Monitoring Financial Flows for Health Research

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Foreword by

by Adetokunbo O. Lucas, MD

Chair, Foundation Council, Global Forum for Health Research

In its widely quoted report, 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 developing countries should review and strengthen the management of health research so as to meet their national needs as well as contribute to the global fund of knowledge. The Commission also recommended that governments in developing countries should allocate at least 2% of the national health budget for research and that 5% of the budget for large externally funded programmes should be assigned to research and capacity strengthening. The Commission hoped that these financial arrangements would provide a secure foundation for funding the priority research needs in developing countries, based on the new concept of Essential National Health Research[2]. The expectation was that developing countries would review their current spending on health research and would strive to meet the stated goals.

Rather disappointingly, neither the developing world nor the donor community enthusiastically followed up the Commission's recommendations, although there were a few exceptions. Furthermore, since most developing 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. This report attempts to fill this gap. The Global Forum for Health Research has tackled the problem through its support of a network of investigators. This document contains a preliminary report of their findings. 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.

The results of this initial study were broadly predictable in that there is still a wide gap between the recommendations of the Commission and the pattern of spending on health research in many developing countries. The more advanced developing countries are making more generous allocations but more needs to be done especially in the least developed countries. Inadequate allocation of national resources for health research makes scientists so heavily dependent on foreign grants that they tend to ignore national priorities in favour of lucrative contracts from foreign sponsors. The monitoring of resource flows will provide scientists and other stakeholders with a powerful tool for advocacy in persuading national governments and foreign donors to support priority health research.

[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

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Andrés de Francisco, Caryn Miller and Alison Young constituted the Drafting Committee. Consultants commissioned by the Global Forum to provide technical analysis and gather relevant data included Bienvenido Alano, Steven Lipworth, Caryn Miller, David Seemungal and Alison Young. Catherine Michaud served as the lead consultant of the project for two years. An Advisory Group of individuals from a spectrum of countries, backgrounds and types of institutions provided valuable insight and advice as the project evolved (see composition in Annex 1). Susan Jupp oversaw the publication and Karen Janjua assisted with the editing. Kirsten Bendixen and Diane Keithly provided administrative support.

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The views expressed in this document are the sole responsibility of the Global Forum for Health Research Secretariat.

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Abbreviations and acronyms

ARI	Acute respiratory infection
ASEAN	Association of South-East Asian Nations
CER	Current exchange rate
CIDEIM	Centro Internacional de Entrenamiento e Investigaciones Medicas
COHRED	Council on Health Research for Development
DANIDA	Danish International Development Agency
DEC	Department of Economics and Chief Economist
DFID	Department of International Development, UK
DGF	Development grant facility
EC	European Commission
ENHR	Essential National Health Research
ESW	Economic and Sector Work
FIC	Fogarty International Center
GBAORD	Government Budget Appropriations and Outlays on R&D
GDP	Gross domestic product
GERD	Gross domestic expenditure on R&D
GNP	Gross national product
GUF	General University Funds
HIV or HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HRP	UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction
ICDDR,B	Centre for Health and Population Research, Bangladesh
IDRC	International Development Research Centre
INCLEN	International Clinical Epidemiology Network
INCO-DC	International Cooperation Research for Developing Countries
INRUD	International Network for the Rational Use of Drugs
IUATLD	International Union against Tuberculosis and Lung Disease
NABS	Nomenclature for the Analysis of Science budgets
NC	National currency
NGO	Non-governmental organization
NHA	National health accounts
NIDI	Netherlands Interdisciplinary Demographic Institute
NIH	National Institutes of Health, USA
NMS	New Management System
NSF	National Science Foundation
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
PNP	Private non-profit

PPP	Purchasing power parity
R&D	Research and development
RCS	Research capacity strengthening
RF	Resource flows
RICYT	Red Iberoamericana de Indicadores de Ciencia y Tecnologia (IberoAmerican Network of Science and Technology Indicators)
S&T	Science and technology; Scientific and technological
SAREC	Swedish Agency for Research Cooperation with Developing Countries
SDC	Swiss Agency for Development and Cooperation
SEATO	South-East Asia Treaty Organization
SEO	Socio-economic objective
Sida	Swedish Development Authority
SRC	Swiss Red Cross
TB	Tuberculosis
TDR	UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases
TEHIP	Tanzania Essential Health Interventions Project
UNAIDS	Joint Programme on HIV/AIDS
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
USNIH	United States National Institutes of Health
WHO	World Health Organization
WHO/CAH	WHO Department of Child and Adolescent Health
WHO/EDM	WHO Department of Essential Drugs and Medicines Policy
WHO/RPC	WHO Department of Research Policy and Cooperation

Executive Summary

1. Introduction

Health research is essential to the design and implementation of health interventions, health policies and health service delivery. Financing health research and development (R&D) is critical to its success.

The information on health research financing is fragmented. This study aims to provide decision-makers with an overview of currently available information on resource flows into health research. In this rapidly changing environment of funding flows into health research, it is critical to have access to information and to analyse it on an ongoing basis.

The main feature of the study is less to provide an overall figure (broadly estimated at close to US$73.5 billion for 1998 from the public and private sectors combined) than to describe the process for arriving at these estimates as a basis for further improvements, and to indicate what to expect from the various data sources and research approaches. In addition, this study presents information on health research funding by developing countries not available before.

2. Overview of the context

For the past decade, and since the ground-breaking work of the Commission on Health Research and Development in 1990, the disequilibrium in health research has been captured in the expression “the 10/90 gap” to indicate the huge discrepancy between the magnitude of disease burden in the world and the allocation of research funding. The exact figures are not known. This will require a lot more work on both burden of disease and resource flows at both the global and national levels. Furthermore, the situation is evolving. For example, with the demographic and epidemiological transitions experienced in developing countries, these countries are bound to benefit more from the research findings undertaken in more advanced countries. However, transmission of findings from the more advanced countries to the developing world is not straightforward in view of the following factors: (a) communicable diseases not prevalent in the more advanced countries still represent a large share of disease burden in developing countries; (b) the determinants of ill-health can vary greatly between regions; (c) the level of development and performance of health systems vary greatly between countries; (d) access to effective treatment, medicines and other research results particularly for the poorer segments of the population are very different between and within countries; (e) interventions for non-communicable diseases available in advanced countries may not be directly adaptable to developing countries or appropriate due to cost and infrastructure requirements, and may not be the most cost-effective intervention in the context of developing countries, particularly for the poorer segments of the population.

In view of this, the gap remains enormous and the need to correct it is just as urgent. In order to ensure that the large reservoir of knowledge available in more advanced countries can be transformed into actual gains of healthy life years in developing countries, it is necessary to increase research particularly in the following areas (as proposed, amongst others, by the 1996 report of the Ad Hoc Committee on Health Research and *The 10/90 Report on Health*

Research 2000 published by the Global Forum for Health Research):

- Analysis of the burden of disease at the country and global levels.
- Analysis of the determinants of health, taking into account not only the biomedical sector but (i) behavioural factors affecting health at the individual and community levels, (ii) factors in sectors other than health having a large impact on people's health, and (iii) factors at the macro-economic policy level.
- Analysis of the current knowledge and of the cost-effectiveness of present interventions to compare viable options at the country and global levels.
- Analysis of the potential cost-effectiveness of future interventions at the country and global levels.
- Analysis of resource flows into health research at the country and global levels.

This is the context in which the present study is situated. Its aim is to contribute to the last of the steps mentioned above.

3. Overview of the present study

This study is the result of teamwork. Members of an Advisory Group, acting in their individual capacity, debated and informed the process for three years. The study presents a new classification system for R&D information, which results from evaluating past achievements. It proposes a future strategy to continue to track health research financing with the involvement of a larger number of partners.

Total worldwide investments into health research was calculated at close to US$73.5 billion for 1998 by both the public and the private sectors (Insert ES.1) as compared to an estimated US$56 billion in 1992 (in current terms). It is estimated that up to one third of this increase is in real terms. In the course of this study, it became evident that important changes were taking place in the health donor community with implications for health research in, and relevant to, developing countries. Public funding (47% of the total funding into health research) grew in the advanced countries as a group and in virtually all the individual countries. Insert ES.2 gives an overview of the public investments into health research for the countries investing the most into health research and the evolution of their investments between 1986 and 1998.

Investments by the private pharmaceutical industry accounted for about 42% of total investments into health research worldwide. Information on the cost of research and clinical trials for discovery and development of medicines was not attempted in this study. The widely quoted figure of US$500 million required to develop a new drug was not evaluated in this study.

The present study reports information on data from developing countries and countries in transition not available earlier. The study did not attempt to do a comprehensive review of all developing countries investing into health research. It focused on a few selected countries

Insert ES.1

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

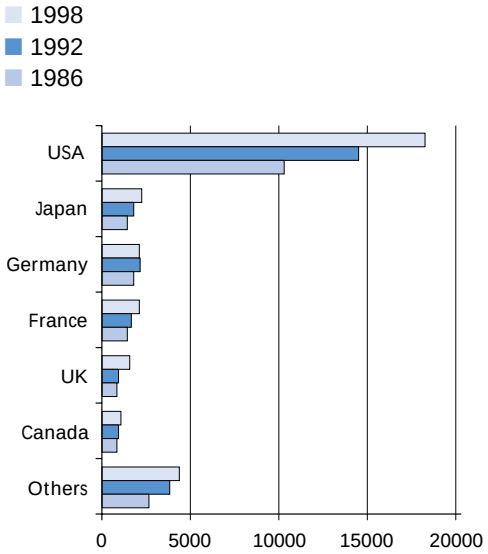
Total US$73.5 billion

	Total (billion US$)	%
Public funding: advanced and transition countries	34.5	47
Private funding: pharmaceutical industry	30.5	42
Private not-for-profit funding	6.0	8
Public funding: developing countries	2.5	3
Total	**73.5**	**100**

Insert ES.2

Trends in public health R&D funding 1986 to 1998 in advanced countries

Million US$ at 1995 prices and purchasing power parities [1]



[1] *See details in Chapter 3.*

Source: Eurostat (annual), OECD (annual) and national publications.

in which teams conducted special surveys on health R&D information or on countries for which published information existed. The Commission on Health Research for Development in its 1990 report recommended that at least 2% of total national health expenditures in less developed countries be allocated to health research and capacity building. This recommendation may be based on the fact that most advanced countries spend the equivalent of 1% to 2% of their national health expenditures on health research. While none of the developing countries studied matched the 2% figure recommended by the Commission, Brazil and Cuba were close to that level of investment in 1998. For lack of data available to the study investigators, the People's Republic of China was not included in this study but will be included in the second phase. Most other developing countries and countries in transition studied invested less than 1% of their national health expenditures into health research. Economic hardship generally results in lower national investments into health research.

Private foundations and other not-for-profit organizations accounted for an estimated 8% of the total health research funding. The numbers and funding of private sponsors of research increased in the late 1990s.

This study proposes a classification method pilot-tested during the course of this study which can be used to incorporate information from developing countries, countries in transition and advanced countries. The system attempts to capture also investments into research capacity building and health systems, two areas frequently left outside of the calculations. The study illustrates the practical use of the classification system by collecting information from national and international sources. The classification of resource flows into health research is presented in insert ES.3.

Information derived from this framework can be used by policy-makers at the national, regional and global levels. This information can be used to relate health research priorities with funding from both the national or international sources.

While funding has increased somewhat in the 1990s as reported, the problem of allocation remains practically the same as in 1990. Research is still seen as a luxury in developing countries and the results of research not very relevant to define policies. Investments in health research need to focus on determinants and diseases corresponding to the heaviest burden and to take a long-term perspective. It is also important to invest in research capacity building in the South and to ensure the survival of research institutions that have been struggling to survive over the years. Moreover, the large majority of health research funding is invested into

Insert ES.3

Classification of resource flows for health research

Levels of aggregation of R&D funds

A1. Non-oriented, fundamental research
A2. Health conditions, diseases or injuries (classified by disease)
A3. Exposures, risk factors that impact on health (determinants)
A4. Health systems research
A5. Research capacity building

Further details on the classification and subcategories can be found in Annex 2.

biomedical research with little investment into health economics and social sciences. Finally, it is necessary to ensure that the outputs of research are implemented in health and development programmes and transformed into measurable health improvements for the people.

Gathering, interpreting and using information of resource flows into health research is one of the crucial steps to identify and understand health research priorities at the national, regional and global levels. Only by measuring efforts, both human and financial, invested into research of the most neglected health problems in the world, will we know how much priority these are given. This study is a step in that direction and a basis for a next round of studies in this critical area. We hope that this study will inspire others to contribute to this effort.

Chapter 1
Introduction

1.1 Why measure resource flows?

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, generally speaking, fragmented. The Organisation for Economic Co-operation and Development (OECD) is the only institution with a mandate to regularly collect and disseminate standardized national statistics on aggregate 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 developing countries, we have recently seen resource flows information emerging.

The challenge now is to develop and apply health R&D indicators which can be collected in developing countries, countries in transition and advanced 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 both advanced and developing 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 important 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 significantly impact reduction of the burden of disease and injury in developing countries, particularly among the poor.

1.2 Historical perspective

In 1990, the report of the Commission on Health Research for Development, "Health Research: Essential Link to Equity in Development," drew world attention to the divide between the level of funding and the magnitude of disease burden (Commission on Health Research for Development, 1990). Indeed, preliminary estimates suggested that 10% or less of the global health research funding was allocated to the diseases and conditions responsible for 90% of the global burden of disease. Not surprisingly, the Commission recommended that an international mechanism be created to monitor health research resource flows as part of a process to redirect funds to priority areas.

The 1996 Report of the WHO Ad Hoc Committee on Health Research Relating to Future Intervention Options, "Investing in Health Research," reiterated the importance of establishing an institutional mechanism for the systematic tracking of investments in health R&D. Its role in informing allocation decisions and in complementing work being done on priority setting for health research was emphasized (World Health Organization, 1996). Although that report provided summary data on

public and private investments in health research and estimated global health research investments at $56 billion, the authors acknowledged the complexity of developing a useful system to monitor resource flows. The report also confirmed the earlier finding that less than 10% of health research funding worldwide was allocated to the largest burden of disease.

Over the past several years, a number of institutions have undertaken activities to document health resource flows for specific areas. For example, the Wellcome Trust supported a study to document resource flows for malaria (PRISM Report No. 7, Wellcome Trust, 1996) and the Netherlands Inter-disciplinary Demographic Institute (NIDI) in collaboration with United Nations Population Fund (UNFPA) and the Joint Programme on HIV/AIDS (UNAIDS) has developed a database for population and HIV/AIDS. Experts from OECD countries have been working to improve the coverage, quality and comparability of data on health R&D that can be compiled from R&D surveys and budgets (OECD, 2001). The United Nations Educational, Scientific and Cultural Organization (UNESCO) is preparing to improve the availability of health-related aggregates through revision of its S&T data collection system. Additionally, the World Health Organization (WHO) is promoting establishment of national health accounts and an enhanced disease surveillance in developing countries.

1.3 The Resource Flows Project

Beginning in 1998, the Global Forum for Health Research supported efforts to develop, coordinate and implement a system for tracking and reporting investments in health research. Monitoring focused on investments made by developing countries, developed country agencies providing funds to developing countries, and for problems relevant to developing countries.

Subsequently, the Resource Flows Project, supported and managed by the Global Forum, was initiated as continued support to this mandate *(The 10/90 Report 1999; The 10/90 Report 2000)*. The five-year project's goal is to improve priority setting through developing a database of internationally comparable statistics on global resource flows for health research. In order to accomplish this goal, the Global Forum intends 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 report describes the first three years of project work. A lead consultant was contracted for a two-year period to provide technical guidance to the project in cooperation with an Advisory Group and the Global Forum Secretariat. The Advisory Group (Annex 1) met with Global Forum staff and the lead consultant 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. Consultants (see Acknowledgements) commissioned by the Global Forum in 2000 and 2001 provided analytical papers for the project, assisted in obtaining data and helped write the final report.

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 where data is not being collected and helping to disseminate the information to those who will use it most effectively.

Chapter 2
Methodological Approach

2.1 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 (OECD, 1994):

"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 for testing 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.

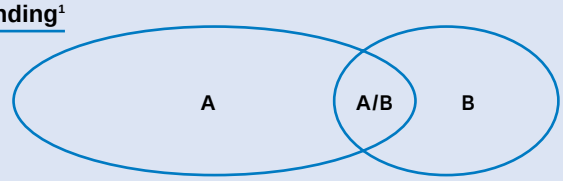
2.2 Conceptual model

One objective of the project was to measure total funding of health R&D worldwide, with particular emphasis on R&D for or by developing countries. Insert 2.1 illustrates the main components. Area A corresponds to the health R&D efforts of advanced countries (see Chapter 3, Results, section 2). Area B represents the health R&D efforts of developing countries (see Chapter 3, Results, section 4). The overlapping area A/B depicts where these efforts converge or overlap (see Chapter 3, Results, section 5). 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 advanced countries; area B, all health R&D financed by and carried out in developing countries. The area A/B corresponds to R&D funded by advanced countries and carried out in and for the primary benefit of developing countries. The area should also incorporate R&D carried out in advanced countries which is relevant to the needs of developing countries, and R&D carried out in developing countries which is for, or relevant to the needs of, advanced countries. The three areas constitute the framework for project data collection.

Insert 2.1

Graphic representation of health research funding[1]

A = R&D by advanced countries
B = R&D by developing countries
A/B = R&D efforts converge or overlap (see text for details)



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

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 difficult to aggregate them into the global total especially to avoid double counting of area A/B.

The countries undergoing transition from centralised 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 developing countries.

2.3 Classification framework

The main purpose of a database on health R&D investments is to contribute one element of the objective information that decision-makers require for determining their own investment priorities. Indeed, such information comprises only a single dimension of the process. Others include (as proposed by the Ad Hoc Committee): examining the importance of the current burden of disease by age, gender and the projected future burden; analysing the reasons why the burden persists; developing an understanding of the present level of knowledge, including the cost-effectiveness of existing interventions; and analysing the likely cost-effectiveness of the new interventions to be researched.

The major product developed under the guidance of the lead consultant and the Advisory Group was a classification system to cover total health R&D that incorporated this approach. The aim was to produce a set of categories that would be useful for decision-makers especially in developing 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 2.2.

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. While it was by no means certain how much data could actually be obtained, it was thought that, in the preliminary phase of the project, the feasibility of such an approach should be assessed.

It is 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 (see Insert 2.3).

The funding classification tested in previous exercises had been used for health R&D financed by advanced countries (areas A and A/B in Insert 2.1). These categories were applied to data at the worldwide level. Thus, this exercise did not provide information on the national health R&D efforts of individual advanced countries.

Insert 2.2

Classification of resource flows for health research

Levels of aggregation of R&D funds

A1. Non-oriented, fundamental research
A2. Health conditions, diseases or injuries (classified by disease)
A3. Exposures, risk factors that impact on health (determinants)
A4. Health systems research
A5. Research capacity building

Further details on the classification and subcategories can be found in Annex 2.

Insert 2.3

Classification of funders and performers

	Funders	Performers in developing 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 user/performer classification was developed during the experimental health R&D surveys in selected developing countries (area B in Insert 2.1). Thus, the national effort in health R&D of each developing country represents a significant portion item of the data set.

2.4 Sources of data

Previous global resource flow studies have, by and large, focused on data from existing databases and estimated the data from developing 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 developing country institutions.

a) Funder questionnaires

A detailed questionnaire was designed and pilot tested by the lead consultant and the Advisory Group and subsequently a web-based version was further revised to make it user friendly. The questionnaire was distributed to over 100 institutions in advanced countries both by mail and electronically. The Advisory Group and consultants assisted in the identification of individuals and institutions to be contacted. The survey targeted selected primary and secondary investors in advanced countries within the public and not-for-profit sectors who fund health research relevant to developing countries (areas A and A/B in Insert 2.1). Funders rather than performers were targeted in order to maximise ease in identification and reduce the number of institutions asked to provide information.

Distribution of questionnaires was followed up by e-mail and telephone contacts by the lead consultant. Due to poor response rates to the long form questionnaire, a short version of the questionnaire with little detail on disaggregated data was developed and distributed.

b) Special survey for developing countries

A special survey conducted by the Center for Economic Policy Research in the Philippines and funded by COHRED (Alano & Almeria 2000) was undertaken in three Asian countries (The Philippines, Thailand and Malaysia). In addition to a set of data for these countries, the study also resulted in a preliminary manual for surveys of health R&D in developing countries based on the proposed framework.

c) Funder surveys/databases

Most funding agencies maintain internal databases on resource flows but these databases most often were incompatible with the data being sought for health R&D for the project. The highest degree of incompatability was found for large funders with very broad mandates that extended beyond health and beyond research.

Sources of aggregate estimates for the pharmaceutical industry and not-for-profit organizations are available as described in Chapter 3. However, health R&D data disaggregated by type and topic are not currently available from these surveys/databases.

d) Government S&T surveys

A major source of information for this study was the results of national and international surveys of resources devoted to R&D. An active network of national R&D experts from various countries and international bodies have developed S&T indicators based on the "Frascati" family of manuals. The resulting S&T indicators are designed to be internationally comparable and also meet national and regional needs. Information from advanced countries and a growing number of middle income countries can now be placed into a common classification system thus allowing international comparability.

e) Evaluations, annual reports, websites

A considerable amount of other data on resource flows for health R&D can be found in the public domain on websites and within annual and special reports of institutions and ministries. However, the majority of this data represents aggregated totals for R&D, S&T and health R&D. These sources only rarely supply the disaggregated data required to complete major portions of the project's classification system.

f) Interviews/personal contacts

It was essential to use personal contacts to clarify and interpret information in published documents and to provide unpublished disaggregated data on selected topics.

Personal interviews were conducted by members of the Advisory Group via e-mail and telephone and, less often, by face-to-face meetings. The utility of these strategies for data collection will be further considered in Chapter 4.

Chapter 3
Results

3.1 Global health R&D and main aggregates funded by advanced and transition countries

a) Level in 1998

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 of advanced, in transition and developing 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 3.1).

Governments of countries having established market economies (advanced 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. If the European Commission's US$260 million spent on health R&D is included, the total comes to 94% of all public funding for health research. This figure actually tends to overestimate the share of the advanced countries, as these countries have better reporting systems for their investments in health research than do many developing countries.

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 developing 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 developing countries which spent important amounts on health research, such as the People's Republic of China, are not available at this stage.

Insert 3.1

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

Total US$73.5 billion

	Total (billion US$)	%
Public funding: advanced and transition countries	34.5	47
Private funding: pharmaceutical industry	30.5	42
Private not-for-profit funding	6.0	8
Public funding: developing countries	2.5	3
Total	**73.5**	**100**

b) Trends and prospects

Overall investments in health R&D from public, industrial and not-for-profit sources increased in real terms in advanced countries

during 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 developing countries, when available, indicate considerably larger R&D investments in health from national sources in middle-income countries than earlier studies had estimated (Michaud and Murray 1996). While this increase reflects real growth in overall investments in health R&D, it likely also reflects better reporting for these countries.

3.2 Funding health R&D in advanced countries

a) Public funding

(i) Level in 1998

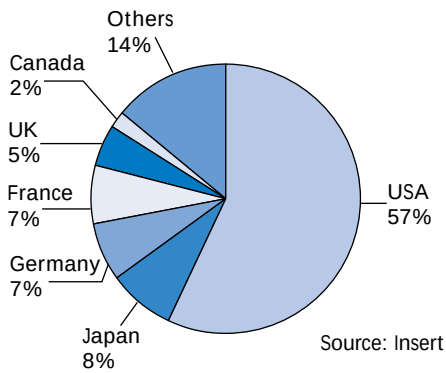
Governments in advanced countries invested US$34.2 billion in health R&D in 1998. The United States provided over half of this amount, investing US$19.5 billion. Japan contributed US$2.9 billion, Germany US$2.4 billion, France US$2.2 billion, the United Kingdom US$1.8 billion and Canada US$0.75 billion.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

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

Insert 3.2

Advanced countries: public funding of health R&D 1998

Total US$34.2 billion



Source: Insert 3.3

Insert 3.3

Public funding of health R&D in advanced countries 1998

	million US$		as % of	
	Current Exch rates	PPPs	Health Expend.	GDP
Funder reported				
United States	19527.0	19527.0	0.22	1.7
Germany	2392.6	2090.2	0.11	1.1
France	2241.5	1972.3	0.15	1.6
United Kingdom	1788.7	1656.4	0.13	1.9
Italy	-	-	0.10	1.2
Netherlands	542.2	536.9	0.14	1.6
Sweden	458.2	369.7	0.19	2.4
Austria	374.7	338.0	0.18	2.1
Spain	301.6	345.0	0.05	0.8
Denmark	223.2	174.4	0.13	1.5
Finland	200.7	174.6	0.16	2.3
Portugal	-	-	0.05	0.7
Greece	44.7	55.4	0.04	0.5
New Zealand	38.2	48.7	0.07	0.9
Ireland	16.2	15.8	0.02	0.3
Performer reported				
Japan	2895.6	2318.0	0.08	1.0
Canada	754.3	961.2	0.13	1.4
Australia	506.1	587.5	0.14	1.6
Norway	204.9	161.5	0.14	1.6
Others	511.7	548.2	-	-

Source: Eurostat (annual), OECD (annual), OECD (2000) and national publications.
PPP: Purchasing Power Parity (see Insert 3.10)

(ii) Compiling data on health R&D

For the present study, data is based on the funds disbursed by funding agencies for health R&D.

Governments can fund health-related R&D in a number of ways:

- Funds for R&D institutions or programmes which are primarily intended to improve human health
- Funds for long-term research which is expected to have health applications
- Support for health-related research funded from the general education/research funds of public universities and colleges (known as public GUF)
- Health-related research funded for other objectives, for example, as part of development policy or military medical research, health and safety research at nuclear establishments, or support for relevant R&D as part of industrial policy.

In countries with federal constitutions, state/provincial governments may finance a significant share of public health research, particularly if they are also responsible for higher education or for public hospitals.

Data series for 15 OECD advanced countries have been compiled to cover the types of health research items listed above. The basic measure is the GBAORD (Government Budget Appropriations and Outlays on R&D) broken down by socio-economic objective as collected and published by OECD and Eurostat. The data are shown in the upper part of Insert 3.3. Insert 3.4 displays the resulting data for four advanced countries. Major differences in the funding patterns between countries are revealed.

In the United States the majority of the funds are allocated to health as a socio-economic objective, including most health-related basic research (mainly the NIH). The contribution of the "Advancement of research objective" (i.e. the National Science Foundation) is negligible. General support for public higher education is a state responsibility and is included under "Sub-central". The "Other" category comes from a special NIH annual table on Federal funding of health R&D and includes health R&D funded by the DOD, NASA, the Environmental Protection Agency, USAID, etc.

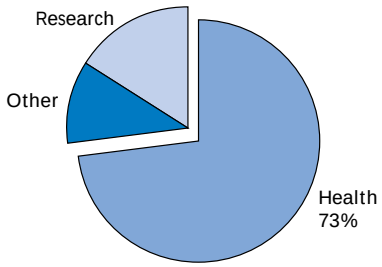
The pattern is somewhat similar in the United Kingdom. Most of the funds are committed directly to health as an SEO (mainly through the Medical Research Council and R&D at the national health hospitals), though a contribution via general university funds (GUF) is also included. The latter category is by far the largest in Germany (where much of it is financed by the "Länder" governments) whereas in France, funds are provided almost equally via "health," "advancement of research" and "GUF."

Compiling and interpreting these data is not without problems. The data is generally based on final budgets and funds allocated to the principal objective of the programme/institution concerned. The main problem thus involves identifying the health-related component of long-term research funds and of research financed via general university funds. Here, when using international sources, R&D in the medical sciences generally has to be used as a proxy; thus health-related research in the biological and social sciences funded for the advancement of knowledge is excluded. (In the present study, the data for France and the United States cover more research in the life sciences.) This means that total public health R&D funding is underestimated in countries with large, general research councils. Likewise, under estimates are generated where public GUF is used as the main method of funding academic research, as compared with those countries where basic research funds flow through health agencies/programmes. The data is also affected by the general S&T policy employed. Some governments favour policies that relate the majority of their R&D funding to those areas expected to demonstrate the outcomes; others prefer to highlight support for long-term research. (See also Chapter 1 of OECD 2001).

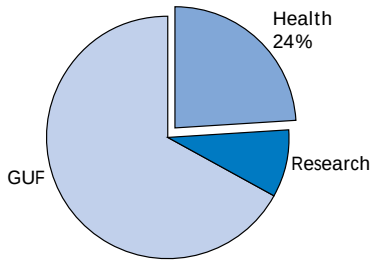
Insert 3.4

Structure of public funding of health R&D in four advanced countries

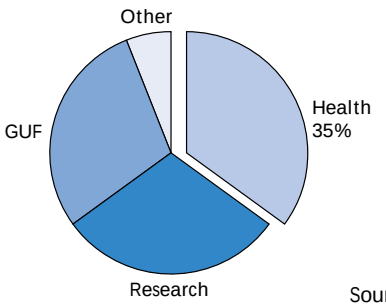
UNITED STATES
US$19.53 billion 0.22% GDP



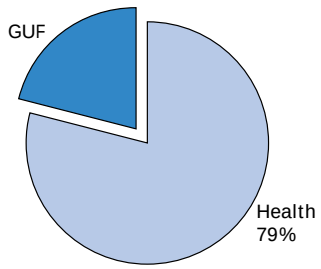
GERMANY
US$2.39 billion 0.11% GDP



FRANCE
US$2.24 billion 0.15% GDP



UNITED KINGDOM
US$1.79 billion 0.13% GDP



Source: Eurostat (annual), OECD (annual) and national publications.

	Main Socio-Economic Objective	Sub-categories
Health	Improvement of human health	All
Research	Advancement of knowledge: Advancement of research	Medical sciences
GUF	Advancement of knowledge: General University Funds	Medical sciences
Other (international sources)	Promotion of industrial development	Support for the pharmaceutical industry
Sub-central	As above, financed by state, provincial or local government	

Source: Eurostat (1994), OECD (1994).

The remaining OECD advanced countries do not collect and report GBAORD data in sufficient detail to derive a total for health R&D. The only GBAORD series of data available is for "health as a primary objective." As seen from the discussion above, this category can give a very incomplete account of the funds involved. For these countries, therefore, public funding data has been derived from the survey results submitted by the R&D performers. The first step has been to identify health R&D carried out in the four standard sectors: Business Enterprise, Government, Higher Education and PNP in order to find "Health GERD" (Gross Domestic Expenditure on R&D). Health GERD is the sum of such R&D

carried out within a nation's territory, excluding payments to abroad. The second step is to identify how much has been financed by government rather than by the other four standard sources: Business, PNP, Higher Education and "abroad." A number of countries have made special estimates of Health GERD, which have been used for this exercise.

The Australian Bureau of Statistics has attained the most complete estimate of total health R&D spending (Byars, in OECD, 2001; ABS, 2000). Data from R&D performing firms/universities/institutes are collected at the project level. Each project is assigned to one of the socio-economic objectives (SEO) from a very detailed list. The health total covers the following categories:

- Support for industry: human pharmaceutical products
- Health: clinical (organs, diseases and conditions)
- Health: public health
- Health: health and support services
- Advancement of knowledge: medical and health sciences.

Five funding sources are identified: federal government, state government, business, "other Australian" and "abroad." An alternative estimate for R&D in the health sciences was significantly lower than when this SEO approach was employed.

A simpler set of annual Health GERD data has been prepared by Statistics Canada (Statistics Canada, 2001). The health component covers R&D for health as an SEO carried out in the federal and provincial government sectors and R&D in the pharmaceutical and medical instrument industries within the business sector. In the Higher Education sector, health R&D is identified during the general process of compiling estimates of R&D in the various subsectors (including university hospitals). Health-related PNP institutes are identified from the survey of the sector. The resulting table, presented as Insert 3.5, is typical of the presentation of Health GERD for OECD countries.

The funding breakdown identifies federal and provincial government sources but assigns a special category to higher education as a source. For the purpose of this exercise, an estimate has been made of the public share and included within the total public funding figures for health R&D (Insert 3.3).

Insert 3.5

Canada gross domestic expenditure on R&D in the health field 1998

	Sector of performance						
Funders	Federal government	Provincial government	Higher education	Business enterprise	PNP	Total	**US$**
Federal government	2.9	0.0	9.4	0.5	1.0	13.7	271.7
Provincial government	0.0	1.2	3.8	0.3	0.7	6.1	120.0
Subtotal Public (direct)	**2.9**	**1.2**	**13.1**	**0.9**	**1.7**	**19.8**	**391.7**
Higher education	0.0	0.0	27.3	0.0	0.0	27.3	541.3
Business	0.0	0.0	4.9	26.0	0.9	31.7	628.9
PNP	**0.0**	**0.0**	**7.2**	**0.0**	**2.8**	**10.0**	**198.9**
Foreign	0.0	0.0	0.7	10.1	0.4	11.2	221.1
TOTAL	2.9	1.2	53.3	36.9	5.7	100.0	1981.9
US$	56.6	24.3	1055.6	731.4	113.9	1981.9	

Source: Statistics Canada (2001)

Similar tables were compiled for Japan and Norway. The latter draws on a national estimate for 1997 presented in a recent OECD report on measuring health R&D (OECD, 2001). Tables were also prepared for Belgium, Iceland, Korea and Switzerland but as the degree of estimation for public funding was very high, the results have been displayed as a group in Insert 3.3.

These performer-reported series are underestimated compared with the funding data as they exclude payments to abroad and also because the coverage of health is sometimes incomplete. If the basis is the medical sciences, then health-related R&D in other life sciences and in the social sciences are excluded. If the basis is health as an SEO, then the health-related component of advancement of knowledge is excluded. Furthermore, even if the two sets of data are put on the same basis of health coverage and both include payments to abroad, the funding data derived from budgets are higher than those reported retrospectively by the units which carry out the programmes concerned (see also OECD 2001, chapter 2).

(iii) Trends and prospects

Public funding of health R&D grew in the advanced countries both as a group and, in virtually all of the countries studied, individually (Insert 3.6). 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

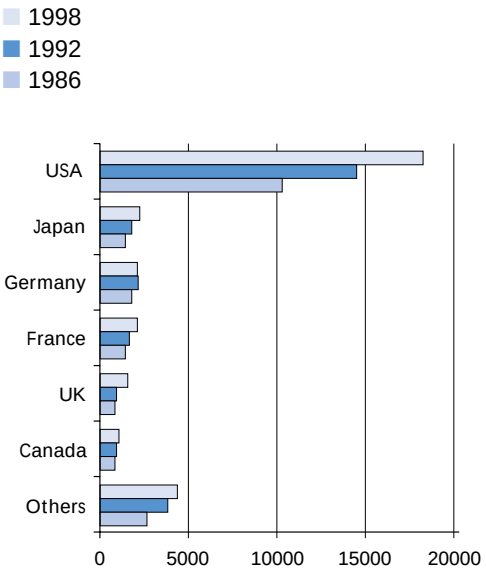
The pharmaceutical industry is the dominant industrial funder of health-related R&D. The medical equipment and prosthetics industries spend relatively little in comparison (see OECD 2001, Table 2.4).

The majority of pharmaceutical research is funded by multinational companies, which are officially headquartered in advanced countries. There is of course some pharmaceutical R&D carried out in transitional and developing countries and this will be reviewed in the context of measuring flows of health R&D in those countries.

Insert 3.6

Trends in public health R&D funding 1986 to 1998 in advanced countries

Million US$ at 1995 prices and purchasing power parities



Source: Eurostat (annual), OECD (annual) and national publications.

(i) Level in 1998

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 3.1 and 3.7).

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 ten biotechnology companies making the largest R&D

investments, corresponding to allocations of 26% to 67% of revenues to R&D (Insert 3.7).

It has not been possible to provide a breakdown of the global total by country. From national sources we know that research-based pharmaceutical companies in the United States invested US$20.3 billion in R&D in human-use pharmaceuticals, of which US$16.9 billion were spent at home and US$3.4 billion abroad (Pharmaceutical Research and Manufacturers of America, PMA Annual Survey 2000). This is equivalent to about two-thirds of the total calculated in this study.

(ii) Compiling data on health R&D

Data on worldwide spending in R&D by the pharmaceutical industry is available from industry trade associations, government surveys and company publications. Pharmaceutical industry trade associations conduct surveys of both foreign and domestic R&D by their member companies. All company-specific data are strictly confidential, and only aggregated data at the industry-wide level are released.

Most major pharmaceutical companies (35) provide data on total pharmaceutical research expenditures, total R&D expenditures, pharmaceutical sales and total sales (SCRIP, 1999). These companies represent 87% of total pharmaceutical R&D. Smaller companies (58) provide data on total pharmaceutical sales and total R&D expenditures but not on expenditures for pharmaceutical research. Estimates for these companies were derived by determining the proportion of total research funds invested in pharmaceutical research and the proportion of sales that were pharmaceutical products. Given that pharmaceutical companies often produce other products, in addition to pharmaceuticals, the distinction between total and pharmaceutical R&D is important.

Information on the cost of research and clinical trials for discovery and development of medicines was not available. The widely quoted figure of US$500 million required to develop a new drug was neither confirmed nor refuted in this study. Estimation of the fraction of public funds invested into fundamental research, which eventually leads to a marketed drug, was outside of the scope of the present study.

Estimates of R&D carried out by pharmaceutical firms can also be made using international R&D sources. These, however, will not only cover R&D financed by the pharmaceutical companies themselves, but by other industries; notably IT and R&D services, or in other sectors of the economy, such as Higher Education. Sometimes national R&D surveys (for example in France) also ask firms to report these extramural expenditures.

(iii) Trends and prospects

The rise in funding for pharmaceutical R&D is well documented. Insert 3.8 shows trends in funding at home and abroad by the research-based pharmaceutical companies based in the United States. Data are in 1995 GDP prices.

This upward trend is likely to continue. Our estimate of total expenditures for pharmaceutical R&D in 1998 was US$30.5 billion. Projected total pharmaceutical R&D spending worldwide for the year 2000 (estimated for the first time by the International Federation of Pharmaceutical Manufacturers Associations) was tentatively projected to be US$35.3 billion (PMA Annual Survey 2000). The US source also shows growth in funding at home between 1998 and 2000 but little change in funding of R&D abroad.

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

(i) Level of funding in 1998

Private foundations and other not-for-profit 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

Insert 3.7

R&D expenditures by major pharmaceutical and bio-technology 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	R&D expenditures	Per US$ of total pharmaceutical sales
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

million from Japan, US$200 million from Canada and US$120 million came from France. An estimated US$200 million came from all other advanced 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 (report from accounts, personal communication Wellcome Trust, Seemungal) and the Howard Hughes Medical Institute in the United States (which spent US$389 million).

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. This type of funding was not foreseen when developing the original statistical framework.

(ii) Compiling data on health R&D

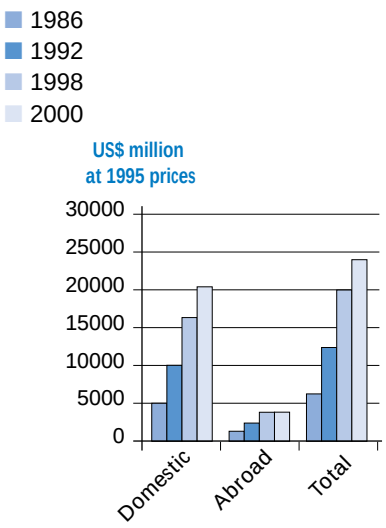
For the United States, PNP funding figures for 1998 were derived by updating results from a special R&D survey by the National Science Foundation covering the sector for 1996 and 1997 (National Science Foundation, 2001). Previous exercises were based on data series up to 1995 which had been published in the now defunct NIH data book (National Institutes of Health, 1995).

The PNP data for the United Kingdom were compiled by the Association of Medical Research Charities. R&D figures quoted for France were reproduced from the table on National Health Accounts, and for Australia, Canada and Japan were derived from the sources used for publicly financed R&D described above. Various sources have been used for calculating other countries' estimates.

The data for the own funds of universities and colleges are derived from the same sources as the data on public university funds for health

Insert 3.8

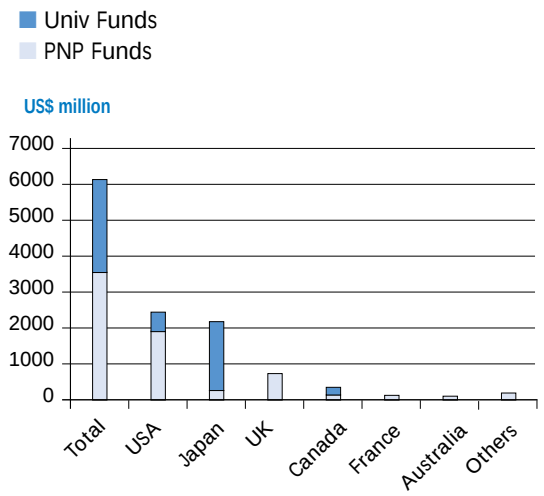
Trends in pharmaceutical R&D by US companies



Source: Pharmaceutical Research and Manufacturers of America, PMA Annual Survey 2000. The total includes 2% for R&D on veterinary medicines.

Insert 3.9

R&D funded by PNP and university funds



Sources: National Science Foundation (2001), Statistics Bureau (annual), Association of Medical Research Charities, Wellcome Trust, MENRT (2000), Statistics Canada (2001), OECD (2001).

R&D. Together they add to a total support for health R&D from university own (institutional) funds in the Higher Education sector.

(iii) Trends and prospects

A new set of data was established for this examination of private sources; thus, it is not possible to plot trends at the global level. However, increased health R&D investments between 1992 and 1998 are evident. The two largest private foundations – the Wellcome Trust and the Howard Hughes Medical Research Institute – provide notable examples. Further-more, new foundations with international focus and large health-sector portfolios were created in the 1990s.

The Foundation Center, in cooperation with the Council on Foundations, conducted a study on US grant-making foundations (Renz et al 1997). The report noted that foundation funding, including international funding, has grown in the 1990s and is expected to continue to do so in the future. In addition, international giving by foundations grew 18% after inflation, matching growth of all funding; and half of all foundations make international grants. Whereas these trends are not specific to health research, data is available for selected foundations that show considerable increases in funding for health research in the 1990s (see Chapter 3.5).

3.3 Funding medical research in Central and Eastern European countries in transition

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

a) Level of funding in 1998

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 is not adequately reflected in these dollar figures, however, as a result of these countries' weak currencies. Comparison of purchasing power parities (Insert 3.10), which reflect 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.

Use of current exchange rates creates a particularly unfavourable picture of R&D in the Russian Federation. Comparatively, the purchasing power parity (PPP) triples the Russian expenditure, although the country commits a much lower percentage of its GDP to health R&D than the others.

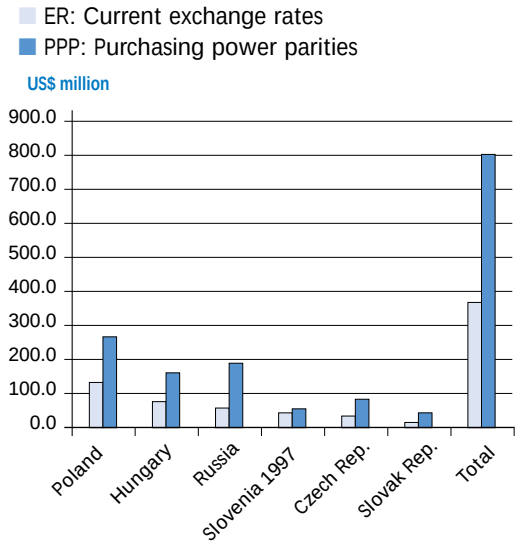
In Hungary and Slovenia, over two-thirds of the national health R&D effort is carried out by the pharmaceutical industry and government funds less than half of the national total. In the Czech Republic, Poland and Russia, the government supplies three-quarters of the funds.

b) Compiling data on health R&D

The seven transition countries considered in this study annually supply R&D data to the OECD. The Czech Republic, Hungary, Poland and the Slovak Republic are OECD members. Romania, Russia and Slovenia are associated with the Organisation's R&D statistical activities.

Insert 3.10

Estimated health R&D expenditure in selected economies in transition 1998



Source: OECD (annual) and OECD (GD documents)

All of them report R&D expenditure by main field of science, of which the medical sciences – for activities carried out in the government and higher education sectors and, where it exists, in the private or not-for-profit sector. These data, therefore, underestimate the total health R&D

Insert 3.11

Total health R&D in selected economies in transition: funding and performance

	US$ million		%	% Funded	% Performed	
	ER	PPP	GDP	Govt	Industry	Other
Poland	134.5	267.2	0.08	70.2	13.8	86.2
Hungary	73.5	165.5	0.16	34.3	69.2	30.8
Russia	60.4	188.2	0.02	71.6	18.3	81.7
Slovenia	43.5	56.3	0.24	34.3	78.2	21.8
Czech Rep.	35.2	84.2	0.06	77.2	19.4	80.6
Slovak Rep.	16.1	43.0	0.08	22.8	40.6	59.4
Total	363.3	804.4	-	57.5	-	-

Source: OECD (annual) and OECD (GD documents)

as they exclude relevant spending in other fields, notably biology and the social sciences. Most also report R&D carried out by the pharmaceutical industry. Thus, the total corresponds to R&D reported by performers and carried out on the national territory.

Deriving estimated figures for the publicly funded component involves a considerable amount of estimation. For most countries, the sources of funds for medical research in the higher education sector are obtainable; the amount of government funds received by the pharmaceutical industries is available only for some. Shares of public funding have, otherwise, had to be estimated from ratios based on broader aggregates.

c) Trends and prospects

Funding of S&T generally went into free fall in Eastern European countries at the beginning of transition. Most still have very high rates of inflation and it is difficult to judge trends largely because the earliest available data is for 1993. Health R&D expenditures generally fell until 1998, both at constant prices and as a percentage of GDP. The more recent data available does not suggest any real improvement during 1999-2000.

3.4 Funding for health R&D by developing countries

a) Results for 1998

The present study did not attempt to be a comprehensive review of all developing 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, Costa Rica, Cuba, 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 developing 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 (see Chapter 5).

b) Special surveys of health R&D

A three-country study conducted for 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.

(i) Level in 1998

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 (Insert 3.12).

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,

Insert 3.12

Funding of health R&D in three Asian countries 1998

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

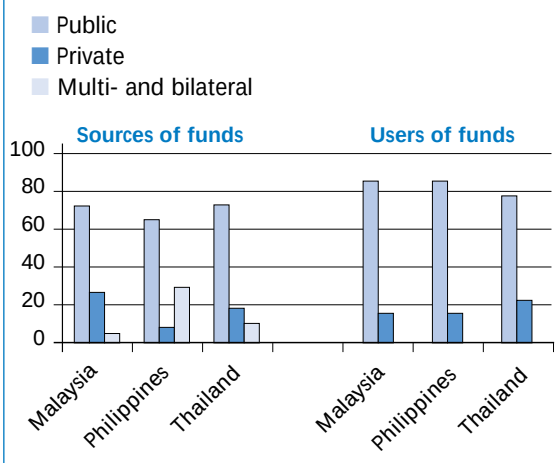
Source: Alano and Almeria (2000)

both ministries contribute. Multilateral and bilateral funding are relatively much higher (28%) in the Philippines than in the other two (Insert 3.13).

Use of R&D funds is even more concentrated in the public sector, covering government departments, public academic/research institutions and hospitals. The private sector, which covers pharmaceutical firms and private academic/research institutions and hospitals, carries out a maximum of 22% in Thailand.

Insert 3.13

Funding and use of health R&D funds in 1998 (%)



Source: Alano and Almeria (2000)

Of the total investments in health R&D, the highest proportion was devoted to medical sciences (94%, 80% and 62% for Malaysia, the Philippines and Thailand, respectively). The Philippines and Thailand spent 14% and 29% of their total investments respectively in health R&D, health economics and social sciences.

A study of allocation patterns indicates that the highest investments in the Philippines are in health systems research and in Group II conditions (non-communicable diseases). Both account for about half of total investments in health research.

(ii) Compiling data on health R&D

The study attempted to estimate the potential of National Health Accounts (NHA) to keep track of Essential National Health Research in two of the countries.

To track the flow of funds for health R&D, an accounting framework is used which traces the flow of funds from funding sources to performers undertaking the R&D activity. The latter refers mainly to the funding recipients.

The institutional breakdown of funding resources is guided as much by their source of financing (e.g. government budget versus performer fee) as their functional role (e.g. public vs. private; providers vs. pharmaceutical firms). The major funding sources are the three categories of public funds (government budgets, user fees and social insurance), private funds (pharmaceutical companies, health care providers and non-government organizations) and foreign funds (bilateral and multilateral agencies). The major fund users are government agencies, academic institutions, research institutions, NGOs/foundations, pharmaceutical companies and health care providers.

Data generation is country-specific and is guided by the flow of funds framework. The strategy consisted in three elements:

- A systematic and comprehensive review of existing, relevant data sets in order to determine their utility as a source of information for the project and to identify information gaps.
- A survey of pertinent respondents through a written questionnaire, supported by telephone and/or personal interviews to fill the information gaps; plus statistical analysis of survey data using Excel spreadsheets and uniform templates.
- A co-ordination mechanism consisting of project meetings and discussions bringing together key members of the country project teams, tied to a timetable having deliverable

milestones. Meetings would produce common decisions on plans of action for the project, encourage sharing of respective countries' findings and enhance networking.

In total, there were 204, 164 and 215 institutions responding respectively in Malaysia, the Philippines and Thailand. The response rate varied from 82% in the Philippines to 44% in Thailand.

The study concluded that NHAs do not, per se, capture all ongoing activities in ENHR. Suggestions are put forward as to how these data sources can be made more practical for policy-makers (Alano and Almeria 2000).

(iii) Trends and prospects

Comparisons of National Accounts for the three countries sought to examine trends in those accounts over time. Analysis of data collected for 1997 and 1998 showed that funding fell in 1998 in all three countries, both in current US$ and relative to health expenditure and GDP. Longer term comparisons were not possible, as the only other available ASEAN data commences in 1992 and the S&T indicators are not comparable (ASEAN Secretariat, 1997).

c) Health R&D data from ongoing R&D surveys

(i) Level of funding in 1998

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 (RICYT, 2000). 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 at 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 (Insert 3.14).

Information available from national studies in Brazil indicates that the funding level is higher than that estimated on the basis of data from RICYT studies (Ministry of Health and Ministry of S&T; Conselho Nacional de Desenvolvimento Científico y Tecnológico). Brazil has a decentralised system of funding and research is funded by both the Federal Government and the States. The State of Sao Paulo, by Constitutional Decree, has a percentage of its income assigned to health research. Additional funds are raised through the Ministry of S&T, Ministry of Health, Federal and State Universities, Fiscal Rent, States and Counties, FINEP (Federal Funds Paid to Enterprises) and private universities. The Government has introduced a new tax on tobacco and alcohol and the proceeds from these taxes fund health research projects, exclusively. A National Agency for Health Research, linked to the Ministry of Health and the Ministry of S&T, manages the funds jointly.

(ii) Compiling data on health R&D

The annual data collected and published by the Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT) provides the point of departure for Latin American countries. These data cover both S&T activities as a whole as well as R&D in each country. The underlying concepts employed in reporting are those already in use in advanced countries (RICYT

Insert 3.14

Total S&T and R&D expenditure and estimated health R&D in Latin America*

		S&T	R&D		Estimated Health R&D		
Country	Year	US$ million		% GDP	US$ million	% total R&D	% GDP
Brazil	1996	9355	6574	0.91	715.6	10.9	0.092
Mexico	1997	1690	1382	0.34	180.3	13.0	0.045
Argentina	1998	1530	1263	0.42	234.8	18.6	0.079
Chile	1998		455	0.62	9.6	2.1	0.013
Colombia	1997	632	398	0.41	40.0	10.0	0.041
Venezuela	1997	293	200	0.23	20.0	10.0	0.023
Cuba	1998	220	129	0.87	13.0	10.0	0.088
Costa Rica	1996		108	1.13	11.0	10.0	0.115
Uruguay	1998		84	0.23	3.5	4.2	0.017
Peru	1997	424	39	0.06	7.3	18.8	0.012
Panama	1998	81	31	0.33	7.6	24.6	0.081
Bolivia	1998	46	25	0.29	2.5	10.0	0.029
Ecuador	1998	43	15	0.08	1.0	6.6	0.005
El Salvador	1998	99	10	0.08	0.9	8.7	0.007
Trinidad	1997	21	8	0.14	0.2	3.0	0.004
Total	**1998**	**15330**	**10781**	**0.58**	**1400**	**8.5**	**0.065**

*Estimated health R&D for Colombia, Venezuela, Cuba and Costa Rica are broad estimates only.
Source: RICYT (2001)

has observer status for OECD S&T Indicator activities) with some adaptations to accommodate Latin American S&T structures. Total R&D expenditures are broken down in a number of ways including by sources of funds, by sector of performance and by socioeconomic objective, using the standard international classification. However these breaks may not be crossed. For example, the total R&D expenditure for health as an SEO can be extracted for each country, but it cannot be determined by whom it was financed or where it was carried out. Furthermore the health component of R&D carried out for the advancement of knowledge is not broken out, which may be important for R&D carried out in the Higher Education sector. For the purpose of this exercise health R&D expenditures have been calculated as health as an SEO plus a nominal 15% of advancement of knowledge. The resulting data give only a first idea of the size of health R&D efforts in these countries.

Insert 3.15

Estimated funding of health R&D in Chinese Taipei, Turkey and India

	Chinese Taipei	Turkey	India
	1998	1996	1996/97
US$ million	322	321	173
% GDP/GNP	0.12	0.18	0.05

Source: OECD (annual), Government of India (1999), State Institute of Statistics (1997), National Science Council (annual).

Mexico is now included in the OECD R&D survey, and provides additional information. Material was also assembled for Brazil from national sources and contacts, including information from the Ministries of Health, Ministry of Science and Technology, and the National Council for S&T Development (Conselho Nacional de Desenvolvimento Científico y Tecnológico, CNPq).

(iii) Trends and prospects

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

d) Data from national R&D surveys

Estimates of health R&D spending were identified from the results of individual national R&D surveys for India, Turkey and Chinese Taipei (Insert 3.15).

(i) Level of funding in 1998

These countries spend less than the largest Latin American countries but more than the smaller Asian nations discussed at the beginning of this section. Funding in Turkey and Chinese Taipei accounts for a higher percentage of GDP than in the other countries in the developing group. Thus, they fall into an intermediate position for health R&D funding in the developing group.

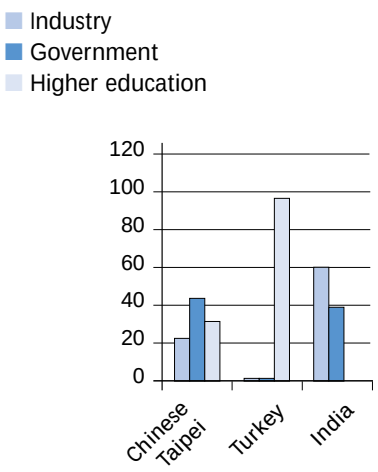
In Turkey, health R&D concentrated in the higher education sector; consequently, the government provides 80% of the funding. In Chinese Taipei where government constitutes the largest performing sector, about two-thirds of the health R&D is subsidized through government funds. Industry is the main sector of performance in India where it is possible that R&D in the higher education sector is excluded.

(ii) Compiling health R&D data

Turkey is an OECD country and Chinese Taipei has just been added to the OECD's R&D database. Chinese Taipei and India data cover total R&D for the health objective. Turkey's total data covers pharmaceutical R&D, plus R&D for health as an SEO in the government sector and R&D in the medical sciences within the higher education sector (Insert 3.16).

Insert 3.16

Sector of performance of health R&D in Chinese Taipei, Turkey and India



Source: OECD (annual), Government of India (1999), State Institute of Statistics (1997), National Science Council (annual).

Insert 3.17

Two measures of health R&D expenditure in India 1996-97

		Government		Industry		Total
		Central	State	Public	Private	
Health objective	million rupees	2375.4	49.7	53.9	3669.2	6148.2
	million $	66.9	1.4	1.5	103.4	173.2
	% of total R&D	4.5	0.7	1.0	22.6	7.5
Medical Sciences	million rupees	1292.4	29.7	12.2	2353.4	3687.7
	million $	36.4	0.8	0.3	66.3	103.9
	% of total R&D	2.4	0.4	0.2	14.5	4.5

Source: Government of India (1999)

For India it would also have been possible to use data for the medical sciences. As can be seen from Insert 3.17, this approach results in much lower figures for health R&D resources.

(iii) Trends and prospects

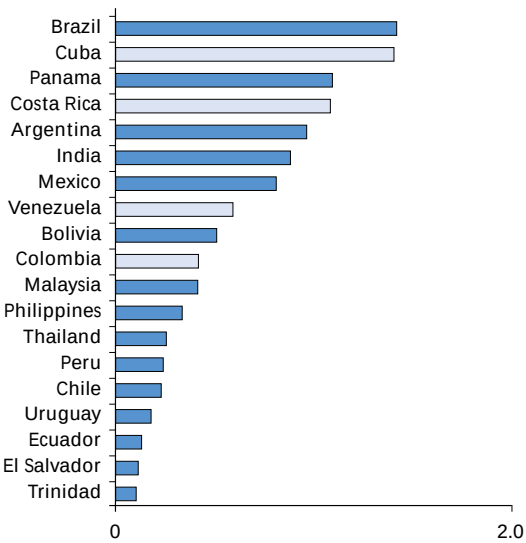
Efforts have not yet been made to trace the origins of these data, which were provided exclusively for the present exercise.

e) Investments in health research as recommended by the Commission on Health Research for Development

The Commission on Health Research for Development convened in 1990 recommended that at least 2% of national health expenditures in less developed countries be allocated to health research and capacity building. Of the countries included in this study, Brazil and Cuba approached the 2% mark (Insert 3.18). Turkey was not included there as higher education subsidies in that country, particularly in state universities for medical education, influenced the high percentage reported.

Insert 3.18

Selected developing 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 Bank (2000) and RICYT (2000)
Health expenditure: WHO (2000) and OECD (2000)

f) Case studies on resource flows for selected institutions

Research organizations in developing countries have used various strategies to secure and maintain their financial resources. Establishing a sound governance structure and a strong relation with the host country are important prerequisites. Diversification of their donor base protects the institution from "donor fatigue" and uneven budget cycles. Sound financial systems allow donors to provide funds directly rather than programming them through northern intermediaries that often incur high overheads and management costs. Lastly, resources that are generated independently of funders and government allow institutions greater flexibility in setting research agendas and providing incentives for staff.

As the cases below illustrate, financial sustainability can only be reached if changes are introduced on the part of both national governments and donors. Donors frequently provide only partial support for research projects, requiring developing country researchers to do what is not expected of researchers in developed countries: mobilize funds for salaries, overheads and all recurrent costs. The adverse socioeconomic situation in many developing countries is an important factor for not funding their own research programmes. In some instances, the lack of long-term vision and political will in some developing country governments considerably limits the allocation of national funds for national institutions, thus creating dependency on external funding, exacerbating the issues related to donor provision of such funding.

In view of these problems, research institutions have developed strategies for improving and

Insert 3.19

Case studies on institutional resource flows

1. The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B) or the Centre for Health and Population Research as it is now called, has become a global leader in diarrhoeal disease and reproductive health. In the 1990s the Centre expanded its scientific programme to include nutrition, neonatal health, tuberculosis and HIV.

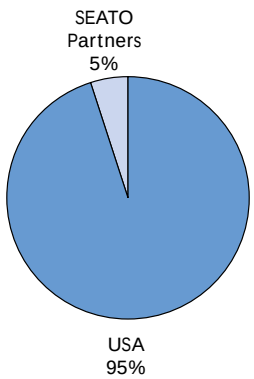
In response to fluctuating contributions from donors in the 1980s, the Centre took a number of steps to improve its resource base in the 1990s. It established a resource development office, aggressively sought to broaden its donor base (Insert 3.19a), and created two endowments to help secure its future. Fifty-five organizations and 87 individuals have contributed to the Hospital Endowment Fund which has a current market value of US$4.5 million. The Centre Endowment Fund, established in 1996, has a current market value of US$4.5 million. A management review in 1996, assisted in the development of sound accounting systems and identified ways to make the institution more efficient in its use of funds. Services such as training for the region, provision of technical assistance in disaster situations, and diagnostics are now providing an estimated 2% of the total income. Research infrastructure development, largely financed by the Government of Japan and the Sasakawa Foundation, has contributed greatly to the Centre's ability to compete for research contracts and grants globally. Increased interest by the Government of Bangladesh has resulted in raising contributions from US$26,000 in 1991 to US$663,000 in 1996 and to US$700,000 in 1999 (ICDDR, B, personal communication Zaman).

The increasing budget over the past two years and the favourable financial outlook for 2000 are evidence that the Centre's strategy to strengthen its resource base is beginning to pay off. The single greatest financial obstacle is the short-term nature of grant funding from donors. Of the 55 donors, 48 provide contributions on an annual basis.

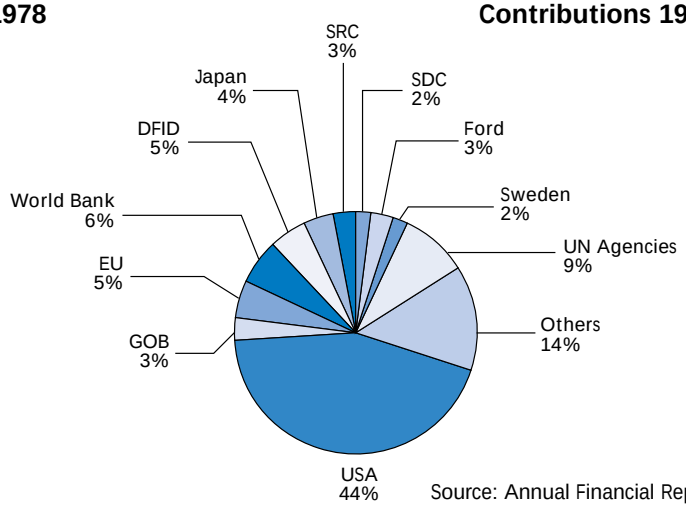
Insert 3.19a

Diversification of ICDDR,B's donor base

Estimated contributions 1960-1978



Contributions 1999



Source: Annual Financial Reports

Insert 3.19 (continued)

2. The heritage of Centro Internacional de Entrenamiento e Investigaciones Medicas (CIDEIM) dates from 1961. CIDEIM is a Colombian autonomous non-profit, non-governmental national organization dedicated to biomedical research and the development of research capability. CIDEIM's principal lines of investigation – leishmaniasis, mycobacteria, biological resistance, and emerging infections – are pursued from an interdisciplinary perspective (CIDEIM Institutional Profile 2000).

The financing of CIDEIM's activities during the period 1997-98 has been achieved with resources from multiple sources. Research grants provided from six donors provided 71% of the total budget (CIDEIM Institutional Profile 2000). Achieving financial sustainability through research financed by external grants has proven difficult. Not only is funding from external sources for projects erratic, but financing agencies do not cover the full and true costs of research conducted in developing countries. Under-financing occurs because cost sharing and counterpart support by the recipient entity are routinely required. Overhead costs are not recognized or supported by most donors, or even the major national agencies for Science and Technology Research. Furthermore, salary support for principal investigators and other "permanent" research personnel is generally not allowed. Hence there is a deficit built into every project from the outset and the scientists most able to generate independent research are ineligible for salary support through grants.

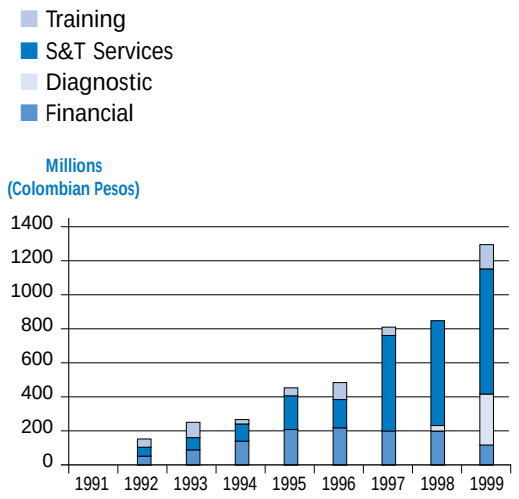
Because of the problems associated with project financing, other sources of income have been sought. CIDEIM established a permanent capital fund in a non-profit commercial financial entity, the Fundacion para Educacion Superior (FES) in Cali. However, activities of the Fundacion were suspended for lack of liquidity and as a result the permanent capital funds of 400 different NGOs including that of CIDEIM were lost.

CIDEIM has sought to attract private-sector funding through the provision of tax incentives; however, the tax incentives were not sufficiently attractive to the private sector. A bond issue is currently under study by the fiscal authorities of the Colombian government (CIDEIM Institutional Profile 2000).

Diagnostic services, especially those for infectious diseases, have generated visibility in the community and attracted increasing resources since 1998. These resources contribute to institutional operational costs and support innovative areas of investigation (CIDEIM, personal communication Saravia). Other sources of income include income-generating investments and training. The percentage of income from services has steadily increased since 1991 as can be seen in Insert 3.19b.

Insert 3.19b

CIDEIM income by activities other than projects 1991-1999



Source: CIDEIM 2000

sustaining resource flows, as illustrated by some of the cases below. These strategies include:
• Diversification of donor base
• Provision of services
• Creation of endowments
• Provision of tax incentives.

3.5. Health research resources from advanced countries to developing countries and countries in transition

a) Introduction

This section examines resource flows for health research from selected advanced countries' public funding organizations to developing countries. Funding organizations receive direct allocations from national governments or generate their own funds; these organizations include government institutions administering official development assistance (ODA), UN agencies, development banks and not-for-profit organizations, such as foundations.

Very little disaggregated financial data was available to researchers and the data that was obtained required considerable time and effort from the staff of organizations queried. Funding organizations were found to have very diverse mandates, modes of operation and priorities; these, in turn, had implications for how data was tracked.

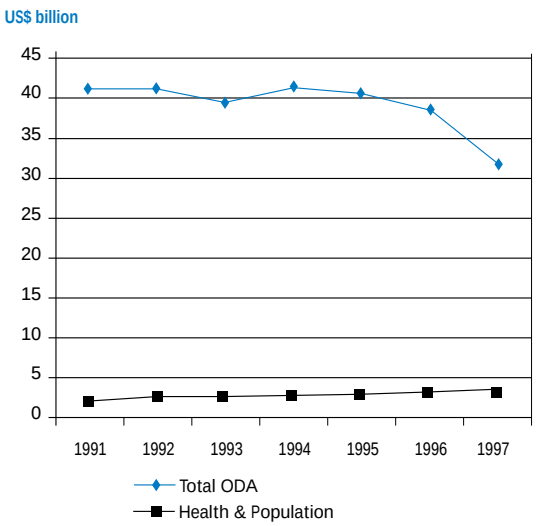
Official Development Assistance (ODA) is financial aid provided to low- and middle-income countries by governments in advanced countries and includes resources for health research. During the 1990s, half of all ODA to the health sector was channelled via multilateral institutions (international institutions that receive pooled contributions from member countries and which are disbursed at the discretion of the institutions). Some countries, such as the United States, provide most of their resources as bilateral aid (funds provided directly by a donor country to a recipient country), whereas other countries use predominantly multilateral channels. Although overall bilateral ODA decreased in the 1990s, disbursements to the health sector increased as a share of total ODA from 6.7% in 1990 to 11.3% in 1997 (see Insert 3.20). It is estimated that total bilateral ODA funding for health research decreased from US$386 million in 1992 to US$350 million in 1998 (C. Michaud, personal communication).

Financing for developing country researchers grew during the 1990s largely as a result of the emergence of a more diversified set of funders that includes, in addition to the ODA, the following institutions:
• New (or expanded) foundations
• Development banks
• National advanced country research institutions
• European Union support.

The favourable economic situation in some advanced countries in the 1990s led to the development of new foundations and increased the wealth of some existing ones. For example,

Insert 3.20

Trends in total bilateral ODA and health bilateral ODA 1991-1997



Source: OECD 1998 DAC Report, OECD (annual) and see text

Wellcome Trust's contribution to research outside the UK increased from 2% of its budget to almost 8% in 1999. This is a very important increase in real terms because the Trust's budget also increased substantially over this period (Wellcome Trust, personal communication Gulati). In addition, funding from multilateral institutions such as the European Union and the development banks during this period (Insert 3.21) contributed to the increase in support for health research in developing countries. Lastly, many national research institutions in advanced countries are increasing their funding for international health, although it is unclear whether this increase will be reflected in increased support for developing country researchers.

The Bill and Melinda Gates Foundation has made total commitments of US$917 million to global health related R&D since 1995. That commitment has risen sharply from a level of US$333,000 in 1995 and US$10 million in 1998, to a level of US$189 million to date in 2001 (Gates Foundation, personal communication Fialdini).

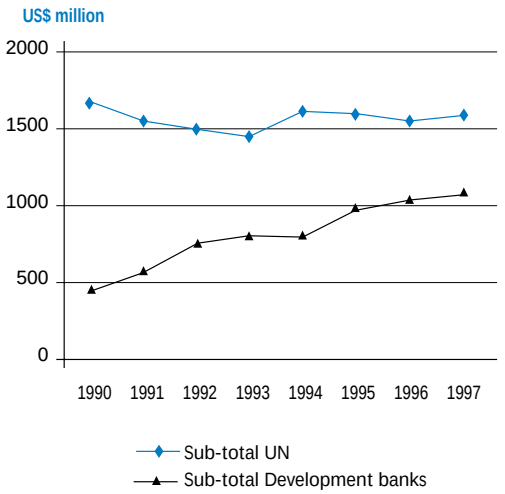
b) Compiling data on health R&D

(i) Selection of organizations

Efforts were made to include a representative sample of advanced country organizations that support research in developing countries: ODA-funded agencies, multilateral institutions, national research institutions, foundations and other non-governmental organizations. A sampling of both primary and secondary investor organizations was conducted. A secondary investor is defined as an organization that receives funding from an investor or funding agency to administer/manage a health research programme/project implemented by a recipient research organization(s). Seventeen institutions or programmes provided data. These institutions and programmes varied according to their mandates, missions, approaches and size of their funding. The type of data they tracked as well as its accessibility were both influenced by these differences.

Insert 3.21

Multilateral ODA to the health sector 1990-1997



(ii) Data sources

It was anticipated that the questionnaire sent to investor organizations would provide the disaggregated data needed regarding the types and topics of research supported in developing/transitional countries. In fact, the most useful sources of information utilized were documents in the public domain and personal interviews. However, the documents in the public domain, while providing interesting descriptive information, provided limited financial information on the amounts of funds actually going to developing countries and levels of disaggregation for specific types of research. This information was obtained from individuals within the organization, based on internal sources of information. While some organizations were willing to provide information from their internal databases and documents, this data was usually difficult to interpret due in part to the multiplicity of mechanisms and channels through which funds are provided. Thus, considerable amounts of time were required from institutions' staff and Global Forum consultants to complete the exercise.

(iii) Standardized definitions

The standardized definitions of research and health research presented in Chapter 2 on Approaches and Methodology were used. To obtain funding data on research capacity strengthening (RCS), respondents were asked to provide aggregated funding for:

- Research conducted by developing/transitional country researchers
- Infrastructure development/consumables for research in developing countries
- Training of developing/transitional country researchers (internal or external to their country of origin).

Respondents were asked not to include costs incurred to manage the research in order to get a better estimate of the funds actually allocated to developing countries to implement research. Information requested from all respondents included institutional/programme income/budget, health budget, health research budget and estimated RCS budget. Other information relevant to the classification system described in Chapter 2 was provided on an ad hoc basis. Given that the organizations sampled perceived health research and capacity strengthening in different ways, personal communication was used to cross-check the validity of the information communicated.

All data is presented in US dollars at current exchange rates unless otherwise stated.

c) Results and trends

Brief descriptions of resource flows and technical priorities for selected types of organizations providing funding for health research in 1998 (or 1999 for newly established organizations) are as follows:

(i) Multilateral organizations supporting health research

- **WHO Department of Research Policy and Cooperation (RPC)**

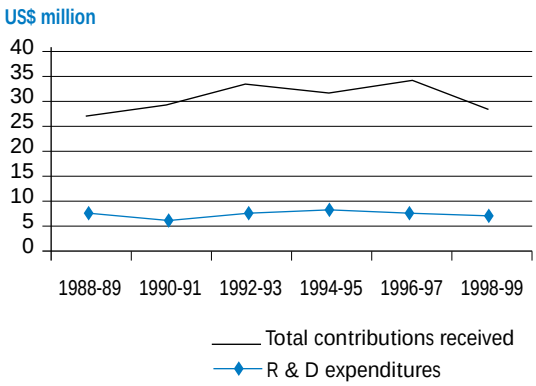
  In 1999, the WHO Department of RPC had an income of US$230,000 of which 65% was provided from voluntary contributions and 35% was supplied through the regular budget. An estimated 30% of the total budget for RPC in 1999 was allocated to capacity strengthening (RPC, personal communication Pang). Priority areas included research policy and cooperation and improving the enabling environment for research. It may be noted that the RPC is a new programme. Its first budget was funded in 1999.

- **WHO Department of Child and Adolescent Health (CAH)**

  The child health component of the WHO Department of CAH had an income of US$28.2 million for the 1998-99 biennium provided by the regular budget, in addition to 15 extra-budgetary donors. The Department spent US$27.8 million on child health activities, US$6.7 million of which was for research and development (CAH Financial Reports). An estimated 60% of the research allocation supported capacity strengthening through the provision of research grants to developing country researchers and insti-

Insert 3.22

Trends in funding, 1988-1999 WHO/Child and Adolescent Health and Development (CAH)



Source: See text.

tutions (CAH, personal communication Wolfheim). Research funding levels have remained relatively unchanged over the last 10 years despite the fall in income following the 1996-97 biennium (Insert 3.22). The scope of research, however, greatly expanded during the same period – from diarrhoea and acute respiratory tract infections (ARI) in the late 1980s to include malnutrition, child development and the delivery of integrated child health services (IMCI) in the late 1990s (CAH, personal communication Fontaine). In the year 2000, the research agenda expanded to include health for the age span from the young infant to the adolescent.

- **UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development & Research Training in Human Reproduction (HRP)**

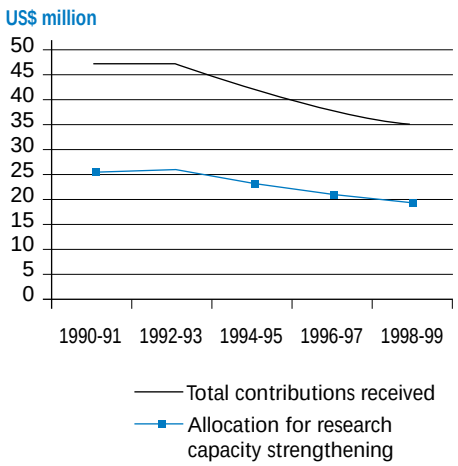
  For the 1998-99 biennium, the income of the co-sponsored HRP programme was US$34.1 million, provided by 25 donors (Ezcurra et al, 1999). Approximately US$23 million (67%) was committed to research projects and RCS. An estimated 55% of the total HRP budget was allocated to research projects implemented in developing countries (Ezcurra et al, 1999; HRP, personal communication Ezcurra and Mbizo). These were either global research projects or national/regional research studies linked to capacity strengthening grants. HRP anticipates that future opportunities for increased income will be more strongly complemented by contributions from foundations, NGOs and civil society. HRP's long-term funding trend shows declines in the 1990s; concurrently, its mandate expanded from fertility regulation to more broadly include reproductive health, reproductive tract infections, unsafe abortion and female genital mutilation (Insert 3.23) (RHR/HRP, 2000).

- **UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)**

  The co-sponsored special programme TDR had an income of US$28.98 million in 1998,

Insert 3.23

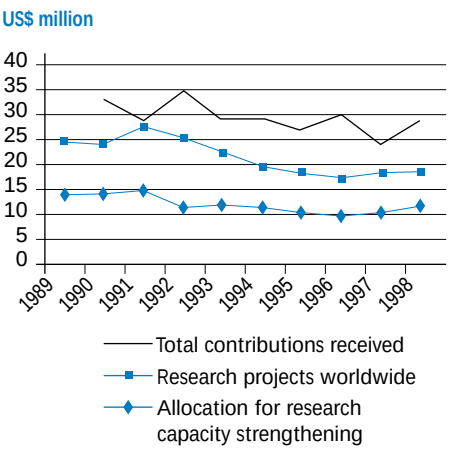
Trends in funding, 1990-1999 Special Programme of Research, Development & Research Training in Human Reproduction (HRP)



Source: See text.

Insert 3.24

Trends in funding, 1989-1998 Special Programme for Research and Training in Tropical Diseases (TDR)



Source: See text.

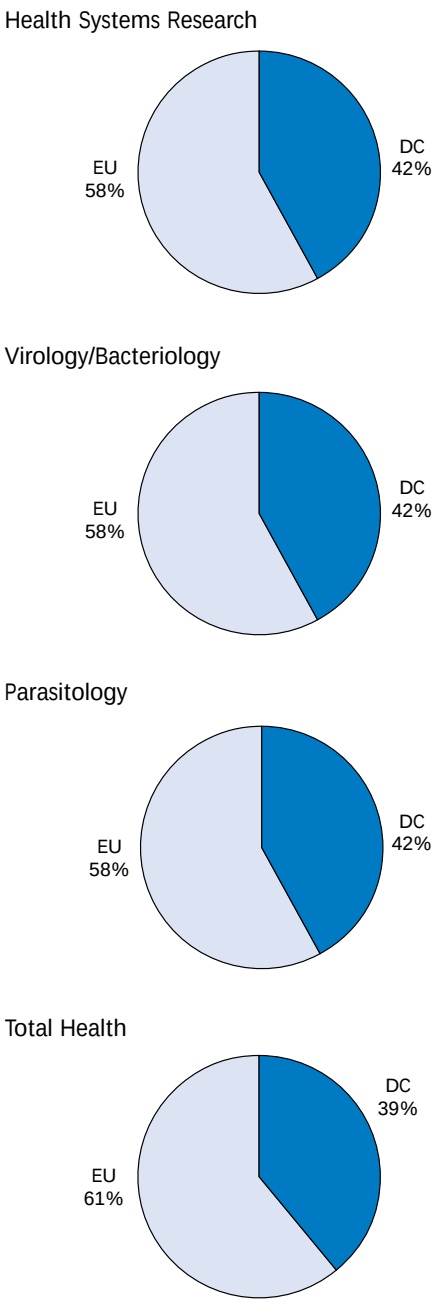
provided through the contributions of 33 donors (Progress Report 1997, and TDR Management Summary 1998). Approximately US$18.9 million (65%) was committed to research projects globally. An estimated US$ 11.7 million (41%) of the 1998 income was allocated for research capacity strengthening, including research projects in developing countries. An additional US$2.2 million was provided for the Multilateral Initiative for Malaria (TDR Management Summary 1998 and personal communication Wayling). TDR's funding declined during the last decade while its mandate expanded to include dengue and tuberculosis (Insert 3.24). Other priority areas include malaria, leishmaniasis, filariasis, schistosomiasis, Chagas disease, trypanosomiasis and onchocerciasis (TDR Progress Report 1999-2000).

- **WHO Department of Essential Drugs and Medicines Policy (EDM)**

The WHO Department of EDM had a 1998 income of US$11 million, of which US$3 million was provided from the WHO regular budget. The balance was contributed by 18 donors (EDM Financial Reports, 1998-99). EDM does not routinely report research as a line item of its annual budget; however, research is estimated at about 5% of the total budget (EDM, personal communication, Baghdadi). The department's priority areas include drug policy, drug access, quality, safety and efficacy of medicines, in addition to rational drug use (EDM Progress Report 1998-99). EDM finances research studies, usually carried out by its collaborating centres, located both in developing and developed countries. Research capacity strengthening – including research in developing countries, training in research methodologies and dissemination of research results to developing countries – constitutes the majority of total research.

Insert 3.25

EC: INCO-DC health research with developing countries (DC) or EU institutions (EU) 1994-1998



Source: Health Research with Developing Countries INCO-DC, 1994-1998

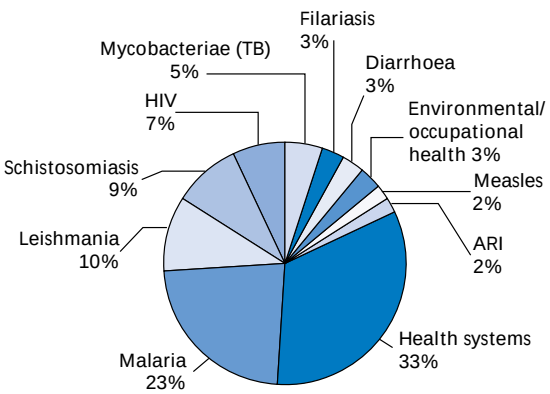
- **European Commission (EC)**

Research in developing countries is supported by two of the EC directorates.

➢ **The Research Directorate's INCO-DC** budget for 1998 was approximately US$62 million (estimate derived from dividing the 1994-98 budget for INCO-DC by four). Thirty percent of this budget (or US$18.6 million) was allocated to health research and US$8 million to research capacity strengthening (EC INCO 2000, and personal communication Karaoglou). An estimated 39% of the total number of research contracts allocated during the 1994-98 INCO-DC programme was for developing countries (Insert 3.25). During the 1998-2002 period it is anticipated that that per-centage will increase to 40-45% (EC INCO-DC 2000). The percentages of funding (total 62.9 million Euros) allocated to three major research areas during the period 1994-98 are as follows: parasitology 46%, health systems research 31%, and virology/bacteriology 23% (EC INCO-DC, 1999). Topic distribution for a total of 152 projects supported by INCO from 1994-98 is presented in Insert 3.26.

Insert 3.26

EC: INCO-DC topic distribution for total of 152 projects 1994-1998



Source: As Insert 3.25

➢ **The Development Directorate** reported that special budget lines had been used to support key policy and strategy development work in HIV/AIDS, population and gender. Total commitments approached US$35 million in 1998. These funds were designed to support the testing of innovative methodologies and strategies and the generation of knowledge to fill gaps in understanding (EC DG DEV website; EC DG DEV Fact Sheet 2000; personal communication Fransen). It is estimated that 15% of funds for HIV/AIDS over the past 10 years (US$354 million) were allocated to scientific study. Data on research funds made available for developing countries in 1998 were not available.

- **The World Bank**

Of the World Bank's total 1998 budget of US$28.5 billion, health lending (including health, nutrition and population) was US$1.99 billion, and contributions to the global health pro-grammes were US$20 million (for a total of US$2.01 billion). A World Bank working paper reviewing the period 1980-91 (Gittinger and Bradford 1992) estimated that project-financed research only accounted for 1-2% of project costs, with about 13% of the health projects supporting medical research. The percentage of project-financed research seems to be rising to levels of 2.5 % for health lending in 1998 and 4.7% in 1999 (World Bank, personal communication, Nassim and McGuire). It is estimated that most funds lent for health research are allocated for research implemented by developing country researchers and institutions for policy and health systems research. A smaller percentage of these funds has been utilized to finance infrastructure development for the Malaria Research and Training Centre in Mali, to support research by the ICDDR,B under the Bangladesh Integrated Nutrition Project and to support RCS under the Brazil Amazon Basin Malaria Control Project (World Bank, personal communication Liese and Habte).

From the Development Grant Facility (DGF), contributions were made to the following global programmes that advocate and programme research: the Global Forum for Health Research (US$1.9 million); the co-sponsored programmes: TDR (US$3 million) and HRP (US$2.5 million); the Early Childhood Study (US$100,000); the Global Micro-nutrients Initiative (US$1.2 million); and the Population and Reproductive Health Capacity Building Program (US$440,000). At least US$6 million of the DGF funds can be attributed to research activities including about US$4 million to research capacity strengthening (World Bank, personal communication Nassim). Funds were prorated to exclude management costs. Since research and RCS are not routinely monitored and tracked, these figures represent estimates obtained from World Bank staff.

Research priorities include: diseases of the poor (malaria, tuberculosis), family planning/ reproductive health, HIV, malnutrition, health systems and policy research (World Bank PHN Sector Strategy 1997).

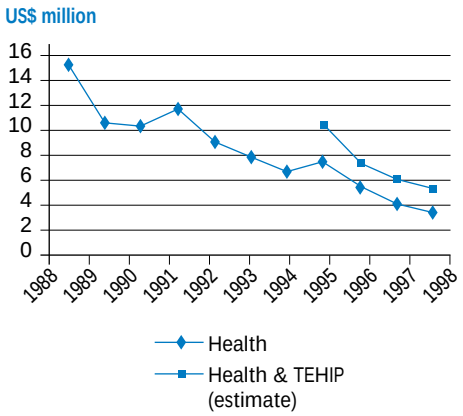
(ii) Development cooperation agencies supporting health research

- **International Development Research Centre (Canada)**

In the face of significant decreases in overall ODA, IDRC suffered budgetary cutbacks in the early 1990s, resulting in the layoff of 30% of staff (IDRC, personal communication, Mohindra). This is reflected in the graph of IDRC funding for health projects 1988-98 (Insert 3.27). Since 90% of the health research budget is allocated to research capacity strengthening, representing the raison d'être of IDRC, the impact on support to research capacity strengthening worldwide has been considerable. The total IDRC budget was US$45 million in 1998. The total health research budget for IDRC was approximately US$4.0 million or 9% of the total IDRC budget (IDRC 2000, and personal communication Mohindra). Although the health research budget has been declining dramatically since 1988, the funds made available to the Tanzania Essential Health Interventions Project (TEHIP) have helped to slow that decline.

Insert 3.27

IDRC funding for health projects 1988-1998



Source: IDRC Financial Reports

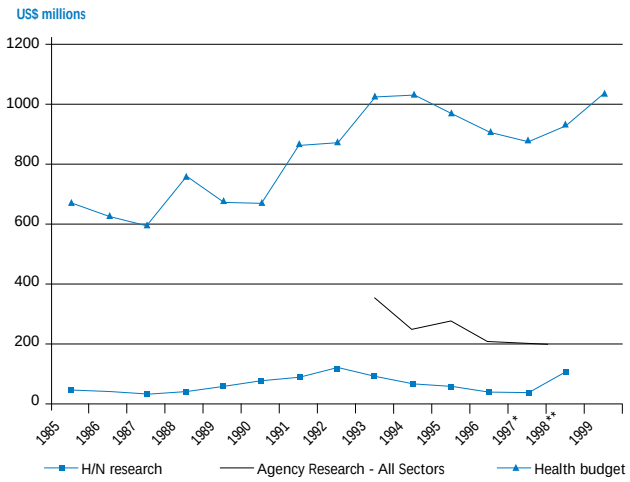
IDRC priorities include: ecosystem health, micronutrients, tobacco prevention and control, interdisciplinary/cross-sectoral research, health systems and policy research.

- **United States Agency for International Development (USAID)**

USAID had a total health budget (including health, population and nutrition) of US$1.19 billion in fiscal year 1998. Of this amount, an estimated US$108 million was attributed to health research (NMS, corrected for population, health, nutrition; personal communication Koek, Lans). Health (including population) research accounted for 54% of all research at USAID in 1998 (NMS, 1998). USAID's health budget increased from the mid-1980s until 1993, largely due to increased allocations for child health and HIV/AIDS. Over the following five years it declined, due

Insert 3.28

USAID funding trends 1985-1999



Source: USAID, NMS and interviews
*Data for 1997 not available
** NMS data, corrected for health

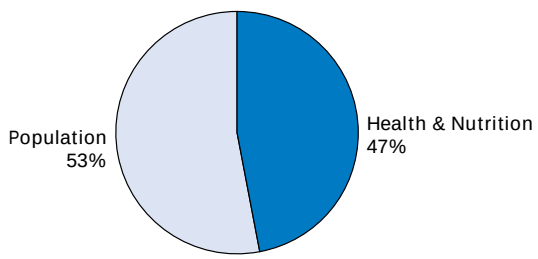
to decreases in overall ODA, but began to rise again in 2001. Agency-wide research declined concurrently with reductions in ODA and has now levelled off. Between 1992 and 1996, health research funding declined dramatically from US$116 million in 1992 to US$40 million in 1996. However, by 1998, health research had risen to US$108 million again (Insert 3.28). USAID-funded research in developing countries by developing country researchers is not tracked but is estimated to be at least 65% of the research total, based on 100% attribution of research funded by field missions and 50% attribution of headquarters funds (USAID, personal communication Holfeld). USAID tracks the research it supports by topic area and disease as shown in Insert 3.29.

Insert 3.29

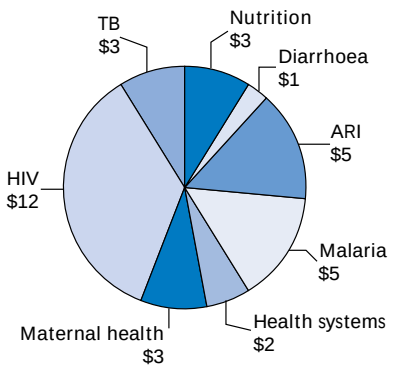
USAID allocation for health research by topic area 1998

Global Bureau for Global Programs, Field Support and Research
Total Research Funding: US$72 million

Health Research Allocation



Health & Nutrition Allocation US$ million



Source: NMS corrected data for health and interviews.

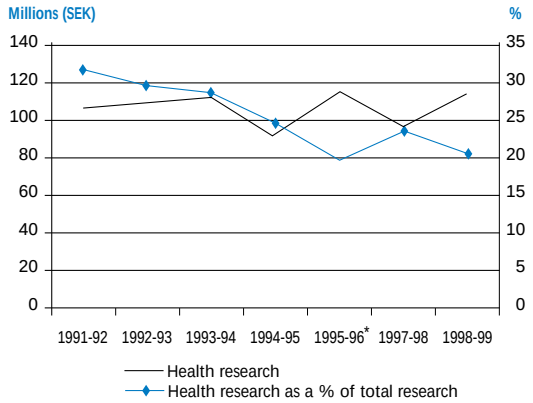
Priority research areas include: health systems and policy research, child health (acute respiratory infection, diarrhoea, nutrition), adolescent/adult health (tuberculosis, HIV, reproductive health), malaria, family planning and anti-microbial resistance (USAID 1996; USAID 2000).

- **Swedish Agency for Research Cooperation with Developing Countries (SAREC)**

The health research budget, as a percentage of all SAREC-funded research, has declined since 1991 while the health research budget, expressed in Swedish kronor, has remained fairly steady over the last decade, as shown in Insert 3.30. However, as noted in the box (Insert 3.31), due to the falling exchange rate of the Swedish kronor in relation to the US dollar, recipient organizations abroad experienced significant decreases in purchasing power. Thus, by 1998, from a Swedish funding perspective, resources allocated for research had increased by 5% since 1992. In real terms, however, governments and organizations abroad receiving the funds in US dollars experienced decreases of over 20%.

Insert 3.30

SAREC funding trend 1991-1999



* Fiscal year 1995-1996 was 18 months.

Source: SAREC Interviews

In 1998, SAREC's bilateral health research budget was approximately US$14.5 million. Thirty percent of this research, representing bilateral cooperation plus a pro-rated share of SAREC's contribution to WHO, can be attributed to research capability strengthening (RCS) for an estimated total of US$7.8 million (SAREC, personal communication). The estimated, combined allocation with RCS from bilateral cooperation, international programmes and special initiatives is about US$9.6 million (SAREC, personal communication Carlsson). Ten percent of the budget is allocated to Swedish development research and therefore none is attributed to RCS. Since 60% of SAREC's health research budget allocation to international programmes and special initiatives is not tracked for RCS, it should be emphasized that this figure represents an estimate.

SAREC priorities include: health systems and policy research, child health, reproductive/sexual health, HIV, poverty-related tropical diseases, vaccine research and multidisciplinary, policy-relevant research (SAREC 2000).

(iii) Foundations supporting health research

- **Rockefeller Foundation**

Funding for health and population research was approximately US$43 million in 1998. Of this total, an estimated US$12.6 was allocated for research capacity strengthening activities (Rockefeller Foundation, personal communication Burke).

Major areas of research activities include: health equity, vaccine development (HIV, malaria, tuberculosis), generation and use of knowledge, reproductive health technology and policy research, tobacco control/prevention, institutional support for higher education in Africa (Rockefeller Foundation Annual Reports).

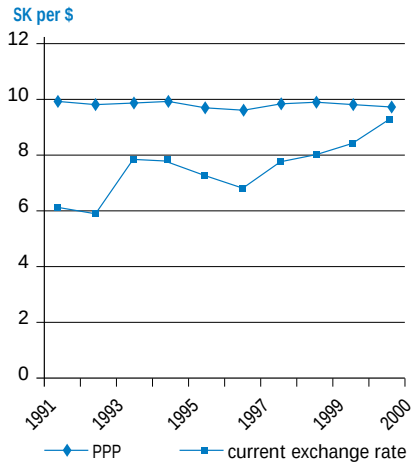
Insert 3.31

Effects of changes in exchange rates on the value of health R&D funded by SAREC

During the 1990s the exchange rate of the Swedish kronor (SEK) against the US dollar (US$) weakened considerably despite a slight recovery between 1993 and 1996. It dropped from 6 SEK to US$1 in 1991 to 9 SEK to US$1 in 2000. Over that period, the purchasing power parity (PPP) of the SEK with the US$ remained stable at approximately 9 SEK. Thus by 2000 the SEK had gone from being seriously overvalued to almost matching the dollar's PPP.

Insert 3.31a

Current exchange rate and purchasing power parity (PPP) of the Swedish kronor against the US dollar



Source: OECD database

- **The Wellcome Trust**

The Trust's expenditures for medical research in 1998 were approximately US$650 million (Wellcome Trust, report from accounts, Wellcome Trust personal communication Seemungal). Although research capacity strengthening activities for training and infrastructure development are tracked, the developing country component of collaborative research projects is not. Therefore, a total for RCS cannot be provided. It should, however, be noted that the Trust's contribution to research outside the UK has increased substantially since 1993 when it allocated approximately 2% of its budget outside the UK. By 1999, this allocation had increased to almost 8% (Wellcome Trust, personal communication Gulati). The increase in real terms was considerable, as the Trust's budget had increased substantially over this period.

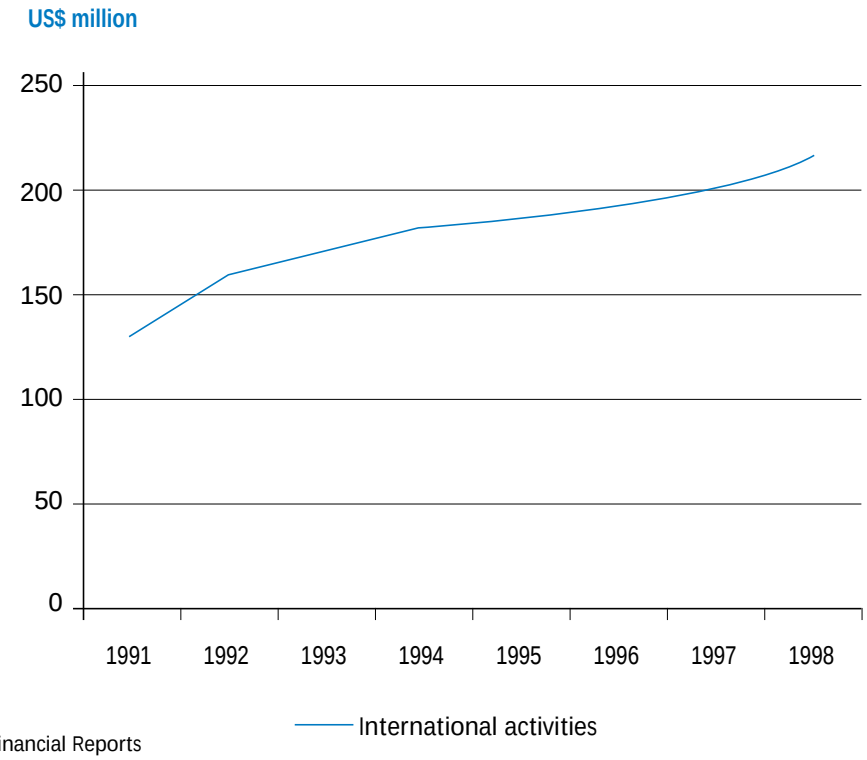
Priority areas include: infectious diseases including malaria and other diseases of the developing world, non-communicable diseases, population studies, health economics, reproductive health, infant and child health, sexual health and social science (Wellcome Trust 1999 and Wellcome Trust website 2000).

iv) Advanced countries' national institutions supporting health research

The international activities budget for the United States National Institutes of Health (US NIH) has been steadily increasing since 1991 (Insert 3.32). While there are international programmes within the various institutes, a breakdown of these activities was not available except for the Fogarty International Center (FIC). FIC had a budget of US$21.2 million in 1998 to support biomedical research capacity strengthening, which increased to US$27.8

Insert 3.32

US National Institutes of Health funding trend for international activities 1991-1998



Source: NIH Financial Reports

million in 1999. It was anticipated that this figure would increase to a total US$35 million in 2000 (FIC Database). It was not possible to separate developing country financial data within the context of collaborative training and research. Priorities of the FIC include biodiversity, ecology of infectious diseases, malaria, HIV, tuberculosis, environmental health, medical informatics, child and maternal health (NIH/FIC website 2000).

A summary of data from selected advanced country and multilateral funding organizations is provided in Insert 3.33. Given that organizations did not track RCS as defined in the study as a line item, most of the RCS data provided by the organizations is listed as estimates.

v) International NGOs/networks supporting health research

- **International Union Against Tuberculosis and Lung Disease (IUATLD)**

  The annual budget of the IUATLD is approximately US$5 million. The budget's funding is obtained from national association members (representing over 110 countries), individual members (over 2,000 scientists and practitioners) and from grants and donations. Financial support has come from Belgium, Canada, Denmark, Finland, France, Iceland, Japan, Luxembourg, Mexico, the Netherlands, Norway, Scotland, Sweden and the United States (IUATLD 2000a and 2000b). Approximately 6-7% of this budget can be attributed to research and research capacity streng-thening (IUATLD, personal communication Enarson). Priority research areas include: tuberculosis, chronic obstructive pulmonary disease, acute respiratory infections and asthma (IUATLD 2000a).

Insert 3.33

Summary of financial data for selected organizations/agencies 1998 (US$ million)

	Total Budget	Health	Health Research	Health RCS*
Multilaterals				
WHO/RPC	0.2	0.2	0.2	0.1
WHO/CAH	14.5	14.5	3.4	2.0
WHO/HRP	17.0	17.0	11.5	9.0
WHO/TDR	28.9	28.9	18.9	11.7
WHO/EDM	11.0	11.0	0.6	0.5
World Bank	28,500.0	2,010.0	**55.7	53.7
EC:INCO-DC	62.0	18.6	18.6	8.0
Bilaterals				
USAID	7,018.6	1,196.0	108.0	at least 65.0
Sida/SAREC	1,186.8	142.4	14.1	9.5
IDRC	45.0	4.0	4.0	3.6
Foundations				
Rockefeller Foundation	145.0	43.0	NA	12.6
Wellcome Trust	650.0	650.0	650.0	NA
Research Institutes				
NIH/FIC	13,647.0	13,647.0	1,3647.0	***21.2
International NGOs/Networks				
IUATLD	5.0	5.0	0.3	0.3
INCLEN	4.0	4.0	2.5	2.5
INRUD	0.4	0.4	0.3	0.3
COHRED	2.0	2.0	1.0	1.0
Global Forum	2.4	2.4	1.3	0.2

NA= not available
** The definition of research capacity strengthening (RCS) is given in Chapter 3.5b iii. RCS is included in the total for health research.*
*** does not include DEC or ESW (see Abbreviations and acronyms).*
**** FIC only; developed country components cannot be separated out.*

- **International Clinical Epidemiological Network (INCLEN)**

INCLEN's income was US$4 million for 1998. The Rockefeller Foundation provided 85% of the budget while USAID provided the remaining 15% (INCLEN inc 2000). Research projects in developing countries constituted 28% of the total budget and RCS accounted for 37%. In 1999, income totalled US$2.58 million with 63% provided by the Rockefeller Foundation and 37% by USAID (INCLEN inc 2000). Priority research areas include maternal and child health, rational use of drugs, quality of care, malaria, HIV and tuber-culosis (INCLEN inc 1999).

- **International Network for Rational Use of Drugs (INRUD)**

The budget for INRUD in 1999 was US$450,000. Of this amount, US$362,000 (80%) was allocated to research capacity building related to drug utilization including proposal development, research support, short-term training, maintenance of a drug use research bibliography and INRUD News updates (INRUD, personal communication Lee). The primary donor for the core pro-

gramme was DANIDA. In 1999, this core budget increased by an additional US$480,000 to support research capacity building for collaborative activities, such as the Joint Initiative for Improving Use of Medicines.

- **Council on Health Research for Development (COHRED)**

  COHRED maintains a small secretariat in Geneva and facilitates essential national health research activities in at least 43 countries. Eight donors provided the COHRED budget of US$2 million in 1998. An estimated 50% of the 1998 budget was devoted to capacity strengthening activities including: research capacity strengthening, activities in developing countries, communication on capacity strengthening and meetings of the working group on research capacity strengthening (COHRED, personal communication de Haan). COHRED's priority areas include national research planning and priority setting in addition to advocacy for ENHR.

- **Global Forum for Health Research**

  The Global Forum's budget amounted to US$2.4 million in 1999, the first full year of its existence. Eight donors provided funds: WHO, World Bank, Rockefeller Foundation and the Governments of Canada, the Netherlands, Norway, Sweden and Switzerland. Fifteen percent of the total budget was allocated to research capacity strengthening activities (Global Forum, personal communication de Francisco). Strategies include support for the efforts in priority-setting methodologies, including tracking resource flows into health research, and for networks in high disease burden areas (Global Forum for Health Research 2000).

d) Observations

The following observations are based upon review of the data presented in this section:

- Decreasing budgets (in current terms) for ODA recipient agencies by USAID and IDRC have meant decreasing budgets for health research during the first half of the 1990s. USAID subsequently increased its funding for health research, and the decline in funding by IDRC also slowed down by the end of the decade.

- None of the funding trends provided in this section were adjusted for inflation. Therefore, increases and decreases in funding over time must be interpreted within this context.

- The USAID and Sida/SAREC health research percentages in the overall health budget (about 10%) remain considerably above the 5% recommended by the 1990 report of the Commission on Health Research.

- Both Wellcome Trust and NIH/Fogarty International Center have seen increases in their international research budgets over the decade. The percentage of resources allocated to developing country institutions and researchers will be studied further.

- Global-level organizations such as COHRED, the Global Forum for Health Research and the WHO/RPC have relatively small budgets, mainly due to their functions as convenors and facilitators rather than implementers; as such, they have a role to attract funding to priority research areas which goes way beyond their small core budgets.

- Resource flows for NGOs and networks are also small but these organizations leverage considerable funding that is not reflected in their core budgets.

- The impact of the many new partnerships, initiatives and networks on the overall level and distribution of health research is not yet known beyond specific examples – such as Medicines for Malaria Venture (MMV), the Global Alliance for TB Drug Development (GATBD) amongst others – and cannot be determined globally from currently available data.

- Separating out research activities from management and administrative functions for the purpose of looking at resource flows for research reveals a remarkably consistent percentage (25-35%) of funds dedicated to manage a research programme. At the same time it reflects that the percentage received by researchers and their institutions in developing countries is about 65-75% of the total. This is a higher percentage than is reported to be achieved through cooperative north/south research projects (30-50% based on evaluation reports and EC data).
- Funding for research in specific disease areas will be difficult to monitor regularly on a global scale as few agencies collect data in this manner. USAID does track data by disease/condition and the EC provides some disaggregated data on a regular basis, but they are the exceptions among organizations with broad mandates. More often, data is collected by project or country.
- Qualitative data obtained in this study on organizational priorities indicates that most organizations surveyed list as priorities reproductive health, HIV, malaria, tuberculosis, heath systems and policy research, but only a few explicitly support diarrhoeal disease, acute respiratory infections, non-communicable diseases and cross-sectoral research in developing countries.
- Funding opportunities for health research exist through the development banks; accessing loans/credits will require more concerted action by the research community at the country level.
- Sources of funding for health research may exist through some of the new foundations that have indicated their commitment to health but whose commitment to health research is not as clear.
- Existing foundations and research institutions in advanced countries have increased their international funding for health research. What is unclear is the degree of increase of funds allocated to developing countries within these programmes.
- Co-sponsored special programmes and WHO regular programmes surveyed had decreasing long-term budgets and, at the same time, were given broadened mandates; the message is "do more with less".

Chapter 4
Discussion

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 funding 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.

4.1 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 and lack of comparability of the data tracked by funders and performers, demonstrated during this study.

4.2 Supply of data

a) Total health R&D data

Data is available for advanced countries from existing data collection systems. Improvements in quality and standardization 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 developing 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 a country's 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 data

This study documented and proposed a pilot-tested tool to track health R&D funds (see Annex 2). The aim of the current study was to request disaggregated data on health R&D at multiple levels, as described in Chapter 1. The diversity on the demand side of the equation had profound implications regarding the types of disaggregated data previously collected and, therefore, available to researchers.

Funding flows from advanced countries to developing 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 developing 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 which administer the funds on behalf of a govern-ment agency. In addition, many funding agencies are highly decentralized with decisions on allocations made in developing countries and reporting requir-ements based on the overall goals and objectives developed within the bilateral relationship. Many advanced countries' funding agencies, especially those disbursing ODA, very often do not collect disease-specific data.

Funding flows within developing 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 difficult, a mapping of institutions and funding structures must be done first.

Private investments by pharmaceuticals account for almost half of total investments into health research worldwide. 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 also not addressed and should be studied in future.

c) Usefulness of data sources for health R&D

The following summary (Insert 4.1) examined the utility of available data sources and the quality of the information obtainable.

- Estimates of total global R&D in advanced countries
  Results obtained mainly from science and technology databases and surveys and supplemented by data from published reports and from organizational databases were deemed acceptable. Collection of data on foundations, however, requires improvement.

- Estimates on health R&D in developing 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 give information on total funds for health R&D. Results obtained from the institutional resource flows case studies were useful. They provided information on both performers and funders. Information on countries not researched in this first phase (e.g., the People's Republic of China), will be carried out in the second phase.

- Estimates of resource flows using advanced country funders as sources of data
  Responses to a questionnaire sent out to a large number of 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 funding organization 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. An attempt to measure funding for research capacity strengthening was undertaken. This component should be further developed in the second phase.

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 developing countries' components of international projects with which they collaborate. This adds to the difficulties in determining resource flows to developing countries.

Insert 4.1

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

	Funder question-naires	Special survey	Funder surveys/ databases	Government S & T surveys	Evaluations/ Annual reports/ Websites	Interviews/ Personal Contacts
Advanced Countries						
Government ministries	x		xx		xx	xx
Public ODA/organizations	x		x		x	xxx
Other[1]			xxx			xx
Pharmaceutical companies			xx		xx	
Not-for-profit/foundations	x	x	xxx		x	xxx
EC	x				x	xxx
WHO		xx			xxx	xx
World Bank					x	xxx
Developing Countries						
Government ministries						xx
State government		x			x	xx
Academic/ research institutions		x			x	xxx
Hospitals						
Multilateral/bilateral	x				xx	
NGOs		x			x	xx
Pharmaceutical		x			xx	xx

[1] *Other: 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

- 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 considered of high priority 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 undertake research is difficult.
- The importance and relevance of data on resource flows for investor organizations is unclear when compared to other priorities.
- Fluctuations in exchange rates and purchasing power parities complicate the interpretation of data, especially long-term funding trends.
- Obtaining data from funders in advanced countries on funds actually used for research in developing 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 developing countries.
- Information from developing countries was not readily available. A framework for the analysis of resource flows into health research in developing countries was tested as a part of this study.

4.3 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 and private funding by advanced countries for northern institutions conducting R&D on problems important to developing countries.
- Pharmaceutical industry funding in developing 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 contributions.
- Relation between health priorities identified in developing 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.

4.4 Donor transition in the late 1990s

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, developing countries. Given that most of the data for this report was gathered for the period up to and including 1998, the expanded role of advanced country foundations, pharmaceutical companies and research institutions since that time has not been fully documented.

There is clear information on shifts of funding sources in the late 1990s and early 2000. The private-sector foundations, particularly the Bill and Melinda Gates Foundation, and philanthropic institutions have taken a larger role in

funding research. Examples include the anonymous donation of US$100 million to create the “Johns Hopkins University Malaria Institute”. Over the next 10 years, the Institute will bring together specialists from the fields of immunology and vaccine development, statistical analysis of genetic data and population studies, the biology of malaria parasites and their mosquito hosts and molecular parasitology to do innovative research (*Washington Post*, 7 May 2001). The Bill and Melinda Gates Foundation has increased its investments in the health research field to US$189 million in 2001. Investments by US pharmaceutical companies are increasing in the US. 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 there has been greater involvement of foundations, 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 developing 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.

Chapter 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 do so. In the real world, there is a constellation of institutions working towards similar goals, which may or may not communicate with each other. It is in this "network of variety" that a platform for discussion and information sharing can be useful. The purpose of this study is to relay the fact that there is a great deal of work going into tracking funding for health research and that a network is active to link these efforts which countries and institutions are welcome to join.

Next steps might include the following:

- Demand or market analysis: analysis of what resource flow information is most important, how and by whom it would be used.
- Critical analysis of the cost of undertaking research, as well as of the benefits derived from it.

Based on the above, the following actions should be considered for the next phase:

1. Measure resource flows in *additional developing/transition countries*, using the methodology developed in this study. This should be implemented at the following levels:
   (a) 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.
   (b) 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.
2. 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.
3. 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.
4. 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., IUATLD, Wellcome Trust, WHO/TDR, NIDI and WHO. Assist in the identification of funding for such studies.

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Annex 1
Resource Flows Advisory Group

The members of the Advisory Group acted in an individual capacity and were active for varying amounts of time. The names of their institutions are mentioned for identification purposes only; the positions given are those members held at the beginning of the project and do not necessarily reflect their current position.

Chair

Louis J. Currat, Executive Secretary, Global Forum for Health Research

Convenor

Andrés 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), Delhi.

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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

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Tikki Pang, Director, Research Policy and Cooperation, World Health Organization (WHO), Geneva

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Annex 2

Categories of classification of resource flows for health research

A.1 Non-oriented, fundamental research

No further disaggregation

A.2 Health conditions, diseases or injuries[1]

A.2.1 Group I (communicable, maternal, perinatal and nutritional conditions)
A.2.2 Group II (non-communicable 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

[1] Follows the Global Burden of Disease classification (Murray and Lopez 1996a).