

Current approaches to national health research systems analysis: a brief overview of the WHO health research system analysis initiative

Abordagens atuais à análise dos sistemas nacionais de pesquisa em saúde: uma introdução à iniciativa HRSA da OMS

Ritu Sadana ¹
Tikki Pang ¹

Abstract *This article introduces the WHO health research system analysis (HRSA) initiative as an input to the World Health Report 2004 on health research, "Knowledge for Better Health". Section 2 presents the HRSA conceptual framework for operational description and analysis of national health research from a system rather than sector perspective. Section 3 summarizes research projects addressing contemporary cross-national issues, aiming to: provide answers to key questions, further explore contested areas within systems, and improve decision-making on research investment options. Section 4 summarizes the comprehensive country studies on research systems. Section 5 outlines a pilot study on methods for 18 comprehensive country studies, including Brazil, Chile, and Costa Rica. Section 6 concludes that the pilot study and eventual main phase to describe and analyze national health research systems will demonstrate WHO's commitment to strengthening capacity in partnership with countries.*

Key words *Health research systems, WHO, HRSA*

Resumo *O artigo apresenta a iniciativa da OMS conhecida como HRSA, sobre análise de sistemas de pesquisa em saúde, como contribuição ao Relatório Mundial da Saúde 2004: "Conhecimento para uma saúde melhor". Em seguida coloca o marco conceitual da HRSA para a descrição operacional e análise da pesquisa em saúde. Na parte 3 resume os projetos de pesquisa que lidam com questões transnacionais contemporâneas visando a: dar respostas a questões-chave, explorar áreas controversas dentro dos sistemas e melhorar processos decisórios em relação a alternativas de investimento em pesquisa. Na parte 4 resume estudos nacionais sobre sistemas de pesquisa. Na parte 5 delineia um estudo-piloto sobre as metodologias de estudo em 18 países, inclusive no Brasil. Na parte 6 conclui que o estudo-piloto e a fase principal do estudo devem demonstrar o compromisso da OMS em relação ao fortalecimento da capacidade de pesquisa em parceria com os países.*

Palavras-chave *Sistemas de pesquisa em saúde, OMS, HRSA*

¹ Department of Research Policy & Cooperation (RPC), World Health Organization, Avenue Appia, 1211 Geneva 27, Switzerland.
sadanar@who.int

1. Introduction

WHO has a mandate in its constitution to promote and conduct research in health (WHO, 2002), as well as to promote cooperation among scientific and professional groups which contribute to the advancement of health. Within the WHO secretariat, the Department of Research Policy & Cooperation's (RPC) aims specifically to address key components of this mandate. One strategy to fulfil this aim is to undertake technical work and activities aimed at strengthening health research capacity and health research systems in the 192 Member States of WHO, with a special emphasis on low and middle income countries. The Health Research System Analysis (HRSA) initiative is part of this strategy, and will be one of the main means of generating information and analysis on the status and use of health research. This short paper covers several aspects of this initiative that RPC is implementing and coordinating in conjunction with representatives from an array of countries and research institutes. In the short term, activities and results will serve to strengthen participating countries' capacity to monitor and evaluate health research system activities and use information as an input to decision making, as well as serving as an input to the *World Health Report 2004* on the theme of health research. Medium and longer term work will contribute to strengthening other functions of health research systems in countries and progress towards the health research system's goals.

2. Conceptual framework

Health research has been broadly defined as *the generation of new knowledge using the scientific method to identify and deal with health problems* (Report of the Commission on Health Research for Development, 1990). At the same time, a system has been defined as a group of elements operating together to achieve a common goal (Forrester, 1980). A conceptual framework has been crafted as a basis for this initiative stressing a system's perspective. It is intended that this framework serves as the basis for operational description and analysis of national health research from a system's perspective, rather than from the perspective of selected sectors driven by markets, specific diseases or technologies, interest or advocacy groups,

technocrats, etc. Building on needs articulated during the 1990's (Report of the Commission on Health Research for Development, 1990; WHO, 1996), the framework has been developed specifically within the last two years during a series of extensive consultations with experts and other interested organizations, a wide range of researchers and representatives from countries, and individuals and institutions working on strengthening health research systems. It also draws upon an extensive literature review (Pang T *et al.*, 2003). In March 2001, WHO organized an international workshop on National Health Research Systems, in Cha-am, Thailand, with financial and logistic support from the Global Forum for Health Research, the Council for Health Research and Development and the Rockefeller Foundation. Key concepts covering goals and terminology, mapping of the health research system and approaches to strengthen health research systems were discussed in detail and summarized (WHO 2001). Since then, continued discussions at various forums have contributed to refining the framework and obtaining a wider consensus.

The key elements of the conceptual framework is presented below, through a series of key questions.

1. *What is the definition of a health research system? What are its boundaries?* The framework delineates a boundary of the health research system based on the following definition: *The people, institutions, and activities whose primary purpose is to generate high quality knowledge that can be used to promote, restore, and or maintain the health status of populations. It can include the mechanisms adopted to encourage the utilization of research.* Health research systems overlap to some extent with health systems and other research systems, i.e., education, environment, science and technology, among others. Of note is that although boundaries may not be clear, it is important to discuss what national health research systems include at a particular point in time. Such concrete definitions are required to describe and analyse what is considered as health research, (i.e., the actual topics covered), who is doing health research (i.e., institutions and individuals), who are the research users (i.e., policy makers, communities, donors, industry) and how much does health research cost (i.e., funding flows and allocation). Being specific at this stage will also aid in the more difficult task of attributing improvements in health or health equity, to health research.

2. *What are the overall goals?* The main goals of health research are the advancement of scientific knowledge and utilization of knowledge to improve health and health equity. There are also many intermediary benefits, such as benefits to future researchers, political and administrative benefits, other benefits to the health sector, as well as other social and economic gains (Buxton M & Hanney S, 1996). As in other areas of science and technology, economic benefits are often cited by countries or regions as a driving force for investments in research and subsequent innovation (Decision Nº 1513, 2002). Nevertheless, participants involved in the extensive consultation process agreed that the intrinsic goals of health research, as opposed to other research or activities, should specifically contribute to improvements in health and health equity.

3. *What are the functions of health research systems?* Four functions are proposed as attributes of a well-functioning health research system. These are defined below by the operational components noted.

a) *Stewardship Function*

Define and articulate a vision for a national health research system.

Identify appropriate health research priorities and coordinate adherence to them.

Set and monitor ethical standards for health research and research partnerships.

Monitor and evaluate the health research system.

b) *Financing Function*

Secure research funds and allocate them accountably.

c) *Creating & Sustaining Resources Function*

Build, strengthen and sustain the human and physical capacity to conduct and absorb health research.

d) *Producing & Using Research Function*

Produce scientifically validated research outputs.

Translate and communicate research to inform health policy, health practice, and public opinion.

Promote the use of research to develop drugs, vaccines, devices and other applications to improve health.

Although developed independently, these groupings are similar to those found within the WHO framework for health systems performance (WHO, 2000). National indicators of each function's key operational components are in the process of development, estimation

and testing with countries participating in the comprehensive description and analysis study (see sections 4 and 5). Descriptions of an overall typology or structures of health research systems will be derived from the data, analysis and evidence collected through the overall HRSA initiative.

The rationale for the HRSA initiative is as follows:

- to develop with countries a methodology to facilitate describing and analyzing health research systems and to stimulate action;
- to understand the contribution of health research systems in improving health and health equity;
- to enable evidence-based advocacy to governments and international organizations to increase investments in health research;
- to provide input to decision making on policies and strategies to strengthen health research systems within the context of each country.

The HRSA initiative is comprised of two main activities: research projects addressing contemporary issues and comprehensive country studies. Each are briefly described in the following two sections.

3. Projects addressing contemporary issues

Based on the conceptual framework for health research systems briefly described above, RPC has initiated several projects to build on, further develop and test methods to describe and analyse specific components of health research systems, or to investigate specific aspects of health research systems that require further investigation from a cross-national or international perspective. Table 1 (summary of projects addressing contemporary issues within HRS) summarizes the focus of each project and the basic link with the conceptual framework. The projects are in different stages of development, review and implementation. All projects will benefit from the comprehensive country case studies and analyses effort, with some projects directly supporting national efforts to collect and analyze data, described in the next section. Several projects are being conducted in collaboration with external researchers or research institutes; others will have input from or be reviewed by external collaborators.

Much of the project work will build on or develop new techniques to estimate valid, com-

Table 1
Summary of projects addressing contemporary issues within HRS.

HRS Function/ Goal	Project	Project Focus
Financing	1. Resource Flows for Health Research	Develop new methods and estimate amount spent on health research in member states; build on methods and estimates of the Global Forum on Health Research, and in-depth work in selected countries participating in a COHRED initiative to better describe allocation of funds, and those participating in the in-depth component of the HRSA.
Producing and using research Goal: advancement of scientific knowledge	2. Estimating primary research outputs through bibliometric analyses	Using the ISI database supplemented by regional databases, estimate the number of articles published and range of journals published, over a 10 year period (1992-2001), by disciplines, countries and other categories. The project will conduct a critical evaluation of existing data bases, including estimating the types of primary outputs that are excluded. Various biases and uncertainty analyses will be made explicit.
Creating and sustaining resources	3a. Health researchers' database	Develop an innovative approach for research institutions to assemble information on researchers and types of research projects underway. The goal is a "dynamic product" based on cutting edge interactive web technology, for enhanced knowledge management & networking among researchers and other actors within health research systems. This will be the collective work of a consortium lead by the Netherlands Organisation for Scientific Research.
	3b. Cross-national movements of health researchers: brain drain/ science gain	Although some recent studies (Boharat <i>et al.</i> , 2001; Beine M <i>et al.</i> 2002) use new approaches to estimate skilled labour migration or resulting benefits/losses to countries in general, this project will focus specifically on the motivation (push and pull factors) for the migration of <i>health researchers</i> . The detailed analyses of motivational factors will be supplemented by macro estimates of the number of health researchers migrating and country based policy reviews in interested countries participating in the in-depth component of the HRSA.
Producing and using research	4. Knowledge utilisation: uptake of research results and policies	This project will develop and test methods to describe and analyse the mechanisms through which research outputs are used within national settings. Four domains will be investigated: policy, health care practice, public engagement and products & technology. Three discrete areas of unambiguous research will be evaluated in selected countries: use of IUDs, multi-drug therapy for leprosy, oral rehydration therapy and equitable access to health services. Pilot testing will take place in China, Ghana, India and Mexico and as well from those participating in the in-depth component of the HRSA.

(continued)

Table 1 (continued)

Summary of projects addressing contemporary issues within HRS.

HRS Function/ Goal	Project	Project Focus
Stewardship	5. Ethical standards for health research and research partnerships	The main objects of this project are to evaluate the status of ethical review of health research and to describe the nature and mechanisms for ethical review in large sample of WHO member states. The project will also investigate the relationship of ethical review of health research with the level of risk in research, sensitivity of topics and use of vulnerable populations, in a smaller sub-set of countries, including those participating in the in-depth component of the HRSA.
Stewardship	6. Linking to millennium research and development priorities: estimating current technology gaps & priorities for investment given projected burden of disease	The premise of this project is that for many health problems, there is a gap between what can be achieved using current interventions and the total anticipated future health burden. In order to optimally allocate future investments in health research, the project will estimate the future burden of disease up to 2030; identify putative new technologies that can address this burden; estimate the magnitude of the future burden that may be avoided through investment in research and development for new technologies. This work will be carried out in conjunction with on-going work on burden of disease and cost-effectiveness analyses within WHO and collaborating institutions.
Stewardship Goal: utilisation of knowledge to improve health and health equity	7. Attributing health gain & other socio-economic benefits to health research	This project will build on existing approaches and develop improved methods that may estimate the health returns on investment in health research. These methods will provide an approach to attribute health research to health gain, a crucial piece that requires significantly more documentation within the evidence base on health research systems. This work will be carried out in conjunction with on-going work on burden of disease and collaborating institutions.

parable indicators to describe health research systems as well as provide insights on key questions, in as many WHO member states as possible. Based on a range of country consultations and review of the limited existing data available particularly in low and middle income countries, this work is clearly justified and needed in order to enhance the evidence base on health research systems. Certain issues within health research systems, such as migration of health researchers (Pang T *et al.*, 2002), among others, clearly will benefit from cross-country perspectives.

Key questions addressing different functions and goals include: What is the total amount spent on health research annually? What percentage is this of the total health budget? How many health researchers and insti-

tutes doing health research are there in a country? How many papers are published each year in Medline, International Science Citation Index (ISI), and other regional reference data bases? How many national journals publish health research findings? Are investments in health research leading to better levels and distribution of health in a population? Where there is overlap, results from the projects will be compared with the results from the comprehensive country case studies in an iterative process: this should enhance the reliability, if not also the validity, of results obtained and certainly strengthen the methods developed.

Furthermore, within each country, or across countries, there are different perspectives based on the various actors within a health research system, most commonly classified as funders of

research, producers of research, and users of research results or applications (Frenk, 1992). We may also add those who benefit from health research in terms of improvements in health status, given one of the intrinsic goals of a health research system. The process itself should illuminate approaches to better align these different perspectives (Lomas, 2000). Regardless of the perspective, it is intended that the results from this collective work will significantly contribute to an evidence base on health research systems. A range of data collection methods are being used in the various projects: from surveys, questionnaires and policy reviews, new bibliometric approaches, to media coverage assessments, new data modelling techniques, etc., among others. Results documenting the benefits of health research and identifying the most effective processes to produce and utilize health research for improved health and health equity, will be especially sought. These findings will clearly serve as an input to the *World Health Report 2004*, but more importantly to concrete, longer-term technical cooperation and support to countries and across countries.

4. Comprehensive country case studies: description and analyses of national health research systems

In parallel with the specific projects identified in table 1, a comprehensive effort to describe and analyse national health research systems by representatives within countries, in collaboration with WHO, will take place ideally in some 40 to 45 countries globally, e.g., around seven countries in each of the six WHO regions. The point will be to complete a comprehensive description and analyses addressing the functions and goals of health research systems. Different countries may use this as a benchmarking exercise, while across countries, the exercise will be used to identify best practices and lessons learnt. As noted, this operational assessment should serve as an input to strengthening existing health research systems.

In the first phase, between two to four countries from each region are participating in selecting core indicators for developing and testing methods (including sampling strategies, data collection tools, analyses approaches, communication strategies) and discussing the usefulness of the results as one input to developing strategies and activities to strengthen health

research systems. Eighteen countries are involved in the selection and testing of indicators, data collection and analysis approaches. From each of the WHO regions, these include: (AFRO) Cameroon, Tanzania, Senegal; (EMRO) Pakistan, Islamic Republic of Iran, Tunisia; (EURO), France, Russian Federation, Kazakhstan; (PAHO) Brazil, Chile, Costa Rica, United States of America; (SEARO) Indonesia, Thailand; (WPRO) Australia, Malaysia, Laos.

A core set of indicators and key descriptive variables have been agreed upon for further testing, as well as a portfolio of data collection and analysis tools. Table 2 outlines a selection of these indicators and variables, and tied to these, a range of data collection methods. Table 3 lists the 14 core indicators of national health research systems for further testing, agreed upon through the consultation process with low and middle income countries thus far. Although building on existing approaches to evaluate research investments (European Commission, 2001; Unesco, 2002), for some of these indicators, existing data may not be available in every country, or limited time series data that is often more useful for policy making than single year estimates. Furthermore, certain sectors within health research systems may be more challenging to describe and analyze, such as private sector funding of health research activities. Also, some countries may be grappling with sets of issues related to their level of overall development or geographic proximity. For example, certain similarities may be found across Australia, France and the USA on one hand, or Thailand, Malaysia and Indonesia on the other hand. For these and other reasons, it is critical that approaches to collect data and estimate these indicators are being developed and tested in conjunction with participating countries, some building on existing tools, others newly developed.

The range of qualitative and quantitative methods is based on the diversity of areas under investigation within each function, the indicators that may be most informative for policies, the descriptive variables most useful to countries, as well as data collection and analyses strategies that are feasible and will most likely lead to defensible, and when appropriate, comparable results. Longer and shorter modules for each of the areas under analysis will be developed after the pilot phase, based on core indicators and descriptive variables: countries may choose to devote more or less resources to

Table 2
Comprehensive country studies: example indicators or descriptive variables addressing functions of a health research system & data collection methods.

HRS Function	Example indicators to be described and analysed	Range of methods
Stewardship	A national policy on health research involving all key stakeholders? Stakeholders' views defined and integrated within a national policy on health research	Document reviews Focus group discussions Key informant interviews
Stewardship	Existence of a forum or process to coordinate the setting of national health research priorities? Factors considered in health research priority setting (e.g., national burden of disease, human resources, political will, community participation, etc.)	Document reviews Key informant interviews
Stewardship	Do ethical review boards exist? Distribution: disciplines, geographic Review criteria, guidelines published Per cent of projects that pass	Document reviews Re-analysis of existing data Surveys
Stewardship	Existence of monitoring and evaluation activities clearly linked with strengthening HRS	Document reviews Key informant interviews Surveys
Financing	Amount of resources allocated in accordance with nationally stated priorities? Public, private, internal, external	Document reviews Re-analysis of existing data Surveys
Creating and sustaining resources	Number of active health researchers Institutions, specialization, geography, gender, core funding, specific research training	Document reviews Re-analysis of existing data Surveys
Producing and using research	Number of journals published Quality & peer review mechanisms Health research output published	Document reviews Key informant interviews Re-analysis of existing data Surveys
Producing and using research	Mechanisms to review primary research outputs Number of systematic reviews	Document reviews Focus group discussions Media Reviews Key informant interviews Re-analysis of existing data
Producing and using research	Mechanism to patent research results Number of patents attributed to health research results	Document reviews Key informant interviews Re-analysis of existing data

different topics of interest and relevance. Countries may also choose to participate as case studies in connection with the projects addressing cross-national issues (as noted in bold in table 1). It is intended that throughout this process, WHO, whether at headquarters or through its regional or country offices, works closely with countries and other collaborating groups, first

during an initial pilot phase, and then in the main phase, to address if not overcome the following challenges:

- Locating data and information that is currently available;
- Adapting existing or developing new data collection and analyses methods that are valid, reliable, acceptable and feasible and that are ro-

Table 3

Core indicators* for further development and testing, by health research system function.

Function 1:	Stewardship
Indicator:1.1	Degree to which stewardship function is fulfilled, in the following four areas: 1.1.1 vision 1.1.2 priorities 1.1.3 ethics 1.1.4 monitoring & evaluation
Indicator:1.2	Research and development expenditure on explicit national priorities for health research financed by public funds, in relation to total health research and development expenditure financed by public funds, in international \$, base year 2001
Indicator:1.3	Health research proposals submitted for ethical review, in relation to total health research proposals requiring ethical review (e.g., human subjects, genetics, stem cell, animal, etc.), base year 2001
Function 2:	Financing
Indicator: 2.1	Total funds allocated to health research, in relation to gross domestic product (GDP), in international \$, base year 2001
Indicator: 2.2	Public funds allocated to health research, in relation to total health expenditures, in international \$, base year 2001
Indicator: 2.3	Share of total funds allocated to health research in each of the following areas, base year 2001: 2.3.1 Non-oriented, fundamental research 2.3.2 Health conditions, diseases or injuries 2.3.3 Exposures, risk factors that impact on health 2.3.4 Health systems research 2.3.5 Research capacity building 2.3.6 Anything not covered by above categories

(continued)

bust to different types of health research systems found in countries;

- Comparability across time or place, given diversity across countries in terms of the scope and appropriate policies to strengthen health research systems, given that health research systems in high-income countries with pluralistic systems, for example, differ greatly from those found in low-income countries with highly centralized systems;
- Basing interpretations on information with biases, confidence and uncertainty made explicit;
- Enabling legitimate and defensible comparisons across countries or across time within a country to inform the international dialogue on health research systems, as appropriate.

The overall operational approach is based on what types of decisions individuals, institutions and sectors within health research systems face, what type of inputs are currently used to make decisions, and what types of in-

puts would be desirable for improved decision making. Several contextual issues arise, first being the diversity across countries. The second is the non-linearity of the policy process and the heterogeneity concerning the critical space and pace of policy changes (Grindle & Thomas, 1991) related to the health research system across countries, which is clearly recognized within this initiative (e.g., practically, some countries may identify information needs for incremental improvements, while others may be considering more radical changes.) Irrespective of the context, the process itself of describing and analyzing the health research system is intended to:

- strengthen coordination among different sectors or perspectives (e.g., public-private, research producers-research users, politicians-technocrats, range of ministries beyond health including education, research or science and technology, etc.);

Table 3 (continued)

Core indicators* for further development and testing, by health research system function.

Function 3: Creating & Sustaining Resources	
Indicator: 3.1	Active health researchers (full time equivalents) in relation to total workforce, base year 2001
Indicator: 3.2	Supportive context of research environment 3.2.1 Range and breadth of health researcher networks 3.2.2 Transparency of the funding process 3.2.3 Quality of the work space and facilities 3.2.4 Encouragement of collaboration with others 3.2.5 Opportunities to present, discuss and publish results 3.2.6 Relevance of health research activities to health problems 3.2.7 Education and continuous training 3.2.8 Wage of health researchers 3.2.9 Nurturing of careers
Indicator: 3.3	Average wage, by sex, in international \$, base year 2001, for: 3.3.1 newly graduated PhD/doctorate entering health research system with full time position 3.3.2 senior researcher with PhD/doctorate with at least 20 years of post-doctorate experience 3.3.3 senior researcher with PhD/doctorate who is a director of a research institute/large research group
Indicator: 3.4	Trend in total public funds allocated to health research, in relation to total health expenditures expressed as annual change, from 1992-2001
Indicator: 3.5	Institutions within the health research system with access to at least 20 national and international health journals (full text print or electronic versions) in relation to total institutions within the health research system
Function 4: Producing & Utilizing Research	
Indicator: 4.1	Health research articles published in ISI, Medline and regional reference databases including peer reviewed journals in relation to total active health researchers, from 1992-2001
Indicator: 4.2	Newspaper articles citing health research systems activities in major newspapers in relation to 4.2.1 all newspaper articles addressing health issues in major newspapers, during a defined time period 4.2.2 all news articles in major newspapers during a defined time period, in column centimetres
Indicator: 4.3	Patents registered resulting from health research in relation to active health researchers, 1992-2001 4.3.1 internationally registered 4.3.2 nationally registered

* In addition to these 14 core indicators, 42 descriptive variables have also been identified for further testing and are accessible at <<http://www.who.int/rpc/researchsystemsanalysis/index.en.shtml>>

- increase the range of stakeholders involved, and;
- enhance the country's capacity to monitor and evaluate health research in a sustainable and legitimate (i.e., technical and political validity) fashion and use the results.

5. Next steps

The next steps toward preparing and testing draft methods in a pilot study, and then in the main phase of the comprehensive country case studies and analyses, are elaborated here. It is planned that WHO, both in Geneva and through its Regional Offices, will support a critical mass of countries representing all WHO regions to participate in this effort before the release of the *World Health Report 2004*. Partnerships with various bi-lateral, multi-lateral and private foundations are also being sought to support this effort. Although desirable, not all 192 Member States will be able to carry out this in-depth work by 2004. Therefore, in conjunction with our collaborators and expert committees made up of representatives from all regions, some criteria for selecting countries to be involved in the comprehensive country case studies and analysis have been forwarded, and include the need to (not presented in any particular order of importance):

- work with countries that have expressed an interest to WHO to carry out this analysis and eventual strengthening of national health research systems;
- ensure a balance across different levels of technological and economic development, demographic profiles, geographic situation and epidemiological transition;
- illustrate differences in the organization of health research systems, across the spectrum of health research systems within each region, as well as across regions;
- build on other existing collaboration or contacts across WHO, including substantial work carried out by its regional offices, and other collaborators or projects external to WHO;
- although the process itself is to be considered as a capacity building component of health research systems (e.g., particularly within the stewardship function, concerning the monitoring and evaluation of HRS), selection should consider the current capacity and priority to carry out the analysis in terms of implementing qualitative and quantitative research within a country;

- highlight particular countries with important health research system examples that should not be overlooked within a *World Health Report* on health research.

As noted, eighteen countries are involved in the first phase of pilot testing. The first Inter-Regional Consultation on Health Research Systems Analysis took place in July 2002 in Kuala Lumpur, Malaysia. Pilot countries that participated at this meeting from each of the WHO regions, included: AFRO – Tanzania, Senegal; EMRO – Pakistan, Iran; EURO – Kazakhstan; PAHO – Brazil, Costa Rica; SEARO – Indonesia, Thailand; WPRO – Malaysia, Laos. During this Inter-Regional Consultation, proposed core indicators and example draft methods were discussed with representatives from these countries and RPC counterparts from regional offices. Based on the Inter-Regional Consultation, a revised list was sent to all participants and others involved in the initiative in August 2002. A second Inter-Regional Consultation with representatives from Chile, Tunisia and the Russian Federation took place in Geneva, during October 2002. Based on these additional comments and peer-review, 14 core indicators and 42 key descriptive variables (WHO, 2003) have been proposed to be tested across all pilot countries (selection of core variables in table 2) in terms of identifying existing data sources and collecting additional data as appropriate. Additional in-depth consultations were held in Geneva with focal points from France and Cameroon during November and December 2002. Based on discussions and inputs, the operational approach, core indicators and descriptive variables, and draft methods for new data collection will be finalized by early in 2003.

Even if the primary focus is to strengthen low and middle income countries' national health research systems, during the pilot phase we will work closely with individuals from Australia, France, and the USA, to address what indicators and types of data would be most useful for the policies and potential strategies under discussion in these countries, given the greater complexity and pluralism within the health research system and major influence of the private sector, among other characteristics. A third consultation is being planned with representatives from the high-income countries, potentially in February 2003, to identify how involvement in the pilot and eventual main phase of this study can be useful to these coun-

tries. A couple of issues already identified as relevant include: investigating the balance between directed research and investigator led research, at least concerning public funds; improving synthesis of existing research findings in a manner relevant to national interests; documenting that health research as a driving force for overall innovation in science and technology and other social and economic benefits beyond health and health equity; enhancing sharing of information across very complex systems.

The formation of "national" teams, ethical review, data collection and analysis period for the pilot phase has been initiated since the period of consultations. New data collection should be completed by April 2003. This window is approximate given the different context in each of the participating countries. The results from this pilot phase will serve to refine the process of including major stakeholders, improve the sampling strategy and data collection tools, refine the indicators in terms of country and cross-country feasibility, and evaluate the reliability of the methods. An inter-regional meeting to discuss the results from the pilot, with representatives from all of the pilot countries, is tentatively planned for April or May 2003.

By June 2003, the revised methods are expected to be available for an additional 4-5 countries from each region to undertake the comprehensive assessment. A series of regional launches that are planned that will bring together representatives from countries who have conducted the pilot, with representatives from additional countries in the same region, for in-depth discussions. Developing countries that are major producers of health research outputs, such as China or India, will hopefully be included at this stage. It is equally hoped that countries that are major funders of health research and supporters of health research capacity building, such as Canada, Sweden, Japan or the United Kingdom, among others, will also be included at this stage. Resulting cross-national lessons and national case studies, including those to be highlighted in the *World Health Report 2004*, will attempt to provide a balanced view of health research systems, and thus countries that have limited activities in this area will also be included. Another reason to include countries with nascent health research systems is that the process itself will contribute to capacity building. In conjunction with suggestions from countries, Regional Offices, and

WHO representatives in countries, RPC would welcome any suggestions for additional countries or expressions of interest from countries.

In this first wave of country studies (pilot and main phase), basic results and lessons concerning the description and analyses of health research systems would be desirable by the end of 2003 in order to be integrated, along with other analyses, within the *World Health Report 2004*. It is expected and desirable that further analyses and interpretation will continue to take place, as well as additional countries wanting to engage in this process of analysis and capacity strengthening of their own national health research systems. Furthermore, key results will be highlighted at the Global Summit on Health Research, which will coincide with the release of the *World Health Report 2004* and the Global Forum for Health Research's Forum 8 in November 2004. This summit will be hosted by the Mexican Government, and will include ministers of health and representatives from other key sectors to research, as well as global leaders in health research.

It is envisioned that RPC and others within WHO will not only support countries to do in-depth analyses of their health research systems and provide a platform for countries to share their experiences with one another, but in the future also offer concrete technical support to countries, if requested, towards strengthening health research systems.

6. Concluding remarks

Although earlier reports have referred to the concept that *research is a system involving people, institutions and processes* (Report of the Commission on Health Research for Development, 1990) there have been relatively few attempts to articulate and define the system's boundaries, goals and functions. Such an attempt would seem to be an important first step towards a better understanding of how research contributes to improvements in health and health equity. A system approach to health research would help to facilitate more effective communication and coordination among various players in the health research endeavour. The framework presented here has multiple uses for decision- and policy-makers, researchers, funding agencies, and the end-users of research. Some (Horton, 2002) have stressed that WHO should focus more efforts at the country

level: the majority of this work will be carried out in countries, in close collaboration with representatives from countries. The operational plans for projects and country studies and the eventual results should provide countries and donor agencies alike with inputs to decision making concerning policies and strategies towards the strengthening of national and global health research systems.

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