poverty reduction can be expected to have significant impact on fuel-use patterns.
III	Cost-effectiveness of current interventions	**Who pays?** Costs are incurred by households through market mechanisms, as well as through investment by utilities (e.g. electricity) and government (targeted subsidies and credit support, if available). **Actual cost**: Costs to households made up of capital costs (appliances, etc.) and running costs (fuels, maintenance). Wide range of costs from US$5-7 (ceramic stove) to US$150+ for biogas or electric appliances. **Community perspectives**: There is a need for more information on how communities and households view *costs* and *benefits*: both are locally specific and tend to be complex – in part due to the multiple impacts/uses of household energy.	**Sectoral issues**: Although there are potentially large *health* gains from household energy interventions, most of the costs of interventions are *not borne by the health sector.* **Cost-benefit**: Estimates based on stoves in Guatemala, Kenya, suggest benefits substantially outweigh costs for overall mortality and ALRI morbidity. **Cost effectiveness**: Estimates for stoves in India indicate $50-100 per DALY saved. **Research**: Strengthen evidence and precision of health risk estimates for IAP (including ARI, COPD, TB, low birth weight, cancer, eye disease); evidence on wider health impacts of household energy; collaboration on systematic monitoring and evaluation.	**Sectoral issues**: In contrast to the health sector, it is the non-health sector (mainly) that 'provides' the interventions. The issue of *cost* is complex, however, as interventions mostly need to be taken up through market mechanisms if widespread uptake and sustainability are to be achieved. A range of *benefits* should accrue to the non-health sector, including economic development, employment, environmental protection, etc. These are also benefits for the health sector. **Research**: Assessment of the costs and benefits of household energy development for the poor, across sectors, is a complex field requiring development.	**Integrated policy**: Not aware of any assessment of contribution to national economies, or reductions in national socioeconomic and health differentials, of integrated policies and investment in household energy for the poor. **Specific programmes**: Chinese rural stove programme implemented in more than 170 million homes, but evaluation so far limited. Indian stove programme has been problematic. South African electrification extensive, but substitution of polluting fuels limited in poor areas. In Brazil, gas is used extensively in rural areas.

Insert 4.15 Indoor air pollution

Global Forum Combined Approach Matrix applied to indoor air pollution (continued)

Actors/factors determining the health status Five steps in priority setting*	Individual, family and community	Health ministry, health research institutions, health systems and delivery	Sectors other than health	Central government, macroeconomic policies
III Cost-effectiveness of current interventions (cont.)				**Financial policy**: Evidence that fuel subsidies do not generally benefit the poor.
IV What types of intervention are under consideration?	**Requires combination** of (a) new technologies and other approaches to interventions, as well as (b) more effective implementation of existing interventions. New ideas include: • uptake of improved fuels, e.g. ethanol gelfuels, solar PV • innovative methods of raising awareness at community level, e.g. drama, community video, etc. • exploring opportunities for behavioural interventions, e.g. keeping child away from smoke • adopt new stove designs, e.g. the insulated 'Ecostove' in Nicaragua • integrating house design with energy needs, e.g. better insulation. **Community participation** in planning and evaluation is required.	**Awareness**: More needs to be done to raise awareness at all levels of the health sector about the health impacts of IAP on 'headline' diseases such as ARI, as well as the overall impact of household energy on health, and of links between environment, health and development in general. **Define role**: If this sector is to be able to respond effectively, better methods are needed to define the role it can play at all levels (ministry, district, clinic, community) in any given setting. **Research**: Stronger evidence on varied impacts of household energy on health; methods for developing health sector role, with case studies.	**Combined approach**: As with the community level, requires new approaches as well as more effective implementation. To include: • development and supply of cleaner fuels and appliances, as well as new fuels (e.g. gelfuel) • strategic development of fuelwood sector, where appropriate • development of micro-credit, which may require more evidence on cost-effectiveness to make case for loans and initial donor support. **Collaboration**: More effective mechanisms for inter-sectoral collaboration at various levels. **Research**: Development of new technologies and approaches to implementation, marketing, etc.	**Integrated policy**: Increased awareness at national level needs to lead to integrated policy, linked in to poverty-reduction efforts. Specific measures to include: • national capacity building • targeted financial support • energy policy which facilitates access of the poor to cleaner fuels • measures to assist the development of micro-credit for household energy • resources for carrying out prioritized research. **Research**: Systematic reviews of experience to date with components of the above to guide more integrated policy.
How cost effective could future interventions be?	Action at community level has a great deal of potential. Participatory development, particularly involving women, can be very effective in	Some initial estimates of potential reductions in mortality and incidence of specific diseases such as ALRI from lowering IAP are becoming	There is potential for cost-effective gains for a range of sectors, including environment, forestry, housing, education and employment. Some studies have	Integrated policy on household energy and the poor has the potential to contribute to national socioeconomic

	promoting change. Some specific new interventions, such as the Ecostove (Nicaragua) and gelfuels (Africa) look promising. But there remains a pressing need for studies that assess the overall effectiveness and sustainability of interventions, covering a range of urban and rural settings. Also needed are impact assessment methods that can be applied more routinely and that are sufficiently flexible to allow for the very variable levels of capacity and information.	available. These are still based on imprecise estimates of risk, and as yet do not: • integrate wider health impacts of household energy on health, nor • consider the potential of interventions and (crucially) approaches to more effective and sustainable implementation outlined here. **Research**: The health sector should take a lead in ensuring that the evidence for making these assessments is both available and clearly presented.	shown the combination of near-term (health) and longer-term (global environment) gains that may accrue from a range of different stove/fuel options in India – see text for examples. The inter-dependence of the costs and benefits for the many sectors involved makes any comprehensive economic evaluation very challenging, as there is only limited value in looking at the cost-effectiveness for one (sectoral) outcome at any one time.	development, particularly if the above measures can contribute to reducing inequalities in health and development in society. This is an important area for further study.

* Disease burden (step 1) and Resource flows (step 5) are not included in the table. IAP is estimated to account for about 4% of the burden of disease. There is little information on resource flows for research in IAP.

(iii) Research on the development and implementation of policy

- Conduct economic studies on implemented policies.
- Assess the potential for policy on household energy to address inequalities in health.
- Develop and test standard indicators for routine application in countries.
- National consequences of policy options relating to the supply and uptake of cleaner household energy for the poor.
- Research to understand household benefits of risk reduction using cost-of-illness and willingness-to-pay valuations.

Section 6

Conclusions

Three important changes have been observed in health research management over the past 12 years:

- There is a better understanding that health research can play a crucial role in policy decisions.
- There is a better recognition of the need for a sound scientific basis for selecting the topics to be researched.
- The lack of methodologies to select and recommend research priorities have stimulated the pace of development of these tools and processes.

In summarizing recent developments, the present chapter underlines the importance of combining a disease-based approach and a determinant-based approach when setting priorities for research. It also highlights the importance of using a participatory process to obtain the information needed to set priorities. The method for setting priorities for health research needs to be separated from political and commercial pressures. The aim of priority setting is to improve health through focusing health research on the most effective interventions for decreasing the diseases burden.

The reduction of disease burden requires not only biomedical interventions but also behavioural, social and political interventions implemented by sectors other than health.

The Global Forum Combined Approach Matrix was developed as a tool to help set priorities based on earlier tools developed since 1990. It can be implemented at any level. The aim is to use priority-setting techniques to gain as many years of healthy life as possible for a given investment in health research, whether the gain in healthy life years is to be made through a reduction in communicable diseases, noncommunicable diseases or violence and injuries. A greater weight can be attached to healthy life years gained for the poorer population to encourage the implementation of interventions benefiting the poor.

Chapter 5

Priorities in health research

For a summary of this chapter, see the Executive Summary, page xvii.

Section 1

The 10/90 gap in health research financing

1. Is there a 10/90 gap?

It could be argued that the 10/90 gap in health research financing is much smaller than estimated since research conducted in high-income countries will, over time, directly benefit low- and middle-income countries. As low- and middle-income countries progress and enjoy a longer life expectancy, the epidemiological and demographic transition will increase the prevalence of the diseases that predominate in high-income countries.

Globally, most research is undertaken in high-income countries and this has, to a certain extent, already contributed to improvements in health in the South. However, the transferability of the research into low- and middle-income countries is very limited due to the following factors:

(a) While communicable diseases still represent a large share of disease burden in low- and middle-income countries, research into these diseases (e.g. malaria) frequently addresses the needs of visitors to developing countries rather than those of people living in areas where the diseases are endemic.

(b) Vaccines developed for use in the more lucrative industrialized country markets may not be effective in developing countries, where the disease (or a more serious form of the disease) may be caused by a different type of virus or bacterium.

(c) The determinants of ill health can vary greatly between regions. For example, in high-income countries, prevention of road traffic injuries is focused primarily on efforts to protect the persons in the car, while in low- and middle-income countries it needs to be geared to protect the pedestrian.

(d) The level of development and performance of health systems and services varies greatly between countries.

(e) Access to treatment, medicines and other research results, particularly for the poorer segments of the population, are very different between and within countries. The high cost of certain patented drugs, for example, limits transferability.[1]

(f) Interventions for noncommunicable diseases available in more advanced countries may not be adaptable or appropriate in low- and middle-income countries due to costs and infrastructure requirements. For example, research on high level techniques to identify and undertake thrombolysis procedures may be applicable in low- and middle-income countries for a selected and limited number of individuals, but this may not necessarily be the most appropriate, applicable or cost-effective measure to be applied on a large scale in these countries. Research to identify cost-effective alternatives is required.

[1] Research on HIV treatment, for example, has made substantial progress in extending the life span of HIV-infected individuals. However, factors such as cost of treatment and deficiencies in the health system make access to these life-saving medicines prohibitive in low- and middle-income countries.

2. Magnitude of the disease burden

There is a marked difference in the magnitude and characteristics of the burden of disease between low- and middle-income countries and high-income countries. To describe these differences (taking into consideration that the population in low- and middle-income countries accounts for 85% of the total world's population), we calculated the rate of DALYs per 100 000 population by disease group (Insert 5.1).[2]

The table shows that the burden of communicable diseases, maternal, perinatal and nutritional conditions (measured as disease rate) is 13 times higher in low- and middle-income countries than in high-income countries. Noncommunicable disease rates are very similar in high-income and low-middle-income countries. The ratio for violence/injuries is three times higher in low- and middle-income countries than in high-income countries.

A review of the list of diseases and conditions with the highest levels of morbidity and mortality[3] and the subsequent investments[4] reveals that most of the top conditions have a very low level of investment. These include acute respiratory infections, diarrhoeal diseases, cardiovascular diseases, mental health, tuberculosis, tropical diseases, perinatal conditions and HIV/AIDS. And some of these diseases and conditions are being fought with tools researched well over a decade ago. Research is needed today into the health problems with the highest disease burden in order to identify interventions which can modify the determinants and the progression of diseases.

3. Comparing disease burden with the level of investment in health research

Several presentations during Forum 5 reviewed the extent to which disease burden was used as a criterion in the allocation of funding for health research.[5] Disparities in the level of investment in research between different diseases has been highlighted in a number of reports.[6,7]

The Commission on Macroeconomics and Health demonstrates that diseases can be classified according to the level of investments in health research and their disease burden in low- and middle-income countries. Insert 5.2 illustrates the persistence of the 10/90 gap in health research financing.

According to the Commission, the total spent on biomedical research is estimated to be around US$60 billion per year (or US$42 per DALY). Of that, malaria accounts for around US$100 million annually (or US$2.2 per DALY) – about one-twentieth of the global average. Yet malaria was estimated to account for 2.7% of the global disease burden in the year 2000, largely affecting poor countries, mostly concentrated in Africa.

Information presented during Forum 5[8] indicated that total expenditures in the year

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2 Andres de Francisco. *Lancet*, 2000. October 14, Vol 356:1355-6

3 C.J. Murray & A. Lopez. *Global Burden of Diseases and Injuries*. Volume 1, WHO, 1996.

4 Ad Hoc Committee on Health Research, *Investing in Health Research and Development*, WHO, September 1996.

5 Papers were presented at Forum 5, October 2001, by: Gerald T. Keusch, Director, Fogarty International Center, NIH, USA; Sigrun Møgedal, State Secretary for International Development Cooperation, Norway; Catherine Davies, Scientific Programme Manager, Welcome Trust, UK; Jerry M. Spiegel, Senior Associate, University of British Columbia, Canada.

6 Ad Hoc Committee on Health Research, *Investing in Health Research and Development*, WHO, September 1996.

7 Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, April 2000.

8 Bernard Pécoul, Paper presented at Forum 5, October 2001/*Fatal imbalance*, MSF, September 2001.

Insert 5.1

Rates of disease burden by disease group and country income level in 1998 (burden calculated as disability-adjusted life years per 100 000 population)

Group	Low-/middle-income countries	High-income countries	Rate ratio
Communicable diseases,maternal, perinatal and nutritional conditions	11 206	863	13:1
Noncommunicable diseases	10 200	9 664	1:1
Injuries	4 198	1 403	3:1

2000 for research on leishmaniasis, malaria, trypanosomiasis (sleeping sickness) and tuberculosis – which together account for about 5% of the total global disease burden (75 million DALYs) – amount to US$383 million. Of this, approximately US$85 million was for drug R&D – equivalent to 0.14% of the total global investment in health research, and a mere US$1.13 per DALY. This is extremely low in view of the fact that, over time, malaria parasites become resistant to antimalarial drugs.

Of the 1233 drugs that reached the global market between 1975 and 1997, only 13 were for tropical infectious diseases that primarily affect the poor. The Commission on Macroeconomics and Health recommends that at least US$3.0 billion per year should be allocated to R&D directed at the health priorities of the world's poor. Of that, at least half, it says, should be allocated to targeted interventions against HIV/AIDS, including research on the use of antiretroviral drugs in low-income settings, malaria, TB and reproductive health.

Insert 5.2

Classification of three types of diseases by the Commission on Macroeconomics and Health[9]

Disease type and category	Global research effort	Epidemiology	Examples	Notes
(I) Disease not neglected	High	• Occurring both in rich and poor countries • Large vulnerable populations worldwide	• Hepatitis B • *Haemophilus influenzae* type b (Hib) • Diabetes • CVD	• High incentives for R&D • Not widely applicable, nor accessible or sustainable for low- and middle-income countries.
(II) Neglected disease	Low	• Occurring in both rich and poor countries • Substantial proportion of burden in poor countries	• HIV/ AIDS • Tuberculosis • (Malaria)[10]	• Substantial research ongoing in rich countries • Level of R&D spending not commensurate with disease burden on a global basis • Low accessibility for poor countries.
(III) Very neglected disease	Very low	• Overwhelming or exclusive incidence in poor countries	• Chagas disease • Schistosomiasis • Leishmaniasis • Trypanosomiasis (African sleeping sickness) • Onchocerciasis (African river blindness) • Lymphatic filariasis	• Extremely low R&D funding • No commercially based R&D in rich countries.

[9] Prepared from World Health Organization, *Macroeconomics and Health: Investing in Health for Economic Development*. Report of the Commission on Macroeconomics and Health, December 2001, pages 78-79.

[10] Malaria is mentioned by the Commission on Macroeconomics and Health as a possible type II or type III disease.

Section 2

The four dimensions of health research to be prioritized

Priorities in health research have traditionally been formulated in terms of diseases and conditions. It is now realized that this is only one dimension of health research and that health determinants themselves have to be prioritized and are competing for the same funding as disease-focused priorities. But, to make things more difficult, there are at least two more dimensions to health research which have to be prioritized against the others, i.e. methodologies for priority-setting and cross-cutting issues in health research, such as policies, poverty and health, gender and health, and research capacity strengthening.

It is therefore proposed that the prioritization exercise in health research take into account all four dimensions mentioned above, i.e.:

1. Research on diseases and conditions
2. Research on determinants and risk factors
3. Research on priority-setting methodologies
4. Research on policies and cross-cutting issues affecting health and health research.

In the present chapter, section 3 reviews key recommendations made in the past 12 years regarding research priorities on diseases and conditions. For details on priorities *within each of these diseases*, see Chapter 8.

Section 4 reviews key recommendations made in the past 12 years for research priorities on determinants and risk factors. For details on priorities *within some of these determinants*, see Chapter 8.

Dimension 3 (research on priority-setting methodologies) is reviewed in Chapters 4 and 6.

Finally, dimension 4 (research on policies and cross-cutting issues) is discussed in Chapter 1 (poverty, gender), Chapter 7 (research capacity strengthening) and Chapter 8 (research on policies and systems, public-private partnerships, genomics and health).

Section 3

Review of recommendations focusing on diseases

Insert 5.3 offers an overview of the recommendations made by different international committees over the past 12 years.

Insert 5.3

Key recommendations for research priorities on diseases and conditions over the past 12 years

Health research priorities	Commission Report (1990)	Ad Hoc Committee Report(1996)	Advisory Committee on Health Research (1997)	ENHR projects[11]	10/90 Reports
Communicable diseases					
Tropical diseases (including malaria, schistosomiasis, leprosy)	•	•	•	•	•
TB	•	•	•	•	•
HIV/AIDS	•	•	•	•	•
Diarrhoeal diseases	•	•	•	•	•
Sexually transmitted diseases	•	•	•	•	•
Acute respiratory infections	•	•	•	•	•
Problems related to antimicrobial resistance	•	•			•
Other vaccine-preventable diseases	•	•	•	•	•
Noncommunicable diseases, injuries and violence					
Mental and behavioural problems	•	•	•		•
Cardiovascular diseases	•	•	•	•	•
Cancer and chronic degenerative diseases	•	•	•	•	•
Injuries/violence	•	•	•	•	•
Diabetes		•	•		•

[11] Depending on each country situation. See ENHR projects (Indonesia, Tanzania and South Africa) reported in the Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, page 73.

1. Recommendations by the Commission on Health Research for Development (1990)[12]

The Commission recommended research on specific diseases in developing countries that accounted for the highest burden. It differentiated between causes of death in developing and developed countries, and drew attention to the high burden in comparison with the low investment in research. The Committee's recommendations focus on specific diseases and conditions (tropical diseases, childhood diseases and reproductive health issues) and on ways to correct the imbalance in funding for health research priorities. The Committee noted that, as the epidemiological transition evolves, developing countries will increasingly face a double burden of pre-transitional diseases (communicable diseases) and post-transitional diseases (noncommunicable diseases and injuries).

2. Recommendations by the Ad Hoc Committee on Health Research (1996)[13]

The Ad Hoc Committee on Health Research in its 1996 Report combined diseases (step 1) with determinants (step 2). Regarding step 1, it warned that the world community faces four critical health problems in the decades to come, and listed 13 recommendations to confront these challenges.[14] The Ad Hoc Committee Report highlighted specific priority diseases, using the five-step approach. They included childhood diseases, tropical diseases, reproductive health conditions, and noncommunicable diseases prevalent in developing countries. A key recommendation specified the importance of strategic and basic research.

3. Recommendations by the Advisory Committee for Health Research (1997)[15]

Based on the use of the Visual Health Information Profile (VHIP), the ACHR focused its recommendations both on diseases with the highest burden in developing countries and on the underlying common determinants of health status. Recommendations included tropical diseases, childhood diseases and noncommunicable diseases prevalent in developing countries.

4. Recommendations by Essential National Health Research Projects (1999)[16]

ENHR exercises on priority setting focus on countries. The diseases mentioned in the various reports may change from country to country. Diseases mentioned include tropical diseases, childhood illnesses, maternal mortality and morbidity causes, and other communicable and noncommunicable diseases.

5. Recommendations by the International Conference (Bangkok 2000)[17]

The International Conference broadly agreed with the previous reports regarding priority research areas and shifted its focus and recommendations on the revitalization of health research systems to deal with the most prevalent diseases in the low- and middle-income countries and research capacity strengthening. It seeks to lower the burden of disease by addressing health equity issues and decreasing health inequalities.

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12 Commission on Health Research for Development, *Health Research, Essential Link to Equity in Development*, 1990.

13 Ad Hoc Committee on Health Research, *Investing in Health Research and Development*, WHO, September 1996.

14 Global Forum for Health Research, *The 10/90 Report on Health Research 1999*, pages 30-31.

15 Advisory Committee on Health Research, *A Research Policy Agenda for Science and Technology to Support Global Health Development, A Synopsis*, WHO, December 1997.

16 Based on papers reviewed in Chapter 4, and in: Global Forum for Health Research, *The 10/90 Report on Health Research 2000*, pages 20-27.

17 International Conference on Health Research for Development, Bangkok, 10-13 October 2000, *Conference Report*.

Section 4

Recommendations focusing on determinants, priority-setting methodologies, policies and cross-cutting issues

Insert 5.4 gives an overview of the recommendations made by different international committees over the past 12 years.

Insert 5.4

Key recommendations for research priorities on health determinants, priority-setting methodologies, policies and cross-cutting issues

Health research priorities	Commission Report (1990)	Ad Hoc Committee Report (1996)	Advisory Committee on Health Research (1997)	ENHR projects[19]	Internationl Conference (2000)[20]	10/90 Reports
Inequity and inefficiency in the delivery of health services						
Health policies	•	•	•	•	•	•
Health costs and financing	•	•	•	•	•	•
Health information	•	•	•		•	•
Health equity and gender	•	•		•	•	•
Health systems performance	•	•	•	•		•
Capacity building in health policies	•	•		•	•	•
Health behaviour research	•			•		•
Gender and socio-cultural research	•		•	•	•	•
Public-private collaboration	•	•				•
Poverty, malnutrition, ignorance, unemployment						
Vicious circle between health and poverty	•	•	•	•	•	•
Evidence and priority-setting methods	•	•	•	•	•	•
Human reproduction and contraception	•		•	•		•
Child nutrition/food security	•	•	•	•		•
Environmental and occupational health			•			•
Education	•			•	•	•
Substance abuse (inc. tobacco)	•	•		•		•
Sustainability of health research	•	•	•	•	•	•

[19] Depending on each country situation. See ENHR projects (Indonesia, Tanzania and South Africa) reported in the Global Forum for Health Research, *The 10/90 Report on Health Research 2000* , page 73.

[20] See Chapter 3 (Insert 3.3) for recommendations at the national, regional and global levels.

1. Recommendations of the Commission on Health Research for Development (1990)

The Commission recommended the evaluation of the health impact of sectors other than health. It reported that most health research funding is in the field of clinical, biomedical and laboratory research, ranging from 60%-90% in the countries studied, and that research activity was limited in the field of health information systems, field epidemiology, demography, behavioural sciences, health economics and management. The Committee suggested that country-specific, multidisciplinary research could overcome that shortcoming and that research on determinants had as much potential as the biomedical approach.

2. Recommendations of the Ad Hoc Committee on Health Research (1996)

In addition to the 13 recommendations mentioned above, the Ad Hoc Committee report made four recommendations related to its step 2 (determinants), mainly in the field of management of health research. The Ad Hoc Report recommended the identification of research areas and research projects likely to have the greatest impact on the largest number of people. They recommended the use of the most cost-effective interventions to reduce the highest level of disease burden (step 3).

3. Recommendations of the Advisory Committee for Health Research (1997)

The Advisory Committee for Health Research recommended the study of the underlying common determinants of health status, including population dynamics, urbanization, environmental threats, shortages of food and water and behavioural and social problems. They recommended the use of the Visual Health Information Profile (VHIP) to reflect the health status of a country incorporating factors outside the biomedical field.

4. Recommendations of Essential National Health Research Projects (1999)

The recommendations from ENHR projects included efforts to initiate, in each country, a demand-driven process to identify risk factors and the magnitude of health problems based on equity, health policy research and health system management and performance. The priorities will be identified on the basis of their ability to contribute to equity and social justice, as well as on the basis of ethical, political, social and cultural acceptability.

5. Recommendations of the International Conference (Bangkok 2000)

The International Conference recommended efforts to strengthen the health research systems and to link health research to development, thereby ensuring that research is carried out in the context of the prevailing problems in a given country. The priority recommendations focus on knowledge management, research capacity strengthening and governance of health research systems. The underpinning principles are health equity and sustainable health research.

Section 5

Conclusions and future steps

- Research in high-income countries is not easily transferable or appropriate for use in low- and middle-income countries.
- Approaches to define health research priorities by disease or by determinants are complementary.
- There is broad consensus in the recommendations made by international committees over the past 12 years regarding research priorities on diseases and health determinants.
- However, action is needed to address both identified research priorities within diseases and policies and cross-cutting issues that affect health.
- To help correct the 10/90 gap in health research funding, greater investment is needed into diseases neglected by the international research community which account for high disease burden and low research funding.
- Health information systems, field epidemiology, demography, behavioural sciences, economics, management, and policy research are disciplines needed to complement clinical, biomedical and laboratory research.
- Health research should focus on those diseases and conditions which disproportionately affect the poor.
- Revitalization of health systems and health research systems are a key component of efforts to improve health and health research.
- Communities need to be part of the process of identification of research priorities.
- Priorities are not static and need to be regularly reviewed.

Chapter 6

Monitoring financial flows

For a summary of this chapter, see the Executive Summary, page xviii.

Section 1

Background

The Commission on Health Research for Development drew attention to the importance of health research as the "essential link to equity in development"[1]. It proposed that low- and middle-income countries should review and strengthen the management of health research so as to meet their national needs as well as contributing to the global fund of knowledge. The Commission also recommended that governments in low- and middle-income countries allocate at least 2% of national health expenditures and 5% of externally funded programmes to research and capacity strengthening. The Commission hoped that these financial arrangements would provide a secure foundation for funding the priority research needs in low- and middle-income countries, based on the new concept of Essential National Health Research.[2] The expectation was that low- and middle-income countries would review their current spending on health research and would strive to meet the stated goals.

Rather disappointingly, neither the low- and middle-income countries nor the donor community enthusiastically followed up the Commission's recommendations, although there were a few exceptions. Furthermore, since most low- and middle-income countries were not actively tracking the pattern of spending on health research, it was difficult to know how close they were to the target and what trends were occurring over time. One major obstacle was the lack of tested methodologies for monitoring spending on health research at the country level.

In an attempt to fill this gap, the Global Forum for Health Research has tackled the problem through its support of a network of investigators. This chapter synthesizes the main points of a recently published report on the first three years of the project.[3] The aim of the publication is to stimulate interest in this important issue in the hope that other investigators will critically review the methodology that this team has developed and perhaps offer refinements. Furthermore, the tentative results from a few countries should stimulate others to follow the example and provide data from many more countries. Ideally, other studies will adopt the core definitions so as to facilitate comparisons among countries and also to examine trends over time.

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1 Commission on Health Research for Development, 1990. *Health Research: Essential Link to Equity in Development*. New York, Oxford University Press

2 Task Force on Health Research for Development, 1991. *Essential National Health Research. A Strategy for Action in Health and Human Development*. c/o United Nations Development Programme, Geneva, Switzerland.

3 Global Forum for Health Research, *Monitoring financial flows for health research*. October 2001.

Section 2

Why measure resource flows?

1. Fragmented data

Knowledge of resource flows for health research is an important input into priority setting. Although funding agencies and companies in the public and private sectors may have internal mechanisms to track health research and development (R&D) expenditures, the available data is very fragmented. The Organisation for Economic Cooperation and Development (OECD) is the only institution with a mandate to regularly collect and disseminate standardized national statistics on aggregated health-related R&D for its member States. R&D funds are reported as part of Science and Technology (S&T) information. While no equivalent institutional mechanism exists in low- and middle-income countries, information on resource flows has recently begun to emerge.

The challenge now is to develop and apply health R&D indicators which can be collected in low- and middle-income countries, countries in transition and high-income countries. Wherever possible, such indicators should draw on existing international statistical standards. Consistency will facilitate comparisons between countries while also meeting national and regional needs.

A more detailed mapping of global resource flows will help decision-makers in all countries to target, and therefore better allocate, funds supporting health R&D. Mapping will also help monitor shifts in R&D funding allocations towards the most prevalent health conditions and determinants, identify the areas which do not attract enough funding, and avoid unnecessary duplication of research efforts. These measures, in turn, are expected to have a significant impact on reduction of the burden of disease and injury in low- and middle-income countries, particularly among the poor.

2. Progress in resource flows measurement

Since the Commission report, the 1996 Report of the WHO Ad Hoc Committee on Health Research reiterated the importance of establishing an institutional mechanism for the systematic tracking of investments in health R&D. Although that report provided summary data on public and private investments in health research and estimated global health research investments at US$56 billion, the authors acknowledged the complexity of developing a useful system to monitor resource flows.

Beginning in 1999, the Global Forum for Health Research supported efforts to develop and implement a system for tracking and reporting investments in health research. Monitoring focused on investments made by low- and middle-income countries, high-income country agencies providing funds to low- and middle-income countries, and for problems relevant to low- and middle-income countries.

The five-year Resource Flows Project's goal is to improve priority setting through developing a database of internationally comparable statistics on global resource flows for health research. To reach this goal, the Global Forum and its partners intend to:

- define the inputs for the database
- develop institutional mechanisms for providing the inputs
- report health R&D expenditures
- ensure that decision-makers have access to the database
- link these activities with priority-setting exercises in order to maximize the effectiveness of investments in health research.

This chapter describes the first three years of project work. An Advisory Group (Annex 6.1) met with Global Forum staff four times between January 1999 and February 2000 to assist in the development and assessment of the methodology used for obtaining data for the project, including the conceptual framework.

Collecting and reporting data on funding for health research are challenging tasks and this report represents only the first step towards that end. The Global Forum is actively supporting the work carried out by others, facilitating standardization where feasible, helping to fill in gaps to disseminate the information.

Section 3

Methods

1. Definition of health research and development

The following definitions of research and health research, used by the OECD and UNESCO, were adopted for this study:[4]

"Research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications."

Thus, health research is a process for generating systematic knowledge, and to test hypotheses, within the domain of medical and natural sciences as well as social sciences, including economics and behavioural science. The information resulting from this process can be used to improve the health of individuals or groups.

2. Conceptual model

One objective of the project was to measure total funding of health R&D worldwide, with

[4] OECD. The Measurement of Scientific and Technological Activities, Proposed Standard Practice for Surveys of Research and Experimental Development, *Frascati Manual 1993*, Paris, 1994.

particular emphasis on R&D for or by low- and middle-income countries. Insert 6.1 illustrates the main components. "Area A" corresponds to the health R&D efforts of high-income countries. "Area B" represents the health R&D efforts of low- and middle-income countries. The overlapping "Area A/B" depicts where these efforts converge or overlap. These three areas could be further defined in several ways. For the purpose of financial flows in the present study, "Area A" describes all health R&D *funded* by high-income countries; "Area B," all health R&D *financed by and carried out in* low- and middle-income countries. "Area A/B" corresponds to R&D funded by high-income countries and carried out in and for the primary benefit of low- and middle-income countries. The area should also incorporate R&D carried out in high-income countries which is for, or relevant to, the needs of low- and middle-income countries, and R&D carried out in low- and middle-income countries which is for, or relevant to, the needs of high-income countries. The three areas constitute the framework for project data collection.

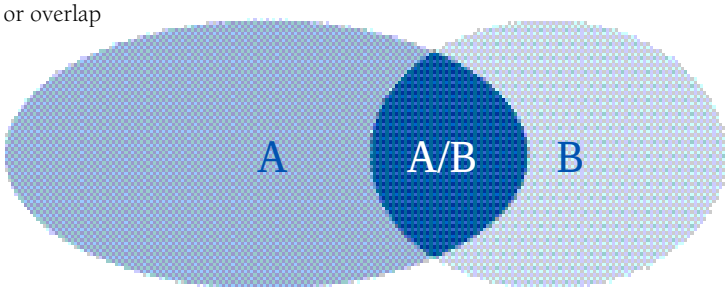
Data on health R&D expenditures can be collected from the unit providing the funds ("the funder") or from the unit actually carrying out the research ("the performer"). The data compiled within areas "A" and "A/B" were generally collected from funders, whereas the data for area "B" were collected from both performers and funders. Because the three categories of data were compiled using different approaches and from different sources, it was challenging to aggregate them into the global total, and especially to avoid double counting of area A/B.

The countries undergoing transition from centralized to market economies do not fit easily into the model. They are examined in a separate section but are also treated in the discussion of area A/B, as they are eligible for some of the types of support for health R&D traditionally oriented towards low- and middle-income countries.

Insert 6.1

*Graphic representation of health research funding**

A = R&D by high-income countries
B = R&D by low- and middle-income countries
A/B = R&D efforts converge or overlap (see text for details)



* Proportions for surfaces A, B and A/B are indicative only.

3. Classification framework

The major product developed under the guidance of the Advisory Group was a classification system to cover total health R&D. The aim was to produce a set of categories that would be useful for decision-makers especially in low- and middle-income countries. It would, in addition, serve as a framework for special surveys and for documenting data compiled from other sources.

The main categories of the classification are listed in Insert 6.2.

There are other dimensions by which R&D resource flows are commonly classified. These may include activity, discipline, topic, location, beneficiary and development outcome. The Advisory Group and consultants endorsed the development of a comprehensive framework that included multiple levels of disaggregated data and thoroughly discussed the details.

Insert 6.2

Classification of resource flows for health research

Levels of aggregation of R&D funds	
A.1	Non-oriented, fundamental research
	No further disaggregation
A.2	Health conditions, diseases or injuries
A.2.1	Group I (communicable, maternal, perinatal and nutritional conditions) *
A.2.2	Group II (noncommunicable diseases) *
A.2.3	Group III (injuries) *
A.3	Exposures, risk factors that impact on health (determinants)
A.3.1	Risk factors within the health system
A.3.2	Risk factors outside the health system
A.4	Health systems research
A.4.1	Policy and planning research
A.4.2	Health services delivery research
A.4.3	Surveillance
A.5	Research capacity building
A.5.1	Recurrent expenses
A.5.2	Capital expenditures

* Groups I, II and III follow the Global Burden of Disease classification (C.J. Murray & A. Lopez, *Global Burden of Diseases and Injuries*. Volume 1. WHO, 1996)

It was also necessary to identify some institutional categories for the main types of health R&D funders and performers. The following groups of funders and users/performers were identified (Insert 6.3):

Insert 6.3
Classification of funders and performers

	Funders	Performers in low- and middle-income countries
Public sector	Government departments (national aid agencies)	Government departments Academic/research institutes Hospitals Others
Private sector	Pharmaceutical firms Private non-profit organizations	Pharmaceutical firms Academic/research institutes Hospitals/laboratories NGOs Others
International	Multilateral Bilateral	Foreign institutions Government departments Others

The funding classification tested in previous exercises had been used for health R&D financed by high-income countries (Areas A and A/B in Insert 6.1).

The user/performer classification was developed during the experimental health R&D surveys in selected low- and middle-income countries (Area B in Insert 6.1).

4. Sources of data[5]

Previous global resource flow studies have, by and large, focused on data from existing databases and estimated the data from low- and middle-income countries. The present project extends that work by developing special surveys based on the new classification; by making more extensive use of recently published data sets; and by undertaking institution-specific case studies involving personal contacts with funding agencies and low- and middle-income country institutions. The following strategies were used:

(a) Funder questionnaires
(b) Special survey for low- and middle-income countries
(c) Funder surveys/databases
(d) Government S&T surveys
(e) Evaluations, annual reports, websites
(f) Interviews/personal contacts.

[5] For further details, see Global Forum for Health Research, *Monitoring financial flows for health research*. October 2001

Section 4

Results

1. Global health R&D and main aggregates funded by high-income and transition countries

Based on partial estimates, public and private sources worldwide invested a minimum of US$73.5 billion in health R&D in 1998 (or about 2.7 % of total health expenditures worldwide). Governments in high-income countries, countries in transition, and low- and middle-income countries invested at least US$ 37 billion (50%), and the pharmaceutical industry US$30.5 billion (42%). Private, non-profit and university funds provided the remaining US$6 billion (8 %). See Insert 6.4.

Governments of countries having established market economies (high-income countries) spent US$34.2 billion on health R&D, in addition to an estimated US$350 million in development assistance for health R&D. Governments of the Central and Eastern European countries in transition for which estimates are available (Czech Republic, Hungary, Poland, Romania, the Russian Federation, Slovak Republic and Slovenia) spent an estimated US$200 million out of a total health R&D expenditure of about US$360 million in these countries.

For low- and middle-income countries, it is estimated that Argentina, Brazil, Mexico and other Latin American countries, in addition to India, Malaysia, the Philippines, Thailand, Turkey and Chinese Taipei, spent a minimum of US$2.5 billion in 1998 on health R&D. Data for other low- and middle-income countries which spent significant amounts on health research, such as the People's Republic of China, are not available at this stage.

Insert 6.4

Estimated global health R&D funding 1998 (in current US$)
Total US$73.5 billion

	Total (billion US$)	Percent
Public funding: high-income and transition countries	34.5	47
Private funding: pharmaceutical industry	30.5	42
Private not-for-profit funding	6.0	8
Public funding: low- and middle-income countries	2.5	3
Total	73.5	100

Overall investments in health R&D from public, industrial and non-profit sources increased in real terms in high-income countries during the 1990s, in contrast to a general decrease in the countries in transition.

The figure of US$73.5 billion contrasts with that of US$56 billion in 1992 (in current terms). It is estimated that up to one-third of the increase between 1992 and the present study is in real terms. Data from low- and middle-income countries, when available, indicate considerably larger R&D investments in health from national sources than earlier studies had estimated.[6] While this increase reflects real growth in overall investments in health R&D, it probably also reflects better reporting for these countries.

2. Funding health R&D in high-income countries

(a) Public funding of health R&D

Governments in high-income countries invested US$34.2 billion in health R&D in 1998. The United States provided over half of this amount, investing US$19.5 billion. Japan contributed US$2.9 billion, Germany US$2.4 billion, France US$2.2 billion, the United Kingdom US$1.8 billion and Canada US$0.75 billion. Together, the G7 countries (including a rough estimate for Italy) accounted for 90% of total publicly funded health R&D in the high-income countries. All other high-income country governments together contributed US$3.5 billion.

For the United States, public funds spent for health R&D are estimated as corresponding to 0.22% of GDP, the highest figure among high-income countries. This is followed by Sweden, Austria and Finland, whose R&D funds correspond to more than 2% of national health expenditure.

Public funding of health R&D grew in the high-income countries both as a group, and in virtually all of the countries studied, individually. This was partly due to improved coverage and reporting of the data series. For example, the category "funding of hospital R&D" was added during the project period in France, the United Kingdom and Finland.

(b) Industry funding of health-related R&D

The pharmaceutical industry is the dominant industrial funder of health-related R&D. The majority of pharmaceutical research is funded by multinational companies, which are officially headquartered in high-income countries. There is of course some pharmaceutical R&D carried out in transitional and low- and middle-income countries.

The pharmaceutical industry, including biotechnology companies, spent an estimated US$30.5 billion in 1998, corresponding to 42% of all health R&D funding (Inserts 6.4 and 6.5). Reported investment in R&D as a share of sales in the pharmaceutical industry is very high. It ranged between 12% and 21% of turnover in the 15 companies having the largest R&D investment. The share was higher still in the 10 biotechnology companies making the largest R&D investments, corresponding to allocations of 26% to 67% of revenues to R&D (Insert 6.5)[7].

It has not been possible to provide a breakdown of the global total by country. From national sources it is estimated that research-based pharmaceutical companies in the United States invested US$20.3 billion in

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[6] C. Michaud, C.J.L. Murray, 1996. Resources for health research and development, 1992: a global overview. Annex 5 of ***Investing in Health Research and Development***. Report of the Ad Hoc Committee on Health Research relating to future intervention options. Geneva, World Health Organization, 1996.

[7] For further details, see Global Forum for Health Research, ***Monitoring financial flows for health research***. October 2001

R&D in human-use pharmaceuticals, of which US$16.9 billion were spent at home and US$3.4 billion abroad.[8]

(c) Private foundations and other not-for-profit organizations

Private foundations and other not-for-profit

Insert 6.5

R&D expenditures by major pharmaceutical and biotechnology companies, 1998 (US$ million)

Pharmaceutical companies 15 leading companies with largest R&D	R&D expenditures	Per US$ of total pharmaceutical sales
AstraZeneca	2,183.0	0.17
Glaxo Wellcome	1,927.5	0.15
Roche	1,893.1	0.19
Merck & Co	1,821.1	0.12
Novartis	1,801.3	0.16
Bristol-Myers Squibb	1,559.0	0.12
Hoechst Marion Roussel	1,426.2	0.18
Johnson & Johnson	1,400.0	0.16
SmithKline Beecham	1,394.0	0.18
American Home Products	1,389.9	0.16
Rhône-Poulenc Rorer	1,010.5	0.17
Boehringer Ingelheim	866.0	0.19
Bayer	852.3	0.18
Novo Nordisk	420.1	0.21
Yamanouchi	415.1	0.17
Biotechnology companies 10 companies with largest R&D		
Amgen	663.3	0.26
Chiron	108.0	NA
Genentech	396.2	0.55
Biogen	177.2	0.45
ALZA	156.8	0.67
Immunex	92.0	NA
Genzyme	63.0	NA
British Biotech	20.8	NA
Chiroscience	51.3	NA
Genset	10.1	NA

Source: SCRIP 1999, Pharmaceutical Company League Tables; Ernst & Young: European Life Sciences 99, Sixth Annual Report

[8] Pharmaceutical Research and Manufacturers of America, Annual Survey 2000.

organizations spent an estimated US$3.4 billion on health research in 1998 of which US$1.9 billion came from the United States, US$700 million from the United Kingdom, US$240 million from Japan, US$200 million from Canada and US$120 million came from France. An estimated US$200 million came from all other high-income countries combined.

The two largest private sponsors of research in 1998 were the Wellcome Trust in the United Kingdom, which spent US$650 million on biomedical research, and the Howard Hughes Medical Institute (HHMI) in the United States, which spent US$389 million.[9]

In addition to these sources, at least US$2.5 billion was contributed to health research through the private funds of universities and colleges in Canada, Japan and the United States.

3. Funding medical research in Central and Eastern European countries in transition

Countries in transition do not fit neatly into the model of country groups used for this study. Like the high-income countries, most had fully developed science and technology as well as health care systems. However, these systems suffered greatly during their difficult initial period of adjustment to market economies. And like the low- and middle-income countries, they have been recipients of aid from high-income countries, mostly to improve economic performance rather than for social objectives.

In 1998, the Czech Republic, Hungary, Poland, Romania, the Russian Federation, the Slovak Republic and Slovenia spent the equivalent of approximately US$360 million on health R&D. Government financing accounted for just over US$200 million. The magnitude of R&D efforts are not adequately reflected in these dollar figures, however, as a result of these countries' weak currencies. Comparison of purchasing power parities, reflecting the average cost of goods and services in each country, raises total health R&D funding to US$800 million, of which an estimated US$450 million was financed by public sources.

4. Funding for health R&D by low- and middle-income countries

The study did not attempt to be a comprehensive review of all low- and middle-income countries investing in health research. Research focused on a few, selected countries in which teams conducted special surveys on health R&D, in addition to countries for which published information already existed. As such, this section is not meant to provide a comprehensive analysis of investments.

It is estimated that Argentina, Brazil, India, Malaysia, Mexico, Panama, Peru, the Philippines, Thailand and Turkey spent a minimum of US$2.3 billion in 1998 on health R&D. Data for other low- and middle-income countries, among them countries which spend important amounts on health research such as the People's Republic of China, are not available at this stage. These gaps in knowledge will be addressed during Phase 2 of the project.

(a) Special surveys of health R&D

A three-country study conducted for the Council on Health Research for Development (COHRED) in Malaysia, the Philippines and Thailand traced flows of funds for health R&D from the funding sources to the performers of the research projects concerned. As a full report has been published, only the main aspects will be described here.[10]

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[9] Global Forum for Health Research, *Monitoring financial flows for health research*. October 2001.

[10] B.A. Alano Jr and E.S. Almeria, *Tracking country resource flows for health research development (R&D)*. The Philippines, Centre for Economic Policy Research, 2000.

The survey concluded that these three countries spent over US$33 million in 1997 and US$30 million in 1998 (total expenditures by public and private sectors), with Thailand spending about 50% of the total.

Government is the main source of funds for health R&D. In Malaysia these funds come largely from the Department of Science and Technology whereas the Department of Health is the main source in Thailand. In the Philippines, both ministries contribute. Multilateral and bilateral funding are relatively much higher (28%) in the Philippines than in the other two countries (see Insert 6.6).

Insert 6.6

Funding of health R&D in three Asian countries, 1998

	Thailand	Philippines	Malaysia
US$ million	15.7	7.4	6.9
% total government budget	0.06	0.11	0.04
% health budget	0.90	0.61	0.60
% GDP	0.012	0.049	0.010

(b) Health R&D data from ongoing R&D surveys

Total annual investment in Scientific and Technological Activities (S&T) in Latin America amounted to US$15.3 billion in 1998, of which R&D accounted for nearly US$11 billion.[11] Three countries (Argentina, Brazil and Mexico) accounted for 86% of the R&D spending. The percentage of GDP devoted to R&D ranged from about 1% in Brazil and Costa Rica to about 0.1% in Ecuador, El Salvador and Trinidad with a regional average of 0.58%. The public sector (government and higher education) tends to play the major role in both funding and carrying out national R&D efforts in the region, though this share is declining. Total health research (R&D) spending in Latin America in 1998 is estimated as US$1.4 billion (about 12.7% of total investments in R&D). Of this figure, Argentina (about US$240 million), Brazil (about US$850 million) and Mexico (about US$200 million) accounted for all but US$100 million (estimated for all other Latin American countries). The proportion of health research to total R&D investments in Latin America varies between more than 20% in Panama to less than 5% in Chile and Uruguay. It is not possible to identify the share funded from public sources.

[11] RICYT (Red Iberoamericana de Ciencia y Tecnologia). *El estado de la ciencia: principales indicadores de ciencia y tecnologia Iberoamericanos/Interamericanos*. Quilmes, 2000.

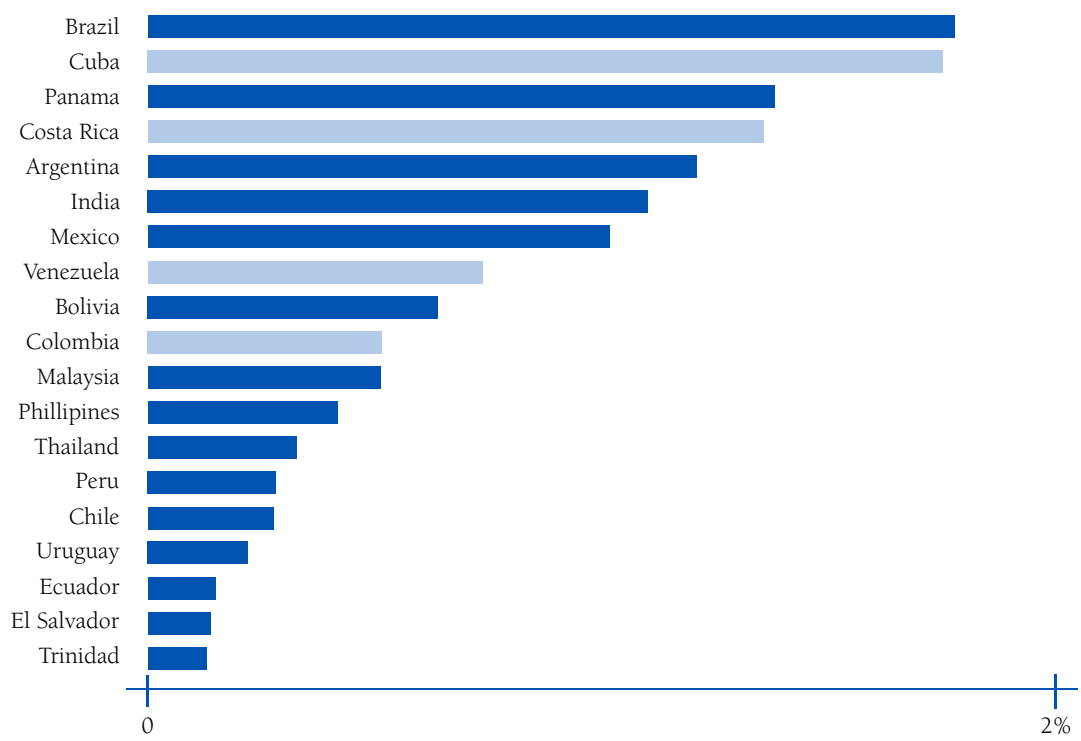
According to these estimates on health R&D, funding increased between 1992 and 1998 for all three major countries. The increases were about 40% (in current US dollars) in Argentina and Mexico, and may have doubled in Brazil.

(c) Investments in health research as recommended by the Commission for Health Research and Development

The Commission on Health Research for Development, convened in 1990, recommended that at least 2% of national health expenditures in low- and middle-income countries be allocated to health research and capacity building. Of the countries included in this study, Brazil and Cuba approached the 2% mark (Insert 6.7). Turkey was not included in Insert 6.7 as higher education subsidies in that country, particularly in state universities for medical education, influenced the high percentage reported.

Insert 6.7

Selected low- and middle-income countries: estimated health R&D as % of total health expenditure



Pale countries are particularly rough estimates.

Sources: Health R&D data: as above

GDP: ***World Development Report 2000-2001: Attacking Poverty.*** World Bank, Washington DC, 2000; RICYT, ***El estado de la ciencia: principales indicadores de ciencia y technologia Iberoamericanos/Interamericanos.*** Quilmes, 2000.

Health expenditure: World Health Report 2000. ***Health Systems: Improving Performance***. WHO, 2000; ***OECD Health DATA 2000; A Comparative Analysis of 29 Countries***. OECD, Paris, 2000.

Section 5

Discussion and future strategies

Health research is essential to improve the design and implementation of health interventions, policies and health service delivery. It is evident that the 1990s have seen a worldwide increase in funds for health research and a transition of donors. Yet, in order to improve the health of the majority of the world's population, research must be targeted to solving the problems of greatest importance worldwide now and in the future. Thus, research funds must be rationally allocated in order to:

- Develop new and improved technologies to address the diseases and conditions of greatest magnitude;
- Improve the delivery of and accessibility to health care, including preventive interventions;
- Address the cross-sectoral issues relevant to improved health.

Access to research findings – not only by the research and biomedical community, but by the global population – is critical. Hence the importance of their application at the policy and programme levels. It is therefore essential that information on health research funding on a disaggregated basis be collected and disseminated.

1. Demand for data

The demand for data on resource flows is highly segmented. Various constituencies require different types of information. Some constituencies want resource flows data to inform policy and, ultimately, to provide guidance for action. Other constituencies want resource flows data for advocacy purposes; for example, to point out that inadequate resources are being allocated for health research by a government or organization. At disease or research topic level, constituencies need data to show that important areas are being neglected. The diversity of the demand for resource flows data is reflected in the diversity of the data tracked by funders and performers.

2. Supply of data

(a) Total health R&D data

Data is readily available for advanced countries from existing data collection systems. Improvements in quality and standardizations are already underway. As part of this process, potential as well as real double counting are being reviewed. Areas constituting gaps, such as research in hospitals, are included. While it is still difficult to obtain reliable health R&D totals for some low- and middle-income countries and countries in transition, data collection systems are evolving: for example, the Latin American region. The best information obtained to date has been through special studies and surveys. While the initial study may take as long as two years to complete, such a study can form the countries' basis for a more systematic approach to monitoring resource flows in the future. In addition, by building such systems in a manner that is compatible with existing global data collection systems, it will be easier in the future to obtain a more accurate overview of total health R&D funding worldwide.

(b) Disaggregated health R&D flows data

Funding flows from high-income countries to low- and middle-income countries, or countries in transition, are usually very difficult to trace. For example, funding may be passed laterally from one advanced country agency to another before it is provided to a low- and middle-income country agency. Furthermore, these funds may be provided through multilateral channels, bilateral channels or via secondary funders, such as advanced country universities or non-governmental organizations who administer the funds on behalf of a government agency. In addition, many funding agencies are highly decentralized with decisions on allocations made in low- and middle-income countries and reporting requirements based on the overall goals and objectives developed within the bilateral relationship. Many advanced countries' funding agencies, especially those disbursing ODA, do not collect disease-specific data; therefore, this is unavailable or not easily accessible.

Funding flows within low- and middle-income countries are also complex. Research institutions receive public funds bilaterally, multilaterally and from their own governments and may concurrently receive funds from external and internal non-governmental entities. As tracking these funds is usually very difficult and time-consuming, a mapping of institutions and funding structures must be done first.

Private investments by pharmaceutical companies account for almost half of the total investments into research worldwide. Only aggregated information is released in this group. Information on the cost of research and clinical trials for discovery and development of medicines was not considered in this study. The widely quoted figure of US$500 million required to develop a new drug was not addressed in this study and should be studied and discussed in future.

(c) Usefulness of data sources for health R&D information

The following summary (Insert 6.8) examined the utility of available data sources and the quality of the information:

- *Estimates of total R&D in high-income countries*
  Results obtained mainly from S&T databases/surveys and supplemented by data from published reports were good.

- *Estimates on health R&D in low- and middle-income countries and countries in transition*
  Results obtained from the methodology developed for three-country studies were good. Improvements are needed in tracking and obtaining disaggregated data at the country level. Results from science and technology surveys and databases gave information on total funds for health research and development. They provided useful information on both performers and funders. Information on countries not researched in this first phase (for example, the People's Republic of China) will be carried out in the second phase.

- *Estimates of resource flows using high-income country funders as sources of data*
  Responses to a questionnaire sent to the funders were disappointing and this data collection approach should be abandoned. Results obtained using personal interviews and public documents were useful but required time and repeated efforts from the consultants and staff. Future efforts along these lines should be focused and adequately supported. Disease-specific data was difficult to obtain as few organizations track this information. Funding invested in research capacity strengthening was identified, along with insights for programming of resources by funders. This component should be further developed in the second phase.

Insert 6.8

Usefulness of sources for health R & D data obtained by the resource flows project

	Funder questionnaire	Special survey	Funder surveys/ databases	Government S&T surveys	Evaluations/ annual reports/ websites	Interviews/ personal contacts
High-income countries						
Government ministries/ public ODA/orgs			x		x	xxx
Other public*			xxx			xx
Pharmaceutical companies			xx		xx	
Non-profit/foundations	x	x	xxx		x	xxx
EC	x				x	xxx
WHO		xx			xxx	xx
World Bank					x	xxx
Low-, middle-income and countries in transition						
Government ministries						xx
State government					xxx	xx
Academic/research institutions		x			x	xx
Hospitals		x				xx
Multilateral/bilateral	x				xx	
NGOs		x			x	xx
Pharmaceutical companies		x			xx	xx
Academic research institutions		x			xx	xx
Total Global R&D Aggregate		xx	xx	xxx		

* Other public: public sector funding other than for ODA such as national research institutes, medical research councils, university-based research

Blank = of limited or no use x = of some use xx = very useful xxx = extremely useful

(d) Obstacles encountered

The following is a list of obstacles encountered during the process of obtaining financial data:

- Organizations surveyed do not systematically track or monitor health research as per categories defined in this paper or in the questionnaires. Members of staff surveyed were too busy to provide information beyond the scope of their records.
- While most organizations track some aspects of research capacity strengthening – such as academic degree programme training, postdoctoral training and

international projects – they generally do not maintain records on the low- and middle-income countries' components of international projects with which they collaborate. This adds to the difficulties in determining resource flows to low- and middle-income countries.
- Questionnaires developed as a survey tool for advanced country funders were too lengthy and detailed, thereby contributing to a poor response rate.
- Decentralization of management in ODA and multilateral organizations contributes to problems in obtaining data on financial resources, especially for purposes that are not high priorities for those organizations.
- Impact level measurements for parameters such as research capacity strengthening are infrequently used. As a result, research capacity strengthening is reduced in status as a priority.
- Capturing data for organizations that facilitate and convene rather than execute is difficult.
- The importance and the relevance of the data on resource flows for investor organizations is unclear when compared to other priorities.
- Fluctuations in exchange rates complicate the interpretation of data, especially long-term funding trends.
- Obtaining data from funders in advanced countries on funds actually used for research in low- and middle-income countries by local researchers is difficult. Ascertaining the percentage of funds used for administrative and managerial purposes by advanced countries and multilateral organizations is of importance to obtain a better estimation of funds actually expended in low- and middle-income countries.
- Information from low- and middle-income countries was not readily available. A framework of information about resource flows for health research in low- and middle-income countries was tested as part of this study.

3. Data gaps identified

In the course of this study, no attempt was made to gather data in the following areas (these will be addressed in the second phase of the study):

- Global allocation of funds to R&D for specific diseases.
- Public funding by advanced countries for northern institutions conducting R&D on problems important to low- and middle-income countries.
- Pharmaceutical industry funding in low- and middle-income countries.
- Cost of R&D to develop drugs and vaccines, including the costs of clinical trials.
- Regular budget allocations by UN agencies such as WHO to health research, as differentiated from voluntary contribution.
- Relation between health priorities identified in low- and middle-income countries and projects funded from national and international sources.
- Fraction of public funds invested into fundamental research which eventually leads to a marketed drug.
- Funding for social science research and for health economics research.

4. Donor transition in the late 1990s and early 2000s

In the course of this study, it became evident that important changes were taking place in the health donor community having implications for health research in, and relevant to, low- and middle-income countries. There is clear information on shifts in funding sources in the late 1990s and early 2000s, such as the new Global Fund to Fight HIV, TB and Malaria, and the recommendations of the Commission on Macroeconomics and Health (see Chapter 1). The private sector foundations, particularly Bill and Melinda Gates Foundation, and philanthropic institutions have taken a larger role in funding research. The Bill and Melinda Gates Foundation increased its investments in the health research field to US$189 million in

2001. Investments by US pharmaceutical companies are increasing in the US but not abroad. The access to the research findings by most of the world's population is a crucial component of health research and should be ensured.

In conclusion, during the late 1990s and early 2000s, there has been greater involvement of foundations, CSOs, national research institutions in advanced countries, and the pharmaceutical industry in international health. This shift is coupled with an increase in investments in health research globally, from governments in both advanced and low- and middle-income countries. The implications of this transition to improve the health of the majority of the world's population, a global public good, are not clear and have to be documented in future. By ensuring that research is conducted on diseases and determinants with the highest magnitude of disease burden, we ensure that the limited available resources have the greatest possible impact on the health of the majority of the world's population, in particular the poorer segments.

5. Conclusions and future steps

At the global level, there is no 'coordination' of health research funding, and perhaps there will never be. This study is certainly not intending to attempt such coordination. In the real world, there is a constellation of institutions working towards similar goals, which may or may not communicate with each other. A platform for discussion and information sharing can be useful to help improve resource allocation for health research.

It is expected that many more organizations will take part in future exercises on resource flows. The following strategies could be considered relevant for the next phase:

a) Measure resource flows in ***additional developing/transition countries*** using the methodology developed in this study. This should be implemented at the following levels:

- Government: improve and expand data on selected topics, such as financial flows related to health problems and determinants of disease burden at the country level; cross-check data generated with that reported by external donors.
- Research institutions: encourage analysis of resource flows into defined country health research priorities by:
  - building research capacity to measure resource flows
  - facilitating information exchange on experiences and strategies
  - disseminating lessons learned.

WHO, governments and medical research councils in low- and middle-income countries and institutions like COHRED are in advantageous positions to facilitate this strategy.

b) Improve the amount and international comparability of publicly available data on the level and structure of aggregate spending on health research by encouraging the ***entities already compiling health statistics*** to pay greater attention to R&D and by encouraging UNESCO and the regional organizations collecting R&D data to give higher priority to health-related series.

c) Periodically obtain disaggregated data from ***large investors*** in advanced countries including ODA agencies, foundations and pharmaceutical companies. Analyse the information to study the 10/90 gap in health research funding.

d) Influence partners with established interests and expertise in ***specific disease areas*** to do periodic studies of resource flows for the conditions representing the highest burden now and in the future (e.g. International Union Against TB and Lung Disease, Wellcome Trust, WHO/TDR, NIDI, WHO); assist in the identification of funding for such studies.

Annex 6.1

Resource Flows Advisory Group

The members of the Advisory Group were acting in their individual capacity and were active for varying amounts of time. The names of their institutions are mentioned for identification purposes only. The position indicated for each member is that held at the beginning of the project and does not necessarily reflect the current position.

Chair

Louis J. Currat
Executive Secretary, Global Forum for Health Research

Convenor

Andres de Francisco
Senior Public Health Specialist, Global Forum for Health Research

Members

Bienvenido P. Alano
President, Centre for Economic Policy Research, The Philippines

Wendy Baldwin
Deputy Director, National Institutes of Health, USA

Julio Frenk
Executive Director, Evidence and Information for Policy Cluster, World Health Organization, Geneva

Myint Htwe
Regional Advisor on Medical Research, World Health Organization Regional Office for South East Asia (WHO/SEARO), New Delhi

Adnan A. Hyder
Research Associate, Johns Hopkins University School of Hygiene and Public Health, USA

Catherine Michaud
Senior Research Associate, Harvard Center for Population and Development Studies, USA

Caryn Miller
Research Policy Advisor, U.S. Agency for International Development (USAID) and Associate, Johns Hopkins University School of Hygiene and Public Health, USA

Barend Mons
The Netherlands Organization for Scientific Research (NWO), The Netherlands

Eric Noehrenberg
Director of Programmes, International Federation of Pharmaceutical Manufacturers Associations, Geneva

Yvo Nuyens
Coordinator, Council on Health Research for Development (COHRED), Switzerland

Tikki Pang
Director, Research Policy and Cooperation, World Health Organization, Geneva

Ulysses B. Panisset
Regional Advisor, Pan American Health Organization (PAHO), Washington DC

Elettra Ronchi
Principal Administrator, Organisation for Economic Cooperation and Development (OECD), Paris

Bruce A. Scoggins
Director, Health Research Council of New Zealand, New Zealand

David Seemungal
Policy Analyst, Wellcome Trust, Great Britain

Adik Wibowo
World Health Organization Regional Office for South East Asia (WHO/SEARO), New Delhi

Alison Young
Organisation for Economic Cooperation and Development (OECD), Paris

Chapter 7

Progress in research capacity strengthening

For a summary of this chapter, see the Executive Summary, page xix.

Section 1

The problem

Although health research is increasingly recognized as one of the driving forces behind development, researchers from low- and middle-income countries continue to lag behind in the quality and volume of their scientific output. As a result, problems specific to the lower income countries do not receive the attention that they should from the research community. The problem is compounded by the fact that many of the communicable diseases prevalent in many lower income countries also constitute a threat to global health. And if research investments in low-income countries are insufficient to help solve their own health problems, they cannot even begin to address those that have a global impact.

Bridging this gap requires renewed and intensified efforts to develop appropriate indigenous research capacity. Capacity development has moved centre stage to become a key factor for sustainable development. It is now high up on the agenda of all development programmes and many low- and middle-income countries now give priority to research capacity strengthening (RCS) within their own national programmes.

Training and institutional development as key elements in RCS were the subject of an extensive study by the Wellcome Trust[1] covering most of the agencies that fund research training both bilaterally and multilaterally. The special focus of the report was malaria in Africa but discussions covered all areas of training. The report found that many funding organizations in industrialized countries have been supporting broad-based research training and institutional development in low- and middle-income countries. However, the study found that overall investment in training by these agencies remained modest, with an aggregate expenditure of US$261 million identified in 1995-1997 for training in biomedical sciences and health over the three-year period.

Some of those trained had, for different reasons, not returned to their home countries, thereby further contributing to the "brain drain". However, reports from the training programmes of the WHO Special Programmes – the Special Programme for Research and Training in Tropical Diseases (TDR)[2] and the Special Programme for Research and Research Training in Human Reproduction (HRP)[3] – and from DANIDA[4] – the Danish government

1 Beattie, P., Renshaw, M., and Davies, C. (1999) ***Strengthening Health Research in the Developing World: Malaria Research Capacity in Africa***, The Wellcome Trust, London.

2 World Health Organization (1999) UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, ***Progress in 1997-98***, WHO/TDR, Geneva.

3 World Health Organization (1993) ***Reproductive Health: a key to a brighter future***, Special Programme for Research, Development and Research Training in Human Reproduction, WHO, Geneva.

4 DANIDA (2000) ***Evaluation of DANIDA's Bilateral Programme on Enhancing Research Capacity in Developing Countries (ENRECA)***, Ministry of Foreign Affairs, Denmark.

programme that carries out research training through its bilateral programme of Enhancing Research Capacity in Developing Countries (ENRECA) – have all consistently shown a trainee return rate of over 95%.
On the whole, training opportunities remain fragmentary and low with no coherent international approach. As a result, the level of RCS for all low- and middle-income countries remains low and there is a need for redoubled efforts and concerted action.

The low level of human resources was recognized in the Ad Hoc Committee Report of 1996[5] as a severe handicap for R&D into health problems in poor countries. RCS has become central to all the initiatives supported by the Global Forum for Health Research and has featured on the agenda for discussion at all annual Forum meetings. The objective of the activities of the Global Forum is to correct the 10/90 gap. In order to shift the balance and increase the 10% of funds available for research on 90% of the world's health problems, a key step is to ensure that researchers from low- and middle-income countries participate actively in research on priority national health problems. In addition, scientists from these countries should be the ones to interpret and present the results of research in forms that can be used as policy and products in their own countries. RCS is now increasingly recognized as central to correcting the 10/90 gap.

The Global Forum has been involved in efforts interpret the results of past efforts at capacity development. For this, information is needed on the following:

- lessons learnt from past efforts at research capacity development by different partners;
- reasons for successes and failures;
- the extent to which these efforts have contributed to self-reliance;
- the extent to which the efforts have been sustainable;
- areas where the efforts have been synergistic and where they may have been counterproductive;
- the extent to which the efforts have helped to train multidisciplinary teams for research in low- and middle-income countries;
- the extent to which the countries have started the process of building up a research coordinating mechanism at the national level bringing together all research institutions to sit with policy-makers, NGOs and representatives of urban and rural population to discuss priority setting, funding research from national sources and evaluation.

In looking at past efforts, the Global Forum and its partners have identified a number of factors that are critical to the successful outcome of RCS. These are shown in Insert 7.1.

[5] World Health Organization Ad Hoc Committee on Health Research Relating to Future Interventions Options (1996) ***Investing in Health Research and Development***. World Health Organization, Geneva (Document TDR/Gen/96.1)

Insert 7.1
Factors critical to successful RCS

- The existence of national scientific leadership.
- Identification of key national health problems and drawing up national research priorities on which RCS should focus.
- Continuity of funding to national research groups.
- Strong commitment and support by the national government (RCS should appear in country development plans).
- Systematic identification and recruitment of talented young scientists, with appropriate gender balance, and provision of high-level training: this should lead to the development of a critical mass of scientists backed by good technical staff and a good *esprit de corps*.
- Provision of appropriate infrastructure, equipment, supplies and communication facilities, for the type of research envisaged.
- Creation of an enabling environment and stable service conditions, including remuneration for the researchers.
- Establishment of good linkages to strong institutions doing similar work in the North and South and fostering of good partnerships and networks (this theme was developed in Bern, Switzerland, during a workshop on 21-22 September 2000[6] and it constitutes the main strategy of DANIDA support[7]).
- Efforts to help countries build up the capacity to train their own scientists within their own national institutions. The aim is to create a critical mass of researchers from different disciplines to implement national research priorities.

6 *Enhancing Research Capacity in Developing and Transition Countries*, Swiss Commission for Research in Partnership with Developing Countries, 2001, KEPE Secretariat, Barenplatz 2, Bern

7 DANIDA (2000) *Evaluation of DANIDA's Bilateral Programme on Enhancing Research Capacity in Developing Countries (ENRECA)*, Ministry of Foreign Affairs, Denmark.

Section 2

What are the main challenges?

There have been some gains, even if modest, from RCS over the past two decades. There has been a substantial quantitative and qualitative increase in trainees in some middle- and low-income countries, mainly in the biomedical sciences, together with a favourable gender balance. However, gaps persist in some disciplines, including the social and behavioural sciences, health economics and priority-setting techniques. Other process and outcome measures (successful training outcomes, reintegration in their home countries, number and quality of publications, competitive grants obtained) have been quite favourable, even if some, such as the volume of publications, remain modest. Some of the trained researchers have received suitable recognition in their own countries and contributed to international research. Others have broadened their research spectrum by undertaking research in other national priority areas of research. A case in point is where scientists trained for work on the immunology of parasitic diseases in the tropics, for example, were moved by their governments to work on HIV/AIDS at the onset of the epidemic in their country. However, many challenges remain. These are summarized in Insert 7.2.

Insert 7.2

Major challenges identified

- Low-income countries are not homogeneous and progress in RCS, as in many other sectors, has been uneven. Some of the more advanced low-income countries have used training opportunities offered through competitive training grant awards to build up their indigenous research capacity much faster than the least-developed countries. The challenge now is to develop strategies for the countries that have made least progress.
- Many low-income countries do not have a comprehensive health plan in which health research has been suitably prioritized nor have they drawn up coherent programmes for research capacity development. Past efforts at promoting this actively have produced slow responses. The challenge is to get policy-makers to see the necessity for drawing this up as a matter of urgency.
- There is poor liaison and understanding between researchers located in the universities and research institutes, on the one hand, and administrators and policy-makers, on the other. The challenge is to find ways to bring these two groups closer together.
- Some developing countries continue to move qualified researchers to administrative posts where their scarce and valuable talents cannot be used either for research or for training others. The challenge is to encourage better deployment of trained personnel.
- A number of governments in low- and middle-income countries are not engaged in knowledge-based and science-based decision-making. The benefits of research are not fully appreciated and research remains low on the national priority list. The challenge is to build a culture of knowledge-based decision-making in these countries.
- Past recommendations by the Commission on Health Research for Development on the proportion of national health budgets and foreign aid (health) programmes that should be used for research – 2% and 5% respectively – have been largely ignored. The challenge is to increase national funding for research on national health priorities.
- Few attempts have been made to measure the results of the important efforts undertaken in the past 10 years in the field of RCS. The challenge is to launch a movement for the systematic measurement of the process, outcome and support of RCS.

One of the most urgent challenges is to measure the results of the efforts undertaken in the past 20 years so as to identify clearly the reasons for success and failures, identify the most blatant remaining gaps and develop a coherent plan of action at the country level.

Up till now, evaluation of the outcomes of RCS has been limited and focused mainly on the following:

1 Measuring inputs (numbers of trainees, cost of training, size of the research team);
2. Process (institutional arrangements, nature of the training, return of trainees and reintegration in home institutions, use of their knowledge/skills by the national institutions);
3. Outcomes and outputs of training (publications, competitive grants, citation index, collaboration/partnerships, "tools" developed, policy change achieved) at the individual, institutional, national and global levels.

There have been few attempts to measure the performance of trainees using impact indicators. More pertinently, there has been no attempt to measure how often research done by scientists is commissioned by policy-makers in order to provide the evidence needed for important policy decisions. Similarly, there has been little study of how often policy changes have been a direct result of research done in the country (or elsewhere). An important conclusion from this, strongly supported by recent meetings and discussions, is for the need to shift the emphasis of evaluation to measuring the impact of RCS: at the individual researcher level, at the institutional level and, most importantly, at the policy-making (national) level.

In addition, more evaluation studies, particularly impact studies, are needed from partners who have been involved in a broad range of research capacity development. This would help stimulate further discussion on this subject and contribute to better understanding and future planning.

Section 3

Progress made

A number of meetings were held in 2000-2001 to asses progress and needs in RCS. Some of the main developments are summarized below.

1. Annecy meeting, April 2000

A meeting on RCS in developing countries was held in Annecy, France in April 2000, under the aegis of the WHO, with 80 participants from more than 40 countries (including many low- and middle-income countries) including representatives from the Global Forum, COHRED, WHO/HQ, a number of research institutions and universities in the South and North and bilateral agencies. The objective of the

Insert 7.3

Recommendations from group discussions at the Annecy meeting, April 2000

- Establishment of the research agenda (including a plan for RCS) should be primarily the responsibility of the developing countries themselves.
- More attention must be given to strengthening the "demand" for research by governments (decision-makers), the public (community), civil society organizations, the media, the private sector and academic institutions (where future researchers and research users are being trained).
- All aspects of the research process (not just technical competence) must be strengthened including advocacy and promotion, priority setting, partnership development, facilitating the use of research results, networking and leadership.
- A "systems view" of RCS is needed, which includes national health research networks and forums and an enabling environment, all of which should lead to the long-term development of a research culture in developing countries.
- There is a critical need for more effective collaboration between different partners (such as WHO, DfID, Fogarty International, SAREC, DANIDA, IDRC, SDC, World Bank and many other partners) that have played critical roles in enhancing and sustaining RCS in developing countries.
- New information and communication technologies are important for RCS and should be explored more vigorously.
- RCS must be more focused on equity-oriented and gender-balanced health research.

meeting was to provide a forum for debate and discuss new ideas on RCS. Key conclusions reached are summarized in Insert 7.3.

2. Bern workshop, September 2000

In September 2000, an international workshop was held on enhancing research capacity in poor countries and countries in transition. The workshop, in Bern, Switzerland, was sponsored by the Swiss Commission for Research Partnership with Developing Countries. The workshop brought together over 120 scientists and researchers from 52 countries to discuss different approaches to and experience of promoting RCS as a means of contributing to sustainable development. The participants came from a mixed background of agriculture, environmental sciences, fisheries, engineering, veterinary sciences, and health research. The discussions showed clearly that the process of building research capacity follows the same pattern in all disciplines: building research capacity through research and learning research by doing research, with partnerships playing an important role. Key conclusions from this workshop[8] include the following:

(a) RCS remains focused mainly on development of the capacity of individuals and much less on institutional

[8] *Enhancing Research Capacity in Developing and Transition Countries*, Swiss Commission for Research in Partnership with Developing Countries, 2001, KEPE Secretariat, Barenplatz 2, Bern.

development. Participants expressed the view that sustainability would be enhanced if RCS would systematically take an institutional development view, and go beyond the training of individuals.

(b) Long-term research support is necessary to ensure good institutional development and building up of a critical mass. The project approach, generally short-term, currently favoured by many partners, is useful for providing quick answers to research questions but has limited capacity to further long-term institutional development goals and the creation of stability and sustainability.

(c) Donors need to be flexible in order to adapt to new situations and meet new challenges arising in the field. This often proves problematic since many donors operate under their own national constraints imposed by rules governing their ODA programmes.

(d) There was some support for the idea of creating "funding consortia" of donor agencies to jointly support research in clearly identified situations. Others suggested the creation of a "European Foundation for Research" that would allow for concentrated and focused funding and lead to better management, monitoring and evaluation of various support schemes.

(e) There was a general plea to make research a key element in all development processes in low- and middle-income countries and raise the status of research as a national priority.

A regional follow-up workshop was organized in Cartagena, Colombia, in November 2001 bringing together scientists and researchers mainly from Latin American countries to exchange research experiences in partnerships in the Latin American context. The discussion focused on:

- Developing the skills necessary for creating partnerships.
- Identifying and stressing the positive role of academia (universities and research institutes) and the private sector in partnerships particularly in view of the lack of effective liaison between the two sectors in Latin America.
- Ways of dealing with intellectual property rights issues raised.
- Evaluation of North-South research partnerships.

All these are key to enhancing research capacity.

3. The International Conference in Bangkok, October 2000

This conference, among other things, singled out RCS as one of five key strategies for the future of health research (the other four being knowledge production, financing, good governance and public-private partnerships). The conference highlighted country needs (citing experiences from China and Kenya) and the general need for developing leadership for priority setting, for monitoring resource flows and for communication and dissemination of research information. The Conference proceedings have been published as a report[9].

The Bangkok Conference also saw the launching of the **International Awards to Support Cooperation in Health Research for Development.** The new award was launched by WHO in collaboration with the Rockefeller Foundation. The call for applications for this award resulted in more than 500 proposals from 83 lower-income countries. Following a comprehensive selection process, 10 grantees were selected (see Insert 7.4).

[9] International Organizing Committee (2001). *Report of the International Conference on Health Research for Development, Bangkok, 10–13 October 2002.*

Insert 7.4

Winners of the International Award to Support Cooperation in Health Research for Development (Bangkok, October 2000)

• Consumer action for health: a research and action programme for Brazil
• Health research for a responsive healthcare system in Georgia
• Strengthening health research in nongovernmental organizations in India
• Improving the links between reproductive health and health sector reform in Latin America – a regional approach
• Capability strengthening of the health research network in Nepal
• South African gender-based violence and health initiative
• Development of Asia-Pacific national health accounts: regional technical standards for health accounting, assessment of equity in health systems, and establishment of regional health systems database to better assess health systems and develop health sector reform
• Africa midwives research network (AMRN): strengthening research for midwives in 10 African countries
• Proposal for strengthening the Tanzania National Health Research Forum: a national mechanism for better health research coordination
• The Alliance and Research Coordination Network for Evidence-Based Health System Reform in Thailand.

4. Evaluation by DANIDA

DANIDA recently commissioned an external evaluation of its ENRECA programme.[10] The evaluators admitted at the outset that the absence of baseline studies prior to the start of their partnership programmes made "before and after" comparisons difficult. The result of their evaluation is similar to those mentioned in this report. The results are summarized in Insert 7.5.

In summary, the evaluators concluded that projects work well when:

- Host-country partners select their counterparts.
- Partnership is balanced, with mutual trust between both parties.
- Host-country institution has clear focused research agenda and can select the projects.
- Both parties are enthusiastically committed to the project.
- There is significant level of pre-existing capacity on both sides.
- The human resource base is developed rapidly past the point of a critical mass.
- There is a strong sense of ownership by the staff of host institution.
- Danish staff provide on-site training early.
- In the case of university-based projects, the partner has significant autonomy in decision-making and partners meet regularly

.

Conversely, resluts are limited or poor when:

- There is a gross imbalance in funding between North and South. Most of the funding (around 70%) should be in the South.
- There is lack of commitment among the Danish researchers.
- There is over-dependence on one or two individuals in the host institution.

[10] DANIDA (2000) Evaluation of DANIDA's Bilateral Programme on Enhancing Research Capacity in Developing Countries (ENRECA), Ministry of Foreign Affairs, Denmark.

- There is insufficient local interest in the project, leaving responsibility for governance to Denmark.
- The parties cannot work well together.
- The research agenda of the host institution is diffuse and lacking in focus.
- Heavy reliance on Danish inputs in successive phases of the project and sustainability not planned from the beginning.
- Insufficient attention paid to dissemination of findings.
- Too much bureaucracy leads to inflexibility.
- The principles of networking are not understood.
- There is lack of collaboration with other funding partners.

Insert 7.5

Evaluation of the impact of DANIDA's ENRECA Programme

In Denmark

1. Improving knowledge and expertise within existing disciplines by feeding research results generated by ENRECA absorbed into the curriculum of Danish institutions.
2. Widening interest in development studies in Denmark by increasing number of academic staff with interest in the type of work involved.
3. Support for Danish students working for their PhD in development issues.
4. Designating development studies as a priority area of study at Copenhagen University.
5. Setting up by Danish universities of professorships in areas closely connected to development studies.
6. Introducing courses in areas such as international public health, paediatric nutrition, tropical ecology, tropical marine science, applied anthropology and tropical livestock management.
7. This Danish experience echoes those of Norway (NUFU) and Sweden (SAREC).

On target countries

Assessing impact here was found to be much more difficult as clear indicators were not readily available to the evaluators. The time available for this evaluation, particularly the field visits, was insufficient to explore the "economic, social, political, technical and environmental effects/impact of the proposal locally, regionally or nationally". The evaluators assumed that measuring the impact beyond the target group, i.e. the group of people who would benefit directly from the project, would be the nearest to a rigorous impact assessment that could be obtained. The assessments are summarized below:

1. Tanzania-Denmark collaborative research on malaria, filariasis and health sector reform

Here the target group was the staff of the National Institute of Medical Research (NIMR) and the local villages. The assumed impact was the adoption of intensive treatment according to the clinical protocols of malaria developed during the project, the handing out and use of bednets and use of qualified staff in key positions within NIMR. The evaluators verified this impact by demonstrating a decrease in the incidence of disease and a reduction in deaths among villagers during the period of the study, which they attributed to malaria.

2. Accra-Copenhagen research project on malaria

Here the target group was the malaria research community and local malaria-affected children in Ghana. The impact, in the view of the evaluators, was that laboratory examination and treatment of malaria followed the protocols developed and was verified by decreased mortality due to malaria.

3. Project on food and nutrition security in Bangladesh

Here the target groups were farmers in a district and policy-makers in food and nutrition in Bangladesh. Through interviews with farmers and the National Nutrition Council, the evaluators determined that the impact included changes in aquaculture practices and the adoption of a new national nutrition policy.

4. Livestock and helminth research project in East and Southern Africa

The target group for this research was the Ministry of Agriculture and Health and small-scale farmers. Through interviews at the National Institute of Medical Research and the Ministry of Agriculture, the evaluators determined that the impact included the identification of a new pig tapeworm (with public health implications) as well as a reduction in livestock deaths in rural areas and improvement in their nutritional status.

5. Forum 5, October 2001

Two WHO Special Programmes presented the findings of internal evaluations of the outcomes of research capacity development activities within their programmes.

(a) Tropical Disease Research Programme (TDR)

TDR administered questionnaires to over 700 past trainees and to 73 leaders of research groups where the former trainees were located. The questionnaires assessed a variety of factors, using outcome indicators developed during a TDR prospective thematic review[11] and focused on individual, institutional and national levels. The following factors were evaluated:

- skills acquired during training
- grants won since return from training
- publication record in home institutions
- interaction with disease control managers in the country
- use of grantees' research results
- further grants received
- improvement in research infrastructure in home institution
- international collaborations developed since return.

The evaluation from these perspectives was positive for all the outcome indicators and showed a much enhanced capacity at individual, institutional and national levels. However a large group of the scientists indicated that the level of their interaction with policy-makers was low. This is not surprising since policy-makers could not be expected to interact with all scientists in a country. However, an equally large proportion were glad to see the results of their research adopted by policy-makers, an acceptable measure of impact. This was mainly in the areas of new diagnostic techniques and innovative treatment protocols for some major diseases. In its latest five-year strategy, TDR has made further adjustments to its policy of RCS. Under this new policy, 40% of the budget for RCS is reserved for the least-developed countries (10% for individual researchers and 30% for institutional development) and the remaining 60% is reserved for TDR-directed priority research in disease-endemic countries (the so-called RCS-Plus). This offers good protection to the least developed countries and ensures that they continue to receive priority in RCS support.

(b) Programme on Research and Research Training in Human Reproduction (HRP)

In 1999, HRP commissioned an external panel of scientists to carry out an evaluation of its unique network of institutions involved in research on reproductive health. The report, covering the 10-year period from 1988-1998, was available in time for Forum 5. The panel used a global database of institutional performance that had been specially created to assess the effectiveness and impact of the RCS process and major constraints. The outcome of this evaluation was similar to that obtained by TDR. It also pointed to a successful programme by HRP for strengthening capacities in institutions from developing countries to do research covering the full breadth of reproductive health issues. The impact is aptly illustrated by the result from one centre in the AFRO/EMRO Region of the WHO summarized in Insert 7.6.

[11] TDR. *Prospective Thematic Review of TDR Research Capacity Strengthening, 15-17 November 1999, Geneva.* TDR/RCS/PTR/00.1

Insert 7.6

Evaluation of a centre in the AFRO/EMRO region of WHO (Department of Obstetrics and Gynaecology at Makerere University, Kampala, Uganda)

When the centre made its application for a long-term institutional development grant (LID) in 1988, the Director wrote: "Due to the political instability and dire economic problems that have gripped this country in the past two decades, there has been minimal research activity in this institution. We now, however, feel confident that with a little outside assistance to start us off, the time is now ripe to revive the much needed research activity." The LID grant was approved and during the ten-year period 1989-1999 the centre developed rapidly. A number of clinical and non-clinical members of staff received high-quality, advanced training in biostatistics, endocrinology, andrology and in medical records keeping. The LID grant played a major catalytic role in building research capacity to allow staff members to undertake multidisciplinary collaborative work with a number of national and international groups. The results of these projects have been published in high-impact peer-reviewed journals and had a major effect in determining national as well as international policies relating to prevention of mother-to-child-transmission of HIV.

The authorities in the Ministry of Health acknowledged in their evaluation the important role that the centre has played in:

- national health policy development
- national reproductive health needs assessment
- training of health personnel for various aspects of reproductive health
- introducing new contraceptive methods
- development of laboratory infrastructure for research.

As for sustainability, the Ministry of Health had proposed "that the Centre should jointly be sponsored by the University and Ministry of Health who should improve on funding, staffing and infrastructure."

(c) Study by the WHO Department of Research Policy and Cooperation

In 2000, the WHO Department of Research Policy and Cooperation distributed a questionnaire to scientists in lower-income countries asking for their perceived priorities and needs, their constraints and steps to be taken for improvement. The main responses are summarized in Insert 7.7.

Insert 7.7

Results from WHO/RPC study: responses to the questionnaire

What should be the ***primary objective*** of RCS initiatives in developing countries?	• funding of research (33%) • strengthening capacity in the research process (e.g. grant writing, research methodology, communication of research) (27%) • better research policy (23%) • postgraduate training (17%)
What would be the best strategy to improve health research capacity in developing countries?	• improve research environment (50%) • provide research funding (48%) • build capacity (37%) • improve networking and communication (24%) • provide incentives (13%) • other reasons (14%)
What are the main constraints faced by researchers in developing countries?	• lack of funds (69%) • lack of enabling environment (66%) • lack of capacity (42%)
Who should be the target of RCS initiatives in developing countries?	• individuals with potential (36%) • institutions (35%) • national and regional networks of researchers (19%) • research managers (7%) • policy-makers (3%)
What type of activities should RCS initiatives be targeting in order to have a sustainable impact?	• training courses (31%) • promoting research networks (21%) • research funding for mid-career scientists (16%) • postgraduate fellowships (11%) • research funding for young scientists (10%) • internships (9%) • awards (2%)
How should research funding be spent optimally?	• technical support (30%) • equipment (28%) • salary supplementation (17%) • reagents and consumables (13%) • computers and internet access (9%) • travel to conferences (3%)
What should be the major criteria for funding of research grants?	• national priority (82%) • track record of researcher (60%) • study design (41%) • sustainability (15%) • multidisciplinarity (11%)
Is there a medical/health research council in your country?	• yes (74%) • no (22%) • don't know (4%)
Does your country have a good database on health research capacity?	• no (51%) • yes (39%) • don't know (10%)

These three reports, presented in a session at Forum 5 (and available on the Global Forum website www.globalforumhealth.org and from the respective WHO departments) were discussed by a panel of five developing-country researchers, who highlighted constraints to RCS within the context of their own countries and institutions. The main recommendations from this discussion are summarized in Insert 7.8.

Insert 7.8

Summary of panel discussion on RCS at Forum 5

Recommendations

- Continued support should be provided to research centres (purchase of equipment, supplies including journals) and to individual scientists in developing countries (research grants, training opportunities, inputs and strong peer support from appropriate consultants).
- Efforts should be made to establish a network of institutions involved in similar research to ensure greater interaction between them.
- Performance indicators should be used to assess the output of scientists and their centres.
- Regular review should be undertaken of ongoing scientific activities.
- RCS should be an integral part of national development and should feature as a national priority with an appropriate budget allocation.
- There should always be a training component to research funding for development activities.
- Training should always be carried out through research, care being taken to ensure that the research is in keeping with national research priorities.
- RCS should include both training and institutional development.
- There should be a stronger focus on national health research priorities.
- There should be an adequate balance in health research between the central, regional and district levels.
- Medical research councils, where they exist, must improve their visibility and obtain adequate financial resources to fund research in accordance with national priorities.
- More effort should go into securing local funds for research and training.
- More established researchers in developing countries should pursue training younger scientists more systematically and vigorously in order to ensure a rapid build-up of a critical mass of researchers in diversified fields.
- Partnerships, both North-South and South-South, should be fostered.

Constraints

- Inadequate resources for research (funding, equipment, reagents and reference material, including electronic communication and the Internet).
- Non-conducive research environment (particularly in the area of remuneration and career structure).
- Insufficient training in certain key disciplines (particularly the behavioural sciences and health economics).
- Tendency of governments to prefer the use of expatriate experts rather than local scientists for health problems of national importance.

6. Other developments

(a) Some countries have started to show an interest in evaluating their RCS efforts. One of these is the Health Research Council for Pakistan. The council plans to evaluate about 69 PhDs trained in Pakistan through different agencies over the period 1986-1996. Questionnaires and focal group discussions will focus on issues such as:

- grantees' productivity (publications record)
- grants won
- cost of training.

They are being encouraged to use the indicators mentioned in the references[12,13] A very preliminary report of their evaluation was presented at the International Conference in Bangkok.[14]

(b) A survey by the *Lancet*[15] in South-East Asia and Africa draws attention to the barriers to publications by developing-country scientists under the following headings:

- low research outputs and lower publication rates by researchers of developing countries
- editorial bias that treated articles from developing countries unfavourably
- inadequate scientific data
- inadequate access to information.

These findings are at the very heart of RCS since they involve training and the scientific competence of developing-country researchers to do good research and publish their findings.

Section 4

Future objectives for RCS

The main objectives of RCS should be to assist developing countries:

- To define their national research agenda and to establish priorities through a broad national consultative process.
- To continue to develop sustainable national research institutions and train a wide range of multidisciplinary researchers with the varying skills needed to provide the evidence for dealing with national health problems, maintaining an appropriate gender balance.
- To foster an enabling environment for

[12] Global Forum for Health Research *The 10/90 Report on Health Research 2000*, Geneva

[13] TDR *Prospective Thematic Review of TDR Research Capacity Strengthening, 15-17 November 1999, Geneva*. TDR/RCS/PTR/00.1

[14] *Capacity Development for Health Research in Pakistan: Evaluating a decade of effort*, Provincial Health Services Academy, Peshawar, Pakistan, October 2000

[15] R. Horton, (2000) "North and South: bridging the information gap", *The Lancet*, 355: 2231-26

Insert 7.9

Evaluation criteria and potential indicators of impact for research capability strengthening[16]

	Individual	Institutional	National	Global
Impact RCS	Incorporation of research results in policy documents and country programmes Incorporation of individual into policy-making bodies at national, regional, global level	Cumulative (individual) involvement in national, regional, global level policy-making bodies Incorporation of institutional representatives into national policy-making bodies (consultations)	Implementation of policy at national level Budget allocation for research and continuity over time (% GNP)	Implementation of evidence-based policy at regional, global level
Outcome RCS	Publications: national, international Citation index Grants: number, magnitude, diversity of source Trainees, undergraduate, postgraduate, % women Collaboration with established international groups Awards Tools/patents Collaborative projects	Total number of publications and citation frequency over time Number of national, regional, international trainees International grants: number, diversity, magnitude and over time Participation in inter-institutional networks Proportion of projects that are inter- or trans-disciplinary Proportion of projects that are collaborative	Product Policies Tools Introduction of health-improving instruments Evidence (research results) for policy development Institutionalization of guidelines	Product Policies Tools Introduction of health-improving instruments Evidence (research results) for policy development Institutionalization of guidelines
Process	Success in training Reintegration to home country over time Promotion record	Number of funded activities and level of funding: • local (state) • national • regional • international Number of functional research groups Number of principal investigators within supported centre	National commitment to research Existence of national research council Research included as line item in national budget	Regional networks in priority research areas

[16] Conclusions of the *Prospective Thematic Review of TDR Research Capability Strengthening*.

researchers that will allow them to continue research in their home countries, with appropriate remuneration and conditions of service.
- To build up a research culture and the practice of science-based and evidence-based decision-making in the country and society.
- To facilitate dialogue between researchers and policy-makers to ensure the transfer of research results into policies.
- To involve local communities as well as civil society organizations and the media in this process in order to build up the widest possible consensus for this important agenda.
- To consolidate past gains and focus even more strongly on development of South-South and South-North partnerships to enhance research capacity development.

There is currently strong support for accelerated action to boost RCS in low-income countries. This is a priority since improving the quality and quantity of scientific research in low- and middle-income countries is critical for national development and self-reliance. Competence and technical capacity is needed in these countries to enable them to participate fully in research activities globally and to meet their own national agenda. Increased efforts are also needed to speed up the implementation of research findings. This depends on the competence of researchers and the ability of policy-makers to make use of the outcomes of research either for health interventions or for policy change as necessary. Meanwhile, governments should commission research on key health problems in order to obtain the information needed to inform policy decisions.

In addition, a redoubling of efforts is needed to ensure the full and systematic evaluation of RCS activities to date. This will require a form of evaluation that goes beyond measuring the process and outcome of capacity development to measure its impact as well. The assessment should be as objective as possible and focus on individual researchers, the national research institutions, the national policy-making level and the global health research system level. Indicators for measuring impact tend to be difficult to determine and some of them could be controversial. However, some indicators have been developed[17,18] and field application is needed in different settings in order to document their possible validity. A particularly useful matrix for the evaluation of RCS efforts was developed in the November 1999 TDR seminar on this topic. It is presented in Insert 7.9. This incorporates indicators of process, outcome and impact, distinguishing between the individual, institutional, national and global levels.

In the long run, RCS should contribute to building up a critical mass of researchers and establishing a science culture in low- and middle-income countries and elsewhere. In addition, RCS should enable developing countries to undertake research on their own health problems and participate in the global research agenda. This constitutes an important and positive step in correcting the 10/90 gap.

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17 Global Forum for Health Research. *The 10/90 Report on Health Research 2000.*

18 TDR *Prospective Thematic Review of TDR Research Capacity Strengthening, 15-17 November 1999, Geneva.* TDR/RCS/PTR/00.1

Chapter 8

Some networks in the priority research areas

Summary

The chapter reviews some of the priority areas recommended in Chapter 5, describing the size of the problem and the results of efforts to build networks which focus on these priority areas (including their objectives, partners, governance, strategies and activities).

Since it would be impossible to review all research efforts currently under way, the chapter describes the efforts undertaken by international networks in only some of the priority research areas. Some of these efforts were supported by the Global Forum for Health Research, others not. They are categorized into the following four groups:

A. Networks focusing on diseases and conditions
- Section 1. Global Alliance for TB Drug Development
- Section 2. HIV/AIDS
- Section 3. Initiative for Cardiovascular Health Research in Developing Countries
- Section 4. Multilateral Initiative on Malaria
- Section 5. Medicines for Malaria Venture
- Section 6. Mental Health and Neurological Disorders

B. Networks focusing on determinants (risk factors)
- Section 7. Reproductive Health
- Section 8. Road Traffic Injuries
- Section 9. Child Health and Nutrition Research Initiative
- Section 10. Initiative on Sexual Violence Against Women

C. Networks focusing on priority-setting methodologies *(Chapters 4 and 6)*

D. Networks focusing on policies and cross-cutting issues affecting health research
- Section 11. Alliance for Health Policy and Systems Research
- Section 12. Genomics and Health Research
- Section 13. Initiative on Public-Private Partnerships for Health.

A. Networks focusing on diseases and conditions

Section 1

Global Alliance for TB Drug Development*

1. The problem: the need for new TB drugs

About 1.86 billion people – one-third of the world's population – are infected with the bacterium that causes tuberculosis (TB). Every year, more than 8 million people go on to develop active TB and over 2 million die from the disease. Twenty per cent of AIDS patients also die from TB, and the HIV and TB epidemics fuel each other's spread. According to recent data from WHO, the annual incidence of TB rose from 8 million in 1997 to 8.4 million in 2000, and is expected to rise to 10.2 million new cases a year by 2005. The most significant increase in cases is in the African countries that have been hardest hit by the AIDS pandemic. The number of people co-infected with TB and HIV – already over 10 million – is expected to increase dramatically over the next 10 years. Moreover, people with HIV/TB are 30 to 50 times more likely to develop active TB, making TB the biggest AIDS-related killer in the world today. To make matters worse, global rates of multidrug-resistant TB (MDR-TB) are also on the rise, especially in the Russian Federation, where MDR-TB has spread in prisons and among the general population.

The resurgence of TB is being driven by the confluence with the HIV/AIDS pandemic, the spread of multidrug-resistant strains and the difficulties in expanding the Directly Observed Treatment Short Course Strategy (DOTS). Launched in 1994 by WHO, the DOTS strategy today reaches only 23% of the people diagnosed with TB. Expansion of DOTS has been slow for several reasons. The long duration of current treatment regimens recommended under DOTS – six to eight months – poses serious, in some cases insurmountable, operational problems for DOTS expansion. With the antibiotics currently available, it is impossible to reduce the duration of successful treatment. While treatment with DOTS is inexpensive, it is difficult to implement and high rates of patient non-compliance – partly because of the length of treatment – lead to increased mortality and the creation of chronic, infectious drug-resistant cases for which these drugs are ineffective or toxic.

Moreover, in the face of the HIV/AIDS pandemic, new "sterilizing" drugs with shorter regimens are needed for those with latent TB

* This text was contributed by the Secretariat of the Global Alliance for TB Drug Development.

infection who are at high risk of developing active TB. Preventive treatments with current drugs are long, cumbersome and have poor adherence rates. To stem the current epidemics, new drugs are urgently needed that can shorten the duration of treatment to less than three months, treat drug-resistant strains and prevent the progression from latent infection to active disease.

Recent scientific advances, including the sequencing of the *Mycobacterium tuberculosis* genome, reflect the continuous efforts in TB basic research by the public sector. However, these developments have not provided sufficient inducements for the development of new anti-TB medicines by the pharmaceutical industry, which is deterred by the high cost of drug development and the perception that the potential global market is insufficient to guarantee a significant return on investment. As a result, private industry has conducted virtually no R&D on anti-TB drugs since the early 1970s.

In addition, gaps in the R&D chain constitute significant barriers to new drug development. Even when new chemical entities or compounds with potential anti-TB activity are discovered and reach the pre-clinical development phase, further research towards drug development and registration is usually not pursued. In the public sector, limited resources are available for pre-clinical and clinical TB studies, while in the private sector such investments are deemed financially unattractive. As a result, most efforts stop after basic research and discovery. Currently, the probability of a single drug candidate progressing from discovery through registration is less than 0.5%.

2. Mission and objectives

The Global Alliance for TB Drug Development is a global not-for-profit venture whose mission is to develop effective new medicines to treat TB and make them affordable and available to people in developing countries. In February 2000, 120 representatives from academia, industry, major agencies, nongovernmental organizations and donors from around the world met in Cape Town, South Africa, to discuss the problem of TB treatment. Participants stressed the need for new TB drugs and highlighted the unprecedented scientific opportunities and the economic rationale for developing new TB treatments. The resulting "Declaration of Cape Town" provided a road map for action towards TB drug development and the impetus for the creation of the Global Alliance for TB Drug Development.

The Global Alliance for TB Drug Development was officially launched in October 2000. Its goal is to develop by 2010 a new anti-TB drug that is effective against resistant strains and improves treatment of latent TB infection, while reducing the duration of treatment to two months. The Global Alliance raises funds from public and private sources to support specific drug development projects and other programmatic objectives.

The Global Alliance functions as a "public-private partnership" by:

- Employing the best practices and professional dynamism of the private sector in pursuit of its social mission;
- Building partnerships and collaborating with public and private institutions working in the TB field;
- Providing staged funding and expert scientific and management guidance to advance promising compounds;
- Stimulating TB drug research and development through partnerships with the public sector, academic institutions and industry;
- Owning, controlling or managing its interest in intellectual property rights to ensure broad access and distribution of new drugs in developing countries.

3. Governance and partners

a) Governance

The Global Alliance is a non-profit organization governed by a Board of Directors. A Chief Executive Officer, responsible for the daily operations and activities of the Alliance, leads the organization and is a member of its Board. The Board consists of 7-13 directors, elected for staggered three-year terms. Currently, the Alliance Board has 11 members, representing international government agencies, the pharmaceutical industry, private foundations, nongovernmental organizations and private companies.

The Global Alliance has established offices in New York, Brussels and Cape Town, all of which operate with minimal overheads. These three locations are essential to support the Alliance's global mission by stimulating and engaging research capacity and resources from all continents. In its Cape Town offices, the Alliance also hosts the Coalition for TB R&D.

The Global Alliance established a Scientific Advisory Committee to assist in evaluating proposals and projects under consideration for investment as part of the TB drugs portfolio. The Scientific Advisory Committee (SAC) consists of 15 scientific experts from a wide range of relevant disciplines, including basic science (genomics, microbiology, molecular biology and pharmacology), clinical expertise (internal medicine, infectious diseases and clinical trials), drug development (preclinical, medicinal chemistry, formulation and manufacturing experts), TB-endemic country clinical trials, epidemiology, ethics, the pharmaceutical and biotechnology industries and statistics. SAC members serve for three years.

SAC members review proposed R&D projects and make recommendations for investments to the Portfolio Committee. The Portfolio Committee makes its recommendations to the Board of Directors for further discussion, approval and funding.

The Global Alliance's Stakeholders Association represents the various partners which helped form the Alliance. The Stakeholders Association includes broad representation from the TB field, including representatives from low-income countries, governments, NGOs, foundations and other significant contributors to the fight against TB.

b) Partners

The Global Alliance supports and works with established R&D networks or establishes dedicated networks in appropriate countries. These networks supplement the work of the Global Alliance and seek to bring together significant expertise to spur TB research. The Global Alliance stimulates synergies and cooperation within and across these national, regional and international networks and seeks to maximize cross-pollination to further TB research and development.

The Coalition for TB R&D is an interest group of stakeholders, predominantly research networks, from countries with developing or emerging economies and a high TB burden. The Coalition mobilizes researchers and investigators worldwide to share expertise and gather resources for R&D projects related to TB drugs and other TB research. The coordinating office is hosted by the Global Alliance in its Cape Town offices. Significantly, the Coalition is a worldwide network with regional focal points in Latin America, Africa and Asia. The Coalition is chaired by Bernard Fourie, who also serves as the Secretary of the Alliance's Scientific Advisory Committee.

The European Networks were launched to focus efforts in Europe toward the development of new TB drugs in partnership with the Global Alliance. Initial meetings sought to identify regional capacity and R&D gaps in these countries, involve national

pharmaceutical associations and determine ways to develop incentives for small- and middle-sized pharmaceutical companies to take advantage of working with the Networks. The European Networks are actively supported by the European Commission, and may develop joint research projects with researchers from the less developed countries for submission to the European Commission for funding through the Global Alliance. The Global Alliance will develop more formal collaborations between European partners and the Coalition for TB Research and Development. In addition to the French and Belgian Networks, other European Networks are being considered for development, including one in the UK.

4. Strategies and update on research and development activities

By using the two-pronged approach to R&D referred to above (i.e. first seeking meritorious projects through calls for proposals and then seeking direct contacts with industry), portfolio development has progressed quickly. The following is a summary of these activities:

a) Call for proposals

The Global Alliance issues calls for proposals to invest in TB-related R&D projects that are aligned with its drug development strategy. Priority is given to those projects that involve the public and private sectors and North-South collaborations. The Global Alliance's first call for proposals was issued shortly after its inception in late 2000. In response, 103 letters of interest were received from various researchers and organizations worldwide, including public research institutions, private laboratories and academic research groups. This large response helped the Alliance identify several promising new compounds, as well as capacity-building projects worthy of further development. Moreover, the process offered an unprecedented opportunity to pair projects of similar or complementary nature, and to stimulate capitalization on experience to accelerate R&D. The Alliance was especially pleased by the number of proposals from developing countries.

Among these 103 projects, 21 were selected for further review, seven were for the discovery stage, seven for the pre-clinical stage, and seven for the clinical stage. The full proposals were further reviewed and screened and the Board of Directors approved projects now in the last stages of contractual negotiations.

b) Discussions with industry

The Global Alliance is proactively pursuing partnerships with pharmaceutical and biotechnology companies.

At its June 2001 meeting, the Global Alliance Board of Directors approved several projects recommended by the Portfolio Committee. The Alliance is currently finalizing contractual agreements for the following investments:

Lead optimization

The Alliance has selected five different projects with already identified promising compounds and the synthesis of analogues. These projects involve both new families of compounds as well as derivatives of existing families.

Animal efficacy testing

The Alliance has selected a project to investigate the sterilizing potential of various compounds in the mouse model.

Enabling the infrastructure and environment

(i) The Alliance has selected a project to facilitate the development and adoption of a standardized regulatory framework for new TB drugs.

(ii) The Alliance is finalizing with partners a project to coordinate the studies of surrogate markers which, when adopted, have the potential to drastically reduce the

amount of time from clinical development to regulatory approval.

Clinical studies
The Alliance has selected one study to enhance the clinical trials capacity of national tuberculosis programmes in high-endemic countries.

5. Major outcomes

a) Scientific Blueprint for TB Drug Development

Published in April 2001 as a supplement to the journal *Tuberculosis*, the *Scientific Blueprint for TB Drug Development* provides scientists and investigators in academia, industry, and the public sector, with a detailed, well-referenced guide to all aspects of TB drug discovery and development. The Global Alliance believes that the drug discovery and development process outlined in the Scientific Blueprint will help ensure that new compounds to treat TB will move successfully through development, receive rapid regulatory approval, and be transferred into clinical use.

b) The Economics of TB Drug Development

To stimulate the active participation of the pharmaceutical industry and others in the development of new drugs to fight TB, the Global Alliance commissioned a study into the economics of TB drug development *The Economics of TB Drug Development* provides data and calculates the financial and social benefits of developing new TB drugs. The result of 12 months of expert research, analysis and consultation, the study explores the epidemiology of TB, the market for TB drugs, the development costs of TB drugs, the potential return on investment and the impact of recent trends in TB drug development. Information in this report will enable industry, philanthropic foundations and global financial and health organizations to make informed decisions about investments in TB drug development. Finally, the Global Alliance anticipates that *The Economics of TB Drug Development* will alter the status quo in TB drug development and enable the introduction of new compounds for new, faster acting, more effective and affordable TB treatment by the end of the decade.

c) Meeting to review current anti-TB drug candidates

To assist in the formulation of portfolio development strategies, the Global Alliance sponsored or co-sponsored meetings of experts. One of these was jointly convened with the Special Programme for Research and Training in Tropical Diseases (TDR) in December 2000 in Geneva. The purpose of the meeting was to count how many of the molecules reported to have anti-TB activity are actually realistic anti-TB drug candidates. The participants (about 25 people from academia, industry and the public sector) reviewed a list of about 35 compounds or classes of compounds with known activity against mycobacteria (mostly *M. tuberculosis*). They also updated and added to this list, and discussed each candidate on the revised list in detail, assessing its potential as a safe, effective and inexpensive anti-TB drug. The group concluded that the number of realistic candidates for new anti-TB drugs, among compounds or classes of compound currently known to have anti-TB activity, is small – not more than one in clinical development, two or three in pre-clinical development and a handful in the discovery phase. The results underscored the importance of more discovery research to bring new anti-TB drug candidates into the development pipeline.

d) Workshop on the role of fluoroquinolones for TB treatment

A workshop on the role of fluoroquinolones for treating tuberculosis took place in Bethesda, Maryland, in April 2001, sponsored by the Global Alliance and hosted by the National Institute of Allergy and Infectious Diseases (NIAID) of the US National Institutes

of Health. The workshop brought together drug development investigators, scientists from the US Food and Drug Agency, representatives from key pharmaceutical companies and academic physicians and scientists. The objective of the meeting was to recommend a strategic approach for the Global Alliance to use to further the evaluation of these drugs for TB treatment and prevention as quinolones have the potential to substantially shorten current TB treatment as well as increase the effectiveness of widely spaced intermittent treatment. It is also possible that a quinolone with potent sterilizing activity could contribute significantly to the treatment of latent TB infection. The overall conclusion of the meeting was that the Global Alliance should pursue the development of a novel quinolone for TB and explore the possibility of using a currently available quinolone drug. Since the meeting, the Global Alliance has continued discussions with the relevant pharmaceutical companies to advance this work.

e) Inaugural Gordon Research Conference on TB Drug Development

The first Gordon Research Conference on TB drug development was held at Colby-Sawyer College in New London, New Hampshire in June 2001. Topics included the identification of the ideal characteristics for new TB therapeutics, target selection, rational drug design, screening and lead compound identification, medicinal chemistry, drug-resistance mechanisms, animal models for TB therapy and clinical issues in the evaluation of new anti-TB drugs.

f) Public, professional, scientific and media outreach

Public, professional, scientific and media outreach are critical programmatic support activities, which stimulate interest in addressing the TB challenges and, in particular, developing new drugs.

The Global Alliance launched its new website in June 2001. While the address remains unchanged (www.tballiance.org), the site has been redesigned to provide in-depth review of the need for new TB drugs, the science and economics of TB drug development, and the Global Alliance for TB Drug Development.

g) Stop TB coordination

The Global Alliance for TB Drug Development is an active participant and member of the coordinating board of the Stop TB partnership. The Alliance has also become the lead agency for the Stop TB Drug Development Working Group. The Global Alliance recently submitted the Strategic Plan for the Working Group on TB Drug Development to the Stop TB Partnership, for inclusion in the Global Plan to Stop TB and discussion at the 2001 Stop TB Partners Forum.

h) Public policy and advocacy

The Global Alliance has an important role to play in public policy and advocacy related to TB, drug development and access, and it sees this role as central to its mission. The organization works to stimulate and advance the debate on priority setting in relation to global health challenges such as TB, and on strategic options to address these challenges – highlighting the value of public-private partnerships. To achieve these goals, the Global Alliance establishes regular contacts and collaborates with government officials and think tanks, publishes reports and articles, and attends key meetings with legislators and policy-makers.

6. Future Plans

a) Announcement of first projects in R&D portfolio

The Alliance is seeking to finalize contractual agreements with partners for projects selected for its first portfolio and a public announcement will be made once the negotiations have been concluded. Both

analogues and new classes of compounds are tentatively featured in the Alliance's pipeline. And a few of its smaller investments seek to improve the environment and strengthen capacity in areas where the Scientific Blueprint identified gaps.

b) Second call for proposals and targeted scientific investigations

Given the success of the first call for proposals, the Global Alliance continues to see this process as an essential tool to identify potential partners, stimulate activity in TB research, and capitalize on worldwide capacities. While the Alliance sees value in periodic calls for proposals, it looks to the second call for proposals to strategically refine its portfolio, most likely with a targeted approach. The second call will seek proposals to fill the gaps in the current pipeline and to refine the portfolio. The recruitment of an R&D Director will be crucial to this process.

c) Meeting on surrogate markers

The Scientific Advisory Committee of the Global Alliance is hosting a workshop on studies of surrogate markers of response to TB treatment. The objectives of the meeting are: 1) to review recent studies of surrogate markers of response to TB treament, 2) to outline standardized protocols for work in this area, and 3) to begin the process of establishing a consortium of trial sites where these studies would be conducted with the support of the Global Alliance.

d) Rifamycin investigations

Following its successful investigation into the role of quinolones for TB treatment, the Global Alliance is considering a similar investigation into the Rifamycin family of compounds. If the organization decides to move forward with the investigation, it would gather experts of relevant backgrounds to review the current status of Rifamycin compounds and to determine the possibility of new analogues for TB. Special attention would be given to Rifamycin interaction with antiretroviral treatments for HIV/AIDS.

e) New target investigations

While the Global Alliance has successfully identified promising compounds for development, it also views investment in new chemical entities as strategic. In the coming months, the Alliance will develop a plan to explore this further.

f) Infrastructure development: policies and staff

As a result of its early accomplishments and success in developing the first portfolio, the Global Alliance is expanding and strengthening its infrastructure, including staffing. In the coming months, the organization seeks to hire an R&D director, finance and administration director, project managers and additional support staff. The Global Alliance intends to explore further interaction and the development of joint advocacy activities with other TB organizations and global health advocacy networks, especially with its stakeholders.

Section 2

HIV/AIDS*

1. The problem: overview

Since the HIV/AIDS epidemic began, almost 58 million people throughout the world have been infected with HIV and almost 22 million people have died. HIV continues to spread, causing more than 15 000 new infections every day – 95% of them in low- and middle-income countries. Today AIDS is the leading cause of death in Africa, and the fourth worldwide. Recent figures indicate that the number of cases is increasing rapidly in Asia and in Eastern Europe.[1] In some areas of Southern Africa, more than 30% of pregnant women are HIV-positive. Life expectancy in the region has dropped from 62 to 47 years, and some of the countries hardest hit could lose more than 20% of their GDP by 2020 as a result of AIDS.

Despite advances in treatment and care, which are now widely available in high-income countries, the availability of antiretroviral drugs, HIV/AIDS prevention programmes and the infrastructure of health services to provide them are lagging behind in low- and middle-income countries.

While not intended to be a comprehensive list of networks, the following website addresses contain information on current research networks working on HIV/AIDS:

http://www.who.int/
http://www.who.int/HIV-vaccines/
http://www.unaids.org/
http://www.iavi.org/
http://www.ivi.org/
http://www.avac.org/
http://www.cdc.gov/hiv/vaccine
http://www.microbicide.org/

2. Research issues

The following is a list of research issues recommended by partners working on HIV/AIDS research.

2.1. Research on AIDS prevention

(a) Interrupting transmission[2,3]

Prevention programmes need to take into account the social context, including perceptions of rights to safer sex, the experience of violence, limited economic opportunities for women and the rise of sex work, communication skills, existing gender norms, the knowledge of and use of condoms and the interruption of mother-to-child transmission. And these will have to be dealt with through sustained education, skills training and support for behaviour change. While unsafe sex and injection drug use continue to fuel the broadening epidemic, it is at the same time shifting to the more

* This text was contributed by Andres de Francisco, Global Forum for Health Research.

1 Joint UNAIDS/WHO press release 53, 28 November 2001.

2 Quarraisha Abdool Karim, University of Natal, South Africa. Paper presented at Forum 5, October 2001.

3 Christopher Elias, President, Program for Appropriate Technology in Health (PATH). Paper presented at Forum 5, October 2001.

disadvantaged communities. It is imperative that these communities get the resources and support needed to take up the prevention message.

Twenty years into the epidemic, millions of young people still know little, if anything about the epidemic (see Section 7 on reproductive health in this chapter). In some countries, many have never even heard of AIDS, and of those who have, many have serious misconceptions about how HIV is transmitted. Data from the Hlabisa region in South Africa, for example, indicate that the incidence rate of HIV among prenatal clinic attendees aged 15-49 has risen from about 2% in 1993 to almost 20% in 1999 and that the ages with the highest prevalence and incidence are between 20 and 29 years. Any successful AIDS response will require providing young people with the information and life skills they need in order to prevent infections.

Research recommendations

- Conduct operations research and implement interventions with known efficacy.
- Identify and incorporate the social context in interventions geared to interrupt transmission.
- Conduct operational research on implementation of programmes aimed at interrupting mother-to-child transmission of HIV.
- Document the shift of HIV transmission to the more disadvantaged communities and identify ways to address this shift.
- Identify strategies to ensure that disadvantaged communities get the resources and support needed to take up prevention messages.
- Identify strategies to ensure that young people have the information and life skills they need in order to prevent infections.

(b) Vaccines (International AIDS Vaccine Initiative)

Although the scientific and technical challenges in the development of AIDS vaccines are formidable, progress so far suggests that these hurdles can and will be overcome. To date, more than 30 candidate vaccines have been tested in over 60 Phase I/II trials, involving approximately 10 000 healthy volunteers, mainly in high-income countries.[4]

To accelerate the development of an HIV vaccine, additional candidate vaccines must be evaluated in parallel in both high- and low- to middle-income countries.

However, the development of a safe and effective AIDS vaccine is not an end in itself. To succeed in developing an AIDS vaccine and fail to make it accessible to those most in need would be a major defeat for mankind.[5]

Research recommendations

- Accelerate the development of an HIV vaccine by evaluating additional candidate vaccines in parallel in both high- and low- to middle-income countries.
- Ensure that future products will be available, acceptable and affordable in resource-poor settings.

(c) Microbicides

The development of an HIV/AIDS prevention method that women can control could save millions of lives. The use of an effective vaginal microbicide could offer women the protection needed, and research has shown that women want such a product. The goal of

[4] Jose Esparza, Coordinator, WHO/UNAIDS HIV Vaccine Initiative. *WHO Bulletin* (2001) 79 (12):1133-1137.

[5] Yvette Madrid, consultant. Paper presented at Forum 5, October 2001.

the International Microbicide Initiative, as part of the overall effort to combat the epidemic, is to mobilize the international community to develop and make available microbicides as rapidly as possible.[6]

Over 60 compounds are currently under consideration, and Phase III clinical trials are needed to evaluate their effectiveness. However, these trials will require substantial human and financial resources as well as political will and consideration of ethical issues. Up till now, the pharmaceutical industry has not invested in this field. It has been suggested that it might be possible to set up simultaneous vaccine and microbicide trials. However, it is critical to ensure that future products will be available, acceptable and affordable in resource-poor settings.

Research recommendations

- Mobilize the international community to develop and make available microbicides as rapidly as possible.
- Ensure that future products will be available, acceptable and affordable in resource-poor settings.
- Link HIV vaccine trials with field trials of microbicides.

2.2. Research on AIDS treatment

(a) Access to drugs

While the availability of antiretroviral drugs in mainly high-income countries over the past two years has increased life expectancy and the quality of life among people infected with HIV/AIDS, most low- and middle-income countries lack access both to lifesaving drugs and the health services infrastructure required to distribute the treatment efficiently. Brazil has proved to be an exception (Insert 8.2.1). Although price is by no means the only reason for the lack of access to drugs, it is an important factor. The Commission on Macroeconomics and Health[7] identified poverty, lack of information and the shortage of health workers as important factors. It also drew attention to the lack of large-scale donor support to buy medicines and to the need to reduce prices. In February 2001, Oxfam launched the Cut the Cost campaign,[8] focusing on the adverse impact of patents on poor people/countries from a public health and basic human rights perspective, and on the inadequate access of the poor to essential drugs. The campaign made recommendations and suggestions to WTO, WHO, transnational companies, national governments and the international community to increase access to antiretroviral drugs.

Research recommendations

- Investigate the barriers to antiretroviral drug access in low- and middle-income countries.
- Evaluate the role of (i) poor health infrastructure and (ii) treatment pricing in access to antiretroviral treatment.
- Review the role of international institutions in helping to increase access to antiretroviral treatment in low- and middle-income countries.
- Conduct cost-effectiveness analysis to determine the best strategy to initiate large-scale treatment programmes in resource-limited settings.
- Replicate the success achieved in Brazil in curbing the HIV epidemic, and measure the impact in other low- and middle-income countries.

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[6] George Brown, Health Equity Program, Rockefeller Foundation. Paper presented at Forum 5, October 2001.

[7] World Health Organization, *Macroeconomics and Health: Investing in Health for Economic Development*, Report of the Commission on Macroeconomics and Health, December 2001.

[8] Ruzanna Stepayan, Oxfam GB, Armenia. Paper prepared for Forum 5, October 2001.

Insert 8.2.1

An example of successful operations research in Brazil

The number of AIDS-related deaths rose steadily in Brazil up until 1995. Then in 1996, a large-scale public health programme was implemented, involving free distribution of dual antiretroviral therapy to all those meeting the criteria set by an independent committee.[9] Dual therapy normally requires minimal laboratory monitoring and training of health care providers, and therefore considerably lower indirect costs. Following the introduction of dual therapy in Brazil, the number of AIDS-related deaths declined by over 40% from 1995-1998 – demonstrating the effectiveness of large-scale use of dual therapy as shown in other parts of the world (British Columbia (70%), Chicago and Europe). In addition, from 1997-99, the incidence of opportunistic infections was reduced by 60%-80% in Brazil, thereby reducing many AIDS-related hospitalizations and saving nearly US$290 million.

There are substantial clinical, observational and population-based data to indicate a considerable survival benefit from the use of dual therapy. In view of the 100 000 people with HIV now being treated in Brazil and the significantly lower direct and indirect costs of dual therapy in comparison with treatment of opportunistic infections, formal benefit-cost analysis is needed to determine the best strategy to initiate large-scale treatment programmes in resource-limited settings.

(b) Syndromic management

Evidence suggests that AIDS-related mortality could be reduced through better basic medical care.[10] Many HIV-infected adults coming to primary health care facilities with opportunistic infections still have a relatively efficient immune system and will respond to treatment. However, in sub-Saharan Africa, questions remain on the issue of the best treatment practice for opportunistic infections. Most studies have shown that respiratory tract infections, skin infections, febrile illness and chronic diarrhoea are the most frequent infections among HIV-infected adults throughout the region. But the cause of these infections and antimicrobial resistance differs regionally and may impact negatively on treatment guidelines.

Research is under way to improve the development and use of tools to develop simple practice guidelines to manage common infections in primary health care facilities. The aim is to improve adult case management, standardize treatment and referral patterns, reduce morbidity and improve survival.

Research recommendations

- Develop tools with simple practical guidelines to manage common infections in non-symptomatic HIV-infected patients in primary health care facilities.

[9] Mauro Schechter, Universidade Federale do Rio de Janeiro, Brazil. Paper presented at Forum 5, October 2001.

[10] Christina Mwachari, Kenya Medical Research Institute, Kenya. Paper presented at Forum 5, October 2001.

Section 3

Initiative for Cardiovascular Health Research in Developing Countries*

1. The problem: overview

The Global Burden of Disease study[11] drew attention to the high and increasing burden of cardiovascular diseases (CVD) in developing countries. And the *World Health Report 1999* revealed that 30% of all deaths in 1998 (15.3 million deaths) were due to CVD. Both sexes were affected, with CVD explaining 28% of deaths in men and 34% of deaths in women. And most deaths (78%) and the highest disease burden (over 86% of DALYs) were accounted for by the low- and middle-income countries. While this is largely due to the larger populations in those countries, the relative rise in CVD deaths as a proportion of all deaths points to a growing burden of CVD in these countries

In lower income countries, CVD-related deaths also occur at a younger age. Of the CVD-related deaths that occurred in those countries in 1990, about 47% occurred below the age of 70, while in higher income countries only about 23% of CVD deaths were among this age group.

As these epidemics advance in the developing countries, the burden of CVD gradually shifts from the rich to the poor. While this phenomenon is seen at present only in some regions, depending on their level of health transition, other regions too are likely to witness this social transition as their CVD epidemics mature.

As the accelerating epidemics of CVDs threaten the poor in increasing numbers and affect men and women alike, research is essential both to identify cost-effective mechanisms for applying existing knowledge and to bridge critical information gaps by generating new knowledge.

Research related to CVD control was recognized as a priority by the WHO Ad Hoc Committee on Health Research (1996). Consultations which began in November 1998 between the Global Forum for Health Research and WHO (NCD cluster) led to preparatory work at Cape Town (February 1999) and Sydney (May 1999) culminating in the formal launch of the CVD Research Initiative at Forum 3 in June 1999.

2. Objectives, partners and governance

The global objective of IC Health is to advance research programmes to support the prevention and control of cardiovascular diseases in developing countries.

The specific objectives of the initiative are:

1. To identify and prioritize areas of research reducing the anticipated burden of cardiovascular disease in developing countries.
2. To evaluate existing resources in developing countries, including scientific knowledge relevant to CVD control, and to identify critical information gaps.

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* This text was contributed by K.Srinath Reddy, Manager of the Initiative for Cardiovascular Health Research in Developing Countries, Delhi.

[11] C.J.L. Murray & A.Lopez, *Global Burden of Diseases and Injuries*, WHO, 1996.

3. To delineate research needs relevant to the application of available knowledge and acquisition of new knowledge in critically deficient areas.
4. To identify the scientific and financial resources required for addressing those needs.
5. To promote partnerships between donors and scientists worldwide to ensure the availability of optimal resources for undertaking essential research relevant to CVD control.
6. To provide an institutional framework for supporting research in a sustainable manner.
7. To develop and strengthen networks of scientific collaboration to address and attain prioritized research goals.
8. To develop and implement international collaborative research projects which will help inform policy and empower national programmes for cardiovascular disease control, by providing models for cost-effective prevention, surveillance and management in lower income countries.
9. To build capacity for conducting such research, through training and institutional strengthening at various levels of health care.
10. To play an effective advocacy role for linking the products of research to policy and practice.

The partners of the initiative, as presently constituted, are as shown in Insert 8.3.1. Efforts are under way to get more partners from middle- and low-income countries.

The initiative functions through a research network of developing-country scientists and institutions that maintains connectivity with other national and global research networks and agencies.

Its governance structure includes:

- Partnership Council (for management policy), currently chaired by Kenneth Shine, President of the Institute of Medicine, National Academy of Sciences, USA
- Executive Committee, comprising six members of the Partnership Council (for regular oversight of the initiative's plans and activities)
- International Scientific Advisory Committee (for science policy)
- Scientific Secretariat (for development and coordination of research projects) based at the All India Institute of Medical Sciences, New Delhi
- Research Network of Developing Country Scientists (for conducting research through internationally funded or nationally mobilized grants)
- Project Advisory Committees of international scientists with project-related expertise to guide, monitor and evaluate each of the collaborative projects.

3. Strategies and priorities for action and funding

The strategies and related action plan pursued by IC Health are guided by the overarching principle that research, policy development, capacity building and advocacy must, in concert, catalyse national programmes and international partnerships for the prevention and control of cardiovascular diseases in developing countries.

During the past two years, the initiative designed and started the implementation of a research portfolio of six projects that will together contribute to the implementation of a programme of CVD prevention and control. These projects are to be conducted as multi-centre collaborative studies, with each project involving at least six developing countries

Insert 8.3.1

Present partners of the Initiative for Cardiovascular Health Research in Developing Countries

Centers for Disease Control and Prevention (USA)
Global Forum for Health Research
Health Canada
Institut Universitaire de Médecine Sociale et Préventive (Switzerland)
Institute of Medicine (USA)
International Clinical Epidemiology Network (INCLEN)
International Institute of Health and Development (Australia)
International Obesity Task Forum
Medical Research Council of South Africa
National Institutes of Health (USA)
National Public Health Institute (Finland)
World Health Organization
World Heart Federation
World Hypertensive League

from different regions. The technical documents of these projects have been placed in the public domain, to enable other investigators also to conduct similar projects by accessing national resources. The initiative has established a research network of developing-country scientists who will conduct these studies either as national studies or multi-centre international collaborative studies.

The Scientific Secretariat is currently funded by the Partnership Council whose members have also provided seed grants for project development. The projects are submitted for grant support to international health research agencies. On behalf of the Partnership Council, the Global Forum coordinates the administrative arrangements and exercises financial control over the Scientific Secretariat.

4. Activities over the past two years

The main activities carried out include the following:

- A Research Network of Developing Country Scientists has been established and strengthened. The Eastern Mediterranean Network of Preventive Cardiology and the Regional Initiative for Central and South America for CVD Prevention were also formed to catalyse regional collaborations in research relevant to CVD control.
- The Partnership Council was expanded by the admission of developing-country institutions. The governance structures were strengthened through the creation of an Executive Committee of the Partnership Council to provide regular oversight of the activities. This Committee holds teleconferences at six-weekly

intervals, while the Partnership Council and ISAC meet every six months.

- The research agenda of the initiative was streamlined and leadership roles assigned. A document entitled "Practical pathways for further development of projects constituting the research portfolio of IC Health" was defined, outlining the methods by which each of the research projects could be advanced through designated leaders chosen from among the partners. This document was adopted by ISAC and Partnership Council.
- Project P1 (Assessment of existing capacity for control of CVD and diabetes in developing countries) is now under way in three countries. In India, qualitative research has been completed and quantitative surveys are in progress. In Cameroon, qualitative research has been completed and quantitative surveys are due to start soon, while in Thailand qualitative research is also ready to start. Projects P2 and P3 are being led by WHO and will involve IC Health at various levels. Project P4 has been submitted to donors, following protocol development, and is awaiting funding decisions. Project P5 will be developed further in two workshops proposed for 2002.
- A workshop conducted on "Research for control of high blood pressure and associated risk factors in the developing countries" during Forum 5 was attended by 48 participants. Two research designs were developed: one for community-based educational interventions and the other for identification and management of individuals at high risk of CVD. It is planned to use these in initiating national and multi-country studies through well developed country-specific protocols.
- A website (www.ichealth.org) has been established to profile the initiative, place the project protocols and related technical documents in the public domain, list recent and future activities and also provide a resource bridge to connect scientists from different countries with IC Health (see Insert 8.3.3).
- The initiative has also been extending support, through the Secretariat, Research Network and Partners, to the WHO-led Framework Convention on Tobacco Control (see Insert 8.3.4).

5. Plans for the next two years

The following activities are planned:

(a) Project P1 is currently under way in three countries. A joint workshop, to be held with WHO in March 2002, will identify three more countries where this study can be initiated. The secretariat of IC Health has prepared the training material for this workshop and will familiarize the participants with qualitative and quantitative research methods to be used for conducting this project. Project P4 has been developed through joint efforts of the Institute of International Health (Sydney, Australia) and the Scientific Secretariat of IC Health. Proposals to initiate the project in India and South Africa are under evaluation. The project is expected to be initiated in one or both countries in 2002.

(b) WHO is leading plans to develop and implement Projects P2 (surveillance of CVD risk factors) and P3 (community-based interventions for CVD intervention).

(c) Two protocol development workshops will initiate work on acute and chronic care of CVD (P5):

- Workshop on research related to acute care of CVD: focusing on acute coronary events (unstable angina and acute myocardial infarction) and acute cerebrovascular events (transient ischaemic attacks and stroke).
- Workshop on research related to chronic care of CVD: focusing on congestive heart failure, secondary

Insert 8.3.2

Summary of the six research projects

	Project	Expected Research Outcome	Process
P1	**Assessment of existing capacity for control of CVD and diabetes in developing countries**	Situation analysis of existing capacity as relevant to present and projected needs of programmes for prevention and control of CVD and diabetes.	Initiated in October 2000; currently being conducted in India, Cameroon and Thailand; three other centres likely to join in early 2002.
P2	**Establishment of sentinel surveillance systems for CVD**	Baseline profile and time trends of CVD mortality, risk factors, determinants; demonstration of feasibility and sustainability of these systems when integrated into existing health care infrastructure.	• To be integrated with WHO's NCD surveillance projects • Indian Sentinel Surveillance Study (ongoing).
P3	**Community-based interventions for CVD risk reduction at the population level**	Demonstration projects of multifactorial interventions to evaluate feasibility and cost-effectiveness.	To be integrated with WHO's NCD prevention projects.
P4	**Clinical algorithms for early detection and cost-effective management of individuals at a high risk of CVD**	Development of evidence-based, context-specific, resource-sensitive algorithms and evaluation of strategies to integrate them into existing primary and secondary health care services.	Project protocol developed; grant application under review.
P5	**Clinical algorithms for cost-effective care of:** **(a) myocardial infarction (MI)** **(b) congestive heart failure (CHF)** **(c) stroke**	Development of algorithms for delivery of high-impact interventions for acute and chronic care and evaluation of strategies to integrate them into existing primary and secondary health care services.	Protocol development workshops related to research on (a) acute care (MI, stroke) and (b) chronic care (CHF, chronic care of cardiovascular risk factors, secondary prevention of CVD) Proposed for 2002.
P6	**(a) Accessing existing knowledge of disease burdens and risk factors of CVD (Phase I)** **(b) Development of a global information network of developing country databases (Phase II)**	Systematically searched and critically appraised data from existing studies (published and unpublished) for immediate application, to guide policy and future research proposals.	Network of CVD-related research in developing countries being established with wide-ranging partnerships.

Insert 8.3.3
IC Health Resource Bridge for Developing Countries

Can we help you to …	**Please help us to …**
Locate resource persons?	Build global partnerships
Acquire technical support for epidemiology studies?	Create a directory of ongoing research
Develop policy documents by providing relevant data?	Collect and disseminate research results
Network with others?	Foster regional research networks

Insert 8.3.4
Framework Convention on Tobacco Control

The Framework Convention on Tobacco Control (FCTC) is a global effort, involving all Member States of the World Health Organization (WHO), to promote concerted international action to counter the increasing threat of tobacco consumption and related diseases. Global and country-specific research on tobacco and its multiple effects on health were pivotal in providing the technical basis for this convention. FCTC represents the first initiative undertaken by WHO in the exercise of its treaty-making rights. It provides countries with a framework for multi-sectoral action at the national level as well as an agreed approach to deal with transnational challenges such as cross-border advertising, illicit trade in tobacco products and standardization of packaging, labelling and measurement of tobacco constituents and emissions. It incorporates a wide range of price and non-price measures intended to promote avoidance and cessation of tobacco use, in all forms, as well as extend protection from exposure to environmental tobacco smoke. The International Negotiating Body (INB) of governmental delegations has met three times in Geneva, since October 2000, to discuss and negotiate the treaty provisions, with several international NGOs as observers. The Global Forum for Health Research is extending its support to the FCTC through global advocacy. In particular, the Initiative for Cardiovascular Health Research in Developing Countries is collaborating with global and national NGOs to mobilize support for FCTC. The Coordinator of IC Health, Professor K. Srinath Reddy, is a member of the official Indian delegation to the INB, and the Scientific Secretariat of the initiative has assisted the Indian Government and Indian NGOs in preparing and presenting the case for a strong and effective FCTC.

prevention of CVD and long-term management of diabetes and hypertension.

Research questions will relate to the development of evidence-based, context-specific and resource-sensitive guidelines and clinical algorithms for management in primary and secondary care as well as health system issues related to delivery of chronic care (including informed self-care and care by non-physician providers), adherence to long-term therapies and health care financing. About 20 disease experts and developing-country researchers will meet for one week to develop research protocols for the development and evaluation of educational interventions involving guideline-based clinical algorithms for primary and secondary health care providers in a range of developing-country settings. These proposals will be submitted to external donor agencies for funding.

(d) IC Health will partner the World Heart Federation's Scientific Council on Epidemiology and Prevention in organizing a 12-day seminar on cardiovascular epidemiology and prevention and a research methodology workshop. The 10-day teaching seminar conducted annually by WHF's scientific council on epidemiology and prevention is scheduled to be held in Kerala, India, in September 2002. IC Health has negotiated with the WHF to increase the number of fellows in 2002 from 30 to 36, of whom at least half will be from developing countries (an increase from one-third in previous years).

The seminar will feature a course on principles of epidemiology, research methodology, CVD risk factors and preventive cardiology. In addition, the 2002 seminar will also feature a workshop for the development of a research protocol on a topic relevant to CVD prevention. A similar seminar will be jointly organized in Venezuela in 2003. These workshops, targeting young health professionals, are designed to strengthen the capacity of developing countries to conduct research in the fields of cardiovascular epidemiology and prevention. The aim is to create a critical mass of skilled investigators who can contribute to applied health research that will, in turn, help facilitate national programmes for the prevention and control of cardiovascular diseases.

(e) The secretariat of IC Health will assist in research project development meetings convened by the Regional Initiative for Central-South America (May 2002) and the Eastern Mediterranean Network of Preventive Cardiology (April 2002). Many of the initiative's projects will be implemented through such research networks.

6. The potential impact of IC Health

IC Health has initiated collaborative studies in developing countries to address research questions relevant to CVD control in low- and middle-income countries. This will be extended to fostering regional networks of cardiovascular investigators within a country. These regional networks will form the hub of a much larger global network with the common goal of enhancing cardiovascular health in developing countries. The information generated by these studies will serve to inform policies and empower programmes for CVD prevention and control while helping to build research capacities and competence in these countries. Such research will help reduce the anticipated burden of CVDs in developing countries.

It has been estimated for example that in Asia a slight reduction in blood pressure across the

population (achievable through modest changes in diet and physical activity) could result in a significant reduction in the number of CVD deaths projected to occur by 2020. If this were coupled with modest treatment among people with clinical hypertension, it could lead to a 22% reduction in projected CVD deaths. If multiple cardiovascular risk factors (systolic and diastolic blood pressure, smoking and obesity) were modified by modest changes in diet, physical activity and tobacco avoidance/cessation at the population level, and combined with appropriate use of proven cost-effective interventions for individuals at high risk, most of the projected CVD burden in low- and middle-income countries could be averted.

The challenge for IC Health is to make effective use of available knowledge to prevent millions of premature deaths and disability due to CVD in low- and middle-income countries – thereby safeguarding valuable human resources for development.

Section 4

Multilateral Initiative on Malaria*

1. Introduction

The Multilateral Initiative on Malaria (MIM) is an international alliance of organizations and individuals working to maximize the impact of scientific research on malaria in endemic countries, especially in Africa. MIM activities are carried out by constituent components: the MIM Secretariat, the Malaria Research and Reference Reagent Resource Center (MR4), MIMCom.Net and the MIM research programme administered by the Special Programme for Research and Training in Tropical Diseases at the World Health Organization (MIM/TDR). The alliance stimulates collaborative research to address the needs of public health and malaria control programmes, supports activities to upgrade communication technologies in support of malaria research and strengthens institutional research capacity and human resources where the need is greatest. Detailed information on MIM, its partners and activities is available on the MIM website at: http://mim.nih.gov.

2. The MIM Secretariat: coordinating the global collaboration in malaria research and capacity strengthening

The MIM Secretariat works to advance all objectives under the MIM umbrella through a number of activities and initiatives. The US National Institutes of Health's (NIH) Fogarty International Center (FIC) assumed the role

* This text was contributed by Andrea Egan, Coordinator of the Multilateral Initiative on Malaria at the Fogarty International Center (NIH) and the TDR/RCS team.

of MIM Secretariat in 1999, following the Wellcome Trust, the first to serve in this capacity after the MIM was formed in 1997. Responsibility for the MIM Secretariat will rotate to another participating organization at the end of 2002, maintaining the multilateral nature of the alliance and representation of all MIM partners.

During 2000-2001, the Secretariat addressed the problem of isolation of scientists in malaria-endemic countries by fostering increased dissemination of relevant information to the malaria research community, especially in Africa, and by providing opportunities for endemic area researchers to communicate their work to each other and to investigators in the North. To accomplish this, the Secretariat organized a number of MIM meetings and symposia.

The Secretariat has produced a number of articles and publications to highlight gaps in research and training and what can be done to address them; it maintains the MIM list-serve which provides a continual update of the latest opportunities in research funding, training, travel scholarships and job appointments relevant to the research community in malaria-endemic countries.

The Secretariat plans to hold the Third MIM Pan-African Malaria Conference in Arusha, Tanzania, on 18-22 November 2002. This is a biennial event that focuses on research in Africa that will lead to improved malaria control and prevention. The MIM conferences are a unique opportunity for scientists and malaria control programme personnel from across Africa to meet to discuss research required to develop new and improved intervention strategies and to evaluate the effectiveness of existing control strategies.

The Secretariat is also acting to stimulate research on vector biology and control.

Finally, the Secretariat works with researchers from malaria-endemic countries to identify mechanisms to strengthen research capacity, and has organized workshops on grant writing, peer review, writing scientific papers and making scientific presentations. The Secretariat is developing a training programme for new and potential leaders of African research institutions that conduct malaria research on the effective administration, management and leadership of research institutions in Africa and will hold the first training workshop in Tanzania in summer/autumn 2002. The goal of these activities is to increase the capacity of both individuals and institutions in malaria-endemic countries in the conduct and support of research.

3. Malaria Research and Reference Reagent Resource

In support of MIM, NIAID of the NIH established a Malaria Research and Reference Reagent Resource Center (MR4) to provide malaria research reagents and training workshops to the malaria research community to enhance multi-site studies. MR4 has a collection of well characterized research materials, both parasite- and vector-related, that is responsive to specific requests or research projects. Workshops, training programmes, and information dissemination aimed at fostering technology transfer to malaria-endemic areas are important components of MR4. MR4 workshops have been held to train malaria researchers from endemic countries on malaria bioinformatics and aspects of handling and managing biological materials.

4. A malaria research network for Africa (MIMCom.Net)

The National Library of Medicine (NLM) at the NIH, working in partnership with organizations in Africa, the USA and Europe, created MIMCom.Net, the first electronic

malaria research network in the world. The network provides full access to the Internet and the resources of the World Wide Web, as well as access to current medical literature, for scientists working in Africa. MIMCom.Net works to provide African research scientists the same level of Internet access as their colleagues elsewhere in the world. In most cases, connectivity has been enhanced by use of a Very Small Aperture Terminal (VSAT) which links to a shared satellite system that is not subject to the problems and limitations of telephone wires or other more traditional means of obtaining an Internet connection and is, therefore, highly reliable. Although associated costs are high, MIMCom.Net is designed to allow hundreds of researchers in Africa to share satellite bandwidth, maximizing the usage of satellite capacity and minimizing cost per site. MIMCom.Net has greatly expanded its network over 2000 and 2001 to include 12 research sites in Mali, Kenya, Uganda, Tanzania and Ghana. The NLM provides ongoing technical support and training to Information Technology (IT) personnel at each site, and held a training workshop for these IT personnel in Scotland in October 2000.

5. Malaria research capability strengthening in Africa (MIM/TDR)

This is a multilateral funding mechanism set up by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). Its activities are run by a Task Force, coordinated by TDR, whose overall goal is to strengthen capacity and human resources for malaria control through support of research activities focusing on areas of broad application in malaria-endemic countries. Its objective is to strengthen core African research groups (engaged in basic and /or applied science) in developing effective control tools for malaria and improving relevant health policy strategies. The strategy used is to support partnership research along with capacity building and technology transfer programmes between African scientists and investigators in developed countries around specific scientific priority areas.

Twenty-three collaborative research projects involving 14 African countries with partnerships in Europe and the United States have been supported by the MIM/TDR Research Capability Strengthening Task Force. The projects focus on six priority areas with potential impact on malaria control:

- epidemiology (3 projects)
- pathogenesis and immunology (5 projects)
- entomology and vector studies (3 projects)
- antimalarial drug policy and chemotherapy (8 projects)
- health systems research including social science (1 project)
- natural products and antimalarial drug development (3 projects).

A significant achievement of the MIM/TDR Task Force during the period is identification and emergence of new research leadership and partnerships among African scientists and institutions collaborating with their colleagues based in Europe and the United States. To date, a total of 20 PhDs and 17 MScs have been funded through the research projects. In addition, training workshops focusing on research methodologies and development of novel protocols and symposia have been supported by the Task Force as mechanisms for capacity building and dissemination of new knowledge to the scientists. Annual investigators meetings were held in Ouagadougou in 2000 and in Harare in 2001. The investigators meetings are an important forum for interaction and communication between the African scientists. The meetings also provide an additional system for assessing the progress of the projects. The immediate challenge is the need for greater strategic input of all stakeholders into the MIM/TDR RCS activities in Africa, considering that this region bears

the largest proportion of the burden of malaria in the world.

A new round of proposals was considered in Entebbe in March 2002. The Task Force will continue to support young scientists in environments with limited resources and provide viable partnerships projects based on South-South and South-North collaboration.

The experiences in the implementation of the 23 projects funded to date will inform the strategy for selection of new projects and follow up on all projects. The Task Force will promote:

- networking of projects of similar research focus
- training activities within research projects
- team building around projects
- regular meeting of principal investigators of projects
- electronic communication in partnership with NIH/MLM-MIMCom.Net including access toscientific publications
- targeted R&D for products with high impact for malaria control.

The development of a critical mass of trained scientists in basic and applied research for the control of malaria in Africa remains the central objective of the Task Force. The next phase of its activities will be devoted to consolidating the research partnerships and capacities established to date. In the last three years, a network of five research groups has emerged with the aim of using targeted research to provide relevant and timely data on *P. falciparum* resistance to national malaria control programmes for evidence-based policies on malaria treatment and control. The activities of this network are being facilitated by direct involvement of the principal investigators and African resource persons in the management and implementation.

The Task Force approach in developing research networks represents the next logical step in malaria RCS in Africa. The network will facilitate the cost-effective use of resources for training and multi-centre studies on malaria. In addition to the antimalarial drug resistance network, four potential research networks have been identified and will be assisted by the Task Force to emerge as regional research and training resource facilities:

- Epidemiology of Malaria in Africa: to facilitate the establishment of capacity and infrastructure for collection and coordination of malaria epidemiology data useful in the selection and assessment of intervention strategies.
- Immunology and Pathophysiology of Malaria: to establish a research and training network of African scientists in immunology and pathogenesis of malaria to share resources, technology transfer and training collaboration.
- Natural Products and Antimalarial Drug Development: to facilitate the development of antimalarial drugs from natural products by linking African scientists and institutions with different levels of expertise in the drug development process; to establish GLP and GMP capability in the drug discovery and development process.
- Vector Biology and Insecticide Resistance: to foster collaboration between vector biology and insecticide resistance investigators and potential links to control programmes with capacity to develop and implement plans for rational insecticide use in Africa.

Section 5

Medicines for Malaria Venture*

1. Size of the problem: overview

Malaria kills over one million people a year – mainly children under five and pregnant women. It is estimated that there are over 300 million cases of malaria every year – mainly in sub-Saharan Africa (90%) and other developing countries. Global warming could extend the range of malarial mosquitoes and increase the spread of the disease.

The countries worst affected today do not have the resources to combat malaria effectively. While a number of malaria vaccines are currently under development, many technical challenges remain. Most recently, scientists have raised the theoretical possibility that an imperfect vaccine could lead to the development of more virulent strains of the parasite and make the public health situation even worse. Although several effective mosquito reduction measures exist to prevent malaria, antimalarial drugs are at present the safest and most effective way of both preventing and treating the disease. With growing resistance to current first-line drugs, there is a clear and urgent need to discover affordable new drugs for use in disease-endemic countries.

The Medicines for Malaria Venture (MMV) was established in response to this situation and to the failure of the market system to provide the required incentives for malaria drug R&D. For "neglected" diseases such as malaria, a commercial return is either not obtainable or at best very modest. The public sector, while recognizing the pressing medical need for drug R&D, normally only funds basic research and thus cannot respond directly from its own resources. Modern drug R&D requires considerable technological, managerial and regulatory inputs that are generally found in the private sector.

In this context, the MMV's operational blueprint was chosen to be a 'public-private partnership'. Such partnerships are increasingly becoming the preferred approach to health care problems which are recognized as important but which neither the public nor the private sector can address on their own.

MMV arose from discussions between the Global Forum for Health Research, private-sector representatives (International Federation of Pharmaceutical Manufacturers Associations and Association of British Pharmaceutical Industries), the Rockefeller Foundation, the Swiss Agency for Development and Cooperation, the Wellcome Trust, the World Bank and WHO. The combined expertise and perspectives of these parties was required for the full development of the MMV concept.

2. Creation of the network, objectives, partners and governance

MMV was established as a Swiss foundation in November 1999. The global objective of the foundation was defined as "to bring public and private sector partners together to fund, and provide managerial and logistical support for, the discovery and development of new

* This text was contributed by Christopher Hentschel, Chief Executive Officer of Medicines for Malaria Venture, Geneva.

medicines for the treatment and prevention of malaria. The products should be registered in malaria-endemic countries as "public goods" that are affordable and appropriate for use by poor populations".

(a) Governing Board

The MMV Foundation is governed by a Board of Directors of up to 12 members, chosen for their scientific, medical and public health expertise in malaria and related fields, their research and management competence, as well as their experience in business, finance and fund-raising. The current Chair of the Board is Dame Bridget Ogilvie, a parasitologist and former head of the Wellcome Trust.

The Board meets at least twice yearly in Geneva at MMV headquarters. It is the highest policy- and decision-making body of the foundation. Its main duty is to ensure that the management, through its current business plan, is efficiently executing the objectives of MMV. It establishes the overarching policies and principles followed by the foundation and also appoints the Chief Executive Officer.

(b) The Expert Scientific Advisory Committee (ESAC)

The function of this body is to advise on the selection and review of projects for funding by MMV and to provide more general advice and information on appropriate technical strategies for the foundation to achieve its goals. The members of the ESAC come from both industry and academia and cover the full range of expertise required to assess projects in the extremely complex process of drug research and development. The Committee Chair is Simon Campbell, who was formerly head of global drug discovery for Pfizer.

Insert 8.5.1

MMV Board Members

David Alnwick	Project Manager, Roll Back Malaria, WHO, Geneva
Enriqueta Bond	President, Bourroughs Wellcome Fund, USA
Louis Currat	Executive Secretary, Global Forum for Health Research, Geneva
Winston E. Gutteridge	former head of Product Research and Development, UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)
Trevor Jones	Director-General, Association of British Pharmaceutical Industries, UK
R.A. Mashelkar	Director General, Indian Council of Scientific and Industrial Research
Graham Mitchell	Chairperson, Scientific and Technical Advisory Committee, UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)
Francis Nkrumah	Director, Noguchi Memorial Institute for Medical Research, University of Ghana
Leon Rosenberg	Professor, Department of Molecular Biology, Princeton University, USA
Christopher C. Hentschel	Chief Executive Officer, MMV

(c) Stakeholders

MMV receives funding and support from the organizations shown in Insert 8.5.2.

3. Strategies and objectives

MMV's virtual R&D approach comprises several modules. It competitively selects and then actively manages projects that, with its partners, contain all the scientific and project-management expertise normally found in both public and private sectors. Thus a key strategy is to link compatible academic and industry groups to optimize access both to the technologies associated with drug R&D, and to the mindset and thinking that is required to generate real world products. In some cases these links may already be established and in others it may be necessary to broker partnerships. MMV managers, together with the Expert Scientific Advisory Committee, then closely monitor the projects against defined milestones. Continued funding will be dependent on success and progress toward the goal of discovering and developing an appropriate drug.

The virtual drug R&D managed by MMV implies that all laboratory processes are outsourced. This is a model pioneered in the bio-pharmaceutical industry to reduce capital expenditure. However, the paradigm envisaged by MMV is not only to utilize cost effectively cutting-edge science where it already exists, but also to integrate this with cutting-edge managerial approaches facilitated by the IT and communications revolution.

A key advantage offered by MMV to potential donors and stakeholders is the ***portfolio management*** aspect operating within MMV. By developing a portfolio approach, assessed by competitive scientific and sustainability criteria, MMV provides a considerably greater chance of achieving success than by the narrowly targeted investment in a single project or single institutions.

MMV has developed a strategy that utilizes existing and emerging scientific opportunity to meet both short-term and long-term drug R&D needs.

Insert 8.5.2

MMV Stakeholders

Bill & Melinda Gates Foundation

Exxon Mobil Corporation

Global Forum for Health Research

International Federation of Pharmaceutical Manufacturers Associations

Netherlands Ministry for Development Cooperation

Rockefeller Foundation

Swiss Agency for Development and Cooperation

United Kingdom Department for International Development

World Bank

World Health Organization: TDR and Roll Back Malaria

In the short term, great hope is attached to the development of existing drug classes such as the artemisinin derivatives, drugs derived from a Chinese herb *Artemisia annua*. However, these drugs currently have to be administered over five to seven days when given alone. In poor countries, where cost of treatment is a major concern and health care infrastructure is poor, the full course is often not completed and recrudescence of the disease can occur. To counter this problem, and in an attempt to reduce the likelihood of drug resistance, some scientists have proposed that these drugs should be combined with other drugs for the treatment of malaria. Examples of such combinations can be found in the current MMV portfolio.

In the medium to longer term, MMV seeks to bring forward entirely new classes of drugs, both singly and in combination, to meet the future challenges of drug resistance and to improve compliance. The availability of the malaria genome sequence, expected to be finalized in the near future, will generate a substantial amount of valuable new information that will be a wonderful additional asset to this long-term goal. However, drug discovery is a long and complex process. It takes many years of dedicated biology allied to cutting-edge medicinal chemistry to convert ideas and "leads" into drugs. The chemical compounds have to be designed not only to inhibit the molecular target against which they are directed, but to be stable, to be non-toxic, to be absorbed into the blood stream and to cross from the blood plasma into the parasitized red blood cell.

Project selection and review

The Medicines for Malaria Venture has established a rigorous process of project selection and review, of which the key component is competition. MMV seeks the best projects possible, both in terms of science and in terms of the teams that can be assembled around the projects. A strong competitive process is generated initially through an open, public and widely communicated call for project proposals. This is coupled with more proactive research and networking on a global scale.

There remains a strong competitive element to the process after selection. The project teams are made aware at the outset that continued MMV support is dependent on both progress against milestones and on the project remaining competitive with other projects in the MMV portfolio. Therefore, all major projects have to be reviewed annually by the Expert Scientific Advisory Committee.

4. Results over the past two years and perspectives over the next two years

MMV has built up a project portfolio over the past two years that is already the largest portfolio in malaria drug R&D since the Second World War. By 2002, MMV's portfolio had grown to include eight projects: three exploratory projects, three discovery projects and two development projects; and funding had reached US$6 million a year, compared with US$2.4 million spent in 2000.

MMV's first call for proposals was focused on drug discovery which, while high risk, has the advantage for a young organization of being less management-intensive than drug development. This focus also provided an early test of the willingness of companies to engage in projects for which the chances of success and commercial return were very limited. Six projects from more than 100 original letters of interest were finally selected. They consisted of three major projects that each contained a link with major pharmaceutical companies, and three exploratory projects based in academic laboratories. All of these projects were initiated under agreements that give MMV the rights to any compounds that are selected for entry into development. All of MMV's legal agreements

are case-by-case and attempt to produce win-win scenarios for all the partners.

MMV is committed to and now has the capability to take on management-intensive drug development projects. One of the challenges over the next two years will be to continue expanding the portfolio while simultaneously driving forward projects into the development phase.

By the end of 2002, MMV hopes to have up to 14 projects in its R&D portfolio while still containing R&D costs to the levels projected in its business plan. By 2004, MMV hopes to have about 20 projects in the pipeline, a number that should meet the challenge of delivering one new antimalarial every five years. To achieve this, funding will need to increase to about US$30 million a year, plus an equivalent of "in kind" support from industry.

Other challenges also need to be addressed over the coming years. Malaria chemotherapy is far more complex than the sole issue of combating the spread of drug resistance, important though that is. The drugs MMV helps develop must also address the full range of unmet medical needs associated with malaria. These include:

- Medicines and appropriate formulations for paediatric use
- Medicines that are safe for use in pregnancy, including intermittent use to prevent serious malaria infection in pregnancy and thus enhance the health of the newborn
- Medicines that are appropriate for use in complex emergency situations such as refugee camps, where healthcare infrastructure is minimal and where extremely short-course treatments are required
- Medicines that address needs of severe (comatose) malaria patients
- Medicines that address the needs resulting from *P. vivax* infection and infection from other species of malaria parasites in addition to *P. falciparum*
- Medicines that are appropriate for malaria prevention.

MMV will manage the development of its portfolio to ensure that these needs are addressed. Regular consultations, particularly through the Roll Back Malaria Partnership, will ensure that the drugs under development continue to be directed principally towards meeting priority medical needs, as data on these needs are refined at the country level.

5. Indicators of success

Ultimately, MMV's value will be measured in terms of the number of patients treated with antimalarial drugs as a result of its work and that of its many partners. Shorter term indicators of success are the size and quality of MMV's pipeline and the rate of pipeline progression compared to industry norms. Such 'surrogate' indicators are required for drug R&D because it takes so long to deliver real products.

Unless the drugs discovered and developed by MMV are widely available to patients in disease-endemic regions, the whole venture will be of little practical use. Therefore, MMV is working at several levels in an effort to ensure optimal uptake of its products downstream:

- MMV has set as a goal the discovery of agents that have low intrinsic costs. Thus, projects will be identified in which manufacturing costs can be kept as low as possible.
- By taking on a large portion of R&D costs and also by taking on the responsibility for managing the projects and assessing their viability as sources of new drugs, MMV is substantially lowering both the cost and the risk for companies wishing to commercialize MMV products downstream.

- Because of this engagement by MMV and the fact that it will actively seek IPR protection, MMV is in a position to negotiate appropriate arrangements for the out-licensing of its products for commercialization.
- MMV is a partnership supported by several organizations (e.g. WHO, IFPMA, World Bank) that are actively engaged in addressing the issue of improving access to products in developing countries. These discussions are maturing and it is anticipated that as MMV products approach the stage of commercialization, MMV will be able to avail itself of the new initiatives that are likely to be developed over the coming years.

6. Conclusion

By engaging in antimalarial drug R&D within a not-for-profit, yet business-like framework, and by aligning itself constructively with both public and private sectors, MMV has already made a significant start towards producing much needed new antimalarial drugs. The vision that one day these will become public goods with a significant impact on this disease seems attainable within the time-frame.

Section 6

Mental Health and Neurological Disorders*

1. Size of the problem

Throughout the 20th century, mental health was the "poor relation" of health and medicine. Mental disorders were mystified and stigmatized, and mental health services were centralized, institutionalized, professionalized and de-personalized. It was widely believed that mental disorders were culture-bound syndromes of the West and the North, that the incidence and prevalence in low- and middle-income countries were low, that most cases were not amenable to effective treatment and that existing treatment regimes would be unaffordable in low- and middle-income countries.

The concept of burden of disease introduced and estimated for a wide range of diseases in the 1993 World Bank Report dramatically changed this picture. It was shown that mental and neurological disorders cause a higher burden than all forms of cancer. And that in both high- and low- to middle-income countries they account for over 10% of the total disease burden. At least one in four

* This text was contributed by Thomas Bornemann, Mental Health and Substance Dependence, WHO, and Walter Gulbinat, Consultant, Global Forum for Health Research .

people will develop one or more mental or behavioural disorders at some stage in their lives.[12] Recent estimates show that, in low- to middle-income countries, neurological, psychiatric and developmental disorders account for nearly 15% of DALYs, 12% of all deaths, and 34% of DALYs from noncommunicable diseases[13].

Mental disorders have clear economic costs. Sufferers and their families or care givers often experience reduced productivity at home and in the workplace. Lost wages, combined with the possibility of catastrophic health care costs, can seriously affect patients and their families' financial situation, creating or worsening poverty.

Mental health problems can lead to antisocial and self-harming behaviours, substance misuse and risk-taking behaviours which expose individuals to potential harm from outcomes such as accidents and sexually transmitted diseases. Poverty limits the treatment of mentally ill patients and good mental health contributes to well-being and to increased productivity and social cohesiveness. Mental disorders also affect the course and outcome of co-morbid chronic conditions, such as cancer, heart disease, diabetes and HIV/AIDS.

2. Mental health and the international agenda

(a) World Health Organization

In 2001, for the first time WHO devoted World Health Day and the *World Health Report* to the issue of mental health.[14] During the World Health Assembly, all four ministerial roundtables focused on this issue. As a follow up to these activities, WHO launched the mental health Global Action Programme which is described below.

At the World Health Assembly, a session on mental health and neurological development reviewed the main messages of the WHR 2001[15] as well as key future research areas. The report identified that the burden of mental and neurological disorders is large, cost-effective interventions are available but still not used adequately and examples of "best practices" illustrate what can be achieved following sustained action. The Report recommends that all countries, regardless of resources available, should take action to:

- provide treatment in primary care
- make psychotropic drugs available
- give care in the community
- educate the public
- involve communities, families and consumers
- establish national policies, programmes and legislation
- develop human resources
- establish links with other sectors
- monitor community mental health
- support more research.

The uneven distribution of resources for mental health within countries was described based on the findings of WHO's ATLAS project.[16] Data collected from 185 countries revealed that over 40% of countries do not have a mental health policy, 25% do not have legislation on mental health, 28% do not have a separate budget for mental health, 37% do not have mental health facilities and 70% of the world's population has access to less than one psychiatrist per 100 000 people.

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12 *World Health Report 2001*. World Health Organization, Geneva.

13 *Neurological, Psychiatric, and Developmental Disorders: Meeting the challenges in the developing world.* Institute of Medicine, USA, 2001.

14 *World Health Report 2001*. World Health Organization, Geneva.

15 Srinivasa Murthy, WHO. Paper presented at Forum 5, October 2001.

16 Project ATLAS, WHO 2000-2001. Geneva 2001.

In response to these two documents, WHO launched a five-year Mental Health Global Action Programme (mhGAP) to provide a clear and coherent strategy for closing the gap between what is urgently needed and what is currently available in an effort to reduce the burden of mental disorders worldwide. The goal is to support Member States by strengthening their capacity to reduce the stigma and burden of mental disorders, with a particular emphasis on six conditions (depression, schizophrenia, alcohol and drug dependence, dementia, epilepsy and suicide). The mhGAP will have four core strategies:

- information
- policy and service development
- advocacy
- research.

(b) Institute of Medicine

In June 2001, the Institute of Medicine (IOM) of the US Academy of Sciences, supported by the Global Forum for Health Research, four institutions of the National Institutes of Health (NIH) and the US Centers for Disease Control and Prevention (CDC), jointly published a report on *Neurological, Psychiatric, and Developmental Disorders: Meeting the challenges in the developing world.*[17]

In order to identify opportunities for research leading to successful interventions in the near future, the report focused on: (i) developmental disorders; (ii) bipolar disorders; (iii) depression; (iv) epilepsy; (v) schizophrenia; (vi) stroke. Each of these disorders or group of disorders is common, and preventable or treatable.

In addition to future research areas quoted below, the main recommendations of the report are:

- Increase public and professional awareness and understanding in low- and middle-income countries.
- Intervene to reduce stigma and ease the burden of discrimination often associated with these disorders.
- Extend and strengthen existing systems of primary care to deliver health services.
- Make cost-effective interventions available to patients.
- Create national centres for training and research on brain disorders.
- Create a programme to facilitate competitive funding for research and for the development of new or enhanced institutions devoted to brain disorders in low- and middle-income countries.

(c) A research network supported by the Global Forum[18]

An increasing number of countries are reviewing and reorganizing the structure of their national health care services in an effort to limit costs, while at the same time enhancing equity and effectiveness. As a result, they need ready access to the basic tools for mental health policy formulation: for assessing the mental health status of the population; for understanding the strengths and weaknesses of the actual system in place; and for studying the alternatives that exist and may already be in operation in other countries.

There is no universally applicable blueprint for formulating and implementing national mental health policy. In response, the Global Forum launched a collaborative research project with a focus on Mental Health Policy and Services. Funding covered the period from March 2000 to December 2001, which was devoted to the development of methods and instruments. The objectives were: (i) to

[17] *Neurological, Psychiatric, and Developmental Disorders: Meeting the challenges in the developing world.* Institute of Medicine, 2001.

[18] "Final Report, International Consortium for Mental Health and Policy Research." Global Forum for Health Research, 2001.

identify and document key elements of a national mental health policy; (ii) to provide tools and methods for assessing the current situation regarding a country's mental health policy, programmes, services and care; and (iii) to establish a global network of expertise (institutions and experts).

A Co-ordinating Centre in each of the six WHO Regions was identified, and regional groups established. Each group adapted a research protocol to the regional sociocultural situation and reviewed research instruments to assess the mental health situation in selected countries. Countries involved included Azerbaijan, Bulgaria, Chile, India, Iran, Lithuania, Malaysia, Nepal, Pakistan, the Philippines, Thailand, Trinidad and Tobago, Uganda, Ukraine and Zambia. The countries started the process of completing National Mental Health Country Profiles.

The work during this two-year project period resulted in the following products (available on request from the Global Forum):

- The Mental Health Country Profile: a description of the structures and human resources available in a country.
- The Mental Health Policy Template: a tool to evaluate policy elements.
- The Focus Group Approach: a method for involving the major stakeholders for research.
- An international network of resource centres for mental health policy and system research.

3. Mental health needs

It is important to clarify what is meant by *mental health*. WHO defines health as "a state of complete physical, mental and social well-being and not only the absence of disease and infirmities". And the *World Health Report 2001* describes how mental health has been variously defined by scholars from different cultures, concluding that "it is generally agreed that mental health is broader than a lack of mental disorders"[19].

The following categories illustrate the various dimensions related to mental health[20] (Insert 8.6.1).

4. De-institutionalization of mental health patients and treatment

The last 100 years of mental health management saw a shift in the way communities approach this. While mental health patients were normally treated in mental health institutions, over the past three decades there has been a gradual shift towards the de-institutionalization of mental health services. The decision of the Italian Government in 1978 to close all mental hospitals received global attention. Since then, most other countries have been trying to find an optimal balance between specialist and primary health care services and between hospital and community care. However, this requires strengthening community health care systems to look after these patients, emphasizing the need for training of staff and for adequate financing for mental care referral systems. The following include some of the key requirements for de-institutionalization to be effective:

- The de-institutionalization of patients with severe mental illness needs to be linked to an upgrading of the health care systems within the community that will have to receive them.
- In order to deliver care to a significant segment of the mentally ill population, primary care and social services must have

[19] *World Health Report 2001*, World Health Organization, Geneva.

[20] Report on a meeting of the project's Organizing Committee, Kampala, 13-14 March 2000.

Insert 8.6.1

Categorization of dimensions related to mental health

Public dimension	Mental "hygiene" dimension	Disease dimension
• violence, crime, homicide	• uprooting	• schizophrenia
• juvenile delinquency	• victimization	• depression
• early pregnancy	• bereavement	• suicide
• excessive risk taking	• social integration	• post-traumatic stress syndrome
• drug and alcohol abuse	• humanization of health care	• epilepsy
• self-destructive behaviour	• mental health promotion	• Alzheimer's disease
• absenteeism	• coping	• mental retardation
• street children (social neglect)	• school mental health	• disorders of childhood and adolescence
	• family mental health	
	• community mental health	

adequate training and structural linkages to specialist mental health service providers.

- The increase in trained mental health professionals as a means of expanding access to care will require increased attention to their distribution and to the acquisition of specific role-based skills through certification and other means.
- The dependence on families and community support systems, including self-help groups, public housing, etc., requires the establishment of sufficient structural and financial linkages with mental health services.

5. Research capacity building for mental health research

In order to conduct mental health research tailored to the needs of their own populations, low- and middle-income countries must have the capacity to do research on their priority needs. The results of the work described above clearly demonstrate that this is an area that has been grossly neglected in the past. For more than 20 years, epilepsy, for example, has been a candidate for immediate intervention in low- and middle-income countries. A cost-effective treatment has been available for a long time, and there is agreement internationally that epilepsy programmes should start immediately in low- and middle-income countries. Yet, the treatment gap is estimated to be 70%-80%, indicating that the availability of a cost-effective treatment is no guarantee that it will be available for those who need it.[21] Operational research is needed in low-income countries to identify the reasons for this treatment gap.

[21] Henneka de Boer, Global Compaign Against Epilepsy. Paper presented at Forum 5, October 2001.

High quality, intersectoral, decentralized and cross-disciplinary research combined with public advocacy of the research results are needed to overcome the barriers to care for the persons with mental and neurological disorders in poor countries and to change unhealthy behaviour among high-risk groups in poor countries. There is a critical lack of research capacity in low-income countries in these fields and of ability to translate research results into action. This gap must be bridged. There is an urgent need to increase the capacity of institutions in low-income countries to conduct research designed to improve the mental, neurological and behavioural health of their populations.

More specifically, the following steps should be undertaken:

- Develop, test and apply a method for assessing the current capacity of low-income countries to conduct mental, neurological and behavioural health research relevant to their populations.
- Identify obstacles and factors conducive to mental, neurological and behavioural health research in low-income countries.
- Design, test and implement strategies and means for strengthening the mental, neurological and behavioural health research capacity of institutions in selected, prototypical low-income countries.
- Establish a sustainable multidisciplinary network of research institutions of excellence, both in high- and low- to middle-income countries, capable and committed to serve as resource centres for mental, neurological and behavioural health research in low-income countries.

6. Research recommendations on mental health

(a) Research into specific diseases/ conditions/consequences

- Clinical descriptions of diseases (including developmental diseases, bipolar conditions, depression, epilepsy, schizophrenia, stroke)
- Course and outcome of disorders (suicide, adherence to treatment)
- New and improved treatment therapies
- Response to treatment including drug trials
- Stigma associated with the diseases.

(b) Research into the gap between treated and untreated disease burden

- Identify how many people, in a given country or community, suffer from a mental disorder that is preventable, treatable or manageable
- Identify how many people seek help for their mental health problems
- Identify how many people use mental health services even though they do not need them
- Identify how many people with defined mental health problems for which treatment exists do not seek help.

(c) Research into determinants (risk factors)

- Focus research on specific groups (women, adolescents, migrants, elderly, people in conflicts, etc.)
- Substance abuse (including co-morbidity)
- Social sciences and behavioural research
- Monitor the burden of brain disorders in low- and middle-income countries
- Alcohol and drugs misuse.

(d) Research into service delivery systems and policies

- Improve instruments and research tools
- Explore ways of translating research into policies and programmes
- Define the role and status of mental health in health sector reforms
- Conduct operational research to assess the cost-effectiveness of specific treatments and health services in local settings
- Document the reasons for the persistence of a treatment gap for available and highly cost-effective interventions, such as for epilepsy.

B. Networks focusing on determinants (risk factors)

This part B deals with some examples of networks focusing on proximate determinants. For a discussion of distal determinants, see Chapters 1, 4 and 7.

Section 7

Reproductive Health*

At Forum 5, two problems were underlined as priorities in the field of reproductive health research: risky sexual behaviour among adolescents and pregnancy-related mortality.

1. Adolescence

Adolescents account for over one billion of the world's population. However, they are not a homogeneous group. There is a need for research studies on the design, implementation and evaluation of programmes which promote safe sexual and reproductive health among young people.

(a) Preventing risky sexual behaviour among young people

This is crucial for preventing problems in later life, such as sexually transmitted infections (including HIV/AIDS) and unwanted pregnancies. Social and behavioural sciences studies have been conducted to evaluate the extent to which social norms and ideologies result in distinct sexual pathways for young females and males.[22] A study in Latin America found that young males were more likely than young females to report sexual initiation at an early age, as well as sex with multiple and casual partners; females were more likely to report sexual initiation and relations either in the context of a committed relationship on the one hand or as a result of coercion. Few sexually active young people, of either sex, reported using condoms or other contraceptives.

Young people of both sexes are put at risk by norms and beliefs that:

- males have uncontrollable sexual needs and women do not;
- demand silence and ignorance of sexual matters among females but not males;
- hold females responsible for avoiding unwanted pregnancies but deny them the ability to negotiate contraceptive use and label those that use contraceptives as promiscuous.

* This text was contributed by Andres de Francisco, Global Forum for Health Research.

22 Ivonne Szasz, Salud Reproductiva y Sociedad, Colegio de Mexico. Paper presented at Forum 5, October 2001.

Work undertaken to understand the context of young people's lives and to identify the factors that constrain or promote sexual health found that terms such as "family planning" are irrelevant in the context of adolescent sexual behaviour.[23] Barriers to sexual health among young people exist at various levels:

- *Individual level*
  Incomplete knowledge; social norms; confusion resulting from mixed messages; lack of skills and ability to communicat with partner, parents, peers and others; physical and psychological inaccessibility of services.
- *Family and community level*
  Social norms that disapprove of young people's sexuality; the tendency to withhold information for fear that information will encourage young people to "experiment".
- *Health system*
  Attitudes of health staff; lack of confidentiality; a shortage of trained staff and policies on sexual health.

Meanwhile, poverty, gender inequalities and the impact of globalization and the media cut across all of these.

(b) Lack of evaluation of "life skills" programmes

In view of the evidence of an inverse association between sexual initiation at an early age and the experience of adverse psychological (regret, coercion) and physical outcomes, delaying the age of sexual initiation is clearly advisable. Although a number of programmes exist which teach life skills to young people, there has been little rigorous evaluation of these programmes in low- and middle-income country settings. As a result, there is insufficient evidence to assess the extent to which they have succeeded in building life and negotiation skills or promoting safer sexual behaviour.[24] While sexual practices among young people in some African countries have changed recently, the contribution of life skills programmes to these changes has not been well evaluated. There is a need for rigorously conducted research and evaluation of promising life skills programmes and their impact on the lives of young people.

Programmes need to be responsive to the contexts in which youth engage in sexual activity. For example, evidence from South Africa indicates that youth place great importance on sex and relationships, but their knowledge about safe practices remains incomplete, laden with myths, and imparted largely through peer networks. Bio-medical models of risky and safe sex that are promoted among youth do not necessarily address the concerns that young people face. Gender socialization perpetuates images of male control over women, and sexual coercion of females and forced sexual initiation characterize the sexual experiences of a disturbing proportion of young people. Parental support and supervision and communication on sexual matters tend to be limited, as is communication between partners. Sexual and reproductive health services remain poor. In addition, violence and poverty combine to inhibit safe sexual practices and the accessibility of services for young people.

(c) Obstacles to health-seeking behaviour for adolescents

In comparison with other age groups, adolescents face a range of obstacles in seeking prompt and appropriate health care.[25]

[23] Roger Ingham, University of Southampton, UK. Paper presented at Forum 5, October 2001.

[24] Rachel Jewkes, Director, Gender and Health Group, Medical Research Council, South Africa. Paper presented at Forum 5, October 2001.

[25] Judith Senderowitz, Pathfinder International, USA. Paper presented at Forum 5, October 2001.

These barriers can be categorized as follows:

- *Policy level*
  Restrictions by age and marital status that limit contraceptive services among young people.
- *Operational barriers*
  Inconvenient times for access to services; lack of transport to access difficult-to-reach facilities; and costs that limit service use among young people.
- *Lack of information*
  About their own development; of risky behaviour; about condoms and other forms of contraception; and where to obtain sexual and reproductive health services.
- *Sense of discomfort*
  This is experienced frequently when accessing sexual and reproductive health services, as the impression is conveyed that services are intended for adults only.

Youth-friendly services need to respond to these barriers, and studies have indicated repeatedly that young people want friendly and confidential services. Adolescents need special spaces and times to make use of services and these should be sensitively adapted to address youth concerns (e.g. where fear of pelvic examinations inhibit the uptake of services).

(d) Recommendation for research in adolescent reproductive health

- Make use of sound research findings that link biomedical and social research to craft programmes targeting adolescents.
- Evaluate life skills programmes and health services for young people.
- Enhance the quality and rigour of research and evaluation of sexual health needs of young people.
- Develop skills among young people, and females in particular, that encourage autonomy, negotiation and more egalitarian intimate relationships.
- Identify strategies to redress gender double standards and power imbalances.
- Develop strategies to enhance communication on sexual health issues.
- Make use of the media to transmit and reinforce ideas to a broad range of people.

2. Pregnancy-related mortality and safe motherhood

Every year more than half a million women die as the result of complications of pregnancy and childbirth – most of them in low- and middle-income countries. The differential in the lifetime risk of maternal death is one of the starkest indicators of the 10/90 gap: from an extreme of 1 in 7 in the highest-risk low- and middle-income countries to 1 in 9200 in the lowest-risk high-income countries.

(a) Morbidity and mortality

Over 80% of all maternal deaths are due to abortion, hypertensive disorders, haemorrhage, obstructed labour and infections. And for the most part, the interventions needed to prevent such deaths are known and cost-effective. What is lacking, however, is the ability to implement them successfully in resource-constrained settings. Further research is needed in several areas. For example, there is a need for better information about the incidence, determinants, long-term consequences, prevention and management of hypertensive disorders of pregnancy and intrauterine growth retardation, which account for a large proportion of morbidity and mortality among women in low- and middle-income countries. Research should also be carried out to evaluate the determinants of the attitudes and practices of women in seeking health care during pregnancy and childbirth as well as to identify and implement effective approaches for overcoming barriers to use of health care services.

Unsafe abortion resulting from unwanted pregnancy remains a most serious public health problem in many low- and middle-

income countries.[26] It is estimated that between 40 and 60 million abortions are carried out every year worldwide. Of these, WHO estimates that about 20 million are unsafe, 90% of them in low- and middle-income countries.

(b) Recommendations for research on pregnancy-related mortality and safe motherhood[27,28]

- Evaluate the determinants of health-seeking behaviour by women during pregnancy and childbirth and identify and implement effective approaches for overcoming barriers to use of health care.
- Document the dissonance between laws, policies and practices related to abortion.
- Estimate the prevalence, health consequences and overall costs of unsafe abortion in low- and middle-income countries.
- Conduct operations research on improving the capacity of service providers to better meet the needs of youth.
- Evaluate the biological determinants of key pregnancy-related complications and design interventions to prevent them.
- Evaluate the gender dynamics of sexual behaviour and contraceptive use.
- Identify ways to ensure the availability and use of interventions for the management of pregnancy-related complications in resource-poor settings.
- Describe the incidence, determinants and long-term consequences of hypertensive disorders of pregnancy, unsafe abortion and intrauterine growth retardation.

[26] Jane Cottingham, Reproductive Health and Research, WHO. Personal communication.

[27] Global Forum for Health Research, *10/90 Report on Health Research 2000*.

[28] *Annual Technical Report 2000*, WHO/RHR/01.11.

Section 8

Road Traffic Injuries*

1. Size of the problem: overview

Injuries are increasingly recognized as a global public health epidemic. Road traffic injuries (RTI) alone accounted in 1998 for an estimated 1 171 000 deaths, establishing this type of injury as the tenth leading cause of death worldwide.[29] RTI account for 2.2% of all deaths and involve people of all ages. According to *The Global Burden of Disease* study, deaths from injuries are projected to rise, and RTI are expected to account for most of this increase.[30]

Fatality rates from RTI vary across income groups. Of those killed during 1998, 1 029 000 people were from low- or middle-income countries and 142 000 people were from high-income countries, corresponding to 20.7 and 15.6 deaths per 100 000 inhabitants respectively.

Although all age groups are affected, young adults, particularly males, are most at risk of death from RTI. Children are also affected by RTI, making a walk to school potentially life threatening. Of those killed in 1998, 844 700 were aged 45 or younger. Since this age group corresponds to the most economically productive segment of the population, this has serious implications for national economies.

According to the limited number of studies available from the developing world, pedestrians account for 41%-75% of all road deaths. However, in most high-income countries, pedestrian fatalities are considerably lower, at one-third to one-fifth that of passengers and drivers. In low- and middle-income countries, the high proportion of pedestrians among road fatalities is due to a variety of factors including the traffic mix on the roads and the lack of pedestrian facilities in road design. In lower income countries, a large proportion of traffic injuries result from travel in two-wheeled vehicles.

Since RTI have only fairly recently been recognized as a major public health problem, science is lagging behind in providing solutions. Although high-income countries have had success in implementing and evaluating interventions, few have been tested in the developing world, and even fewer are currently in place. Interventions implemented in high-income countries may not be suitable for use in low-income countries and, in most cases, they are beyond the financial reach of low- and middle-income countries. This is a cause for concern – underlining the critical need for research and development on RTI in developing countries.

There are several key questions that need to be answered on the issue of RTI in developing countries. These include:

- What is the precise epidemiology and burden of disease for RTI in low- and

* This text was contributed by Adnan A. Hyder, Johns Hopkins University, USA.

29 World Health Organization. *Global Burden of Injuries*. Geneva: WHO, 1999

30 C.J.L. Murray & A. Lopez. *Global Burden of Disease and Injuries*. Cambridge, Massachusetts: Harvard University Press, 1996

middle-income countries? In Africa? In Asia? In Latin America?
- What are the risk factors for RTI in low- and middle-income countries? Which ones are amenable to interventions?
- What are the specific regional and national profiles in terms of effects on the poor, gender differences and age?
- What are the current interventions for reducing this burden?
- What are the costs, effectiveness and cost-effectiveness of such interventions in low- and middle-income countries?
- Why are the current interventions not being implemented in the developing world? How can they be put into action?
- What types of interventions need to be developed to further reduce the burden of injuries from RTI?
- What are the behavioural issues that affect this global epidemic and how can appropriate modifications be developed?

In response, a group of institutions interested in RTI proposed the initiation of a partnership to conduct research and address these questions.

2. Objectives, partners and governance

The objectives of the partnership are to:

- Formalize the established partnership involving a host of institutions committed to addressing the problem of RTI.
- Describe the impact of RTI on health in some low- and middle-income countries to provide a baseline for measuring change.
- Conduct research to better understand the risks and protective factors of RTI in low- and middle-income countries.
- Design, test and evaluate an RTI prevention programmes in these countries.

The partnership was an outcome of a session on "Road Traffic Injuries in Developing Countries" at Forum 3, the 1999 annual meeting of the Global Forum in Geneva. Presentations from colleagues in Kenya, Mexico and Pakistan highlighted the potential for collaboration in this field. An informal network was created and regular communication initiated by electronic mail. Partners currently involved in the network include institutions from high-, middle- and low-income countries, and include representatives of government, academic and nongovernmental organizations. Partners from Latin America (Mexico, Argentina, Colombia), Asia (India, Pakistan, China, Thailand, Indonesia), Africa (Kenya, Uganda), OECD nations (Australia, UK, USA) and other countries and organizations (Fiji, World Bank, WHO) are now part of the network. As partners in the process, the Global Forum for Health Research and WHO's Violence and Injuries Prevention Department will continue to support this activity by providing technical assistance and organizational and logistic support as necessary.

The partnership will eventually become a formal network, at which point issues of governance and management of the network will be discussed among partners.

3. Work plan and budgets

The current work plan of the partnership for the period 2001-2002 includes the following activities:

- In 2001, development of three specific research proposals for RTI in the developing world.
- Implementation of the research studies in low- and middle-income countries based on the three research proposals.
- In 2002, second formal meeting of partners to discuss progress of the partnership and formation of a network.
- Strengthening and enhancing the network partnership through e-mail and list-serve mechanisms.
- In 2002, discussions at the sixth annual meeting of the Global Forum for Health

Research (Forum 6) in Africa with special emphasis on the African epidemic of RTI.

These activities are undertaken by partners with support from the Global Forum and WHO.

4. Results over the past two years (2000-2001)

(a) Partnership Meeting 2000

In April 2000, a partnership meeting was held in Kampala, Uganda, to discuss ways of reducing the impact of RTI on health globally. The group put forward proposals for collaborative research and underlined the need to:

- strengthen research capacity in developing countries
- gain a general understanding of the institutions and individuals currently involved in the field of RTI worldwide
- raise awareness of RTI as a public health issue and promote their prevention and control.

The "Uganda Action Plan" proposed the following:

- formation of active research groups for the development of proposals
- mapping of donors and their priorities, as well as research groups in the field of RTI
- promotion of more discussion and deliberation of RTI at policy level
- mobilization of more funds to support activities related to RTI.

Research groups were formed and initiated work after the Uganda meeting and began to develop a number of research concept papers (pre-proposals).

(b) International Conference 2000

A parallel session on "Research collaboration on road traffic injuries in the developing world" was held at the International Conference on Health Research for Development in Bangkok in October 2000. The session had been defined as a milestone in the further development of the partnership since its first meeting in Uganda.[31] The objectives of the session in Bangkok were:

- presentation of working pre-proposals to colleagues and donors
- further development of proposals based on feedback
- promotion of the need and urgency for RTI research in developing countries.

Discussion among participants highlighted:

- The need to move ahead with specific research projects to highlight the problem of road traffic injuries in the developing world.
- The need for a partnership which involves researchers from different parts of the world and enables them to meet to share ideas and experiences.
- The need for global advocacy on these issues to ensure that RTI becomes a mainstream public health and health research issue.
- The need to mobilize resources to sustain the partnership and the conduct of research.

(c) Proposal development workshop 2001

This meeting was held in Geneva in April 2001, and 11 partners of the network came to work on a series of specific proposals. WHO co-sponsored and actively participated in this workshop. The objectives were:

[31] A.A. Hyder, E. Krug, O. Kobusingye and A. Ghaffar. Report of the first meeting of the research collaboration on "road traffic injuries in the developing world". Uganda: Global Forum, April 2000

- Completion of research proposals in a collaborative manner, with technical help from experienced colleagues.
- Development of a plan for resource mobilization and an approach to donors for each proposal.
- Planning next steps for the partnership.

The workshop involved working sessions devoted to group work on individual research proposals being developed by the partnership including:

- Research on visibility aids and their effectiveness in Uganda and Pakistan.
- Research on stakeholders' perceptions and concerns about RTI in Africa and Asia.
- Development of guidelines to define the types and nature of information needed to assess the burden of RTI in developing countries.

By the end of the workshop, three research proposals were near completion, their partners and locations identified, and a search for potential donors initiated.

(d) Forum 5, 2001

Forum 5 held in Geneva in October 2001 provided an opportunity for the network to invite new partners to become actively involved in the collaboration. A session on new developments in the field of RTI included presentations on the state of RTI burden in the United Arab Emirates; the impact of RTI on children in Egypt; and the newly developed five-year strategy for the prevention and control of RTI developed by WHO and partners.

Highlights of the discussion that followed included:

- A decision to continue dialogue among partners on the Internet using a list-serve mechanism for now.
- Proposals should be submitted to the Global Forum for seed grants to increase the chance of co-funding from other donors.
- Linkages between partners should be promoted to encourage bilateral and trilateral projects on RTI research.
- A proactive plan for resource mobilization for RTI research should be developed.

5. Proposed strategies for 2002-2003

- **Formally establish and strengthen the network of partners committed to road traffic injuries issues**

  Through a memo of understanding, the partners will formalize their agreement to cooperate on research and projects in the developing world relating to RTI. The partners will establish a website and develop links with governments and international organizations. As the network becomes known to others working in the field of injury prevention and control, additional partners are likely to join, thereby further strengthening efforts to implement regional and national health research agendas and activities.

- **Conduct research on specific topics related to road traffic injuries and design, test and evaluate measures which can be taken to prevent the problem**

  After much deliberation, the partners have selected the following four topics for research: (i) stakeholder analysis and participatory research to explore risk factors and interventions; (ii) exploration of case-control methods and studies for research on injury prevention and control in the developing world; (iii) measurement of RTI at the national level (a situation analysis); (iv) evaluation of interventions for RTI prevention, such as increased visibility of vulnerable road users and interventions for black spots. The specific studies will be initiated in 2002.

- **Raise awareness of efforts to promote road traffic injuries prevention and control**

  In order to ensure that the efforts of the partners are of value to others, it is important to raise awareness not only of the network itself, but also of efforts to promote RTI prevention and control. Since RTI are increasingly recognized as a major public health problem, it is vital that policy-makers, professionals and the general public understand the issue.

- **Promote and evaluate efforts to conduct public health research in developing countries**

  The activities of the network will serve to strengthen capacity to conduct research and design, pilot test and evaluate potential interventions for the prevention and control of RTI. Experienced researchers will support the work of colleagues in developing countries who may have less experience as researchers but greater understanding of the situation locally. The projects will be designed and evaluated in a way that will allow them to serve as examples for replication in other locations. The partners have entered into preliminary discussions with several donor agencies for additional funding.

6. Expected results

The network activities to date and future plans will result in the following outcomes:

- A network of partners representing various geographic regions and types of institutions including government, academic and nongovernmental organizations addressing national and regional health priorities with regard to the prevention and control of RTI. The network will develop:

- A list-serve to maintain regular communication among the partners.
- A web site describing and promoting the work of the network and issues related to RTI in general.
- Information on stakeholder analysis and participatory research to explore risk factors and interventions.
- Guidance for conducting case-control studies for research on injury prevention and control in the developing world.
- Data on the burden of RTI in selected developing countries.
- Evidence of cost-effectiveness of selected interventions.
- Improved research capacity of researchers in low- and middle-income countries.

Through their extensive network of contacts worldwide, the partners will broadly disseminate research results among policy-makers, professionals and the general public to initiate evidence-based discussion of the impact of RTI on health and the potential for prevention. The network partners will conduct a series of seminars to promote discussion of the research findings and their policy implications at the regional and national level. Sessions during the annual meetings of the Global Forum for Health Research, the world conferences on injuries and other meetings will be used to present the activities and outcomes of the partnership.

Section 9

Child Health and Nutrition Research Initiative*

1. Size of the problem: overview

Every year, about 11 million children die before their fifth birthday – most of them in low- and middle-income countries. Of these, about 8 million children die from no more than five conditions: pneumonia, diarrhoeal diseases, malaria, malnutrition and measles. Others suffer infections that are preventable with currently available vaccines or medicines. Among the top ten causes of DALYs in 1998, children largely account for the top three conditions (lower respiratory infections, perinatal conditions, and diarrhoeal disease) and play an important role in the fourth one (HIV/AIDS). The first three conditions account for over 17% of DALYs.[32]

Malaria is estimated to kill almost one million children a year in Africa alone, and accounts for 4.5% of DALYs in children aged 0-4 years. In addition, it is estimated that 7.7 million perinatal deaths occur each year (4.3 million foetal deaths and 3.4 million neonatal deaths), 98% of them in the low- and middle-income countries. While in the United States, the rate of neonatal deaths is 5 per 1000 live births, in the low- and middle-income countries, 40 newborn babies die for every 1000 live births.

(a) The perinatal period

The perinatal period is a critical period in child health. While a number of interventions have been able to reduce childhood mortality in low- and middle-income countries, perinatal mortality has not been reduced significantly. There is a shortage of information on neonatal outcomes, particularly cause-specific mortality and community-based data. The first week of life is a particularly high-risk period when approximately two-thirds of neonatal deaths occur. However, the magnitude of the problem may be underestimated, due to the fact that most births and deaths take place at home, outside the formal health system.

A comprehensive report on the status of the world's newborns published by Save the Children[33] indicates that improving the health of newborns is largely a matter of applying sound health care practices at the appropriate milestones in the development of a newborn. This includes interventions during pregnancy, at the time of birth, and after birth up to the first 28 days of life. Thus, the health of the mother during pregnancy, delivery and postpartum is intimately linked with the health of her newborn, emphasizing the need to integrate maternal and newborn health care strategies.

In addition to the mother's health, low birth weight (LBW) also has profound implications for newborn health and survival. LBW is an underlying factor in 40%-80% of newborn deaths, depending on the region, and is of particular importance in south Asia. Interventions that prevent morbidity during the neonatal period have the potential to be

* This text was contributed by the Secretariat of the Child Health and Nutrition Research Initiative.

[32] Global Forum for Health Research, *10/90 Report on Health Resarch 2000*.

[33] Saving Newborn Lives. *State of the World's Newborns*. Washington, DC: Save the Children, 2001.

highly cost-effective and affect health far beyond the neonatal period. In order for strategies aimed at improving neonatal outcomes to be effective, affordable and sustainable, they must take place within a broader context of improving maternal and child health, and be integrated within Safe Motherhood and Child Survival programmes.

(b) Malnutrition and nutritional deficiencies[34]

Although malnutrition is prevalent in children in low- and middle-income countries, it is rarely cited as being among the leading causes of death. This is due in part to the conventional way that deaths are reported and analysed. In many countries, statistics are compiled from records in which a single cause of death has been reported. Studies carried out in the 1990s to evaluate the contribution of malnutrition as an underlying factor in child deaths indicated that malnutrition is implicated in about half of the cases. They also indicated that children with mild and moderate malnutrition are at high risk of dying, thereby refocusing international attention on the potential impact of preventing mild and moderate malnutrition.

Meanwhile, birth weight is an important indicator of maternal health and nutrition prior to and during pregnancy, as well as a powerful predictor of infant growth and survival. The extent of the global burden of low birth weight is not currently available, but indirect estimates indicate that 17% of all births worldwide involve low-birth-weight babies (below 2500g at birth), of which most (90% or approximately 22 million) are born in low- and middle-income countries.

Malnutrition is important not only because of its immediate effects on the individual but also because of its long-term impact. For example, studies in The Gambia indicate that people born during the annual "hungry season" are 10 times more likely to die prematurely in young adulthood. There is a close relationship between disease and malnutrition, with high rates of infectious diseases resulting in further losses of nutrients and increasing metabolic demands. Low-birth-weight infants are at a higher risk of morbidity, growth failure including stunting, abnormal cognitive development, neurological impairment and poor school performance; and premature mortality from infectious and cardiovascular diseases, hypertension and diabetes.

2. Objectives of CHNRI

The high disease burden experienced by children prompted a move by participants at the third annual meeting of the Global Forum (Forum 3) to strengthen and formalize the interaction between researchers in child health and child nutrition. The objectives of the resulting Child Health and Nutrition Research Initiative (CHNRI) are the following:

- **Promote priority research discussion within a broadened approach to child health, nutrition and development**
  CHNRI seeks to gather partners to identify a common list of research priorities for child health and child nutrition using established methodologies for priority setting. Gender sensitivity is incorporated into this objective.

- **Expand global knowledge on childhood disease burden and the cost-effectiveness of interventions**
  CHNRI works to identify gaps on key issues for which information is limited. This includes interventions and their cost-effectiveness.

[34] Amy Rice et al, *WHO Bulletin* 2000, 78(10) pages 1207-21.

- **Ensure adequate inclusion of low- and middle-income country institutions and scientists in the setting of priorities and formulation of plans**
  CHNRI's first project is to identify institutions and researchers working in child health and in child nutrition research in low- and middle-income countries.

- **Promote appropriate research capacity development in the South for participation in these activities**
  The initiative will contribute towards capacity building by helping increase interactions between low-, middle- and high-income countries.

- **Stimulate donor participation**
  This is being achieved by proposing a clearly defined and focused list of research priorities on child health and nutrition research. CHNRI will develop a resource mobilization plan to include strategies to stimulate donor interest.

3. Strategies of CHNRI

- **Priority-setting methods**
  CHNRI uses priority-setting methodologies compatible with the Combined Approach Matrix.

- **Mapping of actors in low- and middle-income countries**
  To establish a network of institutions and individuals working on child health research, on child nutrition research, or both.

- **Selection of projects**
  CHNRI actively seeks to identify the best candidates to implement its mandate and uses mainly requests for proposals to select candidates. A few studies are commissioned.

- **Mobilizing funds**
  CHNRI invites donors to participate as partners at its meetings. It is in the process of developing a resource mobilization plan and will organize specific meetings with selected donors to inform them of CHNRI's plans and achievements.

- **Annual meetings and electronic communication**
  CHNRI meets at least once a year during the annual Forum meeting. The Core Group (governing body) is in discussion more frequently, either in person or electronically.

4. Partners and governance

Since the first meeting of interested partners held in Geneva in February 2000, several institutions and individuals have joined the network (Insert 8.9.1).

CHNRI is governed by a Core Group of eight members, chosen for their scientific, medical and public health expertise on child health and nutrition research. The members are chosen from the constituencies which form CHNRI. The normal tenure is one year (renewable once).

The Core Group is the policy- and decision-making body of CHNRI. Its main duty is to ensure that the management is efficiently executing the objectives of CHNRI. It establishes the overarching policies and principles followed by CHNRI. Members of the Core Group take an active part in the peer review process for the selection of projects.

Members of the Core Group are listed in Insert 8.9.2. The Secretariat currently comprises Andrés de Francisco (Global Forum, Interim Secretary), Olivier Fontaine (Child and Adolescent Health/WHO) and Adnan Hyder (Focal Point). Efforts are under way to establish the Secretariat in a low- or middle-income country.

5. Overview of past activities

(a) Identification of priorities

CHNRI partners agreed on the following

Insert 8.9.1
CHNRI Partners

Representatives of the scientific community/universities/research institutions

Aga Khan University
Christian Medical College, Vellore
Harvard Institute for International Development (HIID)
Johns Hopkins University (JHU)
London School of Hygiene and Tropical Medicine (LSHTM)
South African Medical Research Council
University of Chile
University of Philippines

International research institutions/groups/networks

Centre for Health and Population Research, Bangladesh (ICDDR,B)
Child Health Research Group, USAID
INCLEN
Medical Research Council, The Gambia
SHARED

WHO programmes

Child and Adolescent Health (CAH)
Evidence and Information for Policy (EIP)
Human Reproduction Programme (HRP)
Nutrition for Health and Development (NHD)

Multilateral and bilateral organizations/UN bodies

Administrative Committee on Coordination /Sub-Committee on Nutrition (ACC/SCN)
DANIDA
Fogarty International Center, NIH
NIH-NICHD
NORAD
USAID
World Bank

Insert 8.9.2
Members of the Core Group for CHNRI

	Constituency	Member
1	Organizations/NGOs/groups on child nutrition	Sonya Rabeneck, UN Sub-Committee on Nutrition
2	Donors/funding agencies	Gilman Grave, NICHD (NIH), USA
3	Public sector/networks	Paul Arthur, Kintamp Health Research Centre, MoH, Ghana
4	Academia/research organization – South	Claudio Lanata, Instituto de Investigacion Nutricional, Peru
5	Academia/research organization – North	Robert Black, Johns Hopkins University, USA
6	Global Forum for Health Research	Andres de Francisco
7	WHO	Olivier Fontaine, CAH-WHO
8	Focal Point	Adnan Hyder

priorities in the field of malnutrition and perinatal health:

Recommendations for research on malnutrition
- Interventions to reduce low birth weight
- Prompt implementation of interventions for the management of diseases and conditions in low-birth-weight children
- Calculate the burden and describe the functional consequences of micronutrient deficiencies
- Improvement of nutritional status of the family and the population through development efforts
- Breaking the vicious cycle of infection and malnutrition
- Rehabilitation and early stimulation of low-birth-weight infants
- Investigation of the prevalence of micronutrient deficiency and anaemia in young children
- Interventions involving food fortification or dietary changes
- Operations research to improve implementation of existing interventions
- Cost-effectiveness comparison of interventions
- Establishment of the role of childhood diets in the development of noncommunicable diseases.

Priorities in the field of perinatal research: Epidemiological research
- Country-specific data on causes and determinants of newborn deaths in the community
- Validated verbal autopsy tool to determine biological causes, and sociocultural and logistical determinants of perinatal and neonatal deaths in the community

Formative research
- Household maternal and newborn care practices, especially regarding delivery and early newborn care
- Barriers to seeking and receiving care
- User perceptions and expectations of the formal health system
- Models of community participation.

Operations research
- Effectiveness of packages of maternal and newborn interventions delivered at the community level
- Workers and infrastructure needed to support delivery of lifesaving interventions at the community level, especially during the postpartum period.

State-of-the-art research
- Detection and management of maternal reproductive and urinary tract infections
- Models of breastfeeding promotion
- Strategies for maternal and/or newborn nutritional supplementation
- Prevention of mother-to-child HIV transmission
- Prevention, recognition and management of newborn infections, birth asphyxia and hypothermia
- Optimal umbilical cord care in the community.

(b) Seed financing

With the financial support provided by the World Bank, CHNRI cofinanced in the past year a number of small research projects in the priority areas identified above, particularly the following: IMCI priority research projects, mother-to-child transmission of HIV, research on interventions to improve child health and nutrition and neonatal survival, priority setting in health, nutrition and development research (including implementation of priority-setting methodologies, measurement of disease burden, and cost-effectiveness of interventions) and evaluation of international collaboration for research on child health and nutrition (three groups were identified to conduct the mapping exercise in Asia, Africa and Latin America through a request for proposals).

(c) United Nations General Assembly Special Session on Children

A request for proposals was conducted to identify a group to prepare the joint WHO-CHNRI document. The resulting document[35] is an evidence-based scientific report highlighting the relevance of health and nutrition research in programme formulation and stimulating research activity on specific priority areas in future.

The document will be presented at the UN General Assembly Special Session on Children (8-10 May 2002 in New York).

6. Perspectives over the next two years

(a) Research projects on IMCI health interventions focusing on breast feeding

Proposals received by March 2002 will be evaluated and peer-reviewed by Global Forum and Core Group reviewers. This will result in the initiation of key IMCI-related research projects in the low- and middle-income countries by summer 2002.

(b) Second Meeting of Partners of CHNRI

This meeting in April 2002 will host a wide spectrum of old and new partners interested in the objectives of CHNRI. The meeting will:

- Discuss ongoing activities of the network including expansion of the core group membership
- Review the priority project list identified in February 2000 for guidance to identify future projects
- Develop a detailed workplan and budget for 2003-2004
- Discuss next steps in governance of the initiative.

(c) Secretariat

The secretariat of CHNRI has been housed temporarily within the Global Forum. It is expected that in 2002, the core group will offer to a low- or middle-income country partner institution the opportunity to house the secretariat for a fixed time period (on a rotational basis).

A summary of CHNRI achievements to date is presented in Insert 8.9.3.

[35] *Child Health Research: A foundation for improving child health*. WHO-CAH/Global Forum for Health Research, 2002.

Insert 8.9.3
CHNRI achievements to date

Scientific/Advocacy	Administrative/Managerial
• Completed joint paper (WHO-CHNRI): *Child Health Research: a foundation for improving health*, document which will be presented at the UN General Assembly Special Session on Children, May 2002. • Identified three international centres (Africa, Latin America and Asia) to map child health and nutrition research institutions. • Initiated project to identify regional priority setting in February 2002. • Identified research priorities on child health and nutrition research. • Obtained seed financing for a number of small research projects. • Worked with eight presentations on priority setting using the five-step approach in its first meeting.	• Established a Core Group • Conducted two meetings of interested parties. • Initiated fund-raising strategy and identified joint funding with WHO. • Initiated strategy to define future home for the CHNRI Secretariat in a low- or middle-income country. • Maintained contact and identified new partners. • Conducted a request for proposals on mapping of health research priorities and actors in child health and nutrition research. • Conducted a request for proposals on strategies for scaling up exclusive breastfeeding using IMCI community strategies.

Section 10

Initiative on Sexual Violence Against Women*

1. Size of the problem: overview

Violence against women is very common and occurs worldwide. However, the number of incidents is vastly under-reported and few population-based data are available to provide an accurate picture of the magnitude of the problem. The shortage of data reflects the deep-rooted nature of violence and the far-reaching sociocultural aspects that perpetuate it. But more data is becoming available with the increasing interest in violence as an important public health issue.

* This text was contributed by Claudia Garcia Moreno on behalf of the Management Committee of the Initiative.

Violence against women has a profound impact on physical and mental health and is a violation of fundamental human rights. It involves a range of different forms of violence, with physical and sexual violence by intimate partners, acquaintances and strangers being particularly serious for women. Although there has been little research on this problem globally, available data suggests that in some countries as many as one in five women report sexual violence by an intimate partner and up to a third of girls report forced sexual initiation. However, because sexual violence is considered taboo in many societies and carries with it a social stigma, women are still reluctant to discuss their experience.

Sexual violence is defined as "any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or trafficking of women for sex, using coercion, threats of harm or physical force, by any person regardless of relationship to the victim, in any setting, including but not limited to home and work."

Sexual violence encompasses:

- rape or sexual coercion
- attempted sexual coercion
- sexual assault with any object, instrument or sexual organ
- sexual harassment, including sexual humiliation
- forced marriage or cohabitation, including marriage of children
- forced prostitution and trafficking in women
- forced abortion
- denial of the right to use contraception or protect from disease
- female genital mutilation and social virginity inspections
- child sexual abuse
- sexual violence in war situations.

The initiative on sexual violence against women recognized the continuum of sexual violence, but decided to focus on sexual abuse and coercion of adult and adolescent women. Sexual harrassment, sexual trafficking and other issues will be included where deemed regionally or nationally appropriate as priorities.

2. Objectives

The overall objective of the initiative is to improve knowledge and understanding of sexual violence as a public health issue internationally. This will be achieved through:

- Identifying gaps in knowledge and pooling human and financial resources to carry out the research that will fill such gaps, in a coordinated and consistent way.
- Undertaking advocacy with donors, the research community and other key individuals to strengthen the support base for research on sexual violence.
- Building capacity in sexual violence research, developing a research agenda and funding research (multi-country studies and innovative country-specific research).
- Creating a network and sharing information on research as well as disseminating other information such as guidelines and other materials.

3. Partners and governance

A number of organizations, as well as interested individuals, have been involved in these consultations and contributed to discussions about the nature and scope of the initiative. The organizations involved include:

- NGOs, such as the International Planned Parenthood Federation (IPPF), ARROW, INCLEN, the Centre for Health and Gender Equity, CHANGE UK, International Center for Research on Women (ICRW) and ASHOKA
- universities and other research institutions, such as the Key Centre for Women's Health in Society at the University of Melbourne, the Gender and Health Group of the South African Medical Research Council,

Population Council in Dhaka, NIMR (Tanzania) and the University of Arizona
- international organizations, such as the Global Forum for Health Research and the World Health Organization
- government departments: Australia and South Africa.

The initiative is still under development and so its full governance structure is still to be developed.

4. Strategies and activities over the past two years

Although discussions on the need for an international research project on violence against women have been ongoing since the early days of the Global Forum for Health Research, it was only in the last two years that a decision was made to focus on sexual violence. This was because while work on other forms of violence, particularly intimate partner violence, has made headway in developing standardized tools for measuring and understanding the problem, sexual violence has remained taboo and neglected.

The initiative took shape after two conferences held in 2000. In May 2000, the first consultative meeting on sexual violence was held in Melbourne.[36] It involved participants from a cross-section of countries, cultures, organizations and professional experience. The Melbourne meeting reached an agreement on the necessity and purpose of an international initiative on sexual violence against women. It also resulted in the appointment of a steering committee to oversee the development of such an initiative. Following the meeting, further discussions were held over a period of six months via an e-mail list-serve administered by WHO. The list-serve included participants in the Melbourne meeting, as well as other individuals recommended by them. During this period of e-mail dialogue, the scope, principles and broad areas of work for the initiative were agreed upon. These were then presented and discussed during the International Conference on Health Research for Development in Bangkok in October 2000. During the Bangkok conference a formal panel on violence against women was held, as well as several informal meetings on sexual violence. These events were instrumental in initiating the formulation of proposals for the initiative.

During 2001, several activities built upon the progress achieved through the consultations and list-serve dialogue. A meeting in January, hosted by the Medical Research Council in Cape Town, South Africa, with the International Network of Researchers on Violence Against Women identified research needs concerning the measurement of sexual violence. It gathered existing information on methodologies for studying the magnitude and nature of sexual violence, explored current work and identified gaps in current research. The outcomes of the Cape Town consultation and other meetings have fed into the discussion. The e-mail discussion forum continued during this time with the objective of developing and finalizing the governance structure and functions of the initiative, as well as working on a funding proposal. During Forum 5 in October 2001, several meetings elaborated on the draft initiative proposal produced by the Secretariat and Steering Committee, and identified three broad areas of research (see section 5).

5. Results of the activities

The last two years have seen considerable progress in the development of the Initiative on Sexual Violence Against Women. During this time the initiative received seed funding and other support from the Global Forum.

[36] *Eliminating Sexual Violence Against Women: Towards a Global Initiative*. Report of the Consultation on Sexual Violence Against Women. The University of Melbourne and Global Forum for Health Research, May 2000.

This has included support for participation of members of the intiative in the various meetings held.

The consultations in Melbourne, Bangkok and Cape Town, in conjunction with the e-mail discussion network, were instrumental in theorizing sexual violence, addressing methodological issues and identifying research priorities. The consultations reflected the multi-dimensional aspect of the initiative, both in the cross-section of disciplines, organizations and individuals involved, and in the practical nature of the proposed research agenda. The e-mail list-serve was equally effective in sharing research and experience when deciding upon the scope and objectives of the initiative.

The discussion of research priorities culminated in the identification of four broad research areas which were agreed upon at Forum 5. The research areas are:

(a) Understanding the magnitude and nature of sexual violence
This includes:

- developing a standardized research tool for measuring sexual violence
- documenting the circumstances in which sexual violence occurs and identifying risk factors
- documenting the responses of women to different forms of sexual violence and help-seeking strategies.

(b) Sexual violence and the medico-legal response
- overview of the medical response to sexual violence
- evaluating the use and impact of medical forensic evidence on legal resolution of sexual assault cases.

(c) Development of interventions for the prevention of sexual violence against women
- review of existing approaches/ interventions for primary and secondary prevention of sexual violence
- development of a knowledge base of innovative approaches/interventions to address sexual violence.

There was also a consensus that research within the initiative should combine qualitative and quantitative methodologies and adhere to the following principles:

- Research is an important tool in preventing and eliminating violence against women.
- The goal of all research into sexual violence must be positive change for women and promotion of gender equality.
- Duplication of research should be avoided.
- Research should be cross-sectoral, involving NGOs, researchers and policy-makers and should be multi-disciplinary.
- A research agenda should be weighted towards resource-poor countries, and committee membership should not be dominated by researchers from industrialized nations.
- Understanding the dynamics of how to change gender/power relations is essential to preventing and eliminating sexual violence against women.
- Research must include positive approaches (rather than victimization) that recognize women's strengths.
- Research should not medicalize sexual violence but should be situated in a broad sociocultural framework consistent with human rights.
- Research terminology and language should be sensitive to sociocultural issues and not purely medical.
- Research should be collaborative and

action-oriented, both engaging and involving the community that is being researched.
- Research must give voice to women's own experience, by taking into account language and cultural sensitivity, recognizing the power of language in shaping knowledge and experience, and involving women as active participants in defining concepts, meaning and terminologies of sexual violence against women.

6. Perspectives over the next two years

The meeting of the management committee in early 2002 secured the final research agenda and Plan of Action for the Initiative on Sexual Violence Against Women. The meeting also developed strategies to facilitate the implementation of the research agenda and discussed methods of networking, information sharing and communication between participants as well as donors. In addition to agreeing upon a detailed work plan and operational structure for the initiative, the management committee meeting will also work on consolidating a funding base.

Over the next two years, the work plan will initiate collaborative research projects in the broad areas described above. It will do so on a step-wise basis, building on the expertise of the partners and ensuring a combination of short- and long-term products. It will ensure collaboration with other ongoing initiatives on sexual violence, such as the WHO initiative to strengthen the health sector response to sexual violence, and the International Rescue Committee's work on sexual and gender-based violence among refugees.

7. Expected results and indicators of success

- **A consolidated network and regular exchange of information on sexual violence research** (e.g. newsletter, web site, electronic discussion group)

- **Specific research proposals developed and funded**

  The ability to undertake this agenda and the time-frame will be dependent on the ability of research teams to raise funds for their activities. It is intended that the end of 2003 will see the publication of new information on sexual violence and models of good practice in the prevention of sexual violence against women, based on the work of the initiative.

- **The development of a strong funding base**

  This will allow the initiative to support different research activities/projects and will be a measure of success.

C. Networks focusing on priority-setting methodologies (chapters 4 and 6)

Chapter 4 describes the areas of activity of networks in the field of priority-setting methodologies. Regarding the measurement of disease burden, WHO coordinates a new global burden of disease assessment, the Global Burden of Disease 2000 project (GBD 2000). The objective of the project is to formulate, within a consistent and comprehensive framework, all relevant epidemiological evidence for the various regions of the world.

The International Burden of Disease Network (IBDN), a project jointly funded by the Centre for Health Care Development (UK), the Global Forum for Health Research and WHO, seeks to promote the best use of burden of disease methodologies (http://www.ibdn.net/). The Network assists developing countries to complete country-wide burden of disease assessments by developing their capacity to apply the methodology and providing technical assistance. IBDN is encouraging the development of Regional Networks.

Chapter 6 describes the activities in monitoring resource flows for health research. The Core Group, a network of institutions and individuals interested in tracking health research funding, recently produced a report with the initial results of the study.[37]

[37] Global Forum for Health Research. *Monitoring financial flows for health research*. October 2001.

D. Networks focusing on policies and cross-cutting issues affecting health

Section 11

Alliance for Health Policy and Systems Research*

1. Size of the problem: overview

Health is now an important component of the development agenda. There is an urgent need to improve understanding of how and for what purposes societies organize themselves to achieve health goals, including how they plan, manage and finance activities to improve health, and also the roles of different partners in this effort. Changes in health policies and systems must be based on the best available evidence, drawn from scientifically valid studies undertaken within developing countries themselves. Research is needed both on the process of health policy-making and on the desirable content of health policies. However, the expertise for carrying out such studies is lacking, especially in the "research-poor" least-developed countries. Since the Interested Parties met in 1999, bringing together more than 50 institutions of the developing and developed world, including representatives of the bilateral and multilateral agencies, and created the Alliance, emphasis has continued to be placed on research capacity development.

To understand the full extent of the limited research capacity in developing countries, prospective partners from these countries were asked to provide their research capacity profiles as a prerequisite for participation in health policy and systems support by the Alliance. Data available to the Alliance in response to this request suggests that more than 60% of over 400 institutions undertaking health policy and systems research (HPSR) in the developing world had less than 10 years of experience in this field. About 20% of their researchers have PhD level training and most of them are concentrated in the larger public institutions located in the big cities. Another 37% had master's level training and the rest, about 42%, were first degree holders with no specific research training. The developing countries involved acknowledged the following deficiencies in HPSR capacity:

- lack of information on current work carried out in the field of health policy and systems research globally;
- their researchers were not trained in

* This text was contributed by Miguel Gonzalez Block, Manager of the Alliance for Health Policy and Systems Research, Geneva.

research methodologies appropriate to health policies and systems research;
- their researchers lacked appropriate research tools and had little or no funding for research;
- they had few training opportunities open to them, particularly for those in Africa, nor were there networks of health policy and systems research open to them.

As a result, most HPSR institutions in developing countries have considerable difficulties in increasing the relevance of their research for use in policy. On account of these deficiencies, the Alliance made an even stronger commitment to research capacity development as one of its main targets for the coming years.

2. Creation of the Alliance and objectives

The Alliance for Health Policy and Systems Research, an initiative of the Global Forum for Health Research in collaboration with the World Health Organization and a large number of partners, was officially launched at WHO headquarters on 27 March 2000. The Secretariat of the Alliance is based in WHO's Global Programme for Evidence. About 300 institutions have become Alliance partners and regular contacts have been established with 11 health policy and systems research networks. The Alliance is now poised, as a global network, to make a difference in the research-to-policy cycle and aims to launch in 2002 a much needed initiative to build and strengthen research capacity in a number of low-income countries.

The aim of the Alliance is to contribute to health development and the efficiency and equity of health systems through research on and for policy, in an effort to:

- promote *capacity* for health policy and systems research (HPSR) on national and international issues
- help develop the *information* for policy decisions in the health sector and other sectors influencing health
- stimulate the generation of *knowledge* which facilitates policy analysis and improves understanding of health systems and policy process
- strengthen international research *collaboration*, information exchange and learning across countries
- identify *global level influences* on health systems and promote appropriate research.

3. Partners and governance

The Alliance exists under the legal umbrella of the Global Forum, with a memorandum of understanding between the Global Forum and WHO on its functions and mode of operation. The Alliance consists of partners, a Board and a Secretariat.

The Alliance has institutional partners in order to encourage widespread participation of interested and relevant institutions in its activities, and to provide a bottom-up source of direction and advice. Those eligible to be partners of the Alliance include institutions active in HPSR as producers and users. A register of partners presently stands at about 300 institutions.

The Board and Secretariat

The Board is composed of 18 members representing countries, donors, international agencies and research institutions active in HPSR. The Board's present composition ensures an appropriate distribution by region, gender and occupation (researcher/policy-maker). The Board is convened and presided over by the Chair and currently meets once a year. An Executive Committee made up of five to six Board members meets more often, about two to three times a year. The Alliance is run by a small three-person Secretariat. The main functions of the Board are summarized in Insert 8.11.1.

Insert 8.11.1
Functions of the Board of the Alliance

- bring clarity and specificity to Alliance policies and priorities
- select an Executive Committee as appropriate
- appoint the Chair
- appoint the Manager of the Secretariat
- approve the Secretariat work plan and associated financial expenditures, and give authority to the Manager of the Secretariat to manage funds
- review and approve progress reports and audited accounts
- periodically monitor and evaluate progress of both the Secretariat and the Alliance more broadly
- report annually to the Global Forum's Foundation Council on progress in implementing the workplan
- play a lead role in ensuring that the Alliance and its work enhances the contributions of complementary HPSR initiatives, at both national and international levels
- ensure that gaps in the translation of research to policy are addressed.

4. Strategies and activities of the Alliance (plan of action)

The Alliance Board has identified six interrelated tasks to meet its aim and objectives, several of which are undertaken jointly with other initiatives:

Mapping and monitoring HPSR at country and regional levels

Gaps and imbalances are identified and collaboration between actors supported to develop funding priorities and to plan Alliance activities. Close liaison with the Council for Health Research for Development (COHRED) has been ensured.

Advocating and collaborating to build sustainable country-level capacity for HPSR

A capacity-building programme is being planned based on a review of current HPSR capacity and capacity development experience. Partner institutions, country authorities, COHRED and other relevant agencies and regional networks have been consulted.

Supporting research priorities

In order to address gaps and emerging issues, and translate HPSR results for policy- and decision-makers, the Alliance has established a competitive small grants programme, and mobilized funds for research on neglected areas with WHO and other partners. The Alliance is identifying research areas of future importance and will commission comparative research in key areas.

Developing methodologies and tools for comparative analysis of country experiences

Where tools and methodologies are unavailable or not standardized, the Alliance is helping in their development and dissemination.

Facilitating systemization, analysis and sharing of information
The Alliance publishes a newsletter and is collaborating with information technologies such as SHARED and the International Clearinghouse of Health System Reform Initiatives. The Alliance is encouraging networking and liaison with existing networks.

Developing partnerships where various HPSR actors with common aims can meet and communicate in an environment of trust
The Alliance is developing partnerships between policy-makers, research institutions, technical support agencies and investors with common aims towards health system development through partner meetings where HPSR takes centre stage and through a state-of-the-art web portal.

5. Results of Alliance activities over the past two years

The Alliance made significant progress in meeting its objectives in 2000-2001. Research priorities were identified and improvements made to the tools available for this purpose. Partner research capacity strengths and weaknesses were identified through an on-line questionnaire completed by over 100 institutions and now available as a benchmarking tool on the Alliance website (www.alliancehpsr.org). Case studies were commissioned to identify HPSR management innovations and identify indicators with which to assess partners' research management strengths and weaknesses on a regular basis. The Alliance also commissioned case studies on the enabling environment for HPSR in order to improve the research-to-policy process. The purpose of these case studies was to identify indicators and develop training materials to assess capacity in priority setting, financial and institutional support for research and on the impact of HPSR.

The Alliance also made progress in promoting the generation of information for policy-making through two rounds of research grants. A call for research grants was launched in 2000. Over 400 letters of intent were received out of which 53 projects were selected, representing over US$700,000 in investment.

The analysis of the requests for funding provided vital information on the range of topics and priorities being pursued, the number and capacity of researchers and institutions active in HPSR, and on the need to strengthen capacity and develop strategic research. Insert 8.11.2 presents the distribution of 416 letters of intent by topic, separating out the 62 that were selected for funding.

In the second round of proposals in 2001, six research priorities were emphasized, each derived from an analysis of partner priorities. Special consideration was given to WHO's capacity to support and co-fund some of these research projects. These priorities were:

- Impact of social policies on poverty and exclusion, and consequences of globalization
- Innovative approaches to health financing for the poor
- National health accounts (NHA): country methodological developments
- Research on human resource development
- Scaling up malaria control and prevention: financing and health system strengthening
- Research on road traffic injuries: policy development and implementation.

A total of 303 letters were received from 57 low- and middle-income countries. Based on peer review by experts, the Alliance funded 24 projects in January 2002 for a total cost of US$400,000.

The Alliance is collaborating with INCLEN, COHRED and the Global Forum in developing a training project called “Research for Policy, Action and Practice”. This will result in a research-to-policy toolkit and a

Insert 8.11.2

Alliance Small Grants (Round 2000): topics by frequency submitted and selected

Topic of letter	Number submitted	Number selected
Access	18	4
Community participation	9	1
Cost effectiveness	20	–
Cost sharing	14	3
Decentralization/local health systems	18	5
Economic policy and health	11	2
Equity	8	2
Financing	22	9
Health needs	12	–
Health reform	12	3
Health-seeking behaviour	14	–
Health systems development	16	1
Hospital autonomy/privatization	12	1
Human resources	21	1
Information, education and communication	10	–
Information systems	18	–
Insurance	15	6
Knowledge, attitudes and practices	12	–
Performance assessment	17	3
Pharmaceutical management/regulation	12	–
Pharmaceutical policy	4	–
Physician behaviour	10	1
Policy process	15	5
Poverty	10	3
Private-public mix	21	7
Prevention/promotion	7	–
Programme evaluation	12	–
Quality	14	1
Reproductive health	12	–
Research to evidence/capacity strengthening	12	1
Traditional medicine/indigenous populations	8	3
TOTAL	**416**	**62**

training methodology and will be ready for testing by June 2002. A series of workshops will be held to train Alliance grantees as well as researchers and policy-makers affiliated to the collaborating regional networks.

6. Perspectives over the next two years

In 2002 and 2003 the Alliance will focus on consolidating the range of activities started since 2000, while expanding capacity-strengthening activities.

The main activities for funding are outlined below, with special emphasis on the proposed new initiative on capacity strengthening.

(a) Development of HPS research, methods and tools

- *Small grants reviewed and awarded in 2000*
  Current grantees (53) will be followed up and final reports will be obtained by the middle of 2002. Peer review will be organized for the Research to Policy grantees

in order to provide recommendations for improvement and to select participants for workshops on writing-up and dissemination. The call for letters will be evaluated on the basis of project proposals, reports and a survey to researchers and policy-makers.

- *Small grants reviewed in 2001*
  A total of 25 projects will be funded in 2002. Technical support will be co-ordinated by the Alliance with the collaboration of regional networks.
- *Small grants Round 2002*
  The call will be launched in the fourth quarter on the basis of the priority-setting exercise and the assessment of the achievements of grants awarded in Round 2000.
- *Development of health policy and systems research-to-policy tools*
  This activity is being undertaken in collaboration with INCLEN, the Global Forum for Health Research and COHRED. Consultants will finalize a set of training modules, one each for priority setting, research management and advocacy. The modules will be tested on the basis of the training-of-trainers workshops and finalized thereafter.
- *Health research system performance assessment*
  This activity is designed to contribute towards the development of WHO's World Health Report 2004, dedicated to the assessment of the performance of health research systems. In collaboration with WHO's Research Policy and Coordination and COHRED, the Alliance will identify specific activities for the assessment of HPSR performance.
- *Strategic research on selected topics*
  Based on previous consultations, this activity will focus on the determinants and consequences of performance of human resources in health. The activity will be undertaken in collaboration with WHO's Organization of Health Services Provision. A consultant will develop terms of reference, full proposals will be requested from candidate institutions and one of them will be appointed to undertake the research.

(b) HPSR review

- *Finalization of HPSR thesaurus*
  A working version of the HPSR thesaurus will be produced on the basis of definitions for up to 20 main HPSR terms and the identification of 120 sub-terms. The resulting taxonomy will be developed into a knowledge management system in collaboration with SHARED information mediation technology. Regional networks will collaborate in the development and testing of terms.
- *Review of partners' institutional activity*
  The continuous partner information system will be the basis for identifying institutional priorities and country and regional issues. This review will serve to support other activities such as the identification of priorities for the small grants Round 3 and to identify country research priorities.
- *Support HPSR priority setting*
  A number of low-income countries with a moderate to high level of HPSR activity will be identified to undertake further work on priority setting. With the collaboration of COHRED and other partners, an HPSR priority-setting exercise will be undertaken. This will take the form of consultations and workshops following a methodology chosen among the options to be developed through the research for policy and practice training project.

(c) Capacity assessment

- *Identify research expertise and strengths of partner institutions*
  This activity will provide evidence on research capacity among partner institutions on the basis of the web-based Alliance indicators and information system.

(d) Capacity strengthening

- *Training of trainers in HPSR priority setting, evidence-to-policy, advocacy and knowledge management*
  This one-week activity will be replicated in four sites and will be based on the policy tools being developed in the training project described below. Collaborating regional networks will participate in the programme, will identify trainees and host these workshops.
- *Collaboration with networks*
  Four regional networks will collaborate in 2002 and will be invited to renew their contracts for 2003 based on results. The agreements will support Alliance activities in accordance with each network's possibilities and will provide support to tailored capacity strengthening activities.
- *Strengthening demand through high-level policy research discussion fora*
  Up to 30 Alliance partners from policy-making institutions will be invited for an orientation on methodologies to improve their utilization of HPSR as a parallel activity to Forum 6 in Arusha, Tanzania.

(e) Dissemination and systemization

- *Books*
  Collaborations will be pursued with WHO, IDRC, COHRED, INCLEN and Public-Private Mix Network to publish three books: (i) Public-private mix in health service delivery in developing countries; (ii) Designing and conducting health systems research projects and (iii) Health research for policy, action and practice.
- *Working papers*
  The Alliance will publish the reviews, assessments and priority setting exercises. Case studies described in the workplan for 2001 will also be published. It is planned to publish about 11 new working papers.
- *Alliance Newsletter*
  This quarterly publication will continue, with translations in Chinese, French and Spanish.

(f) Toward a new initiative for capacity strengthening

The Alliance is now seeking donor support to launch a major six-year initiative to strengthen capacity for health policy and systems research (HPSR), with a tentative budget of US$10 million. The initiative takes into account the experience in capacity strengthening of various international research programmes over the last 25 years. The goal of the initiative is to support policy-makers in improving health in low- and middle-income countries by developing the capabilities of broad-based coalitions of investigators, policy-makers, donors and community advocates. The initative aims to improve their ability to analyse and set priorities for health policy and systems research, undertake quality projects and facilitate the demand, supply and utilization of results for improved health policies.

Complementary capacity-strengthening approaches are proposed, in the form of five grant mechanisms, to be implemented with technical support. The initiative will be mainly directed at "research-poor", lower income countries, with emphasis on the needs of the poor and marginalized population. Capacity-building grants are proposed for these countries, to enable research groups to undertake diverse activities of between three and five years' duration.

Capacity development will mainly take the form of research and needs-based training, with technical and financial support provided by the Alliance for the three- to five-year period. At the same time, the Alliance will advocate the use of HPSR for policy-making in these countries, by stimulating demand and facilitating the research-to-policy process.

Selected institutions will also be eligible for capacity-strengthening grants and academic support, through grants for curricular development, young researchers and courses,

seminars and workshops. It is expected that these grant mechanisms will be combined and adapted to suit specific institutions and developing country situations, with significant technical support to be provided by the Alliance and its partners as well as by regional networks.

7. Indicators of success

The measurement of the contribution of the Alliance to health development and the efficiency and equity of health systems through research on and for policy can only be gauged indirectly through the attainment of its concrete objectives. The promotion of *capacity* for health policy and systems research (HPSR) on national and international issues will be gauged by the number and range of national and international teams of researchers and policy-makers established, strengthened and sustained as a result of Alliance efforts, particularly in poor countries. The credibility of such teams will be assessed through their participation in policy debates and, ultimately, through their influence in securing better health services for the poor.

The Alliance objective of helping to develop the *information* for policy decisions in the health sector and other sectors influencing health will be evaluated by the number and range of scientific publications, and their influence on policy. Alliance grantees will be followed up to establish the extent to which support to them played a role in undertaking more valuable research and in publishing their work. A direct function of increased demand for HPSR is to stimulate the generation of *knowledge* to facilitate policy analysis and improve understanding of the health systems and policy process. This will be assessed through the number of policy-makers and community advocates trained in making the most of the research-to-policy process. Indirectly, the Alliance will be able to observe how policy-makers respond to research opportunities and the articulation of research needs.

Strengthening international research *collaboration*, information exchange and learning across countries will be measured by the evaluation of Alliance support to the creation or strengthening of regional networks working in the field of HPSR. Furthermore, the readership of Alliance publications and the benefits of the website and its search engines and databases will be assessed. Finally, the identification of *global level influences* on health systems and promotion of appropriate research will be measured through the success of the strategic research undertaken by the Alliance, including its research results, their dissemination and influence on national and international policies.

Section 12

Genomics and Health Research*

Genomics and bioinformatics provide the foundation for revolutionary advances in the prevention, diagnosis and treatment of disease, which will have a major impact on the human condition.

Genomics and the 10/90 gap

In harnessing this technology, it is critical to ensure that these advances do not widen the 10/90 gap. The public sector needs to be engaged and to invest in research on this technology. Failure to do so will leave potentially profitable findings exclusively to the private sector.

In a statement to the World Health Assembly in May 2001, Dr Gro Harlem Brundtland, Director-General of WHO, stated that: "Most biotechnology research is now carried out in the industrialized world, and is primarily market-driven. This is ethically unacceptable. WHO will work with Member States on the scientific, ethical, social and legal issues."[38] WHO, through the Advisory Committee on Health Research (ACHR), has initiated a study to monitor and evaluate emerging trends and developments in scientific research with implications for public health improvement and to provide advice to the Director-General.

The Report on Genomics and World Health, published in 2002, will provide a road map (description and analysis) and vision (potential scenarios) of the impact of genomics on world health, especially in low- and middle-income countries. Through global and regional consultations with experts from a wide range of disciplines, it will evaluate the scientific potential, as well as the ethical, legal and social implications of such research (including human rights, issues of confidentiality, ethics, priorities and intellectual property rights). The experts include representatives of civil society, academic researchers, industry, biomedical scientists, clinicians, public health specialists, policy researchers, social scientists, bioethicists and lawyers.

The adoption of a proactive strategy and its implementation by the public sector in all WHO Member States should ensure that the 10/90 gap is not made worse by excluding low- and middle-income countries from the potential benefits of these technological advances.

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* This text was contributed by Tikki Pang, Director, Research Policy and Cooperation, WHO.

[38] Tikki Pang, Research Policy and Cooperation, WHO. Paper presented at Forum 5, October 2001.

Section 13

Initiative on Public-Private Partnerships for Health*

1. Size of the problem: overview

The global burden of disease disproportionately affects the world's poor. The poor in low- and middle-income countries are disproportionately affected by diseases such as HIV/AIDS and tuberculosis and by tropical diseases such as malaria, trypanosomiasis (sleeping sickness) and onchocerciasis (river blindness). Although potentially treatable, scientific obstacles and a lack of economic incentives have left these diseases inadequately addressed. Developing products for poor populations is commercially unattractive. And developing strategies and infrastructure for appropriate delivery of existing products and health services has been neglected in the poor countries.

This situation continues largely because of the imbalance in global investment in health and health research (the 10/90 gap), which imposes high costs, both economically and socially, on the world community.

Public-private partnerships are essential to addressing and solving the world's most persistent, but neglected health problems. In general terms, reducing disparities in health will require:

- *developing new drugs, vaccines or other health products* to control these "neglected" diseases or conditions that result in high disease burden;
- *devising and implementing strategies that ensure accessibility* of existing and new products and services in poor countries and to poor populations;
- *creating environments conducive to product quality*, appropriate use, sustainability and commercial viability, nationally and globally;
- *establishing health as a central strategy for poverty alleviation* and mobilizing more resources for improving health.

These activities will require the capacities of both public and private sectors, and motivating them to work collaboratively. While public sector institutions enjoy the advantages of governmental frameworks, they also suffer from limitations: they lack skills in product development, manufacturing and distribution. For-profit private organizations have this expertise but must maintain profitability to compete for investments. A range of non-profit private institutions can variously bring focus, flexibility and, sometimes, resources to the table. Working independently, neither the public nor the private sector has all of the skills, resources and funds necessary to resolve health inequities. They need each other. Although historically institutions in these sectors have predominantly worked relatively independently, in the new era of "globalization", the situation is changing.

When appropriately organized and motivated, public-private partnerships are key means of tackling neglected health problems which

* This text was contributed by Roy Widdus, Manager of the Initiative on Public-Private Partnerships for Health.

disproportionately affect the poor and perpetuate poverty. The most effective modes of public-private collaboration need to be identified from among the increasing number of social experiments now under way.

2. IPPPH objectives and strategies

The Initiative on Public-Private Partnerships for Health (IPPPH) grew out of early Global Forum efforts to support and foster individual responses to the 10/90 gap (such as MMV and IAVI), and recognition of the need for a more systematic response to catalyzing effective public-private collaboration.

IPPPH is an independent non-profit research and advisory group operating under the aegis of the Global Forum for Health Research.

The mission of IPPPH is to promote effective public-private partnerships tackling neglected health issues in low- and middle-income countries.

The objectives of IPPPH are to support:

- existing public-private partnerships for health
- the development of effective new partnerships, where appropriate, through services, analysis, studies and information exchange.

To reach these objectives, IPPPH's principal strategies are to:

- serve as a clearing-house of impartial information on public-private partnerships for health
- develop strategic research and services to help public-private partnerships for health be more efficient
- sponsor meetings that bring together the perspectives of the partnerships themselves, their supporters and prospective partnership participants.

3. Partners and governance

Located in Geneva, Switzerland, IPPPH was launched in mid-2000, with the support of the Bill & Melinda Gates Foundation, the Rockefeller Foundation and the World Bank. The initiative's Advisory Board is composed of up to 20 members selected in their individual capacities from a range of constituencies: public health policy, multilateral institutions, research institutions, health sector industry, nongovernmental organizations, and foundations (see Insert 8.13.1). The purpose of the Advisory Board is to guide IPPPH in establishing its strategic direction and on implementation of its activities.

4. Activities since the creation of IPPPH (plan of action)

Based on its strategies, IPPPH activities since its creation were organized into three components:

(a) Information exchange and services

- *Information clearing house*
  Completion of the initial database of comparative information on 75 international public-private partnerships for health, with a specific focus on the product development partnerships and the donation/distribution partnerships. The database is accessible on www.ippph.org.
- *Information dissemination and services*
  The following sessions were organized at Forum 5 in October 2001: intellectual property protection and access to pharmaceuticals; public-private partnerships and neglected global health problems; public-private partnerships for health: recent trends; public-private partnerships for health: emerging issues. The reports of these sessions are available on www.ippph.org.

(b) Analytical work and services

- *Assessment of organizational arrangements of existing PPPs*

Insert 8.13.1

Members of the IPPPH Advisory Board (December 2001)

Richard G.A. Feachem (Chair)
Director, Institute for Global Health, University of San Francisco/University of Berkeley

Joseph Cook
Executive Director, International Trachoma Initiative, New York

Louis J. Currat
Executive Secretary, Global Forum for Health Research, Geneva

Martin Hartigan
Formerly with International Finance Corporation, World Bank Group

Akira Homma
Vice-President of Technology, Fundaçao Oswaldo Cruz (FIOCRUZ), Ministry of Health of Brazil

John Kilama
President, Global Biodiversity Institute, USA

Sean P. Lance
Chairman and CEO, Chiron Corporation, USA

Christopher Lovelace
Director, Health, Nutrition and Population, The World Bank, Washington DC

Mwelecele Ntuli Malecela-Lazaro
Director of Research and Training, National Institute for Medical Research, Tanzania

Jacques-François Martin
President, Global Fund for Children's Vaccines, Lyon

Ragunath A. Mashelkar
Director General, Council of Scientific & Industrial Research, India

Ariel Pablos-Mendez
Associate Director, Health Equity Division, Rockefeller Foundation, USA

Giorgio Roscigno
Director of Strategic Development, Global Alliance for TB Drug Development

To facilitate comparisons of partnerships, IPPPH has developed two papers:

- *Towards better defining public-private partnerships for health*, R. Widdus et al. Initiative on Public-Private Partnerships for Health, Global Forum for Health Research, Geneva
- Public-private partnerships for health: Their main targets, their diversity and their future direction. R. Widdus 2001. *Bulletin of the World Health Organization*, 2001 79: 713-720

• *Operational issues for public-private partnerships*

IPPPH published in 2001 the first version of its study on *Good practices for the establishment and operations of public-private partnerships, 2001.*

In September 2001, IPPPH held a joint meeting with the London School of Hygiene and Tropical Medicine at which a group of donation/distribution partnership managers, operating at the country level, met to examine ways to measure effectiveness, integrate programmes with national priorities and develop a research agenda in this area.

- *Studies for product development partnerships* From a survey among the managers of product development partnerships, four topics were identified forfurther studies by selected authors:
  - Valuation of in-kind industry contributions to public-private partnerships for health
  - Options for leveraging public or philanthropic input into product development to achieve public health goals
  - Analysis of pharmaceutical pricing, including estimation of manufacturing costs and opportunities to influence pricing
  - Where does local manufacturing make sense? Issues to consider.

(c) Supporting effective new collaborations
IPPPH has provided consultation services to various groups interested in exploring collaborative activities, including:

- Stop TB Partnership, on options to ensure reliable supply of quality TB drugs for high-burden countries (via a Global TB Drug Facility)
- Netherlands Institute for Applied Research on the business and public health prospects for their Special Programme on Infectious Diseases
- Herbal medicine development between German academic institutes, pharmaceutical companies and Zimbabwe
- Novartis, on measuring the success/effectiveness of a discounted pricing arrangement with WHO on the antimalarial drug Coartem
- International AIDS Vaccine Initiative, *inter alia*, on organizational issues relating to access issues for HIV vaccines
- Population Council/International Center for Research on Women/Rockefeller Foundation on ensuring access to future anti-HIV/STI microbicides and mechanisms to integrate development and access considerations
- Emory University and pharmaceutical companies, on collaborative research on influenza control
- Médecins Sans Frontières Campaign for Access to Essential Medicines, on needs and mechanisms for promoting development of drugs for the tropical diseases including trypanosomiasis, Chagas disease and leishmaniasis
- WHO Noncommunicable Diseases and Mental Health Cluster, on desirable partnerships for control of noncommunicable diseases.

5. Perspectives over the next two years

The planned activities of IPPPH for 2002-2003 can be summarized as follows:

(a) Information exchange and services
(i) Information clearing house
The database of comparative information on 75 international public-private partnerships for health is available in a searchable database on IPPPH's website (www.ippph.org).

In 2002, IPPPH will continue its systematic effort to compile and compare approaches and experience of public-private partnerships, including an analysis of the success/failure factors of a partnership, "local" partnerships for health operating in the larger low- to middle-income countries, and an inventory of

Insert 8.13.2

Examples of existing public-private partnerships under research by the Initiative on Public-Private Partnerships

Health goals disease/condition	Product development partnerships*	Donation/distribution partnerships**	Other health goals***
Infectious diseases			
AIDS		Accelerating Access Initiative to HIV Care (AAI)	
AIDS			Botswana Comprehensive HIV/AIDS Partnership (BCHP)
AIDS			Global Business Council on HIV & AIDS (GBC)
AIDS	Alliance for Microbicide Development (AMD)		
AIDS	Global Microbicide Project (GMP)		
AIDS	International AIDS Vaccine Initiative (IAVI)		
AIDS			Secure the Future
AIDS			Stepping Forward... for the World's Children
Malaria	Japanese Pharma., Ministry of Health, WHO Malaria Drug Partnership (JPMW)		
Malaria	LAPDAP Antimalarial Product Development (LAPDAP)		
Tuberculosis (TB)	Medicines for Malaria Venture (MMV)		
Tuberculosis (TB)	Action TB Programme		
Tuberculosis (TB)	Global Alliance for TB Drug Development (GATB)		
Tuberculosis (TB)	Sequella Global Tuberculosis Foundation (Sequella)		Stop TB Partnership

* **Product development partnerships**. *Partnerships involved in the discovery and/or development of new drugs, vaccines or other health products addressing 'neglected' diseases and conditions in low- and middle-income countries.*

** **Donation/distribution partnerships.** *Collaborations focused on access, delivery and/or distribution methods for already available drugs, vaccines or other health products addressing 'neglected' diseases and conditions in low- and middle-income countries where the relationship extends beyond the traditional donor/recipient roles.*

Insert 8.13.2

Examples of existing public-private partnerships under research by the Initiative on Public-Private Partnerships (continued)

Health goals disease/condition	Product development partnerships*	Donation/distribution partnerships**	Other health goals***
Other infectious diseases			
Hookworm	Hookworm Vaccine Initiative (HVI)		
Leishmaniasis, tuberculosis, Chagas disease	Leishmaniasis Vaccine Initiative (LVI) and other neglected diseases at IDRI		
Leprosy		Global Alliance to Eliminate Leprosy (GAEL)	
Lymphatic filariasis		Global Alliance for the Elimination of Lymphatic Filariasis (GAELF)	
Meningitis	Meningitis Vaccine Project at WHO/PATH (MVP)		
Onchocerciasis (river blindness)		Mectizan® Donation Program (Mectizan)	
Sleeping sickness (human African trypanosomiasis)		Sleeping Sickness Initiative (SSI)	
Trachoma		International Trachoma Initiative (ITI)	
Other health problems			
All human diseases and medical conditions			Single Nucleotide Polymorphisms Consortium Ltd (SNP)
Injection safety, syringes	Development of Autodestruct Syringes		
Injection safety, syringes			Safe Injection Global Network (SIGN)
Reproductive health	Concept Foundation		
Vitamin A deficiency			Vitamin A Global Alliance

*** **Other health goals include:**

- *Global coordination mechanisms: alliances serving as a mechanism for coordinating multiple efforts to ensure the success of global health goals – often for a particular disease/condition.*
- *Health services strengthening: partnerships involved in improving the health infrastructures in low and middle-income countries – often at the community level and including employer/workplace initiatives.*
- *Public advocacy, education, research: collaborations focused on advocacy, education or research around health issues predominantly affecting poor populations in low- and middle-income countries. This includes social mobilization and social marketing efforts.*
- *Regulation and quality assurance: initiatives working toward improving the regulatory environment and product quality, appropriate use of and access to effective health products addressing neglected diseases and conditions in low- and middle-income countries.*

illustrative examples of non-health sector business action to improve health in low- to middle-income countries.

(ii) Information dissemination and services
IPPPH will implement a targeted communications strategy, aiming at informing its major constituencies (public-private partnerships, their supporters and prospective partnership participants) on the products and services offered, including advocacy for attention to neglected health problems in low- to middle-income countries through public-private partnerships.

IPPPH plans to periodically update the information required by its major constituencies such as examples of business plans, and examples of economic/market studies for drugs, vaccines and diagnostics for neglected diseases.

In parallel, IPPPH will develop a referrals service for expertise sought by public-private partnerships in various areas (e.g., regulatory affairs in low- and middle-income countries, strategic/business planning, economic/market assessments, intellectual property management) based on rosters of individuals who have agreed to serve in this capacity.

Finally, IPPPH will also foster exchange of information and networking between public-private partnerships by convening meetings on priority topics and initiating a periodic 'web alert' on public-private collaboration for health in low- and middle-income countries.

(b) Analytical work and services
(i) Assessment of organizational arrangements of existing PPPs
To facilitate comparisons of partnerships, IPPPH has developed a provisional categorization of partnerships by:

- health goal or purpose
- legal status
- disease or condition addressed
- product or service focus
- participants
- funding sources.

This topography will be refined in the update of the paper on "Towards better defining and understanding public-private partnerships for health" by R. Widdus et al, based on new information gathered.

A more comprehensive review of the legal basis, guidelines, screening mechanisms, and implementation process for certain partnership arrangements (with UN agencies, including WHO, UNICEF, World Bank, UNFPA and UNAIDS) will be developed with Yale University and the London School of Hygiene and Tropical Medicine in 2002.

(ii) Operational issues for public-private partnerships
IPPPH will revise the initial version of "Good practices for the establishment and operations of public-private partnerships", based on the analysis of case studies.

Following the meeting in September 2001 with the London School of Hygiene and Tropical Medicine, IPPPH will continue information gathering and assessment of methods to measure the effectiveness of partnerships operating at country level and prepare a report on the methods selected by partnerships.

(iii) Studies for product development partnerships on shared concerns
In the coming year, together with a number of product development partnerships, IPPPH plans to:

- complete comprehensive studies on the four priority topics of shared concern for product development partnerships identified in 2001
- prepare a study on methods to evaluate the results of product development

partnerships
- identify further analytical work on topics of shared concern.

(c) Supporting effective new collaborations

While many new public-private collaborations have arisen in the last 5-10 years, most came into existence without the benefit of systematic review of prior related experience. Each new partnership typically has a unique mission and participants, and is shaped by the environment in which it emerges. However, useful general lessons can be drawn from experience. IPPPH strives to help prospective new partnerships in the following ways:

- guidance on organizational options and good practices
- networking
- consultation services
- neutral facilitating and convening activities
- supporting emerging partnerships.

Annex

Forum 5, Geneva, 9-12 October 2001

The 10/90 gap in health research: assessing the progress

Programme

Tuesday 9 October

8.30-10.00
Newcomers' and Orientation Session
Chair: Adetokunbo O. Lucas, Chair, Global Forum for Health Research

- Louis J. Currat, Executive Secretary, Global Forum for Health Research
  Overview of four years of activity and first results
- Andrés de Francisco, Senior Public Health Specialist, Global Forum for Health Research
  Overview of activities in the field of priority-setting methodologies
- Thomas C. Nchinda, Senior Public Health Specialist, Global Forum for Health Research
  Examples of the support given by the Global Forum to the development of networks
- Susan Jupp, Senior Communication Officer, Global Forum for Health Research
  Overview of strategies in the field of communication

10.30-12.30
Opening Plenary Session
Chair: Adetokunbo O. Lucas, Chair, Global Forum for Health Research

10.30-10.45
Welcome address by the Government of Switzerland

- Walter Fust, Director General, Swiss Agency for Development and Cooperation, Ministry of Foreign Affairs, Switzerland

10.45-11.15
Keynote address
The contribution of health and health research to growth and equity in Mozambique

- Pascoal M. Mocumbi, Prime Minister of Mozambique

11.15-12.30
Opening Plenary
Is disease burden (global or national) a criterion in the allocation of funding in health research?
Co-Chairs: Adetokunbo O. Lucas, Chair, Global Forum for Health Research; Berit Olsson, Director, Department for Research Cooperation (SAREC), Swedish International Development Cooperation Agency (SIDA), Sweden

- Manju Sharma, Secretary, Department of Biotechnology, Ministry of Science and *Technology of India*
  Biotechnology for healthcare
- Catherine Davies, Scientific Programme Manager, International Research, Wellcome Trust, UK
- Gerald T. Keusch, Director, Fogarty International Center, National Institutes of Health, USA
- Jerry M. Spiegel, Senior Associate, Liu Centre for the Study of Global Issues, University of British Columbia, Canada
  Canada and the 10/90 gap
- Sigrun Møgedal, State Secretary for International Development Cooperation, Norway

14.00-15.30 **Sessions in parallel**

Developing an effective national health research system
Co-Chairs: Somsak Chunharas, Department of Medical Sciences, Ministry of Public Health, Thailand; Ragna Valen, Director, Department of Medicine and Health, Research Council, Norway

- Somsak Chunharas, Department of Medical Sciences, Ministry of Public Health, Thailand
- Chitr Sitthi-Amorn, Professor, Faculty of Medicine, Chulalongkorn University, Thailand
- Agus Suwandono, Secretary, Centre for

Health Systems Research and Development, National Institute of Health Research and Development, Indonesia
- José Noronha, President, Brazilian Association of Public Health (ABRASCO), Brazil

Preventing risky sexual behaviour among young people: findings from social and behavioural research

Chair: Pramilla Senanayake, Assistant Director General, International Planned Parenthood Federation (IPPF), London
- Ivonne Szasz, Programa "Salud Reproductiva y Sociedad", Colegio de Mexico, Mexico
  Overcoming gender double standards and power imbalances in adolescents
- Roger Ingham, Director, Centre for Sexual Health Research, University of Southampton, UK
  Understanding the contexts of young people's lives and factors that constrain and facilitate sexual health
- Rachel Jewkes, Director, Gender and Health Group, Medical Research Council, South Africa
  Programmes imparting life skills and sexuality education: do they work?
- Judith Senderowitz, Senior Adolescent Reproductive Health Adviser, Pathfinder International, USA
  Obstacles to timely and appropriate health seeking among young people

Research on AIDS vaccines and drugs

Chair: Frans van de Boom, European Director, Department of Policy and Public Support, International AIDS Vaccine Initiative, The Netherlands
- Saladin Osmanov, Scientist, HIV Vaccine Initiative, World Health Organization, Geneva
  R&D for HIV vaccines
- David Gold, Vice-President, Policy and Public Sector Support, International AIDS Vaccine Initiative, New York
  R&D for HIV drugs
- Yvette Madrid, Consultant, Health Policy, Pharmaceuticals, Vaccines
  AIDS vaccines and the half-truths of access
- Daniel Tarantola, Director, Department of Vaccines and Biologicals, World Health Organization, Geneva
  Access to AIDS drugs

Research for improving cardiovascular health in developing countries: priorities, pathways and partnerships

Co-Chairs: Philip A. Poole-Wilson, President-Elect, World Heart Federation, London; Hervé Koffi Yangni-Angate, Chairman, Department of Cardiovascular Disease, Université de Bouaké, Côte d'Ivoire
- Nizal Sarraf-Zadegan, Director, Cardiovascular Research Centre, Isfahan University of Medical Sciences, Islamic Republic of Iran
  Regional initiatives in research for cardiovascular diseases control
- Liu Lisheng, President, Chinese Hypertension League, Fu Wai Hospital, People's Republic of China
- Shanthi Mendis, Coordinator CVD, World Health Organization, Geneva
- K. Srinath Reddy, Coordinator, Initiative for Cardiovascular Health Research in Developing Countries, India
- Anthony Rodgers, Co-Director, Clinical Trials Research Unit, University of Auckland School of Medicine, New Zealand

Resource flows in health research

Chair: Adolfo Martinez-Palomo, Director-General, Center for Research and Advanced Studies, Mexico
- Andrés de Francisco, Senior Public Health Officer, Global Forum for Health Research
  The first three years of the Resource Flows

study and its future strategy

- Bienvenido P. Alano, President, Centre for Economic Policy Research, The Philippines
  Country studies on resource flows
- Catherine S. Davies, Scientific Programme Manager, Tropical Medicine, Wellcome Trust, UK
  Methods and process for measuring resource flows into malaria research
- Paul Nunn, Coordinator TB and Leprosy Research, TDR, World Health Organization, Geneva
  Resource flows for tuberculosis research 1995-2000

16.00-17.30 *Sessions in parallel*

Application of a framework to help set priorities for health research

Co-Chairs: Andrés de Francisco, Senior Public Health Specialist, Global Forum for Health Research; Christina Zarowsky, Senior Scientific Advisor Health, International Development Research Centre, Canada

- Nigel Bruce, Senior Lecturer in Public Health, University of Liverpool, UK
  Indoor air pollution and health: applying a framework to identify research policies for health and other sectors
- Emmanuel Makundi, Research Scientist, Health System and Policy Research, National Institute for Medical Research, Tanzania
  Application of a framework to help set priorities in health care: the Tanzanian experience
- Paul Nunn, Coordinator TB and Leprosy Research, TDR, World Health Organization, Geneva
  The approach to priority-setting in TDR

Evaluating the performance of health research systems

Chair: Chitr Sitthi-Amorn, Professor, Faculty of Medicine, Chulalongkorn University, Thailand

- Jonathon Simon, Director, Center for International Health, Boston University School of Public Health, USA
  A concept for health research performance evaluation

Medicines for malaria: from drug development to effective delivery systems

Chair: John Kilama, President, Global Biodiversity Institute, USA

- David Alnwick, Project Manager, Roll Back Malaria, World Health Organization, Geneva
- Christopher Hentschel, Chief Executive Officer, Medicines for Malaria Venture, Switzerland
  Products in the pipeline and timelines for their availability
- Liza Kimbo, Executive Director, Cry for the World Foundation, Kenya
  Medicines for malaria: from development to effective delivery systems
- Ravi Narayan, Community Health Adviser, Community Health Cell, India

NGO research to inform programme design

Co-Chairs: Mira Aghi, Resident Coordinator, Research for International Tobacco Control (RITC), India; Lillian Liberman, Chairperson, Yaocihuatl, Mexico

Contribution by:

- Ruzanna Stepanyan, Health Programme Manager, Oxfam GB, Armenia
  Health research as an Oxfam global policy component

with:

- Isabel Aleta, Consultant, Alliance for Health Policy and Systems Research
- Hersit Sinha, Director, Vardaan Foundation, India

Research on AIDS care in Africa

Chair: Peter Mugyenyi, Director, Joint Clinical Research Centre, Uganda

- Mauro Schechter, Professor of Infectious Diseases, Universidade Federal do Rio de Janeiro, Brazil

Antiretroviral drugs for developing countries: not only when and how, but also which

- Robert Scherpbier, Task Manager, Practical Approach to Lung Health, Stop TB, World Health Organization, Geneva
  Syndromic approaches for common outpatient conditions in adults: a priority for revitalizing primary care
- Peter Mugyenyi, Director, Joint Clinical Research Centre, Uganda
  ARV use in poor communities
- Elly Katabira, Associate Dean, Research, Makerere University Medical School, Uganda
  Prophylaxis of opportunistic infections

18.00-20.00
Opening Reception hosted by the Chair of the Global Forum for Health Research and Poster Session

Wednesday 10 October

8.30-10.00 **Plenary Session**

The contribution of health and health research to economic growth and equity
Chair: Mahmoud F. Fathalla, Chairman, Department of Obstetrics and Gynaecology, Assiut University Hospital, Egypt

- Richard G.A. Feachem, Director, Institute for Global Health, University of California, USA
  The contribution of health and health research to economic growth and equity: an overview
- Anne Mills, Professor of Health Economics and Policy, London School of Hygiene and Tropical Medicine, UK
  The challenge of addressing the health needs of the poor

with regional viewpoints from:

- Adolfo Martinez-Palomo, Director-General, Center for Research and Advanced Studies, Mexico
- Andrew Y. Kitua, Director General, National Institute for Medical Research, Tanzania
- Chitr Sitthi-Amorn, Professor, Faculty of Medicine, Chulalongkorn University, Thailand

10.30-12.00 **Plenary Session**

Gender analysis in health research: from evidence to practice
Chair: Lesley Doyal, Professor, School for Policy Studies, University of Bristol, UK

- Lesley Doyal, Professor, School for Policy Studies, University of Bristol, UK
  Sex, gender and science in health research: introductory comments
- T.K. Sundari Ravindran, Gender and Health Specialist, Department of Gender and Women's Health, World Health Organization, Geneva
  Gender analysis in health research: from theory to practice
- Ian Smith, Stop TB Initiative, World Health Organization, Geneva
  Gender issues in TB research

14.00-15.30 **Sessions in parallel**

Enhancing health policy and systems research performance
Chair: Anne Mills, Professor of Health Economics and Policy, London School of Hygiene and Tropical Medicine, UK

- Eusèbe Alihonou, Director-General, Centre régional pour le développement de la Santé (CREDESA), Benin
- Gcinile Buthelezi, Research Programme Manager, Health Systems Trust, South Africa
  Confronting the role of research in policy development and implementation
- Wiput Phoolcharoen, Director, Health Systems Research Institute, Thailand
  Health system reform in Thailand: the role of health systems research
- Francisco Yepes, Researcher, Asociación Colombiana de la Salud, Colombia

Intellectual property and access to pharmaceuticals

Co-Chairs: John Kilama, President, Global Biodiversity Institute, USA; Thu-Lang Tran Wasescha, Counsellor, Intellectual Property Division, World Trade Organization, Geneva

- Elizabeth Fuller, Director, Legal Affairs, Triskel Integrated Services, Switzerland
  Overview of intellectual property and its management
- Michael Gollin, Partner, Venable Attorneys, USA
  Creative options for enhancing pharmaceutical access under TRIPS
- Eric Noehrenberg, Director, Intellectual Property and International Trade Issues, International Federation of Pharmaceutical Manufacturers Associations (IFPMA), Geneva
  How much does intellectual property protection per se affect access to pharmaceuticals?
- David Earnshaw, Head of EU Advocacy Office, Oxfam International, Brussels
  Summary of recent proposals to modify intellectual property protection

Progress in child health and nutrition research

Chair: Paul Arthur, Director, Kintampo Health Research Centre, Ghana

- Adnan A. Hyder, Assistant Scientist, Johns Hopkins University School of Hygiene and Public Health, USA
  Progress in child health and nutrition research
- Olivier Fontaine, Medical Officer, Child and Adolescent Health and Development, World Health Organization, Geneva
  Priorities for child health and nutrition research: an update
- Shafika Nasser, Professor Public Health, Cairo University, Egypt
  Research in diarrhoeal disease control: Egyptian experience
- Andrés de Francisco, Senior Public Health Specialist, Global Forum for Health Research
  Next steps in child health and nutrition research: new RFPs

Research capacity development: perspectives from the South

Co-Chairs: Mary Ann Lansang, Executive Director, INCLEN Trust; Marcel Tanner, Director, Swiss Tropical Institute, Switzerland

- Michael Mbizvo, Programme Manager for Male Reproductive Health, World Health Organization, Geneva
  A review of research capacity strengthening by HRP in the decade 1990-1999
- Abha Saxena, Scientist, Department of Research Policy Cooperation, World Health Organization, Geneva
  Priorities and needs of researchers in developing countries
- Steve Wayling, Manager, TDR, World Health Organization, Geneva
  Survey of TDR Research Capability Strengthening Impact

Panel discussion with:

- Jackeline Alger, Department of Clinical Laboratories, Hospital Escuela, Honduras
- Yeya Touré, Manager, Molecular Entomology, Special Programme on Research and Training in Tropical Diseases (TDR), World Health Organization, Geneva
- John Gyapong, Director, Health Research Unit, Ministry of Health, Ghana
- Shiroma Handunnetti, Head, Malaria Research Unit, University of Colombo, Sri Lanka
- Ellen Hardy, Associate Professor, State University of Campinas, Brazil

Moving sexual violence research forward

Chair: Pramilla Senanayake, Assistant Director General, International Planned Parenthood Federation, London

- Claudia Garcia Moreno, Coordinator, Violence against women multicountry study, World Health Organization, Geneva
  Overview and introduction to a draft proposal
- June Lopez, Associate Professor of

Psychiatry, University of the Philippines, Philippines
Research priorities in interventions for sexual violence

- Rachel Jewkes, Director, Gender and Health Group, Medical Research Council, South Africa
  Measurement of sexual violence: research priorities and recommendations from the January 2001 meeting
- Jill Astbury, Deputy Director, Key Centre for Women's Health in Society, University of Melbourne, Australia
  Mental health effects of sexual violence against women: outcomes and research questions
- Magdalena Cerda, Technical Officer, Injuries and Violence Prevention, World Health Organization, Geneva
  Evaluating the process, outcomes and impact of health-sector interventions using the WHO guidelines for sexual violence as a case study

16.00-17.30 **Sessions in parallel**

Accelerating microbicide development
Chair: George F. Brown, Associate Director, Health Equity, Rockefeller Foundation, USA

- Quarraisha Abdool Karim, Professor, University of Natal, South Africa
  Access and gender issues in microbicides
- Christopher J. Elias, President, Programme for Appropriate Technology in Health (PATH), USA
  Scientific development: Microbicides Scientific Working Group
- George F. Brown, Associate Director, Health Equity, Rockefeller Foundation, USA
  Accelerating microbicide development

Burden of disease: new developments
Chair: Adnan A. Hyder, Assistant Scientist, Department of International Health, Johns Hopkins University School of Hygiene and Public Health, USA

- Glyn N. Chapman, Chairman, Department of Community Medicine, University of Zimbabwe Medical School, Zimbabwe
  Measuring the burden of disease in Zimbabwe
- Daniel Reidpath, Senior Lecturer in Social Epidemiology, School of Health Sciences, Deakin University, Australia
  Measuring health in a vacuum: comparing developed and developing countries
- Robert Black, Professor, Johns Hopkins University School of Hygiene and Public Health, USA
  Comparative risk assessment of the burden of disease from malnutrition

Health research on conflicts and disasters: where is the evidence?
Co-Chairs: Peter J. Baxter, Consultant, Occupational Health, University of Cambridge Institute of Public Health, UK; Anna Karaoglou, Principal Scientific Officer, Health Sector, European Commission Research DG, Brussels

- André Griekspooor, Focal Point for Research in Emergencies, World Health Organization, Geneva
  Health effects of conflicts and disasters: what is the real burden of disease?
- Pooran C. Joshi, Head, Department of Medical Anthropology, Institute of Human Behaviour and Allied Sciences (IHBAS), India
  Health research needs in the context of natural disasters: reflections on earthquakes
- Peter J. Baxter, Consultant Occupational Health Physician, Institute of Public Health, University of Cambridge, UK
  Disaster research: the next challenge
- Michael Marx, Head, Health Systems and Evaluation Unit, Department of Tropical Hygiene and Public Health, University of Heidelberg, Germany
  Health systems in protracted conflicts and disasters: their role and potential
- David R. Davis, Director, Conflict Resolution and Public Health Institute, The Carter Center, USA
  Violent conflict and its impact on health indicators in sub-Saharan Africa
- Muhiuddin Haider, Technical Program

Director, The George Washington Center for International Health, George Washington University, USA
Health: a bridge for peace
- Debarati Guha-Sapir, Department of Epidemiology, University of Louvain School of Public Health, Belgium
Summary remarks

Making health research relevant to national health-care policies: the case for tobacco control
Co-Chairs: Joy de Beyer, Tobacco Coordinator, World Bank, Washington DC; Emmanuel Guindon, Economist, Tobacco Free Initiative, World Health Organization, Geneva
- Mira Aghi, Resident Coordinator, Taleem Research Foundation, India
Women's participation in health policy formulation in India: promulgation of the Cigarette and Other Tobacco Products Bill
- Andrey Demin, President, Russian Public Health Association, Russian Federation
Tobacco policy-making in Russia and the role of civil society
- Yussuf Saloojee, Coordinator, International Non Governmental Coalition Against Tobacco (INGCAT), South Africa
- Linda Waverley Brigden, Executive Director, Research for International Tobacco Control, Canada
The policy-making process: how can research contribute?

Managing intellectual property for enhancing pharmaceutical access
Co-Chairs: John Kilama, President, Global Biodiversity Institute, USA; Elizabeth Fuller, Director, Legal Affairs, TRISKEL Integrated Services, Switzerland
- P.V. Venugopal, Director, International Operations, Medicines for Malaria Venture
The evolution of intellectual property protection in India
- Siripen Supakankunti, Director, Centre for Health Economics, Chulalongkorn University, Thailand
Evolution of IP protection and strategies for accommodating WTO/TRIPS in Thailand
- Richard Wilder, Attorney at Law, Intellectual Property, International Trade Policy, Powell, Goldstein, Frazer and Murphy, USA
"Access conditions" on public/philanthropic/*PPP funding for product development*
- Joachim Oehler, Chief Executive Officer, The Concept Foundation, Thailand
Managing intellectual property for contraceptive access: The Concept Foundation

18.00-20.00 **Special Sessions**

Workshop: Resource flows measurement at the country level
Co-chairs: Bienvenido P. Alano, President, Centre for Economic Policy Research, Philippines; Andrés de Francisco, Senior Public Health Specialist, Global Forum for Health Research

Presentation on the African Council for Sustainable Health Development (ACOSHED)
Chair: Adetokunbo O. Lucas, Chair, Global Forum for Health Research
- Lola Dare, Chief Executive Officer, Centre for Health Sciences, Training, Research and Development (CHESTRAD), Nigeria
- A. Edward Elmendorf, Consultant, World Bank, Washington DC

Progress in health research systems in Latin America
Chair: Delia Sanchez, Researcher, Grupo de Estudios en Economia, Organization y Politicas Sociales (GEOPS), Uruguay

Thursday 11 October

8.30-10.00 **Plenary Session**

Public-private partnerships and neglected global health problems
Chair: Richard G.A. Feachem, Director, Institute for Global Health, University of California, USA

- Sir Richard Sykes, Rector, Imperial College of Science, Technology and Medicine; Chairman, GlaxoSmithKline, UK
  What research institutions and industry can bring to partnerships on product development for health
- Kareng Masupu, Epidemiologist, National AIDS Coordinating Agency, Botswana
  Strengthening HIV/AIDS-related efforts at country level
- Roy Widdus, Manager, Initiative on Public-Private Partnerships for Health, Global Forum for Health Research
  The diversity of new "partnerships" for health

10.30-12.00 **Plenary Session**

Health policy research and the 10/90 gap
Co-Chairs: Eusèbe Alihonou, Director-General, Centre régional pour le développement de la Santé (CREDESA), Benin; Nirmal K. Ganguly, Director-General, Indian Council of Medical Research, India

- Yu Dezhi, Deputy Director General, Ministry of Health, People's Republic of China
  Strengthening health policy research, deepening health reforms and development in China
- Guillermo Soberon, Executive President, Mexican Health Foundation, Mexico
- Lola Dare, Chief Executive Officer, Centre for Health Sciences, Training, Research and Development (CHESTRAD), Nigeria

14.00-15.30 **Sessions in parallel**

Framework for violence prevention
Chair: Etienne Krug, Director, Injuries and Violence Prevention, World Health Organization, Geneva

- Alexander Butchart, Scientist and Team Leader a.i., Department of Injuries and Violence, World Health Organization, Geneva
  Framework for violence prevention: the role of research
- Karen Colvard, Senior Program Officer, Guggenheim Foundation, USA
  The policy uses of research on terrorist violence
- Mohamed Seedat, Director, Crime, Violence and Injury Lead Programme, Medical Research Council-University of South Africa, South Africa
  The use of scientific research in stimulating violence-prevention practices and policies: reflections and questions from South African experience
- Nancy Cardia, Research Coordinator, Centre for the Study of Violence, University of Sao Paulo, Brazil
  Violence: the role from repression to prevention – the Brazilian case

National and regional efforts in priority-setting: the place of collaboration
(double session: session continues at 16.00)
Co-Chairs: Eusèbe Alihonou, Director-General, Centre régional pour le développement de la Santé (CREDESA), Benin; Raphael Owor, Director, Uganda National Health Research Organization, Uganda

- Ruzanna Yuzbashyan, Head of Primary Health Care Unit, Ministry of Health, Armenia
  Optimization and reforms in the health care system of Armenia
- Beatriz Tess, Head of Department, Science and Technology in Health, Secretariat of the National Health Policies, Ministry of Health, Brazil

Priority setting in health research: the opportunities and challenges from the Brazilian experience

- Mutuma Mugambi, Principal Vice-Chancellor, Kenya Methodist University, Kenya
  The African Health Research Forum: its perspectives and future
- Delia Sanchez, Researcher, Grupo de Estudios en Economia, Organization y Politicas Sociales (GEOPS), Uruguay
  Health research in Latin America: its challenges for the future

Public-private partnerships for health: recent trends

Co-Chairs: Mwelecele Malecela-Lazaro, Director for Research and Training, National Institute for Medical Research, Tanzania; Sissel Brinchmann, Director for European Public Affairs, Merck Sharp & Dohme (Europe), Belgium

- Robert Ridley, Chief Scientific Officer, Medicines for Malaria Venture, Switzerland
  PPPs for development of drugs, vaccines, diagnostics and contraceptives
- Bernard Pécoul, Project Director, Médecins Sans Frontières, Switzerland
  The most neglected diseases: unfinished business
- Gill M.R. Samuels, Senior Director, Science Policy and Scientific Affairs (Europe), Pfizer Global Research and Development, UK
  Industry perspective on partnerships for health
- Camille Saadé, Public Private Partnerships Coordinator, Academy for Educational Development, USA
  Country-level partnerships for disease prevention

Research into mental health and neurological disorders

Chair: Malik Mubbashar, Head, Institute of Psychiatry, Rawalpindi Medical College, Pakistan

- Srinivasa Murthy, Chief Editor, World Health Report 2001, World Health Organization, Geneva
- Rangaswamy Thara, Director, Schizophrenia Research Foundation, India
- Hanneka de Boer, Chair, Secretariat, Global Campaign Against Epilepsy
- Harvey Whiteford, Mental Health Specialist, World Bank, Washington DC

The Stop TB partnership: control and research

Chair: Jong Wook Lee, Director, Stop TB, World Health Organization, Geneva

- Jacob Kumaresan, Executive Secretary, Stop TB, World Health Organization, Geneva
  The global partnership to stop tuberculosis
- Giorgio Roscigno, Senior Adviser and Founder, Global Alliance for TB Drug Development
  The Global Alliance for TB Drug Development
- Mark Perkins, Manager, Diagnostics R&D, World Health Organization, Geneva
  The new TB diagnostic initiative: its relevance
- Mario Raviglione, Coordinator, TB Strategy and Operations, Stop TB Department, World Health Organization, Geneva
  Global DOTS expansion plan – an economic analysis

16.00-17.30 **Sessions in parallel**

Cost-effectiveness of health interventions

Chair: Tessa Tan-Torres Edejer, Coordinator a.i., Choosing Interventions: Effectiveness, Quality, Costs, Gender and Ethics, World Health Organization, Geneva

- Tessa Tan-Torres Edejer, Coordinator a.i., Choosing Interventions: Effectiveness, Quality, Costs, Gender and Ethics, World Health Organization, Geneva
  Cost-effectiveness and comparative risk assessment
- Yvan Hutin, Project Leader, Safe Injection Global Network, World Health Organization, Geneva
  Estimating the cost-effectiveness of safe and appropriate use of injection policies
- Chika Hayashi, Global Health Leadership

Fellow, World Health Organization, Geneva
Malnutrition as a risk factor and its impact on the cost-effectiveness of interventions for children under five years old

Evaluating quality gender-sensitive health services: the results, methodology and tools of an Asian study coordinated by the Asian-Pacific Resource & Research Centre for Women (ARROW)
Chair: Nafsiah M'boi, Director, Gender, Women and Health, World Health Organization, Geneva

- Rashidah Abdullah, Director, Asian-Pacific Resource and Research Centre for Women (ARROW), Malaysia
  Overview of the methodology and tools research study
- Rosana Sanchez, Co-Coordinator, Ateneo Task Force and Mindanao Working Group on Reproductive Health, Gender and Sexuality, Ateneo de Daveo University, Philippines
  Poor Filipino women's experiences of obstetrics and gynaecological services in a government hospital

National and regional efforts in priority-setting: the place of collaboration (cont.)
Co-Chairs: Eusèbe Alihonou, Director-General, Centre régional pour le développement de la Santé (CREDESA), Benin; Raphael Owor, Director, Uganda National Health Research Organization, Uganda

- Mariam J. Mwaffisi, Permanent Secretary, Ministry of Health, Tanzania
  Achievements and lessons learnt in implementing health sector reforms within the context of the Tanzanian National Health Research Forum
- Mwelecele Malecela-Lazaro, Director for Research and Training, National Institute for Medical Research, Tanzania
  Strengthening national health research coordination and prioritization: the Tanzanian National Health Research Forum
- Mihaly Kokeny, Chairman, Health and Social Affairs Committee of the Hungarian Parliament, Hungary
  Hungarian health research: challenges and problems

Public-private partnerships for health: emerging issues
Co-Chairs: Justine Frain, Vice-President, Global Community Partnerships, GlaxoSmithKline, UK; Kent Buse, Professor, Yale University School of Medicine, USA

- Bernard Fourie, Director, Tuberculosis Research Lead Programme, Medical Research Council, South Africa
  Ensuring the input of "intended beneficiaries" in the creation of "partnerships": the example of GATBDD
- Stefanie Meredith, Director, Mectizan Donation Program, Task Force for Child Survival and Development, USA
  Operational questions for partnerships at country level
- Louisiana Lush, Lecturer in Health and Population Policy, London School of Hygiene and Tropical Medicine, UK
  Addressing questions on partnerships: conclusions of a workshop
- Derek Yach, Executive Director, Noncommunicable Diseases and Mental Health, World Health Organization, Geneva
  Desirable public-private collaborations for non-communicable diseases

Road traffic injuries in developing countries
Chair: Etienne Krug, Director, Injuries and Violence Prevention, World Health Organization, Geneva

- Adnan A. Hyder, Assistant Scientist, Department of International Health, Johns Hopkins University School of Hygiene and Public Health, USA
  Report on the WHO-Global Forum RTI initiative: progress and challenges
- Margie Peden, Acting Team Leader,

Unintentional Injuries Prevention, Department of Injuries and Violence, World Health Organization, Geneva
Global strategy for RTI prevention and control
- Abdulbari Bener, Professor of Epidemiology and Biostatistics, Department of Community Medicine, United Arab Emirates University, United Arab Emirates
Motor vehicle accidents in the United Arab Emirates: strategies for prevention

18.00-20.00 **Special Sessions**

Improving HPSR relevance, support and utilization
Chair: Anne Mills, Professor of Health Economics and Policy, London School of Hygiene and Tropical Medicine, UK
- C.A.K. Yesudian, Head, Department of Health Services Studies, Tata Institute of Social Sciences, India
- Francisco Yepes, Researcher, Asociación Colombiana de la Salud, Colombia
- Mahmoud Abel Latif Salem, Director, Salem for Health Research Consultants, Egypt
- Miguel Gonzalez Block, Manager, Alliance for Health Policy and Systems Research, Global Forum for Health Research

Presentation on SHARED
Chair: Thomas C. Nchinda, Senior Public Health Specialist, Global Forum for Health Research
- Agnes Soares da Silva, SHARED, Netherlands Organization for Scientific Research (NWO), The Netherlands
- Bienvenido P. Alano, SHARED Asia, Center for Economic Policy Research, The Philippines
- Stephen Chandiwana, SHARED Africa, Blair Research Institute, Zimbabwe
- Abel L. Packer, Director, Latin American and Caribbean Center on Health Science Information, Brazil
- Barend Mons, SHARED (NWO)
Summary

Friday 12 October

8.30-9.00 **Plenary Session**

Genomics and world health: implications and promise for developing countries
Chair: Jan Holmgren, Chairman, Department of Medical Microbiology and Immunology, Göteborg University, Sweden
- Tikki Pang, Director, Research Policy and Cooperation, World Health Organization, Geneva

9.00-10.00 **Plenary Session**

The future of health research collaboration: strategies and actions post-Bangkok
Chair: Somsak Chunharas, Department of Medical Sciences, Ministry of Public Health, Thailand
- Marian Jacobs, Professor of Child Health, University of Cape Town, South Africa
Overview since Bangkok
- Tikki Pang, Director, Research Policy and Cooperation, World Health Organization, Geneva
Actions at the global level since Bangkok and perspectives for the coming years
- Somsak Chunharas, Department of Medical Sciences, Ministry of Public Health, Thailand
Actions at the regional level in the East Asia region since Bangkok: results of the Cha-am workshop

10.30-12.00 **Closing Plenary Session**

What perspectives for the 10/90 gap? What recommendations to the partners in the Global Forum?
Chair: Adetokunbo O. Lucas, Chair, Global Forum for Health Research
- Mariam J. Mwaffisi, Permanent Secretary, Ministry of Health, Tanzania

- Ravi Narayan, Community Health Adviser, Community Health Cell, India
  The People's Charter for Health
- Andrey Demin, World Federation of Public Health Associations
- David Nabarro, Executive Director, World Health Organization

Speakers were invited from the floor to present their views for reducing the 10/90 gap and their recommendations to the partners in the Global Forum for Health Research.

- Adetokunbo O. Lucas, Chair, Global Forum for Health Research
  Concluding address

12.00-14.00 **Closing event**
A celebration in honour of Dr Adetokunbo O. Lucas, retiring chair of the Global Forum for Health Research.

Forum 5 Posters

Poster Sessions took place on Tuesday 9 October 18.00-20.00, Wednesday 10 and Thursday 11 October 13.00-13.45

Saeed Asefzadeh, Qazvin University of Medical Sciences, Islamic Republic of Iran
Learning HSR by doing: forming parallel learning groups

Ishtiaq Bashir, ICDDR,B, Bangladesh
Translating research findings into policy formulation: the role of an advisory committee

Gerald Bloom, Institute of Development Studies, University of Sussex, UK
Knowledge mechanisms for health system development in the context of rapid change

Bishan S. Garg, Mahatma Ghandi Institute of Medical Sciences, India
Health system research at MGIMS Sewagram, India: a Ghandian approach

Mohammad Jalali, Isfahan University of Medical Sciences, Islamic Republic of Iran
HACCP and the Iranian food industry

Dede Kusmana, National Cardiac Center, Indonesia
Trends of cardiovascular risk factors in Indonesia: result of three surveys on the population of Jakarta in 1988, 1993 and 2000

Siba Prasad Mukhopadhyay, Indian Institute of Social Welfare and Business Management, India
Cost-benefit study of a new strategic approach for advancement of sanitary status of hospitals in West Bengal

Natalia Nojkina, Ural State Medical Academy, Russian Federation
Harm reduction strategy and health research in the Ural Region

Faiza Mohamed Osman, Institute of Endemic Diseases, Khartoum University
New approaches toward the improvement of health policy and systems research: institutional plan of action 1998-2003

Basil Porter, Maccabi Health Services, Israel
Culture-sensitive chronic disease management

Diana Rodriguez, Universidad Peruana Cayetano, Peru
Knowledge of patients with arterial hypertension who attend external consulting of cardiology at Cayetano Heredia National Hospital, Lima, Peru

Nelia P. Salazar, Southeast Asian Ministers of Education Organization (SEAMEO), Regional Tropical Medicine and Public Health (TROPMED) Network, Thailand
Bridging the gap: research capability development for community health workers in Greater Mekong Subregion countries

Harshit Sinha, Vardaan Foundation, India
Integrated model to study the burden of disease: multidisciplinary approach

Nitin Unkule, Kaivalya Yoga Institute, India
Presentation on cardiovascular diseases: Attack the attack!

Misael Uribe-Esquivel, National Institutes of Health, Mexico
Is a public forum useful in identifying problems to be addressed by health research programmes?

Anis Waiz, Bangladesh Medical College, Bangladesh
Health and research problems in developing countries

Wang Qian, Sichuan Academy of Medical Sciences, People's Republic of China
Ownership of grassland, overgrazing and transmission of alveolar echinococcosis: a study of relationships among property rights of land, ecology and disease in Tibetan area, Sichuan, China

Xi Liliu, Henan Provincial Institute of Parasitic Diseases, People's Republic of China
Economics of malaria control in China: cost, performance and effectiveness of Henan's consolidation programme

Ali Reza Yousefy, Isfahan University of Medical Sciences
Burnout in nurses

Zhang Zhenzhong, Chinese Health Economics Institute, People's Republic of China
China Health Development Forum: bridging the gap between researchers, managers and policy-makers in China

Forum 5 Marketplace

Alliance for Health Policy and Systems Research

Cellabs, Australia

Clinical Research Centre, Cuba

Council on Health Research for Development

Dugald Baird Centre for Research on Women's Health, University of Aberdeen, UK

Global Forum for Health Research

Government Pharmaceutical Organization, Thailand

Initiative on Public-Private Partnerships for Health, Global Forum for Health Research

ID21, Institute of Development Studies, University of Sussex, UK

Institute of Development Studies (IDS), China Health Economics Institute (CHEI), China Health Development Forum

International Federation of Pharmaceutical Manufacturers Associations

International Planned Parenthood Federation

Medicines for Malaria Venture (MMV)

Research Initiative on Traditional Antimalarial Medicine (RITAM)

SHARED

UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)

Universidad Peruana Cayetano Heredia, Peru

World Health Organization
- Communicable Diseases
- Health Technology and Pharmaceuticals
- Noncommunicable Diseases and Mental Health
- Research Policy and Cooperation
- Roll Back Malaria