

**RESOURCE FLOWS FOR
HEALTH RESEARCH AND DEVELOPMENT
IN
MALAYSIA**

1997-1998

Final Report

**Submitted to the
Council on Health Research for Development**

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Ten Sew Keoh, M Sc
Ho Tze Ming, PhD
Asmaliza S Ismail, M Sc
Narimah Awin, MBBS, MPH, MD
Lye Munn Sann, MBBS, MPH, PhD

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ACRONYMS

COHRED	Council on Health Research for Development
CEPR	Center for Economic Policy Research
CIDA	Canadian International Development Agency
DAGS	Demonstrator Applications Grant Scheme
ENHR	Essential National Health Research
FOR	Field of Research
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
IAEA	International Atomic Energy Agency
IGS	Industry Research and Development Grant Scheme
ILSI	International Life Sciences Institute
IMR	Institute for Medical Research
IRPA	Intensification of Research in Priority Areas
5MP	5 th Malaysia Plan
6MP	6 th Malaysia Plan
7MP	7 th Malaysia Plan
8MP	8 th Malaysia Plan
MASTIC	Malaysian Science & Technology Information Center
MGS	Multimedia Super Corridor Research and Development Grant Scheme
MOE	Ministry of Education
MOH	Ministry of Health
MOPI	Malaysian Organisation of Pharmaceutical Industries
MOSTE	Ministry of Science, Technology and the Environment
NCSRD	National Council for Scientific Research and Development
NGO	Non-government Organizations
NHA	National Health Accounts
NMDS	National Science and Technology Minimum Data Sets
OECD	Organisation for Economic Co-operation and Development
PHAMA	Pharmaceutical Association of Malaysia
R&D	Research and Development
RDE	R & D Expenditure
RM	Ringgit Malaysia
S&T	Science and Technology
S&T Division	Science and Technology Division
SCMR	Standing Committee for Medical Research
SEAMEO TROPMED	South East Asian Ministers of Education Organization Tropical Medicine
SEO	Socio-economic Objective
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

This study is a first attempt to track health research and development (R&D) funds in Malaysia. It is part of a three-country study on resource flows funded by the Council on Health Research for Development (COHRED) with the participation of research teams from the Philippines and Thailand. This study adopts the approach and methodology of the pioneering study on funds flow for health research in the Philippines (CEPR, 1998) with some minor refinements.

OBJECTIVES

The overall objective of the study is to develop a basic methodology for tracing and measuring health R&D funds in a country as a tool to streamline and fine tune the allocation of health R&D funds.

The specific objectives are to:

- ♦ Identify the sources, users and uses of health R&D funds;
- ♦ Estimate the amount and nature of health R&D expenditures;
- ♦ Assess if health R&D expenditures are aligned with the priorities of the research agenda; and
- ♦ Establish trends in health R&D expenditures.

DEFINITION AND FRAMEWORK

The definition of R&D in the study was based on the definition of the United Nations Educational, Scientific and Cultural Organization (UNESCO). Health R&D is defined as “any systematic and creative work undertaken in order to increase the stock of knowledge of health, and the use of such knowledge to devise new applications”.

R&D activities were classified into three types: basic or fundamental research, applied research, and experimental development.

In terms of field of activity, health R&D was classified as natural sciences, epidemiology, clinical research, biomedical research, and social sciences.

The study of resource flows followed a sources-users framework. Fund sources were categorized as government budget, private sector funds, and foreign funds (including funding from bilateral and multilateral funding agencies). Fund users comprised the government and private sector.

METHODOLOGY

The survey uses a structured questionnaire that solicited primary data from sources and users of health R&D funds, identified in the sources-users framework. The survey seeks financial data about the source, allocation, use and outsourcing of health R&D funds at government institutions and private sectors. The survey also requests information about the R&D expenditure in terms of type and field of R&D activity. Finally, and perhaps most importantly, the survey requests matching of the R&D expenditures against the national health research priority areas for the Seventh Malaysia Plan (1996-2000). To assure credible time-series data, the respondents were requested to fill up the questionnaires for 1997 and 1998 concurrently.

Almost all survey respondents provided quantitative data about sources of R&D allocations. However, information on R&D expenditures were at times incomplete. In such cases, allocations were taken as expenditures in the analysis.

HEALTH R&D PRIORITY-SETTING PROCESS AND DATA SETS

The study also examined the priority-setting process for health research in Malaysia. The National Council for Scientific Research and Development (NCSRD) and the Standing Committee for Medical Research (SCMR) of the Ministry of Health (MOH) were identified as the leading bodies that formulate health research agendas for the country. Priority setting was conducted through consultative processes with direct or indirect inputs from public research institutions, academic institutions and private organizations.

Three data sets were identified to contain some relevant information related to health R&D. These data sets are not specific for health R&D only, but represent subsets of larger data sets for all categories of R&D activities. The 3 data sets, under the management of the Malaysian Science and Technology Information Centre (MASTIC), Ministry of Science, Technology and Environment Malaysia are : the National Surveys of R&D efforts, the National S&T Minimum Dataset, and the Intensification of Research in Priority Areas.

FINDINGS

The government sector respondent base consisted of 131 institutions/departments/hospitals from the Ministry of Health, 7 academic institutions from the Ministry of Education and 7 government research institutions. The private sector respondent base consisted of 52 pharmaceutical firms, 2 private academic institutions, 2 private hospitals and 3 non-governmental organisations.

- The survey registered a response rate of 70%. Of the 143 institutions that responded, 41% confirmed carrying out R&D activities in 1997 and/or 1998.
- The total health R&D expenditures of the respondents amounted to US\$8.5 million in 1997 and US \$6.4 million in 1998. The ratio of health R&D expenditure to GDP was 0.01 percent for 1997 and 1998. Taken as percentage of total government budget, health R&D expenditure constituted 0.05 percent in 1997 and 0.04 percent in 1998. In terms of percentage of the health budget, it constituted 0.87 percent in 1997 and 0.6 percent in 1998.

- The public sector was the dominant source of funding and main performer of R&D. The Ministry of Science, Technology and the Environment was the largest fund source through its disbursement of the Intensification of Research in Priority Areas (IRPA) funds. The main users of research funds were the academic institutions followed by institutions/departments/hospitals in the Ministry of Health.
- The public sector being the dominant source of funding contributed 80 percent and 72 percent of total health R&D funding for 1997 and 1998 respectively, followed by the private sector (18 percent in 1997 and 25 percent in 1998) and the foreign agencies (2 percent in 1997 and 3 percent in 1998).
- In terms of users of fund, the government institutions were the biggest spenders accounting for 88 percent and 85 percent of the health R&D expenditures in 1997 and 1998 respectively followed by the private institutions which accounted for 12 percent and 15 percent of the spending for 1997 and 1998 respectively.
- Applied research and research in the medical sciences received the highest funding levels, registering at 68 percent and 95 percent respectively in 1997. In 1998, the figures were 63 percent for applied research and 94 percent for research in the medical sciences.
- By more specific fields of activity, funds were mostly allocated for biomedical research (47 percent in 1997 and 37 percent in 1998) followed by research classified under the broad field of Others which include public health, health systems, health services, occupational and environmental health research (37 percent in 1997 and 45 percent in 1998). The remaining spending were distributed in other fields such as epidemiology, clinical research and natural sciences.
- The survey results showed a good alignment of the country's health R&D expenditures with the national health research priorities with more than 90 percent of funds allocated to the eight national research priority areas for the medical sector in the 7MP for both years. The government health R&D expenditures largely adhered to the national health research priorities of the 7MP while the research carried out by the private sector companies were more reflective of their own agendas.
- Government funding for R&D was generally channeled towards government institutions, with government academic institutions receiving the largest share. A similar funds flow pattern was observed in the private sector: private sector fund largely contributed by the pharmaceutical firms were mostly used by the firms themselves, particularly the local pharmaceutical firms, to finance their own R&D such as product and formulation development. Government and academic hospitals also received some funding from the private sector to conduct clinical trials.

LESSONS LEARNED

This study has uncovered some important lessons which may be useful in developing strategies for future studies and policy implementation.

Measurement of Health R&D Flows

- High level support and involvement by officials at the ministerial level as well as personal networkings of the research team have contributed considerably towards building the respondent base and in garnering a favourable response to the survey questionnaires.
- Double counting was minimized by project-based accounting of health R&D allocations and expenditures. Respondents were encouraged to fill up the questionnaires on individual project basis. Through this manner, funds allocation, utilization and outsourcing to other institutions were captured for each project. This approach enables cross-checking of responses from all institutions and, in the process, detect inconsistencies, thereby allowing for a fairly accurate trace of the flow of funds. The availability of project titles enabled the validation of respondents' classification of their research according to type and field of R&D activity as well as matching with priority areas.
- The request for time series data on only the most recent years of R&D expenditures enabled the trend analysis on a common set of respondents. It also minimized problem faced by respondents in digging up past multi-year data needed to fill up the questionnaire.
- The survey instrument can be further refined to provide more clarity on definitions and categories. Health research can be classified into more specific fields of activity to better reflect the different fields of activity relevant to health research such as to include health systems research and public health research.
- As the survey essentially measures direct project costs, all other indirect costs incurred such as emoluments for permanent research personnel, capacity building and training were not accounted for. To facilitate comparisons of data across countries and surveys, the issues of indirect costs incurred need to be addressed and standardized in future surveys.

Coordinating Mechanisms for Matching Funds with Priorities

One of the significant findings from this survey is the matching of funding allocation pattern with national health research priorities. Overall there is good alignment of research allocation with the priority areas. Several factors could have contributed to this. Foremost is the involvement of major stakeholders in the priority setting exercise for health research in the country and the communication of the priority listings to the people who influence research funding as well as the research communities themselves. These measures ensure that projects that address the health research priority areas are proposed and thus enhance their chances of receiving funding. Another contributing factor is the existence of institutional screening for research project applications that ensures projects relevant to national research priorities are approved.

Strategies for Sustained Monitoring of Health Research Resource Flows

The importance of a sustained monitoring of resource flows on a regular basis has often been stressed and this call has again been echoed in the recently concluded International Conference on Health Research for Development held at Bangkok in October 2000. Ideally, the Ministry of Health in collaboration with the Ministry of Science, Technology and the Environment should spearhead a committee to undertake a periodic survey of resource flows. Another possibility would be to add on the health research resource flow questions on to an existing survey or a potential survey such as the National Health Accounts survey.

I. INTRODUCTION

In the early 1990s, the Commission on Health Research for Development published a report recommending that all countries should vigorously undertake essential national health research (ENHR) to accelerate appropriate health action in diverse national and community settings, and to ensure that resources available for the health sector, achieve maximum results. The recommendation was particularly directed to developing countries where ENHR could, among other things, enhance the impact of limited resources.

Within the decade the World Health Organization (WHO) published the report, *Investing in Health (1996)* which noted related findings: the need for a mechanism for exchanging ideas about progress and priorities in health research and development (R&D), and for tracking flows of funding and identifying important gaps. The following years, a paper presented at the First Global Forum for Health Research pointed out the need to collect, analyze, and disseminate information on health resource flows to better address health problems of low and middle income countries.

This study is a first attempt at responding to the concerns raised so far about the tracking of health R&D funds. It is a COHRED-funded study involving three middle income countries: Malaysia, the Philippines and Thailand. The country studies were undertaken simultaneously by country-based research team. To ensure comparability of results, a common framework was used for the three countries.

Presently, information on resource flows in health research in Malaysia is not available. Thus, it is timely that tracking of the country's health research spending is initiated to enable the assessment of the matching between health research fundings and the country's health research priorities areas and to monitor changes in the allocation over time. Such information is useful in aiding decision makers in the better allocation of funds to support research in areas which are of high national health priority, to identify neglected areas of research which have limited funding and the unnecessary duplication of research efforts.

Secondly, tracking the country's health research spending will determine the attainment of the Commission-recommended ENHR financing goal of two percent of national health expenditures to research.

II. OBJECTIVES AND REPORT FORMAT

The general objective of the study is to develop a basic methodology for tracing and measuring health research and development (R&D) funds in a country as a tool to streamline and fine-tune the allocation of health R&D funds.

The specific objectives are to:

- ◆ Identify the sources, users and uses of health R&D funds;

- ◆ Estimate the amount of and nature of health R&D expenditures;
- ◆ Assess if health R&D expenditures are aligned with the priorities of the research agenda; and
- ◆ Establish trends in health R&D expenditures.

As a prerequisite to the above objectives, the following activities were conducted:

- ◆ Documentation of health research priority setting;
- ◆ Identification of existing data sets on health R&D;
- ◆ Development of a plan for sustained monitoring of health R&D;
- ◆ Drafting of a survey questionnaire to track funds flow of health research resources; and
- ◆ Formulation of survey approach and methodology

This report consists of the following sections.

The first section describes the study approach and methodology.

The next section discusses the context of health R&D in Malaysia, the existing institutional framework for health R&D priority-setting process and an overview of existing data sets on health R&D prior to this study.

The third section presents the findings of the study.

The last section describes the lessons learned, recommendations and implications for future research.

III. APPROACH AND METHODOLOGY

This study adopts the approach and methodology of the pioneering study on funds flow for health research in the Philippines (CEPR, 1998) with some minor refinements.

A. CONCEPTUAL FRAMEWORK

Definition of Health R&D

A modified version of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) definition of R&D is used as the starting point.

Health R&D is defined as any systematic and creative work undertaken in order to increase the stock of knowledge of health, and the use of such knowledge to devise new applications. Thus, the definition covers the following:

- All R&D work falling within the domain of the medical and natural sciences.

The medical sciences include the following fields of study: anatomy, dentistry, medicine, nursing, obstetrics, optometry, osteopathy, pharmacy, physiotherapy, public health, and other allied subjects. Public health is

further defined to cover the following areas of concern: malaria control, schistosomiasis control, tuberculosis control, communicable disease control, non-communicable disease control, environmental and occupational health, nutrition, maternal and child health, family planning, dental health, AIDS prevention and control, and other allied programs.

The natural sciences cover the fields of bacteriology and biochemistry.

- Studies on health financing and economics.
- Sociological studies such as knowledge, attitudes, and practices (KAP) of people towards health programs and interventions. Although purists may not consider such sociological studies as health research, the study team chose to err towards comprehensiveness, especially because the study is the first of its kind.

Classification of Health R&D

Type of R&D

A distinction is also made between the three types of health R&D activities: *Basic or Fundamental Research*; *Applied Research*; and *Experimental Development*. Basic or Fundamental Research is defined as any experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular or specific application in view. On the other hand, any original investigation undertaken in order to acquire new knowledge, but directed primarily towards a specific practical aim or objective, is classified as Applied Research. Lastly, any systematic work that draws on existing knowledge gained from research and/or practical experience and is directed to producing new materials, products and devices; installing new processes, systems and services; and substantially improving those already produced or installed is categorized as Experimental Development.

Field of Activity

In the 1998 study, the classification of health R&D by field of activity was limited to three fields, namely: *Natural Sciences*, *Medical Sciences*, and *Social Sciences* (including health Economics and Social Sciences).

To further gain insight on the uses of health R&D funds, Medical Sciences as a category has been subdivided into *Epidemiological Research*, *Clinical Research*, and *Biomedical research*. A category for any combination of the five fields as well an open-ended category was also added.

The current classification by field of activity thus includes the following study areas defined as follows:

1. **Natural Sciences** – concerns the treatment of Natural Phenomenon like Biology, Botany, Chemistry, Physics, etc. as applied to health
2. **Epidemiology** – study of the distribution and determinants of health-related states and events in specified populations and applications of this study to the control of health problems
3. **Clinical Research** – studies, trials, and /or experiments regarding illnesses and diseases conducted for the benefit and with the use of specific patients

4. **Biomedical research** – studies in living organism with a medical purpose which include diagnosis, therapy, and rehabilitation like Chemistry, Pharmacology, Biochemistry, etc.
5. **Social Sciences** – studies that are concerned with behavioral patterns or changes in a population as subject to certain conditions, situations or phenomena
6. **Combination** – studies that may involve more than one of the fields of activity mentioned above
7. **Others** – studies not falling on any of the above categories

B. ANALYTICAL FRAMEWORK

Accounting Framework

The study approach utilized an accounting framework to track the flow of funds for health R&D from fund sources to fund users, the latter referring mainly to funding recipients tasked to undertake the R&D activity. Table 1 presents the categories used to capture fund sources and fund users in the framework.

The above categories of institutions are viewed as the main players and stakeholders in the health research platform of Malaysia. It is noted here that the foreign funding agencies were not surveyed in the current study but were identified as fund sources from the respondent institutions which included the government and private sector.

The framework is presented, with the caveat that it does have severe limitations. These include the danger of double-counting, the inability to capture research activities carried out in other countries which may affect the Malaysian health research agenda, and the time lag between budgeted and actual R&D expenditures. These limitations and problems exist in the measurement of research activity, whether approached from the input/sources or the output/users end.

Alignment of Health R&D Expenditures with Health Priorities

The current study also looked at the matching of fund allocation pattern with the national priorities in health research for the years 1996 to 2000 which have been identified through a consultative process involving the government research institutions, institutions of higher learning and the private organisations.

Techniques for data generation and statistical analysis

Primary data for the current study is generated with the use of a structured questionnaire that requested information pertaining to flow of resources for health R&D for calendar year 1997 to 1998 from institutions identified in the framework as fund sources and users. These questionnaires were mailed out and responses were subsequently supplemented with personal interviews.

Table 1 : Framework and Categories for Flow of Funds

SOURCES	USERS
Government Budget	Government Sector Ministry of Health Research Institutions Hospitals Federal and State Departments Ministry of Education Academic Institutions Research Institutions under Ministry of Science, Technology & the Environment Ministry of Primary Industry Ministry of Agriculture
Private Sector Pharmaceutical Firms Corporate R&D Funds Foundations Financial Institution (1) Others	Private Sector Pharmaceutical Firms Academic Institutions Hospitals
Bilateral/Multilateral Funding Agencies UN System COHRED UNFPA UNICEF WHO Multilateral / Bilateral Agencies IAEA ILSI SEAMEO TROPED CIDA	

Source: COHRED-MOH Survey, 2000

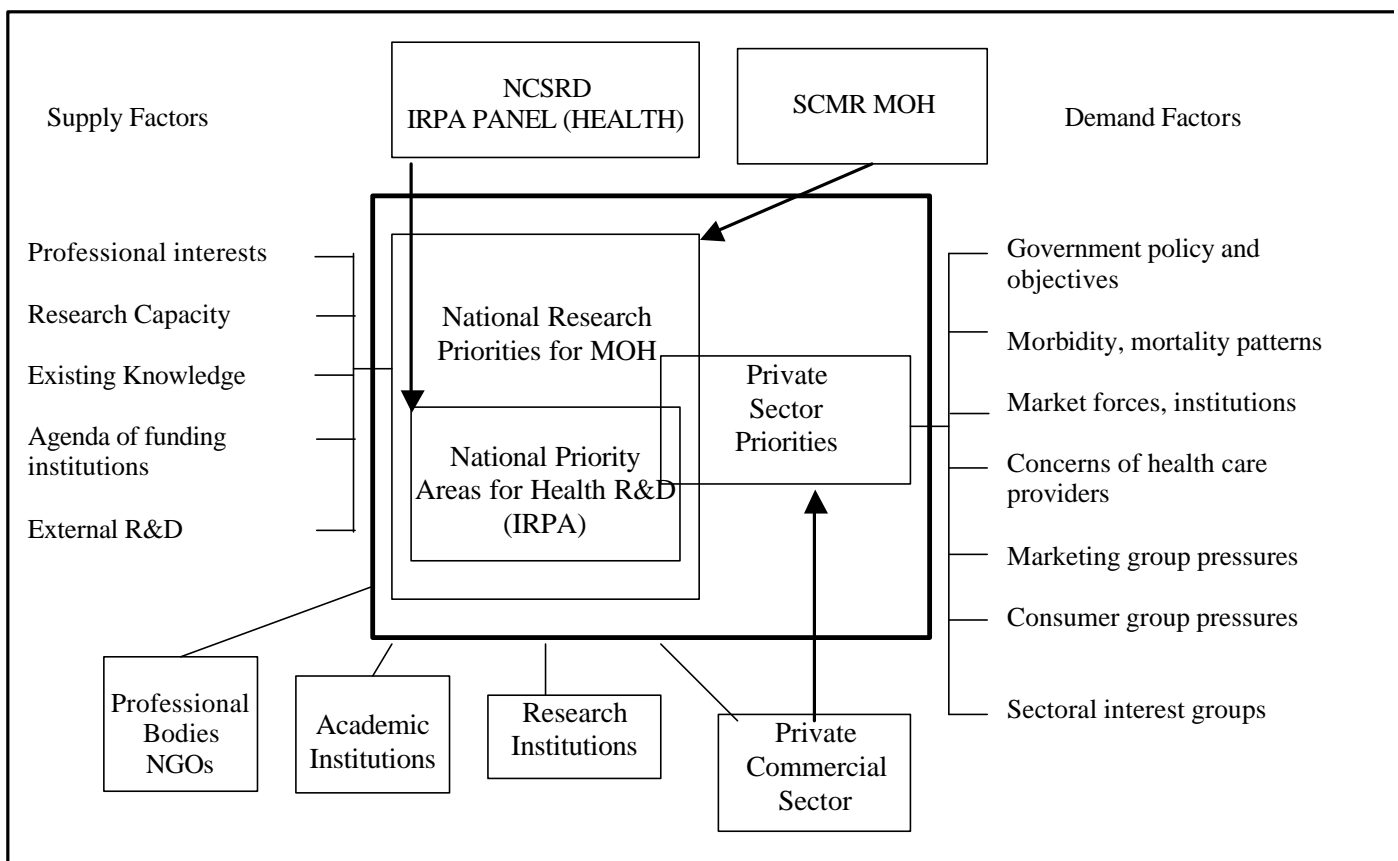
The field survey was also complemented by desk research. Annual budgets and published reports of government and other institutions were closely analyzed to extract pertinent data. Databases on research projects, principal investigators, sources and amount of financial allocations were also obtained from the funding agencies as well as the users whenever available.

IV. HEALTH R&D PRIORITY-SETTING PROCESS AND DATA SETS

A. INSTITUTIONAL FRAMEWORK FOR HEALTH RESEARCH PRIORITY SETTING

In the public health sector, research priorities are defined by two government bodies: National Council for Scientific Research and Development (NCSRD) and the Standing Committee for Medical Research (SCMR) of the Ministry of Health (MOH). Both bodies formulate their respective research agendas through similar consultative processes with direct or indirect inputs from public research institutions, academic institutions and private organizations. A substantial amount of research is also funded by the private sector, which generally follows the priorities set by their respective institutions. Taken together, the private and government sector priorities for research constitute the country's research agenda for any given time period. The following figure illustrates the institutional framework for the health R & D agenda-setting process in Malaysia:

Figure 1 : Institutional Framework for the Malaysian Health R & D Agenda



National Council for Scientific Research and Development (NCSRD)

The **NCSRD** was set up by the Malaysian Government in 1975 as an advisory council specifically to oversee public sector research so that the research resources are directed at enhancing the national development objectives. The Council is chaired by the Chief Secretary to the Government and its members comprise eminent science and technology (S&T) experts from industry, academia, public research institutes, universities, and key Government agencies. The Council advises the Government and in specific, the Minister of Science, Technology and the Environment on all matters relating to S&T, among which include the formulation of S&T policies, identification of S&T priorities and the coordination, implementation and evaluation of S&T programmes. The Council is assisted by two committees: the Standing Committee on Science and Technology Development and Management, and the Coordinating Committee on Intensification of Research in Priority Areas (IRPA) for its effective functioning. These 2 committees are further assisted by 8 Working Groups and 11 IRPA Panels, one of which is the IRPA Panel for the Health Sector.

The importance of R&D in the attainment of national health, social and economic goals is well recognized by the Government. This is reflected in the integration of Science and Technology planning into the overall 5 year development plans and the creation of a central public fund in the 5th Malaysia Plan 5(MP) (1986-1990), specifically for Research and Development, namely the Intensification of Research in Priority Areas “IRPA” program.

The introduction of the IRPA funding mechanism marked an important milestone because it provides a substantial funding source for the research community and decision makers to translate their research questions and needs into research projects and programs. In the 5MP, RM 500 million was allocated for R&D, this amount was increased to RM 600 million in the 6MP and to RM 1 billion in the 7MP. The public health sector successfully bided for at least 10% of the total allocation.. In tandem with the increasing government budget allocations for R&D, efforts and strategies have also been put in place for strengthening institutional capability, establishing strong industry-public sector linkages and developing a highly skilled and technologically competent society. A new initiative by the Malaysian government to develop capability in targeted technologies was the generation of a RM 300 million S&T Human Resource Development Fund in 1997. Other financial supports were initiated in 1998 to encourage the industry to undertake R&D in designated technology areas that will enhance Malaysia’s technological entrepreneurship and economic competitiveness. These include : the Industry Research and Development Grant Scheme (IGS), Multimedia Super Corridor Research and Development Grant Scheme (MGS); and the Demonstrator Applications Grant Scheme (DAGS). From 1998, the IRPA Fund is made accessible to the private universities as a means to stimulate competitive research focus amongst the existing public research institutions and universities and also to encourage greater involvement of the private sector in R&D.

Prior to 1987, health research priorities were set at the institutional level. This was based mainly on perceived needs, interest and strengths of the various institutions. The introduction of the IRPA program in 1987 spearheaded national exercises to determine priorities in research to support the funding approval process. Efforts to

establish priorities in health research in Malaysia have since been made through the framework of the NCSR's policy and mechanism for national priority setting, specifically under the auspices of its Health IRPA Panel, which is chaired by the Director-General of Health Malaysia. The members of the IRPA Health Panel comprise of the Deputy Director-General of Health Malaysia (Research & Technical Support), deans/professors and eminent scientists from the medical faculties of the local universities and the private sector.

As an interim measure for the 1988 IRPA funding exercise, a listing of 'Indicative Areas for R&D Support' was developed for funding projects under the then 4 sectors of agriculture, medical, industrial and strategic research (**Malaysia: Annex 1**). This list was further modified for use in the exercise for the 1989 IRPA funding (**Malaysia: Annex 2**).

These lists, although serving a useful purpose in guiding the initial funding processes were too broad and unfocussed to be effective. A more comprehensive guideline for priority setting in Health Research was clearly needed and this task was given to the Medical Sciences Committee, or its successor, the IRPA Panel for Health Sector.

An Ad hoc Subcommittee of the IRPA Panel (Medical Sector) was then appointed to develop a matrix for improved prioritizing of research. Techniques used by the subcommittee included review of pertinent literature and other relevant documents, brainstorming, and discussion with clinicians. Finally, the subcommittee divided the priority listing into 6 major areas needing research and identified the diseases or conditions which would fall into each of these areas (**Malaysia: Annex 3a**). Each of these areas was then taken and their component diseases/conditions were evaluated in turn to decide on their priority ranking (high, medium or low) based on various health indicators identified by the review of the 5th Malaysia Plan and on the following parameters (**Malaysia: Annex 3b**):

- a) Its socio-economic implications - the extent of the problem
- b) Lack of information in the subject
- c) Operational weaknesses
- d) Cost and time needed for research

This process was taken a step further by identifying actual research questions that need to be answered for each of the diseases/conditions (**Malaysia: Annex 3c**). The list of priorities developed by the subcommittee was then presented to the IRPA Panel (Medical Sector), and deans of the Medical Faculty of the 3 major universities in Malaysia who were invited to give their comments and suggestions. After modifications to include relevant suggestions, a document titled, "Priority Areas for Medical/Health Research" was circulated for use commencing with the 1991 IRPA funding exercise.

A third revision of the priorities listing was carried out in 1995 in preparation for the Seventh Malaysia Plan (1996-2000). The revised document was the product of a "National Conference on the Setting of Research Priorities for the Medical Sector for the 7th Malaysia Plan". Inputs for this conference were invited from as wide a representation as possible of organisations which had an interest and/or working in health research in Malaysia. The following organisations were invited to submit suggestions on what should be included in the priorities document: Departments of

the Ministry of Health; medical faculties of 3 major universities, other institutes with health research interests; and relevant non-governmental organisations. Prior to the conference proper, a number of satellite meetings were held for specific topics deemed to be of national importance; these being: clinical research, traditional medicines, malaria and dengue. The outcomes of 2 scientific meetings, “The National Health Systems Research Conference” and the “First National Conference on Environmental Health Research”, also contributed towards the priority conference. At the national priorities conference, after much deliberation by three working groups, a consensus was reached on what should constitute the health research priorities for the 7th Malaysia Plan (**Malaysia: Annex 4a - b**). This list of priorities is not meant to be static and will evolve with changing national needs and aspirations.

The national priority setting exercise is conducted for each of the 5-year development plans. Thus, through a similar consultative and inclusive process, the National Conference on Setting Health Research Priorities for the 8th Malaysia Plan (8MP) has been successfully convened in October 1999 and the listing of the national health research agenda under the IRPA program is in the process of being finalized.

Standing Committee for Medical Research, Ministry of Health (SCMR)

The Standing Committee for Medical Research (SCMR) chaired by the Director-General of Health Malaysia is charged with the responsibility of managing the research activity and programs of the Ministry of Health. The members of the SCMR comprise the Deputy Secretary-General of Health (Finance), the three Deputy Director-Generals of Health, and senior Program Directors of the MOH. It is given the mandate to plan, organize and monitor the development of research facilities and research expertise, assist in obtaining research funds, and ensure the proper dissemination and utilization of research findings. The Standing Committee also provides liaison between the Ministry of Health and other national as well as international agencies in matters pertaining to health research.

The SCMR recognizes and take in cognizance the importance of health research activities and its findings in contributing towards the national public health plans and programs. The setting of health research priorities in the MOH is carried through two broad approaches. The first approach takes its cue from the nature and size of national health problems and the preventive and curative measures that are needed to control and/or eradicate these problems. Such problems included diseases that were significant contributors to mortality and morbidity as well as those diseases where the incidence showed a rising trend. The second approach was to formulate a scenario and determine the likely outcomes in terms of new challenges. Priorities were set through consensus involving consultations and workshops with researchers, policy makers, program managers, health service providers, and users. A platform for identification of current research needs is also instituted through the annual research dialogue sessions held between researchers and the Ministry of Health’s policy makers, planners and managers. The dialogue sessions provide a forum where researchers are told of the latter’s research needs and expectations. Research needs are also identified through monitoring of the health data obtained from the National Health and Morbidity Survey conducted every ten years and from the Health Management Information System.

In preparation for the 8th Malaysia Plan, the MOH organised a scientific meeting and workshop in August 1999 to identify the Health Ministry's priority areas for research for the 8MP, identify research needs for the year 2000 and to provide a forum for sharing of research information and results. Inputs for the workshop included information obtained from questionnaires on national health research priorities for the 8MP which had been distributed to all MOH heads of programmes, institutions and state departments, and from the lists of research areas identified by specific expert groups prior to the meeting. Outcomes derived from the scientific meeting were the proposed national research priorities for the MOH in the 8th Malaysia Plan and for the year 2000. The former served as a major input document for the national priority setting exercise in October 1999.

Other Institutions

National health research is not the exclusive domain of NCSR and SCMR. The academic institutions, specifically the Medical Faculties of the country's universities under the Ministry of Education work closely with the MOH on health research-related concerns. The academic institutions play a prominent contributory role in the consultative process of the national priority setting exercise undertaken by the MOH and IRPA Health Panel.

B. EXISTING DATA SETS ON HEALTH R&D

One of the initial tasks undertaken prior to the conduct of the survey proper was to review existing data sets on Malaysian health R&D expenditure. Three data sets have been identified to contain information related to health R&D. All these datasets are not specific for health R&D, but represents a subset of a larger dataset for all categories of R&D activities. These data have been collected, analysed and are managed by the Malaysian Science and Technology Information Centre (MASTIC) located within the Ministry of Science, Technology and Environment. MASTIC, commissioned in late 1992, is the country's primary authoritative provider of S&T Information. The 3 data sets include the national surveys of R&D efforts, the National S&T Minimum Dataset, and the Intensification of Research in Priority Areas (Table 2). The latter two data sets are now made available via on-line access from MASTIC (homepage: <http://mastic.gov.my>).

National Surveys of R&D Activities

The main source of information on health R&D currently available is contained within the national R&D data set of the MASTIC. These data are obtained through national surveys that are conducted biennially. So far, MASTIC has conducted 4 surveys, namely for the years 1992, 1994, 1996 and 1998. The definitions and methods used are based on the internationally agreed guidelines as put forward by the Organisation for Economic Co-operation and Development (OECD) member countries.

The surveys highlight various aspects of R&D efforts in Malaysia carried out by four sectors: private sector, government agencies and research institutions, institutes of higher learning and non-profit organisations. However, in the 1996 Survey, the non-

profit organisations were left out due to their poor response. Four sets of questionnaires were developed for the surveys, one for each sector.

In general, the information captured and presented in the national R&D survey reports encompasses the following:

- Overview of national research and development
 - Profile of National R&D activities
 - R&D spending by Sector
 - R&D spending by Type of Cost (Labour, Capital, Operating)
 - R&D spending by Type of Research (Basic, Applied, Experimental)
 - Manpower for R&D expressed in terms of figures and Full Time Equivalent (FTE)
 - The Factors Limiting R&D Activities (internal and external factors)
 - International Comparisons according to the GERD/GDP ratios, Manpower for R&D, and Type of Research by Sectors
 - Research and Development activities for each sector : Government Agencies and Research Institutions, Institutes of Higher Learning and Private Sector
 - R&D expenditures
 - Manpower for R&D
 - R&D expenditures by Field of Research
 - R&D expenditures by Socio-economic Objectives
 - R&D labour cost
 - R&D outsourcing
 - Factors limiting R&D activities

Published reports of the national R&D surveys can also be assessed on-line from MASTIC homepage.

Definitions

R&D is defined as “Creative work undertaken on beyond a systematic basis in order to increase the stock of knowledge, and the use of this stock of knowledge to devise new applications”.

R&D Expenditure (RDE) includes capital expenditure (Acquisition of fixed tangible assets involved in R&D activities), manpower costs, and other related operating expenditures.

R&D manpower includes all personnel, comprising of researchers, technicians and staffs supporting R&D work, irrespective of their qualifications.

Full Time Equivalent (FTE) is an approximate measure of the proportion of time a researcher, technician or other support staff spent on R&D work during the surveyed year.

Research is classified in terms of fields of research (FOR) and the socio-economic objective (SEO) according to the revised “Malaysian R&D Classification System (Second Edition) August 1995”.

National Science and Technology Minimum DataSet (NMDS)

The NMDS captures information relating to S&T human resources, S&T projects and S&T facilities. Data are obtained through mailed questionnaires. The third survey exercise is currently ongoing. The details of the information contained are as follow:

S&T human resources :	identity, qualification and skills, contact details, S&T outputs
S&T projects :	identification and type of project, scientific area of discipline, project socio-economic objective and outputs produced
S&T facilities:	development of facilities, its unique equipment and location and conditions of access

The survey does not obtain data on R&D expenditures, nevertheless the profile of the S&T human resources and organisations in the country will be useful in assisting us in the choice of our sampling frame.

Intensification of Research in Priority Areas (IRPA)

The IRPA data set contains information on projects funded under the IRPA mechanism in the 6th Malaysia Plan (1991 - 1995) and the 7th Malaysia Plan (1996 - 2000). The data that can be extracted include project leader, organisation, title and abstracts of project, project status and allocation. Considering that a large proportion of research in the country is funded under the IRPA mechanism, the data set is informative in that we can utilise it to determine the types of health research conducted in the country particularly so by government agencies/research institutions and institutes of higher learning. In addition to this data set maintained by MASTIC, the Science & Technology Division in MOSTE which acts as the Secretariat for the IRPA funding mechanism has set up its own database on the allocation and expenditures of IRPA funded projects.

From these data sets, it appears that information on health R&D by the public sector has been captured to a fair extent and is accessible via online. This is however not so for health R&D activities by the private sectors and non-governmental sectors. The conduct of this intercountry collaborative study on resource flow attempts to fill this gap.

Table 2
Existing Data Sets on Health R&D

DATA SET	DATA CONTAINED	SOURCE OF DATA/ RESPONDENT BASE	METHODOLOGY/ INSTRUMENT USED	STATUS
National R&D activities Malaysian Science and Technology Information Centre (MASTIC), Ministry of Science, Technology & Environment	National Survey of R&D, 1992, 1994, 1996, 1998 Human resources for R&D Financial resources for R&D R&D expenditures by <ul style="list-style-type: none"> • Type of costs • sources of fund • types of activity • major field of research • major socio-economic objectives Location of R&D activities by Sector Factors limiting R&D activities Patents and Utility Innovation	<ul style="list-style-type: none"> • Government Sector • Private Sector • Institutes of Higher Learning 	<ul style="list-style-type: none"> • Survey with mailed questionnaires • special workshop was organised for the private sector for the 1994 survey • telephone and facsimile hot-line service Three sets of questionnaires were developed for each sector	It is a biennial survey exercise.
National S&T Minimum Dataset MASTIC	National surveys of S&T 1994, 1996, 1998 S&T human resources S&T projects S&T facilities	<ul style="list-style-type: none"> • Government Sector • Private Sector • Institutes of Higher Learning 	Mailed questionnaires Interviews Telephone	Ongoing, annually
Intensification of Research in Priority Area (IRPA) MASTIC Science & Technology Division	Database on IRPA grants - allocation, locations, project leaders, project titles, field of research, socio-economic objectives	All organisations which are recipients of the IRPA grants	IRPA application forms submitted by applicants	Ongoing

V. FINDINGS

Respondent Base

The survey questionnaires were sent to a total of 204 institutions comprising 145 institutions from the government sector and 59 from the private sector. Targeted institution respondents from the government sector consisted of research institutions, hospitals, federal and state departments under the Ministry of Health, academic institutions under the Ministry of Education, and government research institutions from 3 other ministries which carry out health-related activities. Private sector respondents consisted of 52 pharmaceutical firms, 2 academic institutions, 2 private hospitals and 3 foundations.

Identification of Respondents

Prior to the study, there was no comprehensive list of sources and users of health R&D funds in Malaysia. As an initial step, target respondents in this survey were identified and drawn up from two sources : the 1997 – 1998 list of IRPA grant recipients compiled by the Science and Technology Division of MOSTE and the respondent lists for the National R&D survey conducted by MASTIC. The respondent lists were mainly of users from the public sector, thus leaving out institutions especially those from the private sector that have no linkages with MOSTE.

Respondents from the pharmaceutical industry were drawn primarily from the memberships of the Pharmaceutical Association of Malaysia (PHAMA) and the Malaysian Pharmaceutical Industry Directory (MOPI). Additional listings were obtained from the National Pharmaceutical Control Bureau that provided names of institutions, researchers and pharmaceutical companies carrying out clinical trials in Malaysia. From the initial list of companies compiled through published directories, telephone surveys were conducted to ascertain their R&D status and to identify the contact person and postal addresses. Through this means, we were able to narrow down our respondent list for the private sector to those with R&D activities.

An additional source of information on potential respondents turned up in the responses given in the survey questionnaires themselves. This was especially true for institutions that subcontracted their research or funded research projects of other institutions.

Personal contacts also contributed to the identification of researchers and companies with health R&D and obtaining their cooperation in responding to the survey.

The survey questionnaires were then sent out according to the compiled list of institutions and companies. No questionnaires were however sent to the foreign funding agencies. Sources of foreign funding were tracked from inputs by the responding institutions. We also attempted to send out questionnaires to individual researchers who are known to have received IRPA funding from the MOSTE. The response rate was low and this approach was not pursued further. However, it was noted that some of the completed questionnaires returned to us by the individual

researchers provided useful information on other sources of research funding, and in particular, the outsourcing of research funds to other institutions involved in their collaborative research.

To complement efforts in obtaining data on health R&D resource flow from the research and academic institutions, the secretariats for R&D in these institutions were approached to obtain relevant information on their sources and amount of R&D allocations, expenditures, lists of grant recipients, project titles and duration of projects. The information supplied, although at times incomplete, enabled the cross-checking and verification of allocations and type of research undertaken by the users with corresponding data provided by the funding sources/agencies.

Accounting Framework

Each survey respondent was asked its role as a source and as a user of health R&D funds. With the data provided by respondents on who funded their R&D activities and on who they funded to carry out R&D activities, the study team was able to countercheck figures from both the source and user sides. This strategy was useful in checking overlapping of data. The inclusion of project/program titles in the survey questionnaire proved to be an important means of checking double counting and to track resource flows of collaborative projects undertaken by institutions from different ministries.

Respondents Engaged in Health R&D

The overall response rate was 70%. The response rate from the government sector was 63% while the private sector was 88%. Details on the number of respondents for each type of institution are tabulated in Table 3.

Of the 143 institutions that responded to the survey questionnaires, 41% confirmed having incurred health R&D expenses for 1997 and/or 1998.

Table 3
Respondent Base of Resource Flow Study, 1997 - 1998

TYPE OF INSTITUTION	NO. OF INSTITUTIONS	NO. OF RESPONSES	RESPONSE RATE	INSTITUTIONS WITH R&D	%	INSTITUTIONS WITHOUT R&D	%
Grand Total	204	143	70	59	41	84	59
GOVERNMENT SECTOR	145	91	63	45	49	46	51
Ministry of Health	131	80	61	36	45	44	55
Research Institutions	2	2	100	2		0	
Hospitals	95	57	60	20		37	
Federal Department	20	12	60	7		5	
State Department	14	9	64	7		2	
Academic Institutions	7	7	100	7	100	0	
Research Institutions	7	4	57	2	50	2	50
PRIVATE SECTOR	59	52	88	14	27	38	73
Pharmaceutical Firms	52	48	92	14	29	34	71
Academic Institutions	2	1	50			1	
Hospitals	2	1	50			1	
Non-government Organisations	3	2	67			2	

Table 4
Summary of Malaysian Resources for Health and Health R&D
In Thousand US dollars, 1997 – 1998

BUDGET ITEM	1997	1998
	US \$ ('000)	US \$ ('000)
Total Government Budget	15,898,684	16,496,842
Gross Domestic Product (GDP)	74,156,579	74,861,053
Resources for Health (MOH)	974,528	1,060,553
as a % of Total Budget	6.13	6.43
as a % of GDP	1.31	1.42
*Resources for Health Research and Development	8,456	6,385
as a % of Total Budget	0.05	0.04
as a % of GDP	0.01	0.01
as a % of Health Resources	0.87	0.60

* Health R&D Expenditures

Magnitudes

The health resources for the Ministry of Health Malaysia rose by 8.8% from US \$ 975 million in 1997 to US \$1,061 million in 1998 (Table 4). The MOH health resources represented 6% of the total government budget and 1% of GDP for both 1997 and 1998. For this population of respondents, the survey data indicated that the health R&D spending in Malaysia declined by 24% in the same period, from US \$ 8.5 million in 1997 to US \$ 6.4 million. The health R&D spending accounted for 0.9% of health resources in 1997 and 0.6% in 1998. Taken as a percentage of total budget and GDP, the health R&D spending had remained fairly constant at 0.05 % and 0.04% of total government budget for 1997 and 1998 respectively, and 0.01% of GDP for both years. The decline in the health R&D spending appears to be due, at least in part, to the economic slowdown during this period.

Figure 2. Government of Malaysia (GOM) Budget, Resources for Health, Resources for Health R&D, 1997 and 1998.
(In thousand US Dollar)

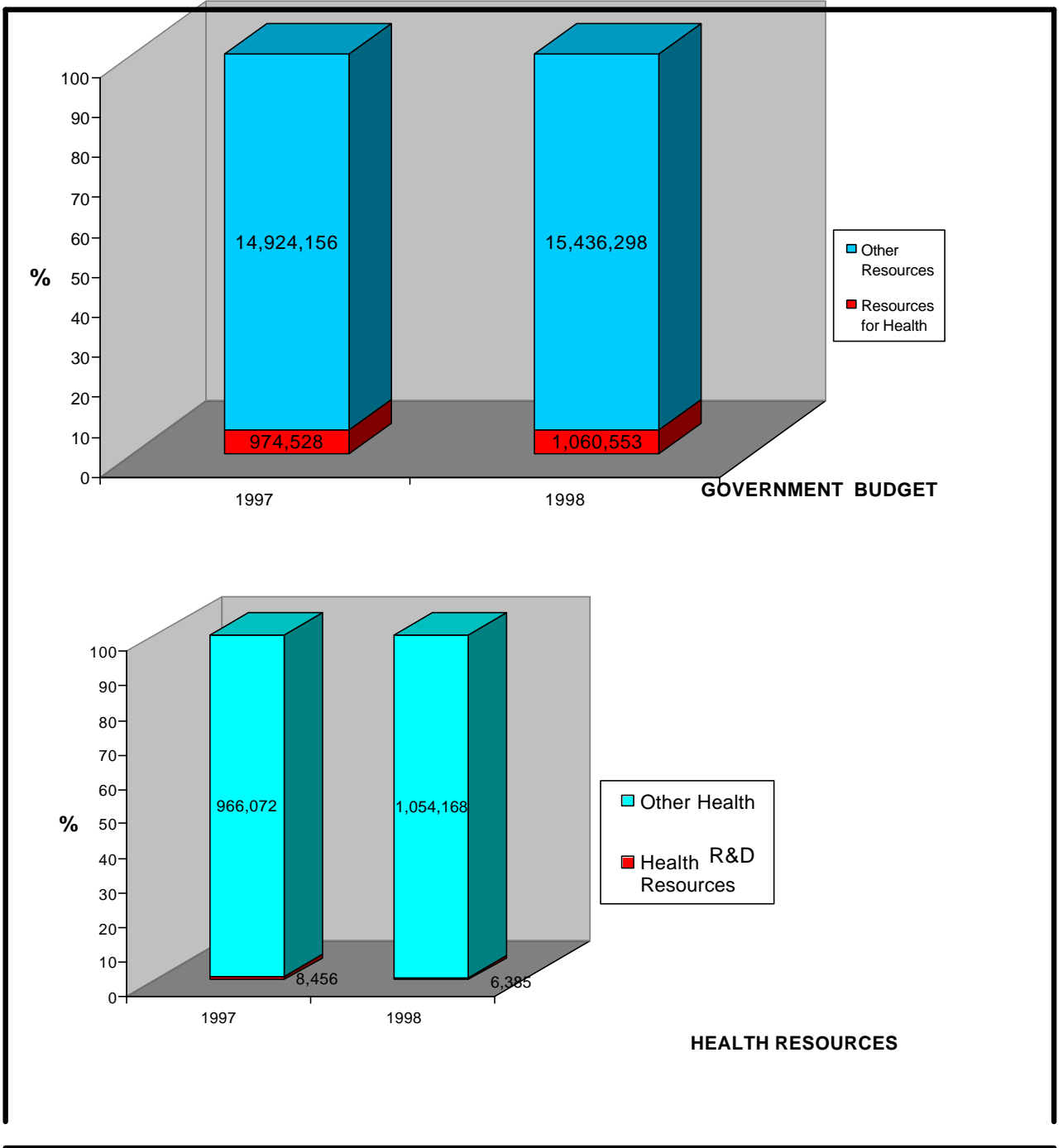


Table 5
Sources of Health R&D Funds, 1997 – 1998
(n=61)

SOURCE	1997		1998	
	HEALTH R&D FUNDS	PERCENT %	HEALTH R&D FUNDS	PERCENT %
Government Budget	7,126	80	4,998	72
Ministry of Health	1,354	15	624	9
Ministry of Science, Technology & The Environment	5,754	65	4,251	61
Ministry of Education	18	< 1	120	2
State Government			3	< 1
Private Institutions	1,571	18	1,717	25
Pharmaceutical Firms	1,535	17	1,526	22
Foundations/Financial Institutions /Others	36	1	191	3
Multilateral / Bilateral Funding Institutions (Foreign Funds)	157	2	217	3
TOTAL HEALTH R&D FUNDS	8,854	100	6,932	100

Fund Sources

Table 5 shows the sources of health research funding in the country for 1997 and 1998. Generally, about three-quarters of total research funding came from the government budget, less than a quarter from the private sector and less than 3% from the foreign agencies.

Government funding for health R&D was channeled mainly via two sources, namely, the national IRPA grant managed by the MOSTE and from the operational and development funds of the MOH (Figure 3-4). The IRPA grant, allocated to public sector institutions, accounted for more than 60 % of total R&D funding received, 65% in 1997 and 61% in 1998. The MOH derived funds accounted for 15% of the total

R&D funding in 1997 and 9% in 1998. The private sector fundings, contributed mainly by the pharmaceutical firms, accounted for 18% of the total R&D funding in 1997 and 25% in 1998.

Funding from foreign sources is comparatively low in the country, 2% of total R&D funding in 1997 and 3% in 1998. These could be partly attributed to two causes : firstly, Malaysia, being considered as “less needy”, does not receive as much international aids for research capacity strengthening and its research programmes as before. The contributions from foreign sources such as from the WHO has usually been small in monetary terms, as it has acted principally as a catalyst for subsequent action by communities and/or governments. Secondly, the research community are not as actively bidding for international research grants as before with the introduction of the national IRPA funds.

Overall, the total health research funding dropped by 22% from 1997 to 1998. While health research funding from the private sector and foreign sources show slight increases, funding from the government budget dropped by 30 %. The survey has shown that the conduct of the country’s health research during the 2 year period is largely dependent on public funding. Concerted efforts must be taken to look for alternative funding resources from within or outside the country.

Figure 3. Sources of Health R&D Funds by Institutions, 1997

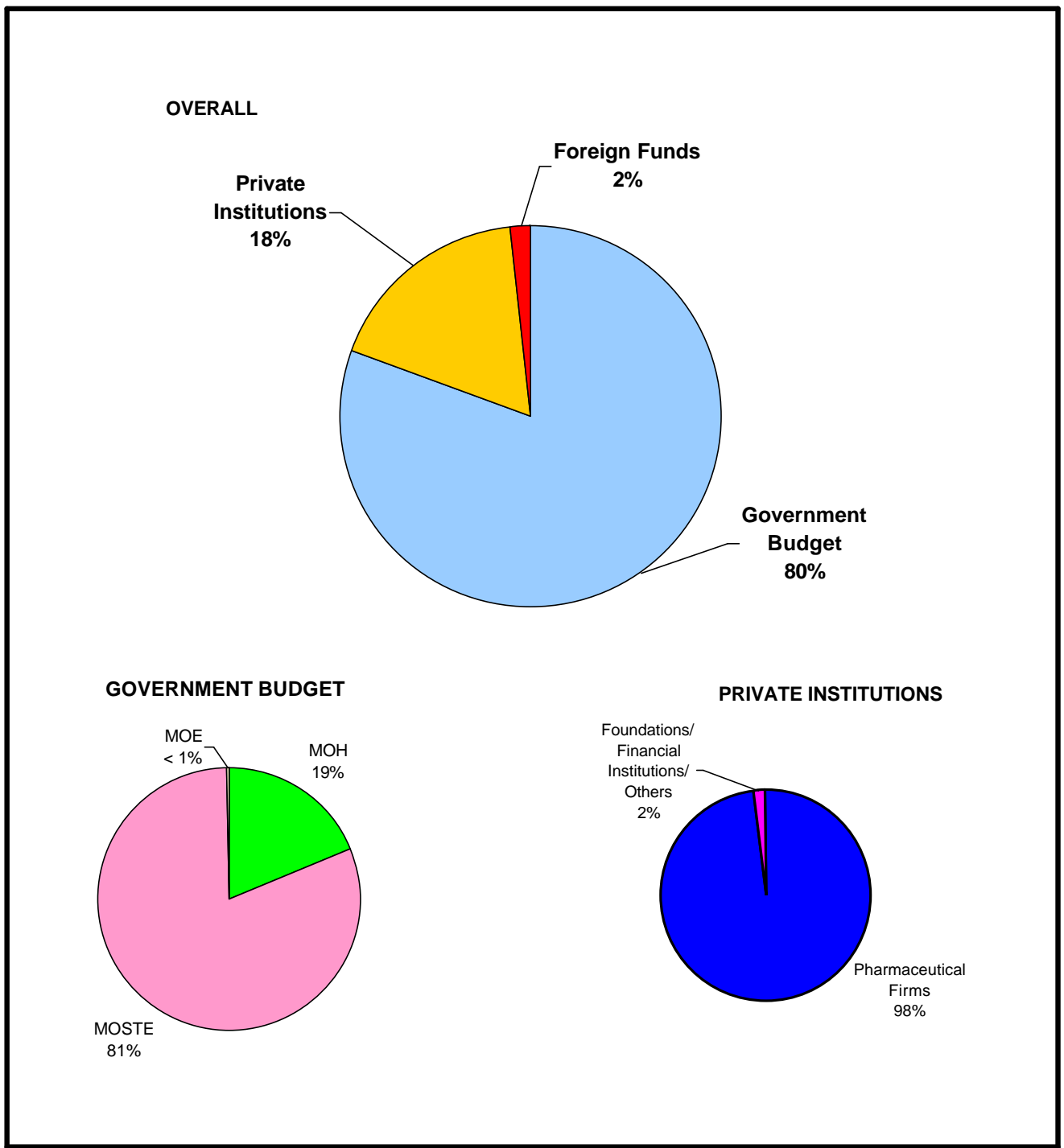


Figure 4. Sources of Health R&D Funds by Institutions, 1998

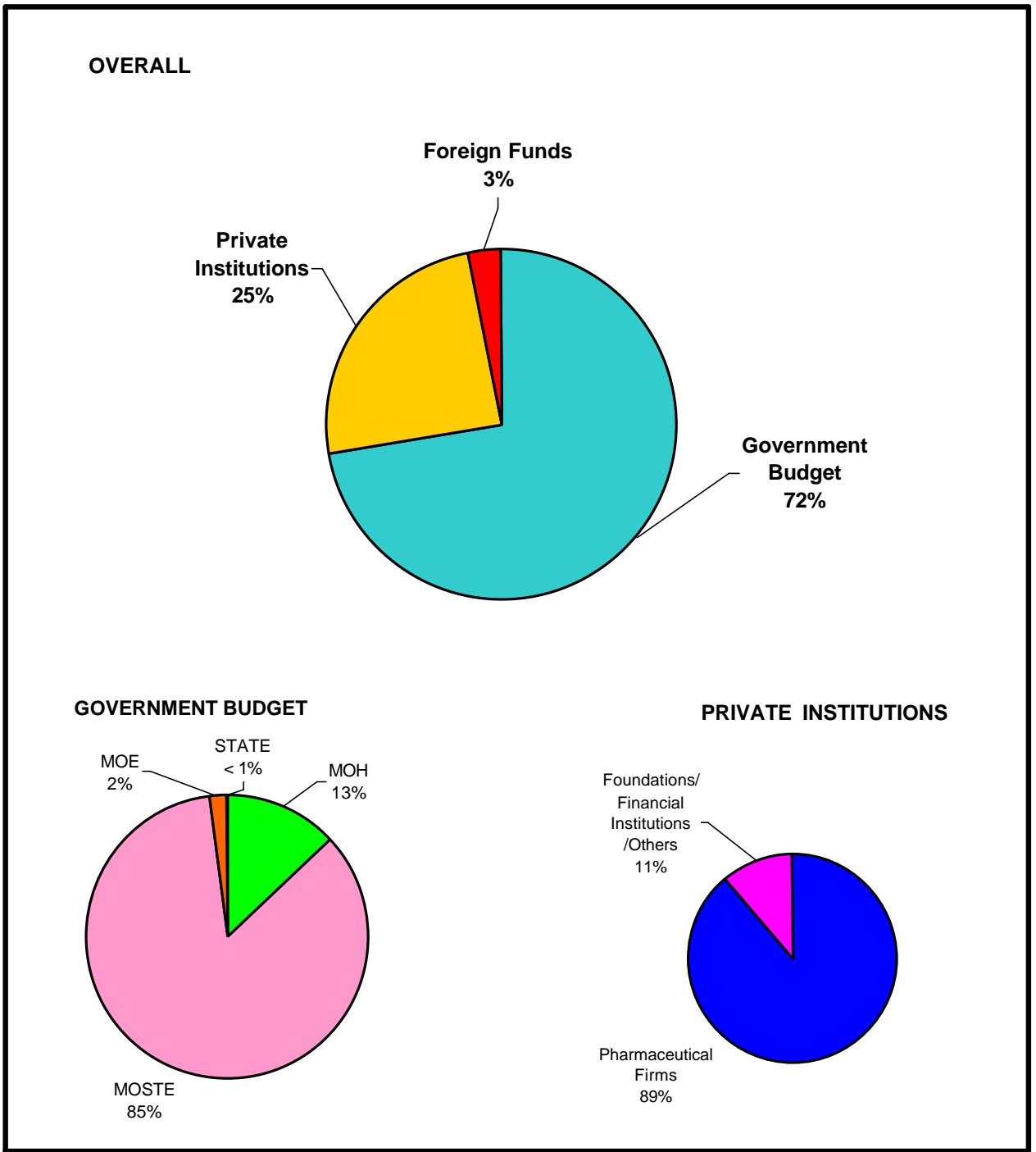


Table 6
Users of Health R&D Funds, 1997-1998
(n=61)

USER	1997		1998	
	HEALTH R&D FUNDS	PERCENT %	HEALTH R&D FUNDS	PERCENT %
Government Institutions	7,448	88	5,396	85
Ministry of Health	2,450	29	1,503	24
Academic Institutions	4,801	57	3,714	58
Research Institutions	197	2	179	3
Private Institutions	1,008	12	989	15
Pharmaceutical Firms	1,007	12	965	15
Hospitals	1	< 1	24	<1
TOTAL HEALTH R&D FUNDS	8,456	100	6,385	100

Fund Users

Table 6 shows the users of health R&D investments in the country. The biggest spenders are the government institutions which accounted for more than 85% of total health R&D expenditures in 1997 and 1998. The private sector spent the remaining amounts.

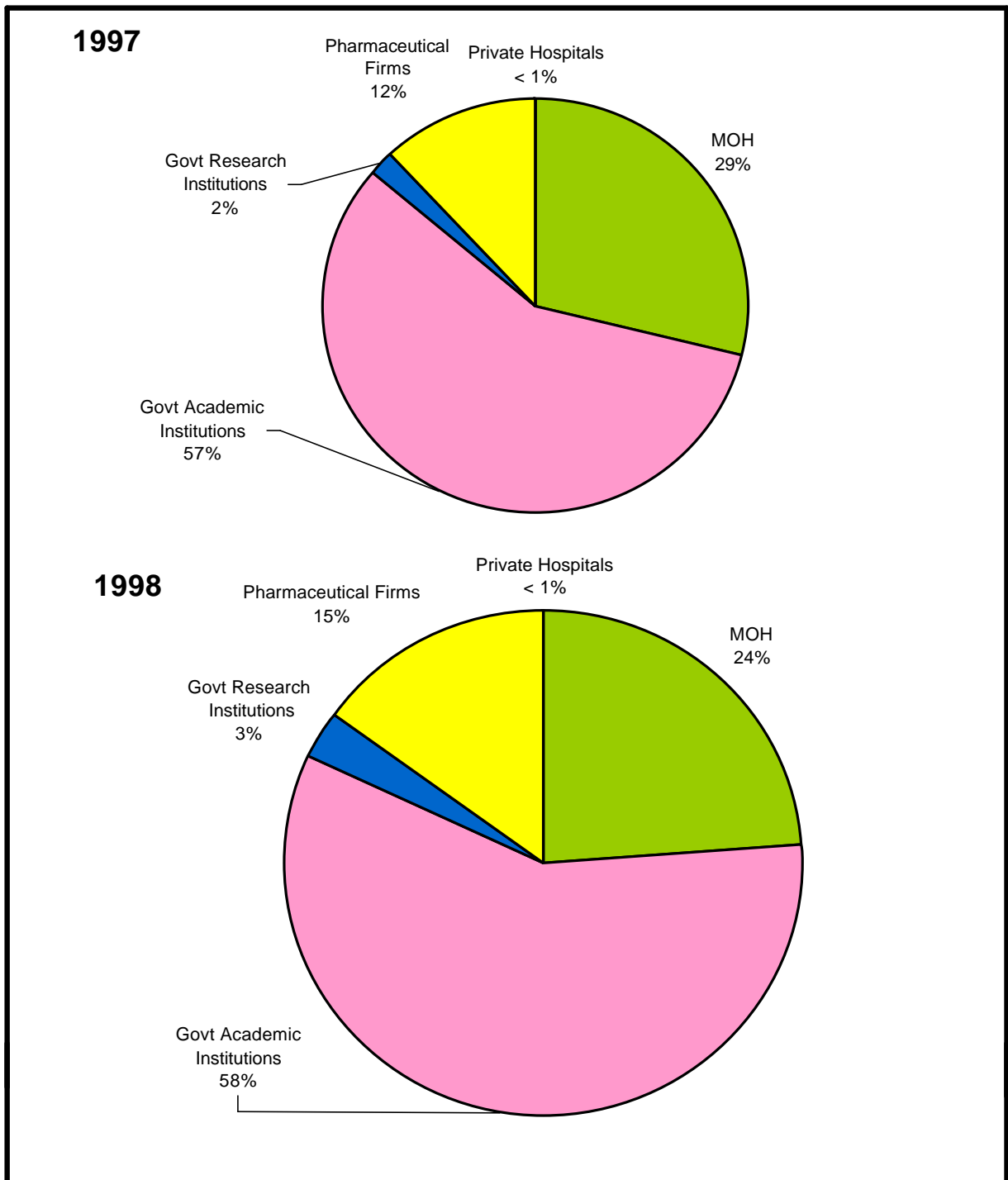
In the government sector, the medical academic institutions accounted for a bigger portion of the budget share (57 % of total R&D spending in 1997, 58% in 1998) followed by the MOH (29% in 1997 and 24% in 1998).

In the private sector, the pharmaceutical firms are the main users of health R&D resources accounting for more than 10% of R&D funds utilized (12% in 1997 and 15% in 1998). Data gathered indicated that all the 13 multinational companies with R&D that responded to the questionnaires outsourced the major portion of their R&D funds to academic and MOH hospitals to carry out their clinical trials. On the other hand the 3 local pharmaceutical companies surveyed conducted their own R&D, mainly on product and formulation development. Only one local company

outsourced a small sum of its R&D fund to one of the local academic institution to conduct a clinical study.

Taking into consideration the survey response rate of 70% and the estimation of direct project costs, the total health R&D spending showed a decline of 24 % from 1997 to 1998. The decline in spending could probably be a consequence of less R&D allocations for the same period. The 1997-1998 period had been one of considerable downsizing of “non essential” activity, possibly as a consequence of the economic downturn. Health research funding may have suffered as a consequence of that.

Figure 5. Users of Health R&D Funds by Institution, 1997 and 1998



Fund Uses

In terms of type of R&D activity, about two-thirds of the R&D expenditures were concentrated on applied research, while the rest were distributed between basic research and experimental development (Table 7 a-b). These results may be partly explained by the significant amount of applied research conducted in the MOH and medical academic institutions. The applied research performed mainly include those that lead to better health in terms of generating new information for decision making, better procedures/methods for diagnosis and treatment of diseases.

Overall in 1997-1998, about 95% health R&D activities were concentrated on Medical Sciences, 4 % in health economics/social sciences and 1% in natural sciences.

A breakdown of the above figures into more specific fields of research is provided in Table 8. In 1997, 47 percent of the research activity were concentrated in biomedical research and 37 percent in the broad field classified as Others which include public health, health systems, health services, occupational and environmental health research. Spending in the fields of epidemiology, clinical research, and natural sciences were comparatively low. In 1998, 37 percent of health R&D expenditures were concentrated in biomedical research and 45 percent in Others. Biomedical research is well developed in the country because of its long history and strong support from foreign agencies and the government in its research capacity and capability strengthening. Thus, institutes were able to submit proposals on biomedical research for funding which absorbed significant funds. On the other hand, research capacity in the other fields of research are still in the process of development and expansion.

When considered in relation to the eight national research priority areas for the medical sector in the 7th Malaysia Plan, a third (33 percent) of the R&D expenditures are in the area of health problems associated with lifestyles and a fair distribution ranging from 11 – 17 % each in health problems associated with demographic changes, new technologies in health/medical biotechnologies, vector-borne and other communicable diseases, as well as health care system and industries (Table 9a-b). These figures indicate that while funding were dedicated to research in most priority areas, there is comparatively lesser funding for the target areas of epidemiological database (2%) and occupational/environment health (5%). A plausible reason could be that research capacity in terms of human resources and infrastructure in these fields is comparatively limited and hence few such projects were put up for funding. The concentration of health R&D efforts in the target areas on Health Problems associated with Lifestyles is not unexpected because the changing trends in the health problems of the country as a consequence of industrialization, affluence, and influx of migrant workers has necessitated the need to direct research into this area. The dedication of health research in the area of New technologies in Health / Medical Biotechnology could be partly explained by increasing emphasis by the government on commercial application and values of research outputs, which is one of the criteria for IRPA funding. Data collected showed that research on epidemiological database and occupational and environment health was relatively underfunded. This is of concern because Malaysia, like many parts of the world is experiencing demographic and

epidemiological transitions that have led to a number of unexpected health problems. In the future diseases related to environmental and industrial hazards and industrial accidents would also be of concerns besides the lifestyle diseases, communicable and non-communicable diseases.

The target-specific spending patterns seen here are also largely influenced by the availability of expertise in the thrust areas, the nature of applicants' interests, and the research thrusts of the various institutions.

It can be surmised that the analysis of the health R&D expenditures against the field of activity and the priority areas has revealed, to a fair extent, the focal points of our research absorptive capacity. This information on our strengths and weaknesses can provide a basis for drawing up future strategies and action plans for the strengthening, mobilization, and directions of our research capacity in response to important health issues.

Table 7a
Internal Health R&D Expenditure by Type of R&D Activity and Field of Activity in Thousand US Dollars, 1997

Type of R&D Activity	BASIC	APPLIED	EXPT'L	TOTAL HEALTH	as a % of Total Internal
	RESEARCH	RESEARCH	DEV'T	R&D EXPENDITURE	Health R&D Expenditure
Field of Activity					
Medical Sciences	1,285	5,323	1,409	8,017	95
Health Economics/Social Sciences	2	307	0	309	4
Natural Sciences	20	110	0	130	1
TOTAL	1,307	5,740	1,409	8,456	100
As a % of Total Internal Health R&D Expenditure	15	68	17	100	

Table 7b
Internal Health R&D Expenditure by Type of R&D Activity and Field of Activity in Thousand US Dollars, 1998

Type of R&D Activity	BASIC	APPLIED	EXPT'L	TOTAL HEALTH	as a % of Total Internal
	RESEARCH	RESEARCH	DEV'T	R&D EXPENDITURE	Health R&D Expenditure
Field of Activity					
Medical Sciences	1,122	3,677	1,231	6,030	94
Health Economics/Social Sciences	0	284	0	284	5
Natural Sciences	16	55	0	71	1
TOTAL	1,138	4,016	1,231	6,385	100
As a % of Total Internal Health R&D Expenditure	18	63	19	100	

Figure 6. Expenditure For Health R&D by Type of Activity, 1997 and 1998

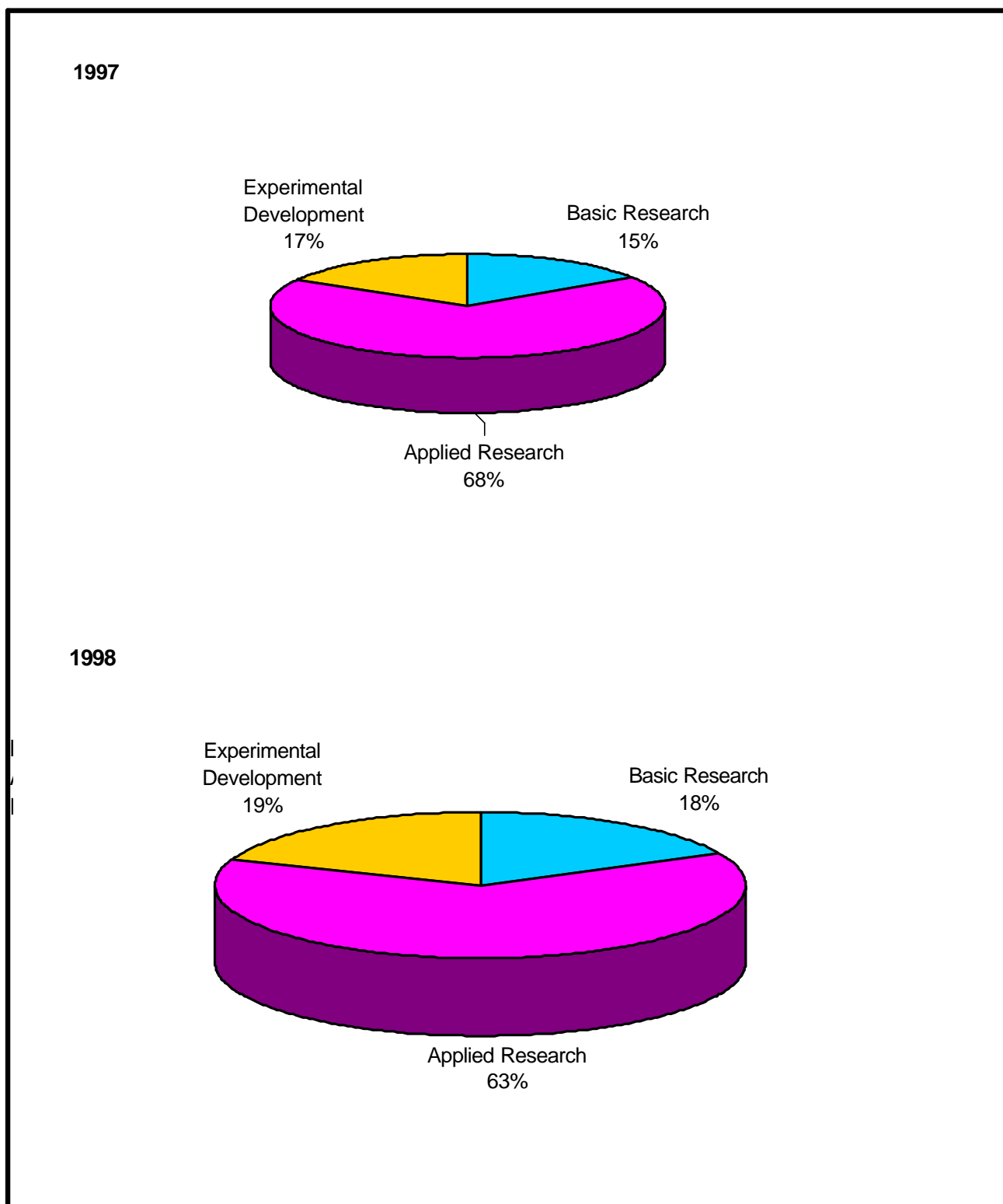


Figure 7. Expenditure For Health R&D by Field of Activity, 1997 and 1998

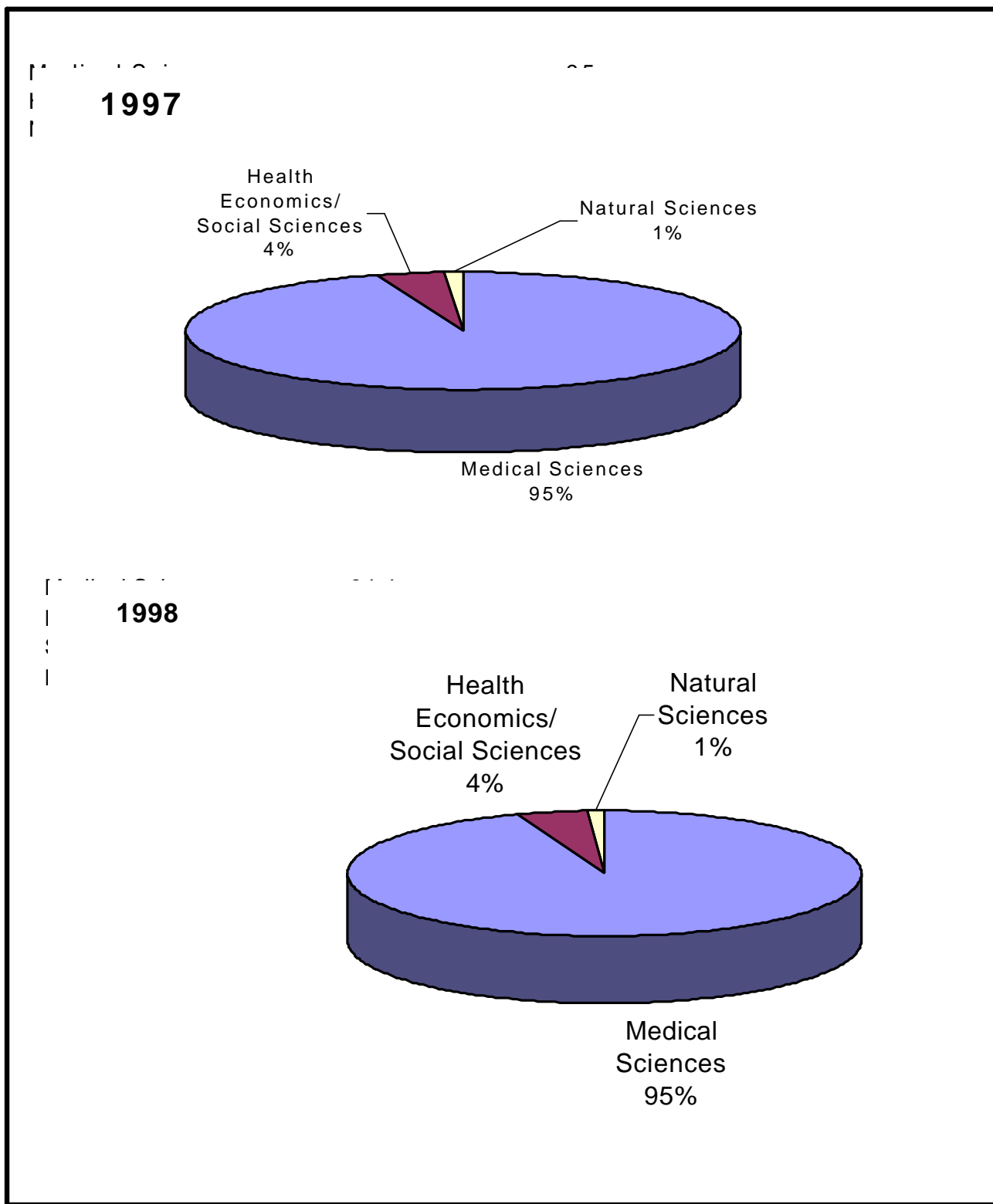


Table 8
Internal Health R&D Expenditure by Type of Activity and Field of Activity in Thousand US Dollars, 1997-1998

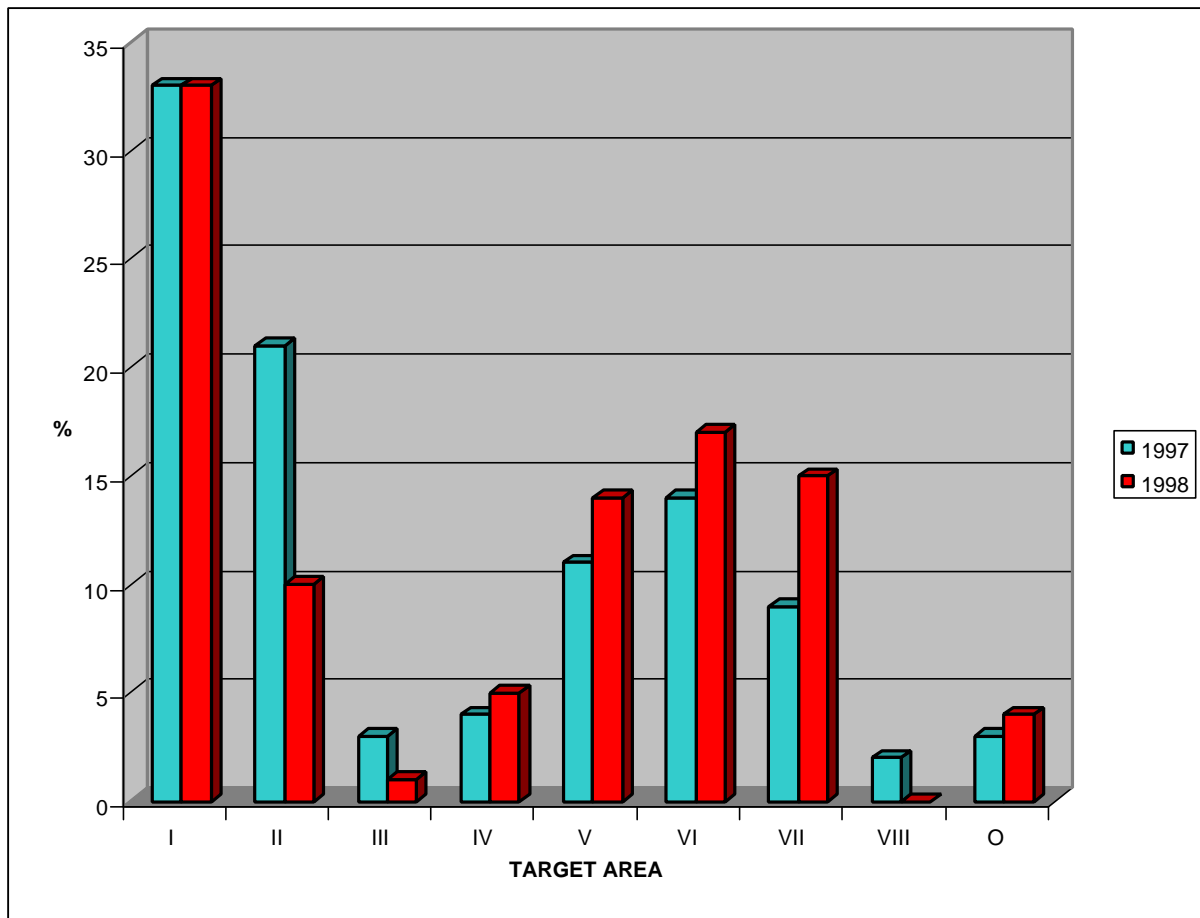
TYPE OF R&D ACTIVITY	BASIC RESEARCH		APPLIED RESEARCH		EXPERIMENTAL DEVELOPMENT		TOTAL HEALTH R&D EXPENDITURE		AS A % OF TOTAL INTERNAL HEALTH R&D EXPENDITURES	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
EPIDEMIOLOGY	145	85	605	395			750	480	9	8
CLINICAL RESEARCH	18	41	401	514			419	555	5	9
BIOMEDICAL RESEARCH	1,066	960	2,641	1,225	283	193	3,990	2,378	47	37
SOCIAL SCIENCES	2						2		< 1	
*OTHERS	58	36	1,975	1,827	1,132	1,038	3,165	2,901	37	45
NATURAL SCIENCES	20	16	110	55			130	71	2	1
TOTAL	1,309	1,138	5,732	4,016	1,415	1,231	8,456	6,385	100	100

* OTHERS : Include public health, health systems, health services, occupational and environmental health research

Table 9
Health R&D Expenditure by Target Area of the Health Research Priorities for 7MP in ('000) US \$, 1997-1998

CODE	TARGET AREA	1997		1998		1997-1998	
		AMOUNT UTILIZED	%	AMOUNT UTILIZED	%	AMOUNT UTILIZED	%
I	Health problems Associated with Lifestyles	2,787	33	2,128	33	4,915	33
II	Health problems Associated with Demographic Changes	1,757	21	654	10	2,411	16
III	Epidemiological Database	231	3	56	1	287	2
IV	Occupational and Environment Health	358	4	323	5	681	5
V	Vector Born and other communicable diseases	949	11	909	14	1,858	13
VI / VIII	New Technologies in Health/Medical Biotechnology	1,363	16	1,090	17	2,453	17
VII	Health care system and industries	734	9	955	15	1,689	11
O	Others	277	3	270	4	547	4
	TOTAL	8,456	100	6,385	100	14,841	100

Figure 8. Ranking of Funding by Target Area, 1997 and 1998



FUNDS FLOW STUDIES AT THE INSTITUTIONAL LEVEL

One advantage of the accounting framework used in the study is that it enables the tracking of funds flow from the source to the user. This section depicts the flow of funds from the perspective of the major institutional users.

Government Sector

It is evident that the government being the main funder of health research in the country recognizes research and development as a powerful tool to address health concerns. From the succeeding figures it can be seen that MOH, given its limited resources, was able to apportion a relatively substantial part of its own funds for research while academic institutions generally had to procure funding from outside. The MOSTE appear to be the major source of assistance in augmenting the research funding of research group in the government.

Ministry of Health (MOH)

MOH resources for health R&D in 1997 amounted to US \$ 2.6 million, of which US \$ 2.5 was utilized. Half (52%) of the total research allocation came from the operating and development budget of the different MOH departments/institutions. Another major source of research funding came from the MOSTE (42%), that is the IRPA grant. Contributions from other resources such as the private sector and foreign sources were scarce. The MOH research activity was concentrated on applied research (91%) in the field of medical sciences (100 %). Very minimal portions were outsourced to the academic institutions (1%) or other government research institutions (0.6%).

In the MOH, the major contributors to the research efforts were the Institute for Medical Research and Institute of Public Health which together accounted for of the total MOH R&D expenditures. The State Health Departments and hospitals also carried out research on a modest scale, a substantial portion of which are small-budget projects funded from their own operating budget. A common difficulty encountered by the respondents is the estimation of the total costs incurred in the running of such projects. A mechanism for estimating such small but numerous R&D activities at the state and hospital levels need to be established in order to obtain a true representative figure of resource flows for the Ministry of Health.

Figure 9. Resource Flow for Health R&D: Ministry of Health (MOH), 1997

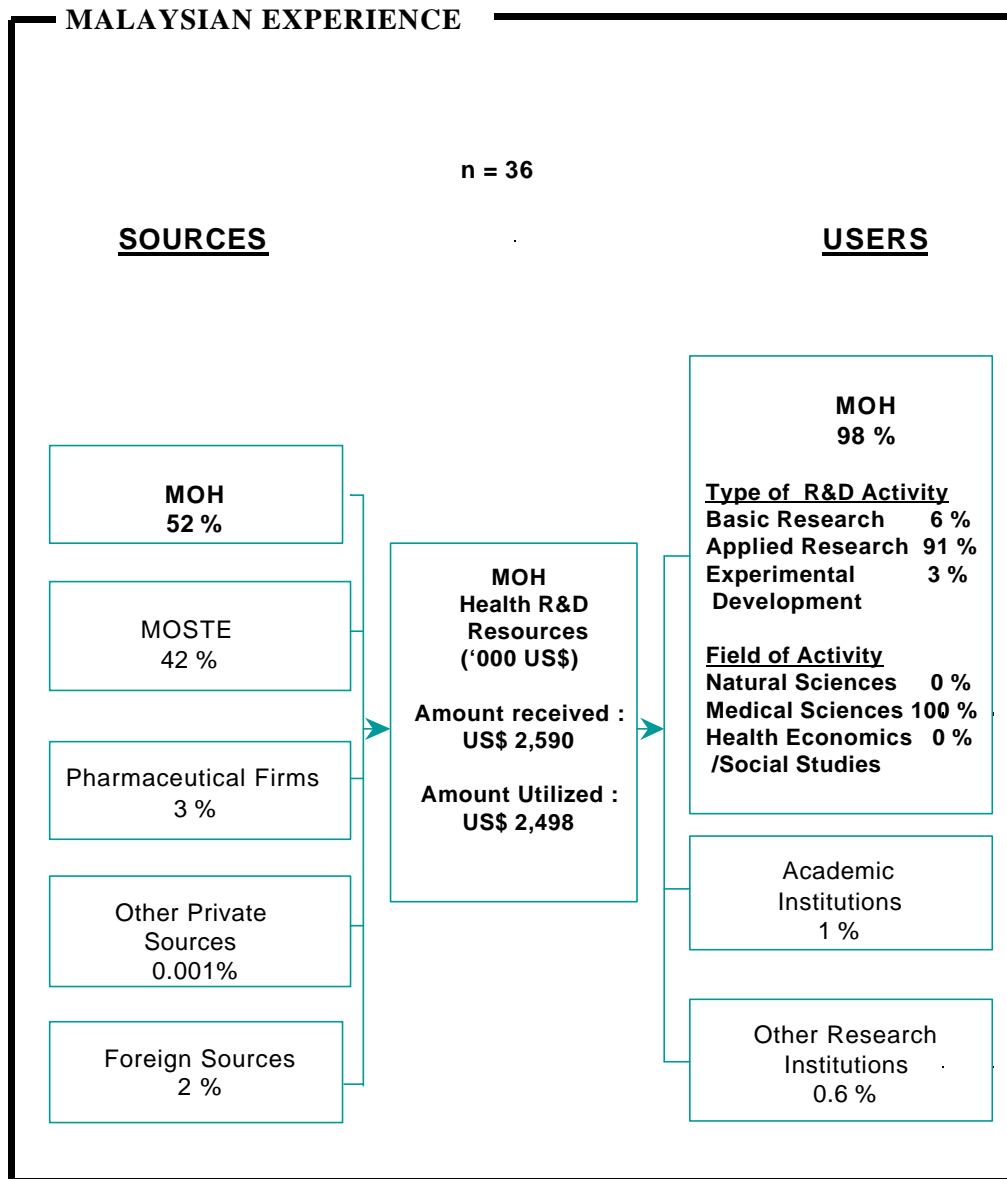
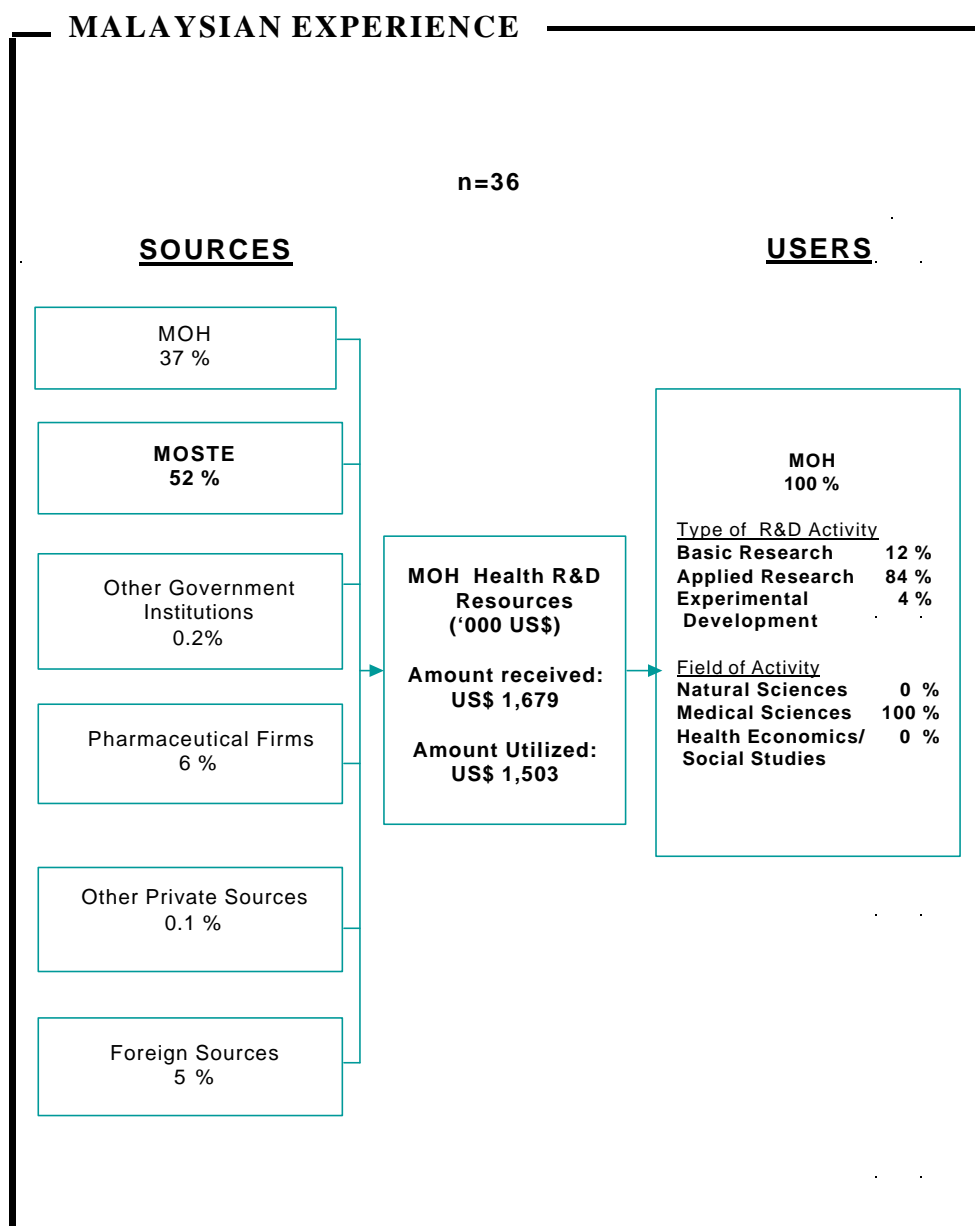


Figure 10. Resource Flow for Health R&D: Ministry of Health (MOH), 1998



In 1998, slightly more than half of the allocation (52%) came from the MOSTE, 37% from the MOH and the rest from pharmaceutical firms and foreign sources.

These figures indicate that the MOH, given its limited resources, has apportioned part of her own health resources to finance health research while the rest were sourced through competitive bidding of the IRPA grant from the MOSTE.

Academic Institutions

The academic institutions which fall under the Ministry of Education (MOE) are the main users of research funds in the country for the period of 1997 – 1998. The major portion of their research funding came from the MOSTE. This amounted to 94 % of their total allocations in 1997 and 87 % in 1998. Contributions from other sources are minimal and the proportions vary from year to year. Very minimal amount is received from the MOE. The figures revealed that the academic institutions have to source almost all of their research funding from outside their Ministry.

In terms of type and field of R&D activity, three-quarters of their research activity were concentrated on applied research in the field of medical sciences. The academic institutions had also invested their research efforts, although to a small extent, in basic research and health economics/social studies.

Other government research institutions

A few research institutions under the MOSTE, Ministry of Agriculture and Ministry of Primary Industry do carry out some health R&D.

The two main sources of funding of health research in these institutions were derived from the MOSTE and foreign sources. IRPA grants from the MOSTE accounted for 61% of their total allocation in 1997 and 53% in 1998, while foreign funds accounted for 32% and 47% respectively for the two years.

Figure 11. Resource Flow for Health R&D: Government Academic Institutions, 1997

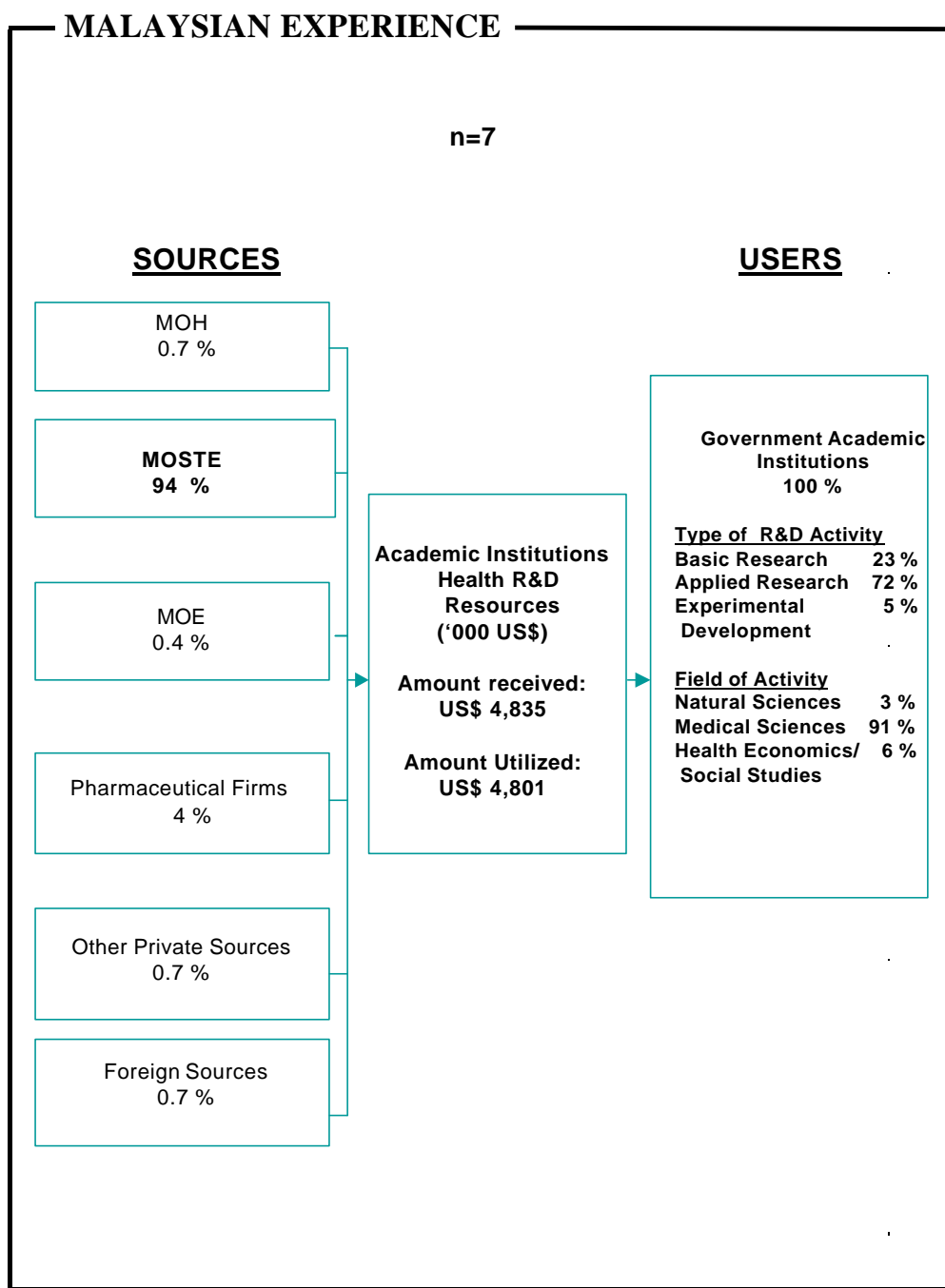


Figure 12. Resource Flow for Health R&D: Government Academic Institutions, 1998

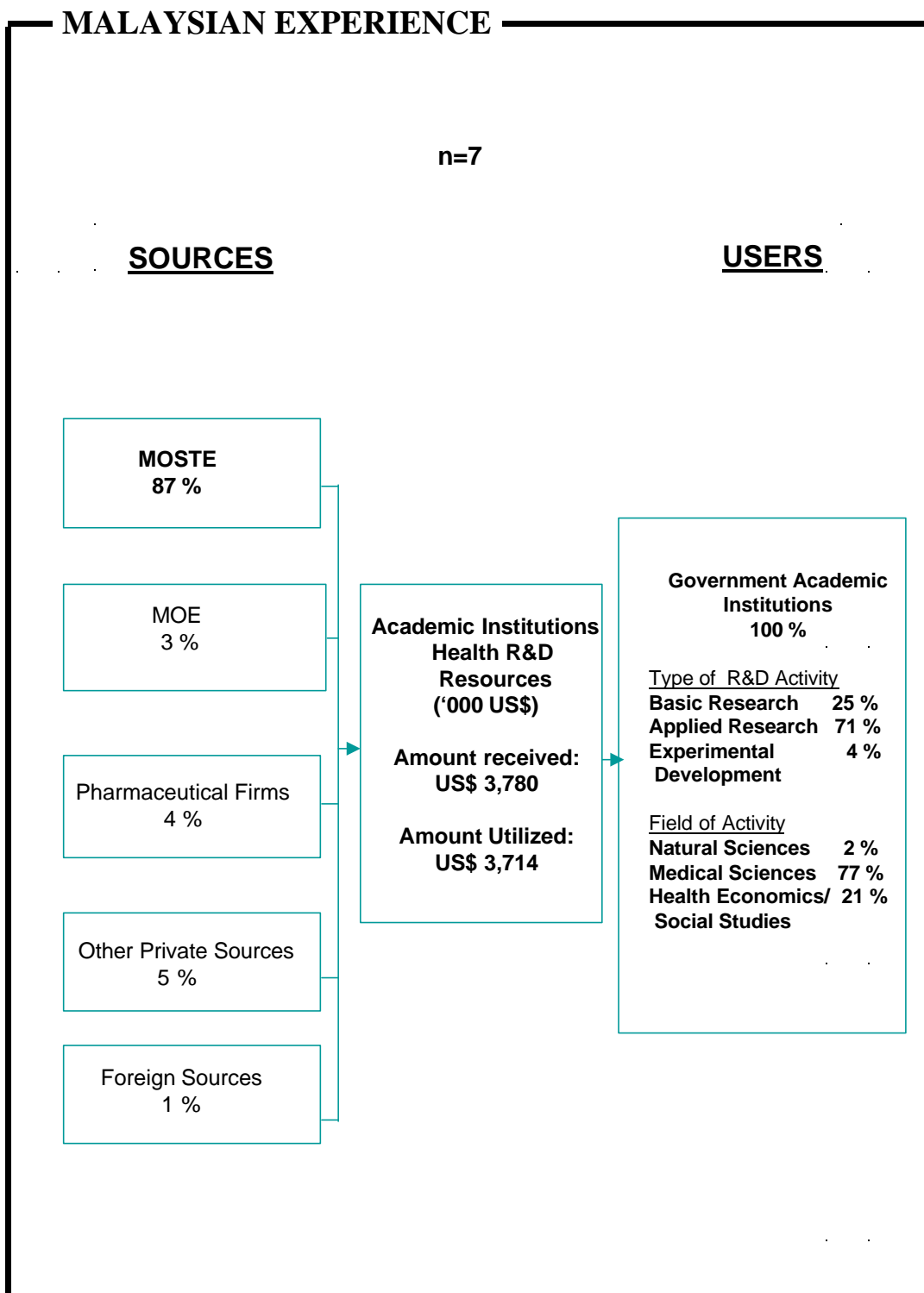


Figure 13. Resource Flow for Health R&D: Other Government Research Institutions, 1997

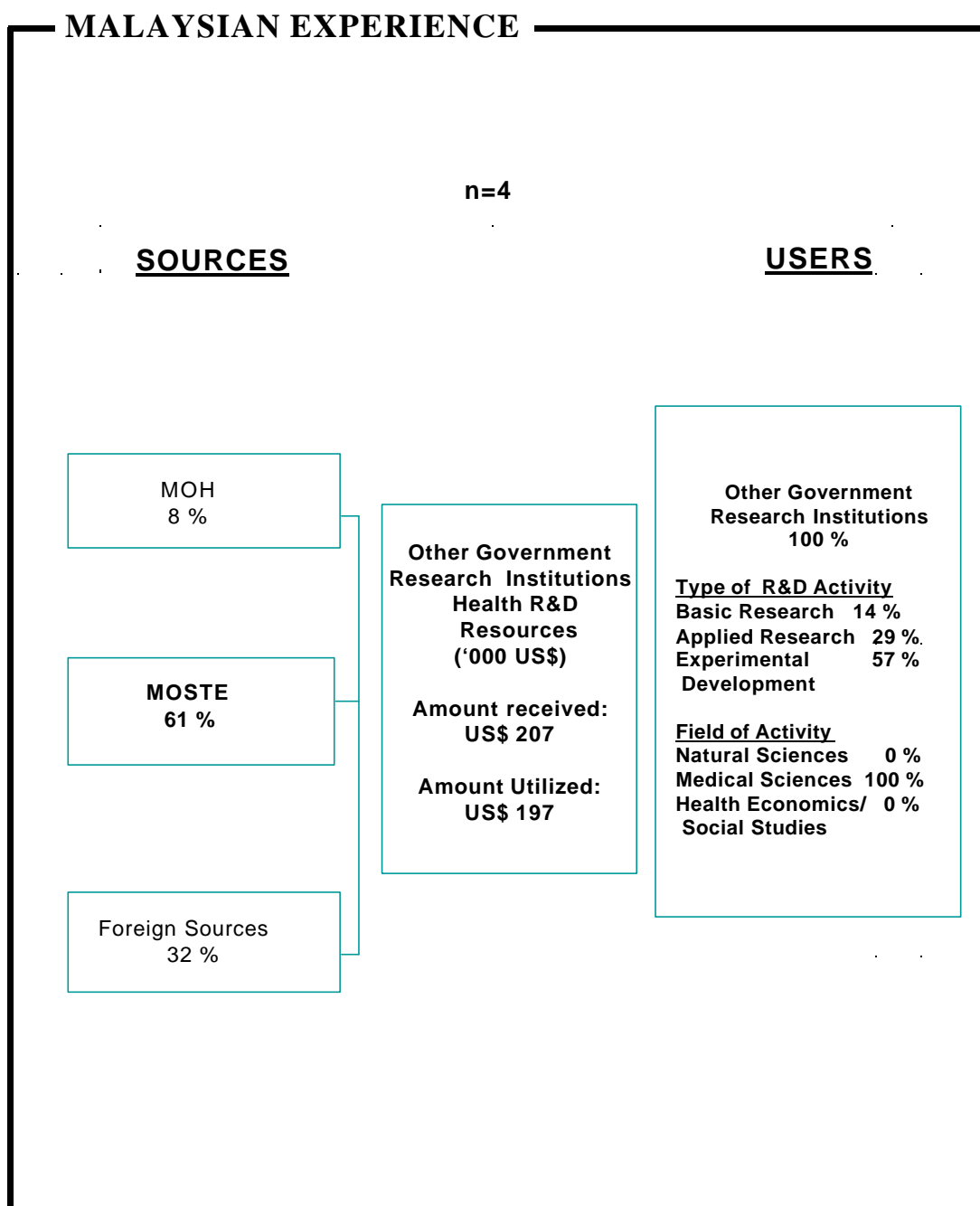
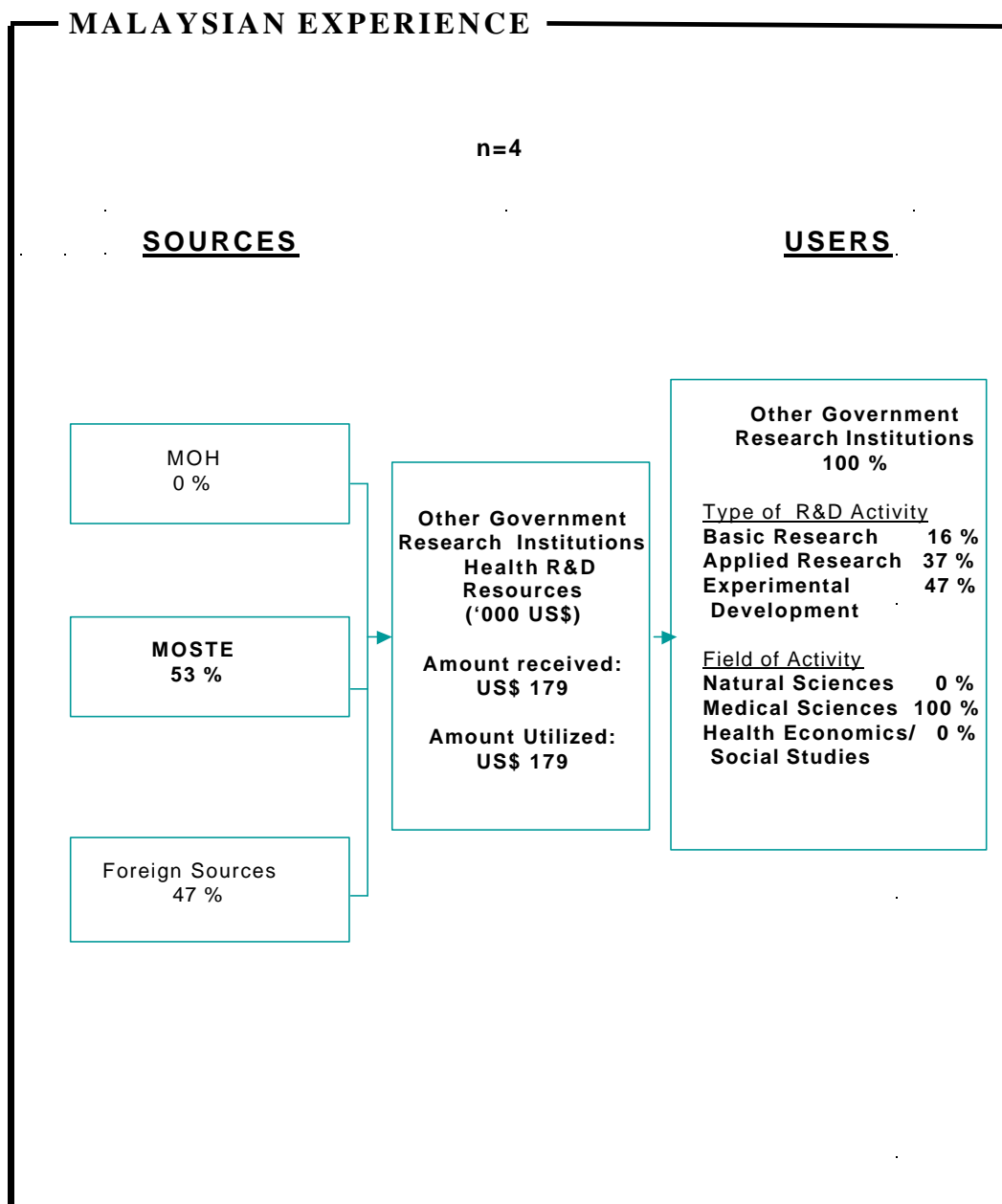


Figure 14. Resource Flow for Health R&D: Other Government Research Institutions, 1998



Private Sector

The sample size of respondents from the private sector who agreed to participate in the survey is small. Thus the findings on the flow of health R&D funds for the private sector is presented with the caveat that under-representation and under-reporting may have occurred.

The biggest source of health R&D funds from the private sector are the pharmaceutical firms. Data gathered also indicated that the main users of funds from the private sector are the pharmaceutical firms themselves, followed by the academic institution and MOH hospitals.

Pharmaceutical Firms

Most of the R&D allocations for the pharmaceutical firms came from their own funds and less than 5% from foreign sources. Of the US \$ 1.3 million spent by the pharmaceutical firms in 1997 and US \$ 1.2 million in 1998, about three-quarters were utilized for R&D conducted by the pharmaceutical firms themselves. Of the remaining funds utilized, 10-20% were outsourced to the academic institutions and 6-8% to the MOH hospitals/research institution. From the survey, it was found that the internal R&D are mainly performed by the local pharmaceutical firms and these were mainly in the area of experimental development, specifically product and formulation development. The local pharmaceutical companies continue, of course, to recognise the importance of innovation to their long-term growth. The multinational firms generally outsourced major portions of their research funds to MOH hospitals and academic institutions to carry out their clinical studies.

Data collected appear to indicate that private hospitals are not active users of research funds and their source of funding came from the pharmaceutical firms. Due to the small sample size of private hospitals surveyed, this is most probably under-reporting.

Figure 15. Resource Flow for Health R&D: Pharmaceutical Firms, 1997

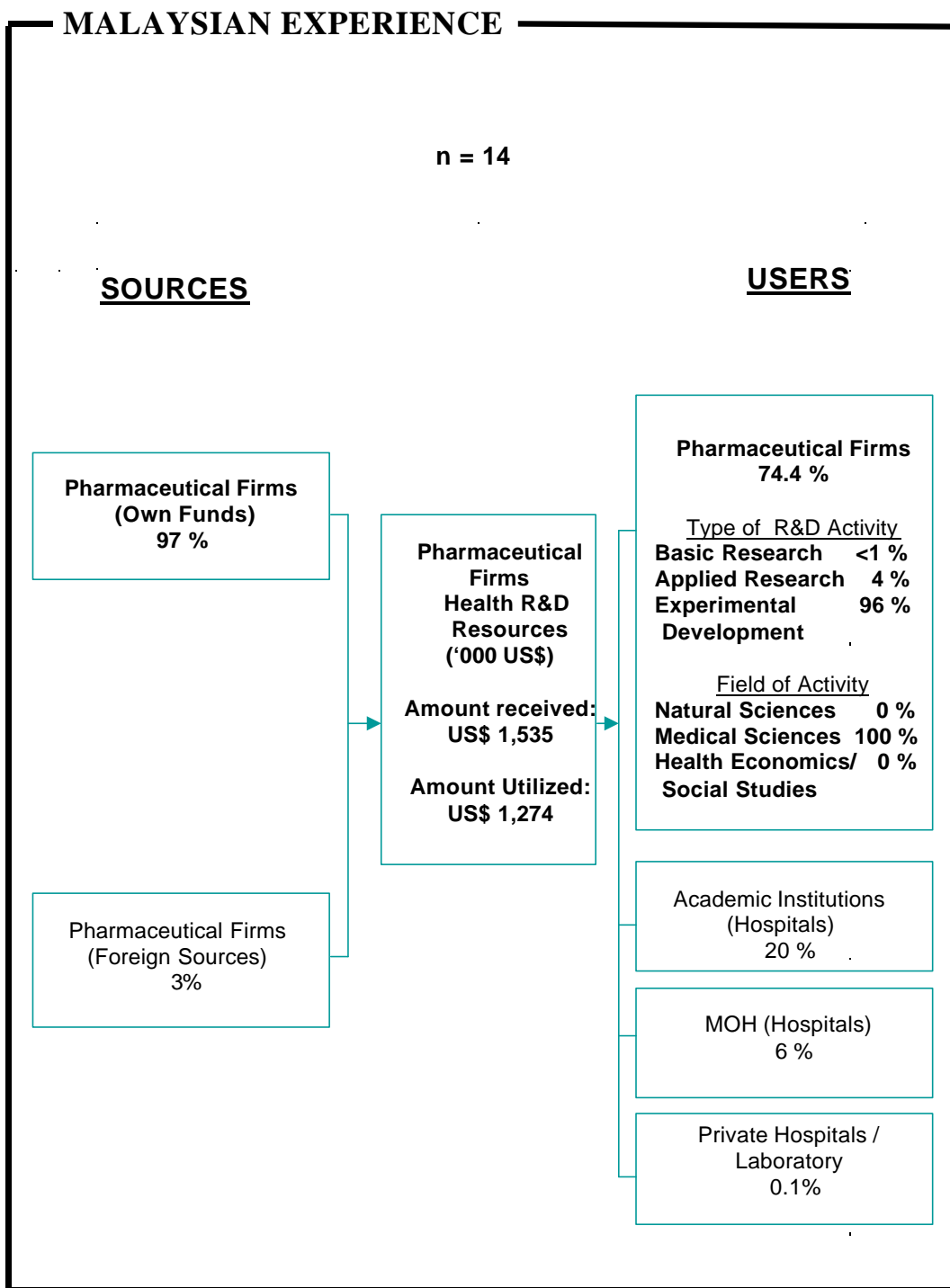
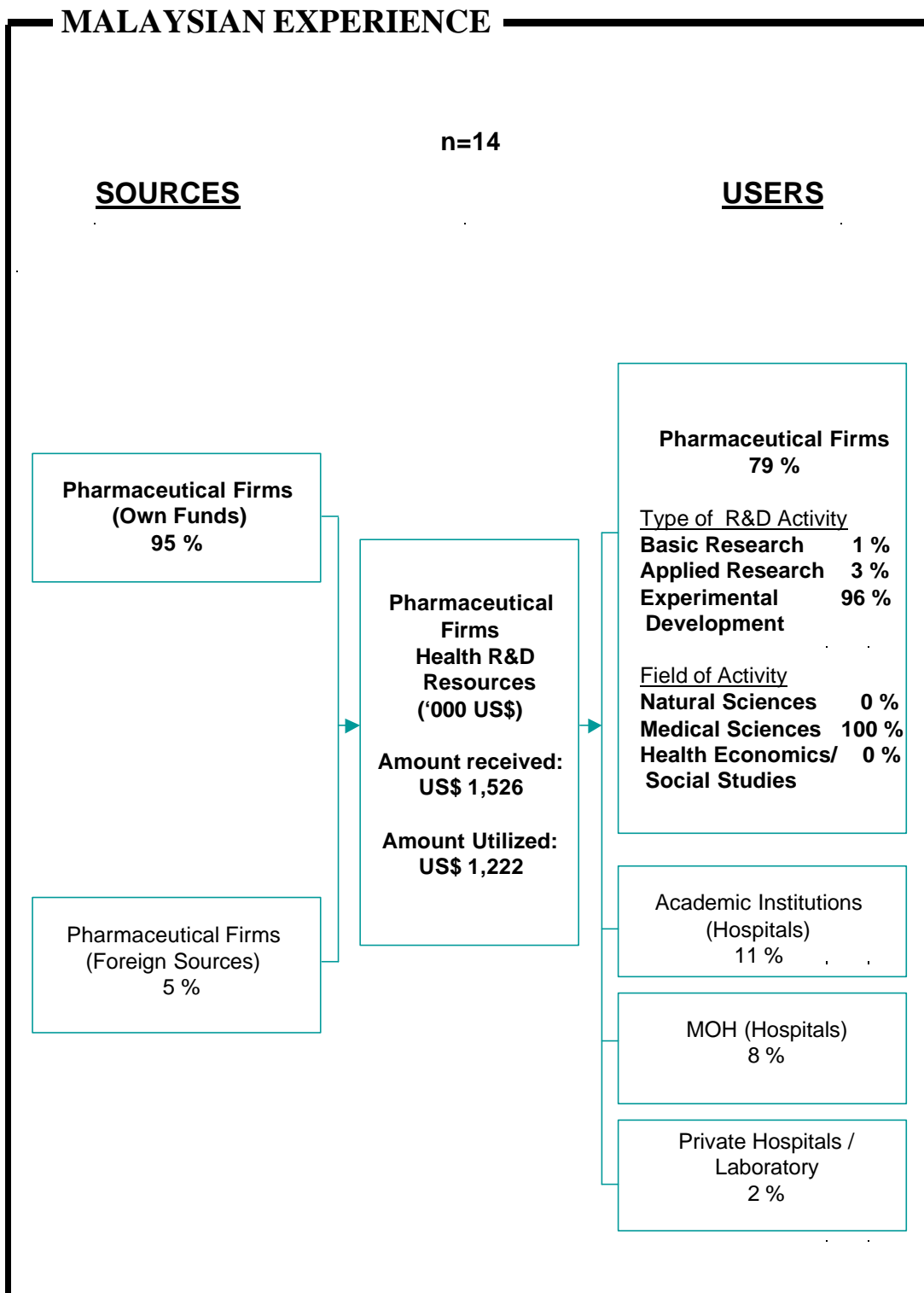


Figure 16. Resource Flow for Health R&D: Pharmaceutical Firms, 1998



VI. LESSONS LEARNED AND RECOMMENDATIONS

One of the outcomes of this three-country research initiative is the refinement of the survey instrument to measure and track health R&D resource flows in a country. This research effort has culminated in the publication of a manual on tracking country resource flows for health research and development which can be used by other developing countries intending to conduct a similar survey.

This study has also enabled the capture of a time-series data of health R&D expenditures from a common set of institutions and companies for the two years. The spin-off is the construct of a database of researchers and health research projects undertaken in 1997-1998. Although the coverage is not 100 percent, given the 70% response rate, major research efforts are deemed to be captured in the survey. The resultant database is a valuable source of data for use by R&D managers to benchmark and track information on R&D spending. It may be used as a reference list for further research on R&D performances and outcomes.

Much can be learned from the existing information obtained. The findings present the best available evidence to date on health research resource flows in Malaysia. It has given insights on the investments and type of health research conducted for the two year period, the alignment of resource allocation to national health research agenda and more importantly, enable the identification of research areas where allocation is low and where research capability strengthening may be needed.

The study had also revealed some lessons which may be useful in future surveys. In building the respondent base, our three-country experience had shown that a relatively high response rate for the survey could be attained through purposive sampling, initial screening out by telephone, personal networking of the research team and more importantly, the high level of ministry support given to the study.

In addition, the common problem of double-counting had been minimised by the collection of fund flows data based on project / program basis. By tracing resource flows of individual project/program from its sources to users and outsourcing to other institutions, it has enabled the comparison of responses from similar sets of institutions and in the process detect inconsistencies.

Although internationally accepted definitions and categories had been used in the survey questionnaires, many queries from the respondents had been directed towards their clarifications. It may be best that definitions and questionnaires are phrased if possible in the context of local practices and norms of the country involved. The classification of health research to the more specific fields of activity still needs further refinement to better reflect the different fields of activity relevant to health research. For instance, health systems research and public health research which are major fields of health research were not classified as a field on its own.

As the survey essentially measures direct project costs, all other indirect costs incurred such as emoluments for permanent research personnel, capacity building and training were not accounted for. On the other hand, the biennial national R&D survey conducted according to the OECD guidelines captured indirect costs such as costs incurred by time spent on research by salaried research personnel. To facilitate comparisons of data across countries and surveys, the issues of indirect costs incurred need to be addressed and standardized in future surveys.

Coordinating Mechanism for Matching Funds with Priorities

An important policy message delivered by this study is the comparison between the funding allocation pattern revealed by the survey with national health research priorities. Our findings indicate that the health R&D expenditure patterns largely fit into most of the 8 target areas of the health research priority areas of the the 7MP. This may be attributed to a number of reasons. Foremost is the involvement of all relevant stakeholders (policy makers, government funders, researchers, academia, public) in the priority setting exercise for health research in the country. The subsequent dissemination of the priority listings to people who influence research funding and the research community particularly in the public sector has also created awareness of the priority areas. These measures ensure that projects that address the national health priority areas are proposed and thus enhance their chances of receiving funding. Another contributing factor is the implementation of institutional screening for research projects that ensures projects relevant to national research priorities are approved.

Strategies for Sustained Monitoring of Health Research Resource Flows

The sustained monitoring of resource flows on a regular basis is important to ensure that the scarce source of health research funding is directed to address the most pressing health research needs of the country. This had been re-emphasized in the recently concluded International Conference on Health Research for Development held at Bangkok in October 2000. To examine the validity of trends, the R&D expenditure values need to be computed over longer years for a larger set of health related institutions and companies. Concerted efforts need to be taken to sustain the resource flow tracking and also to expand the survey instrument to measure impact assessment of research done. Sustaining this effort at the national level may entail forming partnerships with all stakeholders, users and funders from the public and private sector to monitor resource flows. Ideally the Ministry of Health in collaboration with the Ministry of Science, Technology and the Environment should spearhead a committee to undertake a periodic survey of resource flows.

Another possibility, as suggested by the Philippine and Thai teams, is the incorporation of resource flow questions into the National Health Accounts (NHA) survey. This may also be feasible in the Malaysian situation as we are in the initial stages of embarking on the NHAs project.

BIBLIOGRAPHY

- Annual Report 1997. Ministry of Science, Technology and the Environment, Malaysia.
- Annual Report 1998. Ministry of Science, Technology and the Environment, Malaysia.
- Annual Report 1998. National Council for Scientific Research and Development, Malaysia.
- Center of Economic Policy Research 1998. Analysis of the Funds Flow for Health Research and Development in the Philippines.
- Council on Health Research for Development. Health Research: Essential Link to Equity in Development. Oxford, Oxford University Press 1990.
- Michaud, C. Monitoring Results: How to measure the contributions of the initiatives to the overall goal of the Forum. A paper presented at the First Global Forum for Health Research, 20-27 June 1997.
- Michaud, C and Murry CJL. Resources for Health Research and Development in 1992: A global review. In Investing in Health Research and Development, a report of the ad Hoc Committee in Health Research relating to future intervention options. World Health Organization, Geneva, Switzerland 1996.
- 1994 National Survey of Research and Development. Ministry of Science and Technology Information Centre, Ministry of Science, Technology and the Environment Malaysia.
- 1996 National Survey of Research and Development. Ministry of Science and Technology Information Centre, Ministry of Science, Technology and the Environment Malaysia.
- 1998 National Survey of Research and Development. Ministry of Science and Technology Information Centre, Ministry of Science, Technology and the Environment Malaysia.
- OECD (Organization for Economic Cooperation and Development) 1994. Main definitions and conventions for the measurement of research and experimental development (R&D), a summary of the Frascati Manual, 1993. OECD/DG (94) 84, Paris.
- Report of the Conference on Health Research Management, 16-17 November 1987, Kuala Lumpur.
- Role of Health Research. Ministry of Health Malaysia 1998.
- Tracking Country Resource Flows for Health Research and Development (R&D). A Comparative Report on Malaysia, the Philippines, and Thailand with A Manual on Tracking Country Resource Flows for Health Research and Development. B P Alano Jr and E S Almario, 2000.

ANNEXES

INDICATIVE AREAS OF R&D SUPPORT IN MEDICAL SCIENCE 1988

OVERALL OBJECTIVES

To reduce the cost of health care or morbidity/mortality and to bring about financial returns through marketing of products, e.g. vaccine production.

LIST OF INDICATIVE AREAS

1.0 BIOMEDICAL such as:

- 1.1 Biotechnology
- 1.2 Infectious diseases
- 1.3 Nutritional, endocrine and metabolic disorders
- 1.4 Neoplastic diseases
- 1.5 Congenital and genetic disorders
- 1.6 Cardiovascular disorders
- 1.7 Diseases of childhood
- 1.8 Development and evaluation of pharmacological products
- 1.9 Mental Health

2.0 HEALTH SYSTEM RESEARCH such as :

- 2.1 Evaluation and implementation of immunisation
- 2.2 Primary health care approach
- 2.3 Evaluation of training of health personnel
- 2.4 Quality assurance in health care delivery

3.0 HEALTH BEHAVIOURAL RESEARCH such as :

- 3.1 Knowledge Attitude Practice (KAP)
- 3.2 Health Education
- 3.3 Health and poverty

4.0 INDUSTRIAL HEALTH RESEARCH such as :

- 4.1 Industrial Health Hazards
- 4.2 Ergonomics

INDICATIVE AREAS OF R&D SUPPORT IN MEDICAL SCIENCE 1989

OVERALL OBJECTIVES

To reduce the cost of health care or morbidity/mortality and to bring about financial returns through marketing of products, e.g. vaccine production.

LIST OF INDICATIVE AREAS

- 1.0 BIOMEDICAL** such as:
 - 1.1 Infectious diseases
 - 1.2 Nutritional, endocrine and metabolic disorders
 - 1.3 Neoplastic diseases
 - 1.4 Congenital and genetic disorders
 - 1.5 Cardiovascular disorders
 - 1.6 Diseases of childhood
 - 1.7 Development and evaluation of pharmacological products
 - 1.8 Mental Health

- 2.0 HEALTH SYSTEM RESEARCH** such as :
 - 2.1 Evaluation and implementation of immunisation
 - 2.2 Primary health care approach
 - 2.3 Evaluation of training of health personnel
 - 2.4 Quality assurance in health care delivery

- 3.0 HEALTH BEHAVIOURAL RESEARCH** such as :
 - 3.1 Knowledge Attitude Practice (KAP)
 - 3.2 Health Education
 - 3.3 Health and poverty
 - 3.4 Addiction
 - 3.5 Traffic accidents

- 4.0 INDUSTRIAL HEALTH RESEARCH** such as :
 - 4.1 Industrial Health Hazards
 - 4.2 Ergonomics

- 5.0 TECHNOLOGY DEVELOPMENT** such as :
 - 5.1 Biotechnology
 - 5.2 Computerisation in Health Care
 - 5.3 Medical Equipment and Instrumentation including design, production and maintenance
 - 5.4 Techno-economics

PRIORITY AREAS FOR MEDICAL/HEALTH RESEARCH

PROBLEM AREAS		V. DISEASES/CONDITIONS
I	Research to facilitate application of available technology to control food/water-borne diseases, nutritional deficiencies, immunisable diseases and inappropriate fertility.	Food and water borne diseases Immunisable diseases Nutritional Deficiencies Inappropriate fertility
II	Research in local diseases for which basic knowledge re control is still lacking.	Vector-borne diseases Viral diseases Bacterial diseases Parasitic non-vector borne diseases Behavioural disorders Neoplasms (geographical/ethnic)
III	Research in Non-Communicable Diseases. (a) Hazardous factors are known e.g. smoking, alcohol	(a)1. Cardiovascular diseases - Acquired Non-infective 2. Accidents Substance abuse (glue, drug, alcohol) Metabolic disorders Occupational diseases
	(b) Hazardous factors are not known	(a) Psychotic disorders Neoplastic (cosmopolitan)
IV	Research to reduce morbidity, mortality & limit disability for conditions for which prevention is not known.	Endocrine disorders Congenital & genetic diseases Degenerative disease Metabolic disorders
V	Research to meet needs of policy makers and planners.	Transmigration. Alternative system of Health (traditional medicine) Resources – availability and deficiency Management of Health Services - community involvement - evaluation of Health Services
VI	Research for Technology Development.	Biotechnology - Pharmaceuticals - Biologicals - Reagents Computerisation in Health care medical equipment & Instrumentation (including design, production and maintenance) Appropriate Technology for Health
VII	Research in Toxicology	

Annex 3b

I. RESEARCH TO FACILITATE APPLICATION OF AVAILABLE TECHNOLOGY TO CONTROL FOOD AND VECTOR-BORNE DISEASES, NUTRITIONAL DEFICIENCIES, IMMUNISABLE DISEASES AND INAPPROPRIATE FERTILITY

	PROBLEM AREA	EVALUATION CRITERIA	PRIORITY
1.	Food and water borne diseases	High prevalence. Wide spread operational weakness. Adequate information	High
2.	Nutritional deficiencies	Borderline malnutrition in pockets. Adequate information for intervention. Operational weakness in identifying disadvantaged groups and applying appropriate strategy.	High
3.	Fertility	Uncontrolled fertility among high risk group (low socio-economic group, older mothers). Adequate information. Operational weakness is high.	High
4.	Immunisable diseases	Continuing existence. Adequate information. Operational weakness in identifying disadvantaged groups and applying appropriate strategy.	High

LIST OF FOOD AND WATER-BORNE DISORDERS

- 1.0 Food and water borne disorders
 - 1.1 Factors contributing to the non-availability of clean water and adequate sanitation in high risk population
 - 1.2 Development of affordable and acceptable alternatives in the organisation of health service delivery and technology for the reduction of food and water-borne diseases, for example, through :
 - (i) improving techniques to effect desirable behavioural changes;
 - (ii) the development of alternative organisational structures including ways to improve interagency and intersectoral coordination;
 - (iii) the development of methods, techniques and equipment to provide clean water and adequate sanitation to disadvantaged groups;
 - (iv) the development of methods, techniques and equipment for the sanitary disposal of human and industrial wastes
 - 1.3 Development of effective, feasible, appropriate and acceptable surveillance mechanisms, including gathering new information on the survival of specific disease agents in the local environment.
 - 1.4 Ways to improve the quality of food-handling, food preparation and cooking, including new information in support of existing legislation on food-handling and quality control.

HEALTH RESEARCH PRIORITIES FOR THE 7TH MALAYSIA PLAN

SEO GROUP	TARGET AREA	PROGRAMME
CLINICAL	HEALTH PROBLEMS ASSOCIATED WITH LIFESTYLES	Health problems associated with industrialisation and affluence. Health promotion, education and evaluation. Maternal and child health. Substance abuse Sexually transmitted diseases (STD) and HIV infection.
PUBLIC HEALTH	HEALTH PROBLEMS ASSOCIATED WITH DEMOGRAPHIC CHANGES	Urban health. Problems associated with increased life expectancy. Malignancies.
PUBLIC HEALTH	EPIDEMIOLOGICAL DATABASE	National database on morbidity and mortality.
PUBLIC HEALTH	OCCUPATIONAL AND ENVIRONMENTAL HEALTH	Occupational health and safety. Injuries. Road injuries. Home/Leisure/School Drinking water quality. Air Quality. Food Quality. Environmental health impact. Waste water collection and treatment. Solid waste management.
PUBLIC HEALTH	VECTOR BORNE AND OTHER COMMUNICABLE DISEASES	Vector-borne diseases. Other communicable diseases. Vaccine development, evaluation and implementation.
HEALTH AND SUPPORT SERVICES	NEW TECHNOLOGIES IN HEALTH	Quality control of medical diagnostic instruments and devices. Innovative technology. Development and adaptation of new medical technologies. Appropriate use of medical technologies.
HEALTH AND SUPPORT SERVICES	HEALTH CARE SYSTEM AND INDUSTRIES	Quality of life. Health care delivery system for specific groups. Health care cost, utilisation and community involvement. Human resource development. Inadequate knowledge and undirected screening of natural products. Emergency medicine. Health rehabilitation services. Health Legislation. Systems for monitoring drug utilisation.

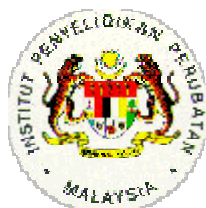
Annex 4b

HEALTH RESEARCH PRIORITIES FOR THE 7TH MALAYSIA PLAN

SEO GROUP	CLINICAL	
TARGET AREA	HEALTH PROBLEMS ASSOCIATED WITH LIFESTYLE CHANGES	
R&D OBJECTIVES	To reduce morbidity and mortality from health problems associated with lifestyle changes	
RESEARCH THEME	Reduction of morbidity and mortality from health problems associated with industrialisation, affluence, substance abuse and sexually transmitted diseases.	
PROGRAMME	RANK	SCOPE OF RESEARCH
Health problems associated with industrialisation and affluence	1	The major health problems that should be studied include : (i) cardiovascular diseases (ischaemic heart disease, hypertension and stroke) (ii) diabetes mellitus (iii) obesity (iv) psychosocial problems For the above diseases research will be conducted on : (i) identification and quantification of risk factors and modification of these risk factors for prevention and control (ii) development of appropriate technologies aimed at early diagnosis and more effective management (iii) evaluating the effectiveness of health promotion campaigns
Health promotion, education and evaluation	2	<ul style="list-style-type: none"> • Determination of the correct target group, message, media for promotion of health in each of the priority problems mentioned above especially diseases associated with lifestyles and substance abuse. • Determination of effective interventional strategies for health promotion targeted at all four levels i.e. environmental, social, organisational and individual. • Development or methods of evaluating the effectiveness of health promotion and health education efforts. • Determination of ways to improve and maximise the utilisation of primary health care facilities.
Maternal and child health	2	<ul style="list-style-type: none"> • Determine ways to reduce high incidence of foetal abnormalities especially in certain parts of the country. • Determine strategies to further reduce prenatal and neonatal morbidity and mortality. • Identify causes of learning disabilities and other handicaps among children so as to provide opportunities for optimal growth and development. • Determine ways to further improve the nutritional status of mothers and children particularly with regard to micronutrients. • Evaluation of nutrition intervention programmes including the promotion of breast feeding programmes. • Prevalence and factors associated with child abuse, neglect, child labour and accidents with the objective of formulating strategies to overcome these problems. • Ways to improve maternal and child health in relation to social, behavioural, cultural, economic, ethnic and geographical factors.
Substance abuse	3	<ul style="list-style-type: none"> • Research aimed at improving the effectiveness of strategies employed in the prevention and control of substance abuse. • Social, behavioural, biological and molecular aspects of substance abuse. • New control and preventive measures.
Sexually transmitted diseases (STD) and HIV infections	3	<ul style="list-style-type: none"> • Prevalence study. • Early and rapid diagnosis for detection, characterisation of strains and treatment e.g. PCR and other new technologies to be accessible and affordable • Characterisation of strains for epidemiological purposes. • Evaluation of new vaccines and new treatment protocols. • Determine reasons for increased incidence of these infections.

ANNEX 5

COHRED – MALAYSIA SURVEY QUESTIONNAIRE



SURVEY ON HEALTH RESEARCH AND DEVELOPMENT

1. This survey aims to obtain information on health research and development (R&D) activities of the government and private sector for calendar years 1997 and 1998. It is particularly designed to gather data on the level and type of available financing and expenditures, as well as the process for agenda-setting, for health R & D. Results of this survey will serve as inputs to a multi-country study that seeks to develop a basic methodology for tracing and measuring health R & D funds, as a tool for fine-tuning the allocation of such funds in a country.
2. Please accomplish the items in the questionnaire by checking or writing the figures in the appropriate box(es). Where complete information is not available, please provide estimates with explanatory footnotes or attachments. Please do not leave any blank spaces. If the information is not applicable, please put N/A. For each research and development (R&D), please complete a separate form.
3. The data reported in this questionnaire will be treated in *strict confidence and will be used for statistical purposes only. Data analysis will be done on a group basis and not individually.*
4. This survey is being conducted by the Secretariat, Standing Committee for Medical Research (SSCMR), and the Institute for Medical Research, Ministry of Health Malaysia. SSCMR staff shall be coordinating with your office to arrange for retrieval of the accomplished questionnaire. If you have questions regarding this survey, please contact any of the persons listed below:

Ms. Ten Sew Keoh or Ms. S Asmaliza Ismail
Institute for Medical Research
Tel. Nos. 603-4402379/4402466
Fax Nos. 603-2920675/2935928
E-mail Address: tensk@imr.gov.my

Thank you for your willingness to spend your time to fill up this questionnaire. Kindly return all completed forms to us before 25th November 1999. Your cooperation is very much appreciated.

DATO' DR HAJI MOHD ISMAIL MERICAN
Deputy Director-General Of Health
(Research & Technical Support)
Ministry Of Health Malaysia.

Remarks :

Please complete the questionnaires:

- 1) **With dark-ink pen**
- 2) **Use capital letters**
- 3) **Fill within the box**

DEFINITION OF TERMS

A. RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D)

Any systematic and creative work undertaken 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.

B. TYPE OF R&D ACTIVITY

- Basic Research

Any experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, **without any particular or specific application** or use in view.

- Applied Research

Any original investigation undertaken in order to acquire new knowledge that is **directed primarily towards a specific practical aim**.

- Experimental Development

Any systematic work, drawing on existing knowledge gained from research and/or practical experience that is directed to **producing new materials, products and devices, to installing new processes, systems and services, and to improving substantially those already produced or installed**.

C. FIELD OF ACTIVITY

- Natural Sciences

Concerns the treatment of Natural Phenomenon like Biology, Botany, Chemistry, Physics, etc. as applied to health. (e.g. studies on bacteriology)

- Epidemiology

Study of distribution and determinants of health-related states and events in specified populations and applications of this study to the control of health problems. (e.g. India-Long-term effects of exposure to methyl Isocyanate)

- Clinical Research

Studies, trials, and/or experiments regarding different illnesses and diseases conducted for the benefit and with the use of specific patients. (e.g. Pressure lowering effect of Lathanoprost versus Timulol in glaucomatous and ocular hypertensive patients)

- Biomedical Research

Studies in living organism with a medical purpose which include diagnosis, therapy, and rehabilitation like Chemistry, Pharmacology, Biochemistry, etc. (e.g. Therapeutic properties of Herbal Medicine)

- Social Sciences

Studies that are concerned with behavioral patterns or changes in a population as subjects to certain conditions, situations or phenomena. (e.g. Effects of Religion on Family Planning Practices)

- Combination

Studies that may involve more than one of the field of activity mentioned above.
(e.g. Clinical Epidemiology: "Prevalence of Poliomyelitis using acute Flaccid Paralysis as an indicator".
Biomedical Epidemiology: "Serological Markers of Hepatitis in Children").

Name of Institution / Department																	
Address																	
								Postcode									
Mailing Address																	
								Postcode									
Telephone No				-						Fax No		-					
Person(s) Completing This Form :																	
Part	Name	Signature				Job Title				Tel. No.							
I																	
II																	
III																	

I. GENERAL INFORMATION

Item 1. Type of Institution (Please shade appropriate circle)

- Government
- Private
- Others (please specify) _____

Item 2.1. Type of Health Research and Experimental Development (R&D) Undertaken by your Institution.

- Internal (Please proceed to Item 2.2.)
- External
- Both Internal & External
- None of the above (Survey ends. Please return questionnaire)

(* if answer is internal, external or both, proceed to the next item)

Item 2.2. Type of Internal Health R & D that is performed **within your institution / department / unit**

- Basic Research only
- Applied Research only
- Experimental Development only
- Basic Research & Applied Research
- Applied Research & Experimental Development
- Basic Research & Experimental Development
- Both Basic Research, Applied Research & Experimental Development
- None of the above

For office use only				

II. RESEARCH AGENDA

Item 3. Is there a list of identified priorities for health research for your institution for 1997, 1998 and the next three to five years ?

- Yes No N/A

Item 4. a. Do you undertake R&D in fields other than health ?

- Yes No N/A

b. If yes, what are these other fields ?

Item 5. Did you consider the Health Research Priorities For The 7th Malaysia Plan (see Table 1) in formulating your institution's health research priority areas ?

- Yes No N/A

Item 6. What are the other factors you considered in the formulation of your institution's health research agenda?

Institution/Department's own objectives

Degree of necessity/requirement

Others, please specify _____

Table 1. Health Research Priorities For The 7th Malaysia Plan

TARGET AREA	PROGRAMME
HEALTH PROBLEMS ASSOCIATED WITH LIFESTYLES	Health problems associated with industrialisation and affluence. Health promotion, education and evaluation. Maternal and child health. Substance abuse. Sexually transmitted diseases (STD) and HIV infection.
HEALTH PROBLEMS ASSOCIATED WITH DEMOGRAPHIC CHANGES	Urban health. Problems associated with increased life expectancy. Malignancies.
EPIDEMIOLOGICAL DATABASE	National database on morbidity and mortality.
OCCUPATIONAL AND ENVIRONMENT HEALTH	Occupational health and safety. Injuries. Road injuries. Home / Leisure / School. Drinking water, air & food quality. Environmental health impact. Waste water collection and treatment. Solid waste management.
VECTOR BORNE AND OTHER COMMUNICABLE DISEASES	Vector-borne diseases. Other communicable diseases. Vaccine development, evaluation and implementation.
NEW TECHNOLOGIES IN HEALTH	Quality control of medical diagnostic instruments and devices. Innovative technology. Development and adaptation of new medical technologies. Appropriate use of medical technologies.
HEALTH CARE SYSTEM AND INDUSTRIES	Quality of life. Health care delivery system for specific groups. Health care cost, utilisation and community involvement. Human resource development Inadequate knowledge and undirected screening of natural products. Emergency medicines. Health rehabilitation services. Health Legislation. Systems for monitoring drug utilisation.
MEDICAL BIOTECHNOLOGY	

III. Financing and Expenditures for Health R&D

The succeeding section asks for information on available financing and expenditures for health R&D. Subsection A requests for 1997 data, while subsection B requests data for 1998.

A. Calendar Year 1997

III.A.1. Financing Health R & D, 1997

Item 7. Source(s) of funds for Health R & D expenditures (for internal R&D, external R&D or both).

(to the nearest RM)

SOURCE(S) OF FUNDS	ALLOCATION (RM)			EXPENDITURE (RM)		
A. INSTITUTION'S OWN FUNDS (includes salaries, wages and other labour costs)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
B. GOVERNMENT FUNDS						
Intensification of Research in Priority Area (IRPA)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Federal Government (apart from IRPA) (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
State or local government	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other funds (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C. PRIVATE FUNDS						
Pharmaceutical Firms (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Academic/Research Institutions (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other Private Funds (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
D. FOREIGN FUNDS (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
E. OTHER SOURCES (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TOTAL (A+B+C+D+E)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

INSTRUCTION

- For Internal R&D, proceed to Section III.A.2.
- For External R&D, proceed to Section III.A.3
- For both, answer all following sections.

III.A.2. Internal Expenditure for Health R & D,

Item 8. Internal Health R & D Expenditure Type of Expenditure, (to the nearest

Type of	Amount
A. Current Expenditure Labour	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
B. Capital Cost Land, building & other Major	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
C. Other Operating Cost Other consumables, repairs and commission	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL Internal Health R&D Expenditure	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Note

LABOR are measured in terms of the level of effort, interpreted as the proportion of working hours to the conduct of health R & D as against the nominal wage. (e.g. Employee is commissioned expected to work 8 hours a day on health R & D. However, he / she only works 4 hours a day. wage is halved according to actual work performed (RM5,000). This will be recorded

Item 9. Internal Health R & D Expenditure Type of R & D Activity, (to the nearest

Type of R & D	Amount
A. Basic	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
B. Applied	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
C. Experimental	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL (to agree with	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Item 10. Internal Health R & D Expenditure by Field of Activity, 1997 (to the nearest RM)

Field of Activity	Expenditure (RM)
1. Natural Sciences (that has benefits for Health)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
2. Epidemiology	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3. Clinical Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
4. Biomedical Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
5. Social Sciences	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
6. Combination of any of the above	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
7. Others, pls. specify _____	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL (to agree with Item 8)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Item 11. Please give details of the funded project(s) performed by your institution as reported at Item 8.

Project Title	Type of R & D Activity	Field of Activity	Target Area (please refer to Table 1)

III.A.3. External Expenditure for Health R & D, 1997

Item 12. Did your institution fund or request other organisation or individuals to carry out health R & D on your behalf using their own facilities ?

- Yes (Please proceed to Item 13)
- No (Survey ends. Please return questionnaire)

Item 13. Please give details on the funded project(s) carried out on your behalf.

Title of Project		
Type Of R & D Activity	Field Of Activity	
<input type="radio"/> Basic Research	<input type="radio"/> Natural Sciences	<input type="radio"/> Social Sciences
<input type="radio"/> Applied Research	<input type="radio"/> Epidemiology	<input type="radio"/> Combination
<input type="radio"/> Experimental Development	<input type="radio"/> Clinical Research	<input type="radio"/> Others
	<input type="radio"/> Biomedical Research	

Item 14. State the amount spent on external Health R & D according to the institutions given financial grant to perform Health R & D on your behalf.

* *Type :*

1 = Government Hospital 2 = University 3 = Private Company 4 = Research Institution
5 = Others

Name of Institution/Contact Number	*Type	Amount (RM)								
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>								
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>								
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>								
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>								
TOTAL External Health R & D Expenditure		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>								

B. Calendar Year 1998

III.B.1. Financing Health R & D, 1998

Item 7. Source(s) of funds for Health R & D expenditures (for internal R&D, external R&D or both).
(to the nearest RM)

SOURCE(S) OF FUNDS	ALLOCATION (RM)			EXPENDITURE (RM)		
A. INSTITUTION'S OWN FUNDS (includes salaries, wages and other labour costs)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
B. GOVERNMENT FUNDS						
Intensification of Research in Priority Area (IRPA)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Federal Government (apart from IRPA) (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
State or local government	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other funds (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C. PRIVATE FUNDS						
Pharmaceutical Firms (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Academic/Research Institutions (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other Private Funds (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
D. FOREIGN FUNDS (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
E. OTHER SOURCES (pls. specify)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TOTAL (A+B+C+D+E)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

INSTRUCTION

- For Internal R&D, proceed to Section III.B.2.
- For External R&D, proceed to Section III.B.3
- For both, answer all following sections.

III.B.2. Internal Expenditure for Health R & D, 1998

Item 8. Internal Health R & D Expenditure by **Type of Expenditure, 1998** (to the nearest RM)

Type of Expenditure	Amount (RM)
A. Current Expenditure :	
Labour cost	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
B. Capital Cost :	
Land, building & other structures :	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Major Equipment	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
C. Other Operating Cost :	
Other consumables, repairs and maintenance, commission work	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL Internal Health R&D Expenditure	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Note :

LABOR COST are measured in terms of the level of effort, interpreted as the proportion of working hours actually devoted to the conduct of health R & D as against the nominal wage. (e.g. Employee is commissioned RM10,000 a month and is expected to work 8 hours a day on health R & D. However, he / she only works 4 hours a day. Therefore, his / her nominal wage is halved according to actual work performed (RM5,000). This will be recorded as the labor cost.

Item 9. Internal Health R & D Expenditure by **Type of R & D Activity, 1998** (to the nearest RM)

Type of R & D Activity	Amount (RM)
A. Basic Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
B. Applied Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
C. Experimental Development	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL (to agree with Item 8)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Item 10. Internal Health R & D Expenditure by **Field of Activity, 1998** (to the nearest RM)

Field of Activity	Expenditure (RM)
1. Natural Sciences (that has benefits for Health)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
2. Epidemiology	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3. Clinical Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
4. Biomedical Research	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
5. Social Sciences	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
6. Combination of any of the above	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
7. Others, pls. specify _____	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
TOTAL (to agree with Item 8)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Item 11. Please give details of the funded project(s) performed by your institution as reported at Item 8.

Project Title	Type of R & D Activity	Field of Activity	Target Area (please refer to Table 1)

III.B.3. External Expenditure for Health R & D, 1998

Item 12. Did your institution fund or request other organisation or individuals to carry out health R & D on your behalf using their own facilities ?

- Yes (Please proceed to Item 13)
- No (Survey ends. Please return questionnaire)

Item 13. Please give details on the funded project(s) carried out on your behalf.

Title of Project		
Type Of R & D Activity	Field Of Activity	
<input type="radio"/> Basic Research	<input type="radio"/> Natural Sciences	<input type="radio"/> Social Sciences
<input type="radio"/> Applied Research	<input type="radio"/> Epidemiology	<input type="radio"/> Combination
<input type="radio"/> Experimental Development	<input type="radio"/> Clinical Research	<input type="radio"/> Others
	<input type="radio"/> Biomedical Research	

Item 14. State the amount spent on external Health R & D according to the institutions given financial grant to perform Health R & D on your behalf.

* *Type :*

1 = Government Hospital 2 = University 3 = Private Company 4 = Research Institution
5 = Others

Name of Institution/Contact Number	*Type	Amount (RM)										
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>										
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>										
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>										
	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>										
TOTAL External Health R & D Expenditure		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> <td style="border: 1px solid black; width: 15px; height: 15px;"></td> </tr> </table>										