Global Programme on Research Policy & Cooperation (RPC)
World Health Organization
WHO/HQ, Geneva
WHO Health Research System Analysis Initiative: Brief Overview
Department of Research Policy & Cooperation (RPC)
World Health Organization (WHO), Geneva

Summary

This short overview covers several aspects of the health research system analysis work that RPC is initiating and coordinating as an input to the World Health Report 2004 on health research - "knowledge for better health" and beyond.

First, a brief version of the draft conceptual framework is presented. This framework serves as the basis for operational description and analysis of national health research from a system's perspective, rather than from a sector perspective. The framework has been developed during a series of extensive consultations with experts and other interested organizations, a wide range of researchers and representatives from countries, and individuals working on strengthening health research systems. The framework has evolved over the past two years. Three areas are delineated, namely, the definition, goals and functions of health research systems.

Second, short summaries of several projects addressing different functions and goals of health research systems, connected to this initiative are provided. These projects aim either to develop and test methods to analyse health research systems, or to investigate specific aspects of health research systems that require further investigation, either from an in-depth country perspective, or from cross-national perspectives. 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. 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, as well as to concrete, longer-term technical cooperation with countries to strengthen national health research systems well beyond the publication of the WHR 2004.

Third, the types of methods that may be used to collect and analyse information on health research systems within the in-depth country case studies are outlined. The range of qualitative and quantitative methods is based on the diversity of areas under investigation, the indicators that may be most informative, and data collection and analyses strategies that are feasible and will most likely lead to defensible, and when appropriate, comparable results. A list of proposed core indicators and key descriptive variables, based on discussions held at the two Inter-Regional Consultations on Health Research Systems Analysis, (July 2002, Kuala Lumpur, Malaysia, with pilot countries representing each of WHO's regions; October 2002, Geneva, Switzerland, with representatives from 3 additional countries joining the pilot study), is attached. The document concludes by noting the next steps toward preparing and testing draft methods in a pilot study and then in the main phase of the in-depth country analyses. It is planned that WHO 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. It is expected that after the report is released, additional countries will want to engage in this process of analysis and capacity strengthening of health research systems.
I. Introduction

WHO has a mandate in its constitution to promote and conduct research in health, 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 aims specifically 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 Member States of WHO, with a special emphasis on low and middle income countries. The Health Research System Analysis Initiative is part of this strategy, and will be one of the main means of generating information and analysis on the status of health research. This short document covers several aspects of this initiative that RPC is implementing and coordinating in conjunction with Member States. Furthermore, in the short term, activities and results will serve to strengthen participating countries' capacity to monitor and evaluation health research system activities and use information as an input to decision making, as well as serve as an input to the World Health Report 2004. Medium and longer term work will contribute to strengthening other functions of health research systems and contribute to enhancing the health research system's goals.

II. Conceptual Framework

A draft conceptual framework has been drafted as a basis for this initiative, and is forthcoming as a peer-reviewed publication. 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, interest groups, technocrats, etc. The framework has been developed 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, and also benefits from an extensive literature review. 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 system and approaches to strengthen health research systems were discussed in detail and summarized. Since then, continued discussions at various forums have contributed to refining the framework and obtaining a wider consensus.

A brief version of the conceptual framework is presented, through a series of key questions:

1. What is the definition of a health research system? The framework sets out to delineate 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. It is important to note 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 topics covered), who is doing health research (i.e., institutions and individuals), who are the research users (i.e., policy makers, communities, donors) 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 many intermediary benefits, such as knowledge benefits, benefits to future researchers, political and administrative benefits, benefits to the health sector, and broader social and economic benefits. Nevertheless, the intrinsic goals of health research, as opposed to other research or activities, should ultimately contribute to improvements in health and health equity.

3. What are the functions of health research systems? The following functions are proposed as putative attributes of a well-functioning health research system:

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

D. Producing, Synthesizing & Using Research
   - Produce scientifically validated research outputs
   - Synthesize, 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. Indicators of each function's key components will be selected and methods to estimate these indicators, will be developed and tested with countries participating in the in-depth description and analysis study (see below). The overall typology or structure 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 their ability to describe and analyze their health research systems and 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 in-depth country studies. Each are briefly described below.
<table>
<thead>
<tr>
<th>HRS Function/Goal</th>
<th>Project</th>
<th>Project Focus</th>
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<tbody>
<tr>
<td><strong>Financing</strong></td>
<td>1. Resource Flows for Health Research</td>
<td>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 <strong>those participating in the in-depth component of the HRSA</strong></td>
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<tr>
<td><strong>Producing &amp; Using Research</strong></td>
<td>2. Estimating primary research outputs through bibliometric analyses</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Creating &amp; Sustaining Resources</strong></td>
<td>Health Researchers’ database (a product from this collective work, rather than a project <em>per se</em>)</td>
<td>Develop an innovative approach for research institutions to assemble information on researchers and potentially types of research projects underway. The goal is a “dynamic product” based on cutting edge interactive web technology, for enhanced knowledge management &amp; networking among researchers and other actors within health research systems.</td>
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<tr>
<td></td>
<td>3. Cross-national movements of health researchers: brain drain/science gain</td>
<td>Although some recent studies[^3] 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 <em>health researchers</em>. 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 <strong>participating in the in-depth component of the HRSA</strong></td>
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<tr>
<th>Producing and Using Research</th>
<th>4. Knowledge Utilisation: uptake of research results and policies</th>
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<tr>
<td>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 &amp; technology. Three discrete areas of unambiguous research will be evaluated in selected countries: use of IUDs, multi-drug therapy for leprosy, and one area from health systems research, potentially looking at provider reimbursement levels for physician or hospital services. In-depth studies in the following countries are expected: South Africa, Ghana, Brazil, Mexico, France, Egypt, India, Thailand, China, and others (to be confirmed), as well from those participating in the in-depth component of the HRSA.</td>
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(continued)
Table 1. Summary of projects addressing contemporary issues within HRS (continued)

<table>
<thead>
<tr>
<th>HRS Function/Goal</th>
<th>Project</th>
<th>Project Focus</th>
</tr>
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<tbody>
<tr>
<td>Stewardship</td>
<td>5. Ethical standards for health research and research partnerships</td>
<td>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 all 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.</td>
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<tr>
<td>Stewardship</td>
<td>6. Linking to Millennium research and development priorities: estimating current technology gaps &amp; priorities for investment given projected burden of disease</td>
<td>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.</td>
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<tr>
<td>Stewardship</td>
<td>7. Attributing health gain &amp; other socio-economic benefits to health research</td>
<td>This project will build on existing approaches to 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.</td>
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III. Projects Addressing Contemporary Issues

Based on the conceptual framework for health research systems, 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 link with the conceptual framework. The projects are in different stages of development, review and implementation. All projects will benefit from the in-depth 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.

The in-depth country data collection and analyses addressed by each of the WHO led projects focuses on selected aspects of the conceptual framework. The in-depth country description and analyses lead by countries, will describe more comprehensively each national health research systems (see section IV. below). These two parallel efforts together form the backbone of this initiative and the work to be presented within the World Health Report 2004. Much of the project work will build on or develop new techniques to estimate valid, comparable answers to key questions on health research systems, in as many WHO member states as possible. Based on a range of country consultations and review of the limited existing data available in countries (by countries), this work is clearly justified and needed in order to enhance the evidence base on health research systems.

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 papers are published each year in Medline or ISI indexed journals? How many local journals are published in health research? How many health researchers are there in a country? Are investments in health research leading to better levels and distribution of health in a population? Results from the projects and various estimations will be compared with the results from the in-depth country case studies in an iterative process: this should enhance the reliability, if not also the validity, of results obtained. 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. 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. Certain issues within health research systems, such as migration of health researchers, among others, clearly will benefit from across-country perspectives.

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 methods will be used in the various projects: from surveys, questionnaires and policy reviews, 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, as well as to concrete, longer-term technical cooperation with countries to strengthen national health research systems.

IV. In depth country case studies, description & analyses: types of methods

In parallel with the specific projects identified above, a comprehensive effort to describe and analyse national health research systems by countries themselves will take place ideally in some 6 to 7 countries per region, addressing the functions and goals of health research systems. The point will be to complete a comprehensive description and analyses. Different countries may use this as a benchmarking exercise, as well as across countries, the identification of best practices and lessons learnt. Ultimately, this
operational assessment should serve as an input to strengthening existing health research systems. In order to do so, a core set of indicators and key descriptive variables should be agreed up for testing, and a portfolio of data collection and analysis tools are required. The following table briefly outlines example indicators and variable, and a range of methods that are being developed in conjunction with participating countries, some building on existing tools, others being newly developed. Existing data may not be available in all countries, for all indicators; furthermore, certain sectors within health research systems may be more challenging to describe and analyze, such as private sector funding of health research activities.

Table 2. Description and analyses approaches for in-depth country work: example indicators addressing functions of a health research system

<table>
<thead>
<tr>
<th>HRS Function</th>
<th>Example indicators to be described and analysed (non-exhaustive)</th>
<th>Range of Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewardship</td>
<td>A national policy on health research involving all key stakeholders?</td>
<td>Document reviews Focus group discussions Key informant interviews</td>
</tr>
<tr>
<td></td>
<td>Stakeholders’ views defined and integrated within a national policy on health research</td>
<td></td>
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<tr>
<td>Stewardship</td>
<td>An Essential National Health Research approach?</td>
<td>Document reviews Key informant interviews</td>
</tr>
<tr>
<td></td>
<td>Factors considered in health research priority setting (e.g., national burden of disease, human resources, political will, community participation, etc.)</td>
<td></td>
</tr>
<tr>
<td>Stewardship</td>
<td>Do ethical review boards exist?</td>
<td>Document reviews Re-analysis of existing data Surveys</td>
</tr>
<tr>
<td></td>
<td>Distribution: disciplines, geographic Review criteria, guidelines published Per cent of projects that pass</td>
<td></td>
</tr>
<tr>
<td>Stewardship</td>
<td>Existence of monitoring and evaluation activities clearly linked with strengthening HRS</td>
<td>Document reviews Key informant interviews Surveys</td>
</tr>
<tr>
<td>Financing</td>
<td>Amount of resources allocated in accordance with nationally stated priorities?</td>
<td>Document reviews Re-analysis of existing data Surveys</td>
</tr>
<tr>
<td></td>
<td>Public, private, internal, external</td>
<td></td>
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<tr>
<td>Creating and Sustaining</td>
<td>Number of active health researchers</td>
<td>Document reviews Re-analysis of existing data Surveys</td>
</tr>
<tr>
<td>Resources</td>
<td>Institutions, specialization, geography, core funding, specific research training</td>
<td></td>
</tr>
<tr>
<td>Producing and Using</td>
<td>Number of journals published</td>
<td>Document reviews Key informant interviews</td>
</tr>
<tr>
<td>Research</td>
<td>Quality / Peer review mechanisms</td>
<td>Re-analysis of existing data</td>
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<td></td>
<td>Magnitude of primary outputs</td>
<td>Surveys</td>
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(continued)
Table 2. Description and analyses approaches for in-depth country work: example indicators addressing functions of a health research system (continued)

<table>
<thead>
<tr>
<th>HRS Function</th>
<th>Example issues to be described and analysed (non-exhaustive)</th>
<th>Range of Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing and Using Research</td>
<td>Mechanisms to review primary research outputs</td>
<td>Document reviews Focus group discussions Media Reviews Key informant interviews Re-analysis of existing data</td>
</tr>
<tr>
<td></td>
<td>Number of systematic reviews</td>
<td></td>
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<tr>
<td>Producing and Using Research</td>
<td>Mechanism to patent research results</td>
<td>Document reviews Key informant interviews Re-analysis of existing data</td>
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<tr>
<td></td>
<td>Number of patents attributed to health research results</td>
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</table>

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, descriptive variables most useful to countries, and data collection and analyses strategies that are feasible and will most likely lead to defensible, and when appropriate, comparable results. The types of methods that may be used to collect and analyse information on health research systems within the in-depth country case studies build on existing approaches. 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 different topics. Countries may also choose to participate as case studies in connection with the WHO led projects (as noted in bold in Table 1). It is intended that through out this process, WHO works closely with countries and other collaborating groups, first during an initial pilot phase, and then in the main phase, to 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 robust to different types of health research systems found in countries
- 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 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 inputs 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 related to the health research system across countries, which is clearly recognized, (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.);
- 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.

V. Next steps

The next steps toward preparing and testing draft methods in a pilot study and then in the main phase of the in-depth country case studies & analyses are noted 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*. 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 in-depth country case studies & 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., within Stewardship function, monitoring and evaluation of HRS), selection should consider the current capacity to carry out the analysis in terms of implementing qualitative and quantitative research with a country;
- highlight particular countries with important health research system examples that should not be overlooked within the *World Health Report 2004*.

In the first phase of pilot testing, around 3 countries from each region will participate in selecting core indicators for testing, 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. 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. Additional pilot countries include Chile, Cameroon, Tunisia, Russian Federation, France, Australia and the USA.

During this Inter-Regional Consultation, proposed core indicators and example draft methods were discussed with representatives from these countries and our 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, Annex I lists the proposed 14 core indicators and 42 key descriptive variables, as revised, to be tested across all pilot countries - in terms of identifying existing data sources and collecting additional data as appropriate. Based on discussions and inputs, the operational approach, core indicators and descriptive variables, and draft methods will be finalized by December 2002.

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 potentially the USA, to work through what types of data would be most useful for the types of policies and strategies discussed in these countries, given the greater complexity and pluralism within the health research system, and major influence of the private sector. A third consultation is being planned with representatives from the high-income countries, potentially in January 2003, to identify how involvement in the pilot and eventual main phase of this study can be useful to these countries. A couple of issues already identified as relevant include: investigating the balance between directed research and investigator led research, at least concerning public funds; synthesis of existing research findings in a manner relevant to national interests; 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 will be initiated by November 2002 through February 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. The range of data collection tools and the main components are noted in Table 3.

By May 2003, the revised methods will be available for an additional 4-5 countries from each region to undertake the in-depth assessment. Additional countries should reflect the diversity found in each region, and will be selected based on consultation with Regional Offices and Advisors. 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 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.

Table 3. List of data collection tools and approaches, and generic sample size for pilot phase of in-depth country studies

<table>
<thead>
<tr>
<th>Data collection approach and modules for testing</th>
<th>Minimum sample size for pilot</th>
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</table>
| **1. Survey of individuals within health research systems (funders, producers, users, among others)** | Test: 200 - 500  
Retest reliability: min. 100 |
| 1000 Background, education, professional activities |  |
| 2000 Health research environment |  |
| 3000 Research production & synthesis |  |
| 4000 Research utilization & applications |  |
| 5000 Systems perspective on health research |  |
| **2. Survey of heads/unit heads of institutes, ministries, organizations, firms, NGOs** | Test: 100 - 200  
Retest reliability: min. 100 |
| 1000 Types & approaches to research |  |
| 2000 Types & approaches to use research |  |
| 3000 Resource flows & budgets |  |
| 4000 Research & knowledge management training offered |  |
| 5000 Human capacity |  |
| 6000 Institutional facilities |  |
| 7000 Ethics and ethical processes |  |
| **3. Media review protocol** | Test: min of 3 national/major newspapers over 2 month period  
Inter-rater reliability: 2 weeks for each newspaper |
| ▪ Prospective 2 month review of major newspapers covering different orientations or readership |  |
| ▪ Health and Health Research Articles compared to total newspaper content |  |
| ▪ Type of article, size, photos/figures |  |
| **4. Focus group discussions** | Min. 10 homogeneous group discussions stratified by age, education, sex & type of activities and geographic location, as determined by country team |
| ▪ Social discourses on key health research system topics |  |
| ▪ Topics related to policy/relevance of research results, production of research and public perception of health research |  |

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1 Several leading national representatives from many countries - such as heads of medical/health research councils, those responsible for research within Ministries of Health - have already expressed their informal desire to participate in the main phase.
5. Document & data base review (nat’l team)

<table>
<thead>
<tr>
<th>Test: process of engaging key actors from various sectors and stakeholders within health research system in each country</th>
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<tbody>
<tr>
<td>- Mapping of actors (funders, producers and users) of health research</td>
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<tr>
<td>- Process including ethics review, strategies to apply results</td>
</tr>
<tr>
<td>- Document review (legislation, policies, grey literature, etc.)</td>
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<tr>
<td>- Data review (databases on various components)</td>
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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 will want to engage in this process of analysis and capacity strengthening of national health research systems. It is envisioned that RPC 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.

For additional information on this initiative, please contact within the Department of Research Policy and Cooperation, WHO, Geneva:

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Other core staff within the Department of Research Policy and Cooperation dedicated to the initiative include:

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Annex 1: Proposed Core Indicators and Key Descriptive Variables for Pilot Testing: draft 2.5

**Development process.** At the end of 2001, a list of some 700 questions, indicators and variables were assembled by O.M. Mendoza and Y.Kachondham, on behalf of RPC/WHO. The RPC HRSA team reviewed this list, then selected and revised some 50 indicators based on the conceptual framework of health research systems analysis, and presented these for in-depth discussion at the Inter-Regional Consultation on Health Research Systems Analysis, July 2002, in Kuala Lumpur, Malaysia. Individuals from countries who will pilot the feasibility, validity, reliability and comparability of these indicators and variables, participated at this meeting. They reviewed the 50 some indicators proposed, as well as had access to the complete list of 700 items. They were encouraged to add new indicators, delete or further revise suggested indicators, for the pilot phase. Participants were from each of the WHO regions (AFRO: Tanzania, Senegal; EMRO: Pakistan, Iran; EURO: Kazakhstan; PAHO: Costa Rica; SEARO: Indonesia, Thailand; WPRO: Malaysia, Laos) discussed these in detail in two working groups. Besides improving the list of indicators, the working groups recommended that a short list of indicators that are key, be selected. Based on the recommendations of the consultation, a revised list of 13 core indicators and an additional 42 descriptive variables (draft 1) was circulated in August 2002 to participants from countries, RPC staff, and others who have participated in the development of the conceptual model for analyzing and describing health research systems, for further comments.

Based on additional comments received thus far, a second draft of the core indicators was produced. A second consultation held in Geneva, October 2002, further commented on this list (participants from Chile, The Russian Federation, and Tunisia). Detailed written comments have been received from focal points from Brazil and Australia, to date. As noted in draft 1 of the revised set of indicators, an attempt to distinguish between core indicators and descriptive variables has been made. This distinction has been drawn to highlight the difference between activities or quantities of interest which we believe have sufficient evidence to provide a good measure (core indicators) of the functions of a well-functioning health research system across countries or are considered the most important descriptive variables, and other descriptive information (descriptive variables) that may provide a good measure of different functions, or are particularly desirable from different country perspectives, but require further analyses. The basic assumptions or areas of interest underlying the core indicators in relation to the health research system, are noted. Although this distinction between indicators and variables may be fuzzy, the recommendation from consultations and peer-review was to select a core that is most likely to inform debates across time or across countries, and a larger set that will allow sufficient descriptive information to provide a detailed and in-depth analysis of each country’s health research system within diverse contexts.
Draft 2.5. Based on the various comments received, 14 core indicators and 42 descriptive variables, are listed below. Many of these indicators and variables have several parts, as noted in the attached list.

These core indicators and descriptive variables that each pilot country should collect data (either existing data or new data), cover each of the four main functions of health research systems, as follows:

<table>
<thead>
<tr>
<th>Main Function</th>
<th>Core indicators</th>
<th>Descriptive variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewardship</td>
<td>A-C</td>
<td>1-20</td>
</tr>
<tr>
<td>Financing</td>
<td>D-F</td>
<td>21-24</td>
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<tr>
<td>Creating and Sustaining Resources</td>
<td>G-K</td>
<td>25-31</td>
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<tr>
<td>Producing and Utilizing Research</td>
<td>L-N</td>
<td>32-42</td>
</tr>
<tr>
<td><strong>Total Number</strong></td>
<td><strong>14</strong></td>
<td><strong>42</strong></td>
</tr>
</tbody>
</table>

In revising this list and selecting core indicators, we have kept in mind the following principles, as discussed during our meetings in Kuala Lumpur and Geneva: that core indicators should be valid, reliable, that these are comparable across countries, that other researchers should be able to replicate findings (e.g., having recognized and traceable data sources and analysis methods), and that these are selected in consultation with countries. The pilot study will confirm some of these aspects.
CORE INDICATORS in bold:
STEWARDSHIP FUNCTION: vision, priorities, ethics, monitoring

A. Rating of the degree to which the stewardship function within the national health research system is fulfilled, expressed as

- self reported response categories converted to 0-100 scale

*(develop vignettes covering vision, coordinated priorities, ethics & monitoring to enhance comparability across raters and countries)*

[assumption: fulfilling stewardship function is desirable for HRS to achieve goals]

B. Total public funds allocated to explicit priority health research areas, expressed as:

- Base year in I$ (international currency units PPP)
- **Proportion of total public health research expenditures**
- Proportion of total health research expenditures
- Proportion of total research expenditures
- Proportion of GDP
- Base year in I$ per capita

*(linked with Financing Function; only if explicit priorities are known)*

[want to know if priorities are set through a public forum/process, are funds allocated to these priorities, at least public funds (i.e., to what degree are priorities implemented in terms of funding flows). This would also given an indication of directed vs investigator led research funded publically.]

C. Total health research proposals/projects/protocols (proposals) submitted for ethical review, expressed as:

- Total number of health research proposals submitted for ethical review, for base year (and 5 year trend, e.g. 1997-2001)
- Total number of health research proposals involving human subjects
- **Proportion of total health research proposals requiring ethical review (e.g., human subjects, genetics, stem cell, animal, etc.) according to criteria described in prevailing national guidelines or cited international guidelines**
- Proportion approved as is
- Proportion approved with revision
- Proportion rejected

[assumption: greater proportion of total health research proposals requiring ethical review, undergoing ethical review, is desirable for HRS to achieve goals]

Suggestion: add a core indicator on monitoring and evaluation: to be selected from descriptive variables after the pilot phase
CORE INDICATORS in bold:
FINANCING FUNCTION

D. **Total funds allocated to health research, expressed as:**
   - Base year in I$ (internationally comparable units - PPP)
   - **Proportion of total health expenditures**
   - Proportion of total research expenditure
   - Proportion of GDP
   - Base year in I$ per capita

[want to know the distribution at the low end of spectrum, i.e., around 5%; with data from 30-40 countries, a target may be recommended. Data collected in countries will be in national currency; WHO will make the appropriate conversions - applicable to all indicators and variables below]

E. **Total public funds allocated to health research, expressed as:**
   - Base year in I$
   - **Proportion of total health expenditures**
   - **Proportion of total public health expenditure**
   - Proportion of total public research expenditure
   - Proportion of total public expenditures
   - Proportion of GDP
   - Base year in I$ per capita

*(linked to creating and sustaining resources function)*

[want to know the mix of public - private funding of health research]

F. **Allocation of total funding, expressed as a proportion of each of the following to the total funds allocated to health research:** (categories below suggested by Global Forum for Health Research, for further testing):
   - 1 Non-oriented, fundamental research
   - 2 Health conditions, diseases or injuries
     - 2.1 Group I - communicable, maternal, perinatal and nutritional conditions
     - 2.2 Group II - non-communicable diseases
     - 2.3 Group III - injuries
   - 3 Exposures, risk factors that impact on health (determinants)
   - 4 Health systems research (covering Policy and planning research, Health services delivery research, and Surveillance)
   - 5 Research capacity building
   - 6 Anything not covered by above categories

[want to know where funds are spent; concerning health conditions, additional, detailed breakdown of groups 1-3, to be provided based on WHO burden of disease categories]
CORE INDICATORS in bold:
CREATING AND SUSTAINING RESOURCES FUNCTION

G. Active health researchers, expressed as:
- Total number (FTE), Base year
- Total number (FTE), base year, per 100,000 overall workforce
- Total number (FTE), base year, per 100,000 health sector workforce
- Total number (FTE), base year, per 100,000 education sector workforce
- Total number (FTE), base year, per 100,000 science & technology sector workforce
- Total number (FTE), base year, per 100,000 population
- Proportion holding a doctoral degree
- Proportion of total number of trained (potential) health researchers

(definition of active health researcher: at least 10% of time devoted to research and are institutional based) [assumption: want to know the stock of workforce dedicated to health research activities, given that the location of health research activities are found in many sectors]

H. Rating of the environment to nurture, conduct and reward health researchers, expressed as:
- self reported response categories converted to 0-100 scale
Domains include:
  - Range and breadth of health researcher networks
  - Transparency of the funding process
  - Quality of the work space and facilities
  - Encouragement of collaboration with others
  - Opportunities to present, discuss and publish results
  - Relevance of health research activities to health problems
  - Education and continuous training
  - Wage of health researchers
  - Nurturing of careers

[assumption: more supportive environment is desirable for HRS to achieve goals]

I. Average wage of (i) newly graduated PhD/doctorate entering health research system with full time position AND (ii) senior researcher with PhD/doctorate with at least 20 years of post-doctorate experience OR senior researcher with PhD/doctorate who is a director of a research institute/large research unit. For each, expressed as:
- Average wage, base year in I$
- Average wage, base year in I$, by sex
- Average wage, base year in I$, in public health sector
- Average wage, base year in I$, in private health sector

[assumption: higher average wage during career span, is one component of a more attractive research environment, is desirable for HRS to achieve goals (for eventual in comparison to health sector, labor force in general, and international labor market). Average wage to include basic official salary for full time equivalent. Other benefits to be discussed elsewhere.]
J. Trend (1992-2001) in total public funds allocated to health research, expressed as:
- Base year (1992) in IS$
- Annual change from base year, for subsequent years (1993 – 2001)
- Proportion of GDP

(linked to financing function)

[want to know whether a relatively stable government commitment of public funds exists; want to know the variance in annual commitment in relation to total health expenditures]

K. Proportion of health research institutions with access to both national and international health journals (print or electronic versions), during 1997-2001

(must define minimum journal level and or reference databases given WHO’s HIN project, and level of access in terms of costs and technology requirement); [assumption: greater proportion with access to national and international health knowledge is desirable for HRS to achieve goals]
CORE INDICATORS in bold:
PRODUCING AND UTILIZING RESEARCH FUNCTION

L. Health research articles published in ISI + regional data bases indexed journals 1992-2001, expressed as:
   ▪ Total number, 1992-2001, annually
   ▪ Per active health researcher
   ▪ Per total funds allocated to health research
   ▪ Per total health research articles in universe of national articles (local, national, regional, international) in peer-reviewed journals

[assumption: greater number of articles in international reference databases per active health researcher is desirable for HRS to achieve goals; this work will be carried out directly in conjunction with the HRSA team at WHO, Geneva]

M. Articles citing health research systems activities (publications, policy briefs, conferences, research projects), in major newspapers, expressed as:
   ▪ Proportion of all articles addressing health issues in major newspapers during a defined time period
   ▪ Proportion of total news articles in column centimetres in major newspapers during a defined time period

[assumption: greater number of articles addressing health research activities in major newspapers is desirable for HRS to achieve goals, as an indicator of diffusion of information on health to the public]

N. National patents registered within country resulting from health research, 1997-2001, expressed as:
   ▪ Total number annually
   ▪ Per active health researcher, annually for 5 year period
   ▪ Proportion registered by nationals
   ▪ Proportion registered by foreigners
   ▪ Proportion of all patents registered

[want to know national patents resulting from health research; this will be compared to internationally registered patents resulting from health research from each country]
DESCRIPTIVE VARIABLES:
STEWARDSHIP FUNCTION

1. Existence of an explicitly stated Vision, Mission and Goals for the national HRS (yes/no)

2. Existence of explicit legislation or regulations promoting research in general (yes/no) and health research in particular (yes/no)

3. Factors considered in the formulation of the VMG (develop check list for main phase data collection after pilot)

4. Main components/provisions of current version of the VMG (develop check list for main phase data collection after pilot, provide explicit text in English)

5. Existence of a forum or process to coordinate the setting of national health research priorities (yes/no)

6. Range of national institutions/bodies in various sectors involved in setting national health research priorities (develop check list for main phase data collection after pilot based on types of institutes/ bodies/ organizations and sectors)

7. Existence of explicit national health research priorities (yes/no)

8. Stated health research priorities (detail/provide documents in English)

9. Factors considered in health research priority setting (develop check list for main phase data collection after pilot)

10. Frequency of health research priorities’ updates (note timeframe(s)).

11. Total funds allocated to explicit priority health research areas, expressed as:
   - Base year in I$ (international currency units PPP)
   - Proportion of total health research expenditures
   - Proportion of total research expenditures
   - Proportion of GDP
   - Base year in I$ per capita
   and an indication of data sources

12. Rating of the environment to allocate and grant funding for health research projects, expressed as
   - self reported response categories converted to 0-100 scale

   (develop vignettes to enhance comparability across raters and countries)

13. Existence of national laws (yes/no), regulations (yes/no), policies (yes/no), guidelines (yes/no) that explicitly cover the ethical conduct of human subject research and other related areas

14. Do national laws (yes/no), regulations (yes/no), policies (yes/no), guidelines (yes/no) on ethical conduct of human subject research and other related areas refer to; or require adherence to any international guidelines (e.g., Helsinki, CIOMS, etc.) (yes/no)

15. Basic characteristics of existing national laws, regulations, policies or guidelines on ethical conduct of human subject research and other related areas (detail; check list will be developed after pilot), and will include whether sanctions exist for not adhering to guidelines.
16. Number of institutional review boards (IRBs/ethics committees) focusing on ethical conduct of human subject research and other related areas (number by different types of boards/committees and scope being developed)

17. Existence of guidelines for the function and composition of IRBs/ethics committees (yes/no) or an accreditation mechanism for IRBs (yes/no)

18. Range of national institutions/bodies involved in monitoring and evaluation (M and E) of HRS (develop check list for main phase data collection after pilot based on types of institutes/bodies/organizations), with an indication if each national institution/body is dedicated to health research, research in general, or evaluation/accountability in general.

19. Functions and goals of HRS regularly being monitored and evaluated (covering the four main functions and two goals of HRS; and additional functions and goals defined nationally)

20. Existence of a designated body to take action based on results of M and E activities (yes/no)
DESCRIPTIVE VARIABLES:
FINANCING FUNCTION

21. Types of research areas covered by total funds allocated to health research (check list being developed using range of primary fields of science such as natural, medical, health economics/social sciences, health systems, etc.)

22. Sources of funding, expressed as proportion of each of the following to the total funds allocated to health research:
   - National public (government vs. university)
   - National private industry
   - National private non-profit
   - International public
   - International private industry
   - International private non-profit

23. Allocation of public funding, expressed as a proportion of each of the following to the total public funds allocated to health research:
   - Non-oriented, fundamental research
   - Total public funding spent on Group 1 conditions (communicable, maternal, perinatal and nutritional diseases)
   - Total public funding spent on Group 2 conditions (non-communicable diseases)
   - Total public funding spent on Group 3 conditions (injuries)
   - Total public funding spent exposures, risk factors that impact on health (determinants)
   - Total public funding spent on health systems research
   - Total public funding spent on research capacity building
   - Total funding spent on everything else not covered above

24. Allocation of total international public and private non-profit funding (combined), expressed as a ratio of
   - Funding spent on each of the national priorities identified for health research (if made explicit)

[link to Stewardship function]
DESCRIPTIVE VARIABLES:
CREATING AND SUSTAINING RESOURCES FUNCTION

25. Total number of training programs on health research currently offered by the country according to:
   ▪ type of program (check list being developed, e.g., degree, non-degree, short course)
   ▪ area covered (check list to be developed after pilot phase - possibly a 2x2 matrix of short, long, informal and formal training programs, and/or by basic research methods, program evaluation, data analysis, etc.)

26. Total number of graduates of different training programs with research components by year, during 1997 - 2001 according to:
   ▪ Type of training level (check list, e.g. MS, PhD, MD-PhD, other categories, etc.)

27. Existence of established national programs for academic post-doctoral research work (yes/no)

28. Total number of trained health researchers entering/leaving the country, expressed as
   ▪ Five years (1997-2001), annually - broken down by
   ▪ Sex
   ▪ Age groups
   ▪ Area of specialization

29. Proportion of graduates of degree training programs who were sent abroad for these advanced degree programs and who have returned to the country, 1997-2001 annually

30. Total number of active health researchers (FTE) -
   A. broken down by
   ▪ Sex
   ▪ Age groups
   ▪ Highest degree awarded (BS, MA/MS, PhD/DS, MD, etc)
   ▪ Geographic location (regions in the country, etc.)
   ▪ Area of specialization
   ▪ Public, Private sector
   B. How much time (as a percentage of FTE) is devoted to research activities?

31. Research institutions, expressed as:
   ▪ Total number, base year
   ▪ Proportion with functioning laboratory facilities
   ▪ Proportion with library facilities
   ▪ Proportion with facilities for processing & managing large databases
   ▪ Proportion with facilities/programs for field research/clinical research
   ▪ Proportion with internet access
   ▪ Proportion with own website
   ▪ Proportion with press/public relations/communications capacity/"knowledge broker"
   ▪ Proportion covered by an IRB/ethics committee

(definition of research institution concerning level of aggregation - faculty, unit, department, related institutes, etc. - must select the basic unit of research institute - in line with funding flows and research outputs.....)
DESCRIPTIVE VARIABLES:
PRODUCING AND UTILIZING RESEARCH FUNCTION

32. Total number of health research publications, 1997-2001, annually, broken down by:
   - articles published in non-ISI indexed journals that have explicit peer-review process
   - articles published in ISI indexed journals (to contrast with core indicator L)
   - books published
   - reports written/published
   (WHO will coordinate part of this work, with inputs from countries)

33. National and institutional journals, expressed as:
   - Total number, 1997-2001, annually
   - Proportion with peer review mechanism
   - Proportion indexed in ISI
   - Proportion not indexed in ISI, but indexed in other reference databases
   - Proportion not indexed in ISI, published in national languages (other than English)

34. Working/discussion paper series addressing health research, expressed as:
   - Total number of series, 1997-2001, annually
   - Total number of manuscripts/papers/monographs contained in these series, 1997-2001, annually
   - Proportion of manuscripts/papers/monographs in these series in national languages (other than English)

35. Health research articles published in ISI + regional databases (as noted in core indicator L), expressed as:
   - Proportion addressing Group 1 conditions (communicable, maternal, perinatal and nutritional diseases)
   - Proportion addressing Group 2 conditions (non-communicable diseases)
   - Proportion addressing Group 3 conditions (injuries)
   - Proportion addressing everything else not covered above
   (WHO will coordinate this work, with inputs from countries)

36. Within public sector (government and university), existence of explicit monetary incentives or promotion schemes related to publications in ISI indexed journals (yes/no) and non-ISI indexed journals (yes/no): detail incentives (categories to be developed based on pilot phase)

37. Number of major systematic reviews (different types of reviews, i.e., Cochrane and others) completed per year, 1997-2001, expressed as:
   - Total number, each year
   - Per active health researcher
   - Topics covered (detail)
   - Proportion of reviews with primary target of policy makers, each year
   - Proportion of reviews with primary target of practitioners, each year

38. Number of nationally organized conferences covering health research topics, 1997-2001, annually.

39. Existence of regular forums to exchange research results and research needs between researchers and range of users (yes/no)
   (also provide details on range of users such as policy-makers, health care providers, public, donors, advocacy/interest groups, and other key stakeholders and the types of exchange/interface)

40. Existence of major newspapers, radio & television programs with a regular science/health feature/section/column, expressed as:
• Proportion of major newspapers with a regular science/health feature/section/column
• Proportion of major radio programs with a regular science/health feature/broadcast
• Proportion of major television programs with a regular science/health feature/broadcast

41. National policies or practice standards (including clinical guidelines) produced or updated due to health research (generated from anywhere in the world), 1997-2001, selected from the following three areas: (i) AIDS/HIV, (ii) maternal/reproductive health, and (iii) equitable access to health services, expressed as
• Per active health researcher, 1997-2001
• Proportion of clinical guidelines produced or updated
• Description of whether an approach exists to monitor adherence to these guidelines in the areas selected.

42. National patents resulting from health research that have been commercialised/gone to market, 1997-2001, expressed as:
• Total number annually
• Per active health researcher, annually for 5 year period
• Proportion of all national patents resulting from health research

(the desire to gauge if national patents have been used is the key here - different countries may or may not be able to find this useful or feasible)
References Cited

4 Beine M et al. (2002). *Brain drain and LDSs’ growth: winners and losers*. Unpublished manuscript, Department of Economics, Stanford University, Stanford, California.