The Strategy for Health Research in Pakistan

2010

Ministry of Health, Pakistan

The World Health Organization

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Foreword

Pakistan is the sixth most populous country in the World and has a very large healthcare sector with nearly 20,000 health and population welfare facilities and around 100,000 lady health workers that provide outreach to the poorest households. However, despite such a large health infrastructure, a number of concerns remain, particularly as chronic underfunding of health and increasing population has meant that many of our health outcomes lag behind our regional neighbors and even our large public sector health infrastructure appears to be inadequate as seen from the fact that much of the curative healthcare is now provided by a burgeoning and unregulated private sector. These factors suggest an urgent need to understand issues that underpin our inability to derive the maximum benefit from our investments in health and improve the health of Pakistanis.

The best means for such an understanding is to promote quality research in health. While not all research that is conducted in the country can be specified or promoted by the government, it is the state's responsibility to outline the theme areas that are essential to the health of the nation and help establish systems that will promote such research. Finally it is also the state's responsibility to promote the use of pertinent research and evidence in policy and programs that impact health of the nation. This strategy seeks to lay the foundation for such efforts.

The final strategy is the result of efforts of a number of dedicated individuals. The Honorable Minsiter of Health, Mr. Makhdoom Shahabuddin championed this strategy personally and the Honorable Secretary Health, Mr. Khushnood Lashari provided considerable support and many valuable insights into the advocacy sections of the strategy.

Our core team consisting of Dr. Huma Qureshi and Dr. Mubashar Khan at the Pakistan Medical Research Council and Dr. Adnan Khan developed the key concepts, reviewed available international and national literature and oversaw the many consultations with stakeholders from to generate ideas, identify priorities and refine the research agenda. In this work they were ably assisted by Ms. Aashifa Yaqoob and Dr. Adeela Khan. We deeply appreciate of the support from the WHO Pakistan. Dr. Khalife Bile and Dr. Abdul Ghaffar personally led many of the discussions and Dr. Zulfiqar Khan provided considerable support. Prof. Zulfiqar Bhutta, Prof. Anita Zaidi, Dr. Assad Hafeez and Dr. Ayesha Khan provided valuable insights into the conduct of research in Pakistan and helped edits the strategy document. These efforts would have been greatly diminished were it not for the great cooperation from the nearly 200 academics, public health professionals, clinicians, government officials and the civil society who attended our consultations and also continued to provide feedback during the strategy development process.

It is my great pleasure to present this strategy, which we hope will serve to initiate the debate on incorporating evidence and research in public health programs, policy and will allow the development of robust, effective and cost effective programs that promote the nation's health.

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Executive Summary

Although health is a fundamental human right, its provision requires the implementation of a series of coordinated and effective actions that require basing health programs on solid evidence so that programs that improve health outcomes and are implemented efficiently and with the least burden on resources. Thus, contrary to a commonly expressed belief that health research is a luxury for richer nations, it follows that health research is an imperative for nations with scarce resources and can lead to cost effective programs on the one hand and efficient prioritization of resources for and within the health sector on the other.

Little research guides health programs in Pakistan. This is due to both underproduction of quality research and the lack utilization of research to guide policy and programs. Quality research requires well trained researchers, supported in a "research milieu" that includes funding, support systems and other colleagues. This happens in only a few institutions in Pakistan. Thus, the considerable research produced nationally is of insufficient quality and is either not published or published in non-indexed journals. Indexed publication constitutes a small proportion of the research conducted in Pakistan, limiting dissemination of research results to possible users of research.

While issues of producing and disseminating quality research are critical, another major gap is the use of evidence in policy and programs. Often, there is antipathy towards research that seems to grounded in a culture that discounts the value of evidence and therefore to guide actions. Other factors that lead to this chronic under use of research are the lack of logistical structures that make research available to decision makers in ways that are easily understandable and lack of training of decision makers in the use of evidence for their decisions.

This strategy was intended to rectify many of these problems. It defines the infrastructure needed for quality research and researchers; allowing them to do their work as a primary vocation and to disseminate the research including via quality indexed publications which also serve a quality check for research. There are suggestions for enhancing research quality and for setting standards. The strategy then seeks to facilitate translation of available research into actionable information by defining actions on part of researchers, a group of specialists that produce information products that extract pertinent messages from research and to present them in a language and by means that resonate with specific end users of health information. The Strategy then defines who these end users would be and how they may be trained to become better users of the information being presented.

Finally there is a discussion of the main priority areas for research in Pakistan. This list was developed in consultation with national stakeholders and represent theme areas that are of most interest to public health in general.

The research priorities are outlined by the following categories: 1) the burden of diseases and general themes, 2) Health Systems Research, 3) Social Determinants of Health, 4) Surveillance and 5) Clinical Research for publicly important diseases. Within these the health systems part is further divided according the internationally accepted theme areas of services, technologies, human resources, financing and governance. The list is not exhaustive and it is recognized that researchers may pursue research theme areas that interest them and that these may not be directly usable for public health in general.

The national Strategy for Health Research was developed to address the many shortcomings in research production and use. It outlines some key implementable actions that are internationally validated and will help improve health research and its usage for health interventions and will help institutionalize the structures needed for both. Recognizing the critical role of government in fostering and using research, many of the proposed actions are based in the government, however, there is wider guidance and a set of national research priorities was elaborated to inform all researchers interested in working on health.

Introduction

Health is often described - and accepted - as a universal human right. However, not all agree what is included in "health" that is provided. Indeed, not all countries can provide the same level of health services for their citizens (or even to all citizens within the same countries). Cultural differences, resource inequities, differing political and cultural priorities mean that health status and access to health services vary widely within and between countries. This context plays against a background cultural and local contextual diversities which further mandate differing approaches to providing the same or similar services in different milieu.

Countries often find their efforts to preserve the health of citizens constrained by resources, cultural or other factors. Such constraints mandate that health policies and strategies be based on the best available evidence which often comes from quality research and allows understanding of how best to apply proven approaches in individual country perspectives. Additionally, innovative discoveries have improved the overall health (and other lifestyle) status of nearly all people worldwide. Thus, contrary to frequently cited notion that research in health is a luxury and that it should only be conducted when all else is accounted for, **effective research can help prioritize limited resources and allow cost effective adaptation of health programs**. Thus, having limited resources means that there is need for more research and not less.

For more than a decade a number of efforts have sought to harness research for health needs. On the international stage, the Commission for Health Research for Development (1990), Ad Hoc Committee (AHC) on Health Research Relating to Future Intervention Options (1994)[1], Global Forum for Health Research (1998)[2], Council on Health Research and Development (COHRED) (2001)[3], The Grand Challenges, World Economic Forum, Davos, Switzerland (2003)[4], the Combined Approach Matrix (2004)[5] and the WHO draft strategy[6] to name a few. These efforts were also reciprocated at country levels,

including one in 1988 and in 2001[7], the latter by the Pakistan Medical Research Council.

Considerable research has defined many aspects of health for decades; although, much of it included revisiting international clinical work in local clinical settings, there has been some novel work done in the country. However, much of this is driven by myriad agendas and has not often contributed to improving the overall health or health services in Pakistan. In part this is because this research did not follow a nationally contextualized research agenda which has not yet existed.

The Current Set up and its Gaps

The Researchers

The bulk of research in Pakistan is by trainees and students as part of a research thesis requirement for many degrees or by faculty seeking promotion. This is often of poor quality, is seldom published (Tables 1 & 2) or otherwise disseminated and thus infrequently used to guide health interventions.

The government and some donor agencies commission consultants or private "for hire" companies (including Contract Research Organizations – CROs) to conduct research which is directly applied to specific programs. These data are usually described in simple reports, often with scant or no analysis. These programs also produce considerable data routinely from either surveillance or from the conduct of programs that may be highly informative if subjected to either direct or secondary analysis. However such analysis is rare. With rare exceptions, none of this is investigator driven or published. These researchers seldom follow up or build on prior work. Since researchers develop expertise in specific theme areas as a result of iterative work within that area, the lack of a focused theme approach deprives them of the deeper perspective that is necessary for quality research. This manifests most commonly in the form of lack of publication of results of their research

(beyond the report that is demanded from their funder) or in poor quality of discussion of papers that are written. Since Peer reviewed publication is a major means to develop, maintain quality standards and disseminate research, its paucity in Pakistan perpetuates a cycle of low quality research leading to lack of funding and opportunities for research which in turn further diminish production of quality research in the country. However, a few individual researchers or institutes do produce quality research that finds use in public health at variable rates. Research outputs from Pakistan and the region are depicted below.

Table 1: Number Of Indexed And Non Indexed Publications In Pakistan And In Regional Countries

	2005	2006	2007	2008	Total 2005-8	Average Annual Publications per Million population
Pakistan - indexed and non indexed	**2,153**	**2,248**	**2,315**	**2,062**	**8,778**	**13**
Total **non-Indexed** Articles[1]	**1,597**	**1,637**	**1,592**	**1,151**	**5,977**	**9**
Total **Indexed** Articles	**556**	**611**	**723**	**911**	**2,801**	**4**
Clinical	190	212	199	276	877	1
Case Reports (subset of above)	60	62	46	74	242	<1
Laboratory	90	101	173	387	751	1
Public Health/Social	82	142	143	194	561	1
Pharmacological	155	156	170	54	535	1
Reviews Including Meta Analysis (also included in above categories)	25	34	46	45	150	<1

Table 2: Research Productivity from Pakistan and Some Regional Neighbors

	2005	2006	2007	2008	Total 2005-8	Average Annual Publications per Million population
Total Indexed Articles from Qatar	**70**	**68**	**78**	**88**	**426**	**83**
Total Indexed Articles from Jordan	**360**	**385**	**437**	**473**	**1,655**	**70**
Total Indexed Articles from Iran	**1626**	**2,401**	**3,695**	**4,075**	**11,797**	**41**
Total Indexed Articles from India	**9,443**	**10,994**	**12,744**	**14,127**	**47,308**	**10**
Total Indexed Articles from Pakistan	**556**	**611**	**723**	**911**	**2,801**	**4**
Total Indexed Articles from Bangladesh	**152**	**173**	**259**	**273**	**857**	**1**

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[1] The number of non indexed articles were provided by the PakMediNet.com. This site lists Pakistani articles from 63 journals published in Pakistan.

While most medical universities conduct research and that this trend has accelerated of late, much of the best research comes from a few universities, usually from the private sector. As Table 3 shows, one private and one public university produced 51% of all indexed publications in Pakistan in the past 4 years. Even within these the majority is produced by a few investigators who define their own agenda and produce high quality of research. Some of the results of this research are directly used to enhance health services, albeit at a smaller scale. Beyond these exceptions, most public and private sector universities struggle with quality and relevance of research and therefore their work contributes rather minimally to the overall health agenda (Table 3). This likely is a reflection of the fact that most universities do not consider research a priority and therefore do not protect or dedicate faculty time for research; nor do they provide funds or infrastructure for research and seldom do they reward quality research by either incentives or promotions. Even beyond universities, there aren't major sources of research funding available in the country. This limitation is made worse by the fact that salaries of most researchers are non-competitive, therefore such positions are either not attractive to quality researchers or they seek to "top up" their income from other means that then eat into their professional time.

Table 3: Number Of Indexed Publications in Pakistan for the Most Productive Institutions

Institute	2005	2006	2007	2008	Total 2005-8	Percent of total research output in the country
Aga Khan University	242	274	266	307	1089	39%
University of Karachi	97	83	86	70	336	12%
Armed Forces Institutes	15	10	6	7	38	1.3%
Ayub Medical College	11	3	9	10	33	1.2%
Jinnah Postgraduate Medical Centre	6	6	6	14	32	1.1%
Dow University of Health Sciences	6	3	10	13	32	1.1%
Shifa International Hospital	8	1	7	12	28	1.0%
Baqai Medical college	6	4	4	9	23	0.8%
Heartfile	2	14	3	0	19	0.7%
Shaukat Khanum Memorial Cancer Hospital and Research Center	3	5	4	3	15	0.5%
Nishtar Medical College, Multan	4	5	2	3	14	0.5%
Khyber Medical College, Peshawar	4	1	2	6	13	0.5%
King Edward Medical University	1	-	4	8	13	0.5%
Bolan Medical College, Balochistan	-	-	1	4	5	0.2%
Health Services Academy, Islamabad	-	1	1	1	3	0.1%
Institute of Public Health, Lahore	-	1	-	-	1	0.04%
Population Council, Pakistan	-	-	1	-	1	0.04%

Institutional Structures for Research

Few institutions have sufficient research infrastructure to foster research by allowing career tracks for researchers and to attract funding. In fact the Higher Education Commission which oversees university education in Pakistan does not allow promotions for health faculty based on research productivity, and most public sector universities do not have mechanisms for either channeling research funding or to incentivize research funding, thus significantly limiting research in academia. Much of

funding is project related and is donor driven. The few grants provided to the academia are usually small and insufficient to sustain research careers or significant projects.

Coordination in Health Research

Despite being recommended in the 2001 report on setting health research priorities, there is little coordination in health research. Diverse actors including the MoH (via its vertical programs), universities and other researchers conduct research according to their own interest. Since there is no research agenda to help focus on national priorities, any synergies in the research produced are only incidental. For example, the Ministry of Health (and the corresponding provincial departments of health) operates very largely via disease specific "vertical" programs. Many of these conduct their own research to define aspects of burden of disease (although the preponderance of work is with prevalence of diseases) or conditions only. Very little research is done on implementation of programs and seldom is this research published thus raising concerns for access and quality. While universities are a major source of research for health (Table 2), they seldom participate in dialogue with government or civil society program designers or implementers to develop a research agenda that guides public health.

Using Research

Beyond the issues of production of quality research and its dissemination, a bigger concern is the lack of utilization of available research or evidence in programs and policy. It has been repeatedly observed that while there is considerable research produced in the country, only a small proportion of it is actually used to guide programs and policy. Recent examples include the over funded media campaigns for uncommon problems such as HIV, under-supply of contraceptives or syringes for therapeutic injections and the establishment of HIV screening sites in many cities despite clear evidence that such screening was unable to identify cases. While some of this has to do with the lack of resonance between the research that is conducted and national health priorities or in the quality of the research that is produced, a considerable proportion of it is due to lack of interest, resources or capacity among decision makers in interpreting research results into policy guidance.

Not basing programs on solid evidence (and research) has led to costly programs that underperform and yet divert precious resources from programs that actually work. This is partly because of the **lack of cultural emphasis on the use of evidence and hence little value for research**. It is not uncommon for people in responsible positions to distinguish between knowledge and practice, claiming personal experience over solid evidence to guide programs and policy. This situation is further confounded by the **lack of logistical structures that convert the results of research into usable information** for health decision makers and the scant communication between researchers and its users. All of this has led to a situation where **decision makers are unaccustomed to the use of evidence** to guide programs or policy.

It is recognized that not all research will ever be fully used in public health as investigators will explore novel ideas, the **main purpose of the national health research strategy is to help guide the majority of researchers** (i.e. academic departments in medical colleges, health universities and other training institutions) **in producing research that will find application in health interventions**. Such a strategy should 1) outline the role of the government in fostering the development of a **research culture** (so that research quality and volume improve and its results are used) and 2) **infrastructure** (so that researchers are facilitated in conducting high quality research) and 3) **support research use**.

The Strategy development process

Recognizing these gaps, the Ministry of Health started the process to develop a strategy for channeling the bulk of health research to address national health priorities. Early discussions on the subject happened

in the late 2008 and early 2009 and led to a concept document that was developed in early 2009 that identified a series of questions about health research and shared with a core group of stakeholders. It asked about: who (and how) was conducting health research, where were they located, how was research being used and what were the major gaps in producing and using research in health-related decisions. These questions were refined in a series of one-on-one interviews with major key informants from the academia, government decision makers and other producers and users of research which also helped develop an understanding of the existing research milieu and its gaps. This understanding was supplemented with a review of indexed and local non indexed literature to assess what research is published and who publishes it. Records of international indexed publications were obtained from PubMed which was queried for the number of publications by the country and institutions (tables 1&2) using the methodology described by Rahman et al[8-10]. Information about local non-index publications was obtained from the organizers of the PakMediNet.com website which tracks Pakistani health publications[2]. Finally we reviewed published international experience with developing similar research strategies to guide our process[6].

The discussions and the literature review formed the basis of a series of consultations with provincial and federal government officials, researchers and research users, academicians and other national stakeholders during 4 meetings in Islamabad, Lahore and Karachi during July 2009 to solicit views, suggestions and to garner support. These suggestions and opinions were then compiled and collated into specific themes and synthesized into specific

recommendations that were shared with the stakeholders in Islamabad in August 2009. Finally a consensus document was developed and electronically shared (via email and website) with stakeholders for comments and critique between August and December 2009. During this period comments received were incorporated and the document was allowed to evolve with iterative versions being continually made available on the internet. The document was finalized in mid December 2009.

The Guiding Vision: The scope and intent of this strategy

In order to improve the quality of research and evidence that guides health interventions, a number of efforts have sought to define national or global needs for information and therefore helping researchers in producing research that is pertinent for public health. This document seeks to define a national research agenda and suggests a strategy to improve the research quality, develop or improve the research infrastructure and to enhance the use of research or evidence to guide programs and policy. Consistent with lessons from the application of the previous such strategy by the PMRC (2001), this strategy will include a proper monitoring framework that can be used to assess its progress.

The intent of this strategy is to establish a national (and provincial) research agenda that will inform about national health priorities and guide programs to meet these priorities. Some of this research may be done within the government, including those either directly conducted or commissioned by the government programs. Other research will be by non-government researchers but in conformity with the agenda that is adapted to meet national health needs. The strategy recognizes the significance of innovative research that will fall outside the agenda but seeks to harness the talent and efforts of the many researchers at different levels who will be guided by it to contribute to the national health needs.

Ultimately this strategy will help improve the quality and quantum of research for health in Pakistan so

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[2] References were searched for Pakistan (or other countries by name) and for individual institutions. "PubMed" restricts assignment of institution by first author only. This approach has been applied previously[8-11]. However, it means that if Pakistani authors were 2nd or later authors on a paper that was first authored by a non Pakistani author, that paper would not be counted as a Pakistani paper. While, most are those instances where Pakistanis were working in overseas institutions, it is worth noting that this methodology discounts Pakistani publications somewhat.

that it can contribute more meaningfully to the overall health status in the country. By necessity it will mean that the strategy address issues of facilitating researchers, improving quality of their research, improving their funding and increasing the use of their research in conduct of health programs and policy formulation. The collective arrangements that go into doing these are understood as those that contribute to the research culture in Pakistan.

Strategy outline

The strategy addresses the many needs of research and its use in the country. It first outlines the current gaps in the research infrastructure and suggests remedies for it. It then does the same of research usage. Finally it sets out an outline of setting research priorities.

1. Organization
   i. The Health Research System
   ii. Research culture
   iii. Guidance and overview of health research in the country
   iv. Funding for research
2. Capacity for research
   i. Who does research
   ii. Research Human resource
   iii. Laboratories and research
   iv. Involving universities:
3. Standards
   i. Quality Standards
   ii. Ethics in research
4. Knowledge Translation:
   i. Data collation
   ii. Ensuring evidence and research are used
   iii. Information products
   iv. Information sharing and dissemination
5. Research Priorities

Organization

The Health Research System

The structures and personnel to conduct and use research for health fit into the large context of the health system on the one hand and the research system on the other. More specifically, the health research system lies at the confluence of these 2 systems[12-14] and constitutes 1) researchers 2) their work environment 3) funding 4) journals or other fora for dissemination and 5) their end users. Other elements that are essential for the system include the vision of the system, its ability to sustain itself by making available and regenerate funds, human and material resources and to ensure that the research is used. Research is an interdisciplinary and cooperative enterprise that may require team work between researchers with differing expertise as no single researcher has expertise on all aspects of their work. Investigators worldwide collaborate with others who may have a specific skill or facility (chemicals, reagents etc in laboratory research, equipment). this makes networking between researchers crucial and allows researchers to enrich their expertise and to explore areas beyond their experience. The government directly or via the PMRC has a role to play in fostering such networking. Aspects of financial, technical and HR constrain research in Pakistan and are discussed below.

Research culture

Research culture is the milieu in which research happens. This includes the researchers and their subjects but also their resources, networks with other researchers, facilities that they work out of and also, critically, their audience which in the larger context include all end users of evidence even when the researchers do not always think of it this way. This larger audience includes the communities that use the evidence, other researchers, government or other program designers and implementers and the funders of research. Each plays a critical role in conduct, ascertaining quality, maintenance of ethical standards and ultimately the use of research.

The Oversight and guidance function

There is a crucial need for oversight and guidance in the kind of national research that is needed. This may be done by developing and enhancing the existing thematic groups for research at national bodies such as the PMRC which also has a core group to ensure that implementation happens as intended. These groups must also have means to speak directly to decision makers and to hold these accountable in achievement of national goals.

Research Infrastructure

Researchers and other personnel

Development and maintenance of skills is essential for a sustainable research culture. There is a paucity of quality researchers and support staff such as biostatisticians, epidemiologists or data managers. Unless means are developed to train these professionals, research will remain of inferior quality. The main problem is that the training for these must be personalized, mentored and hands on. With few researchers in the country, there isn't the critical mass of research to provide for such training. There are some opportunities for Pakistani researchers to enter into long term mentoring relationships with internationally renowned researchers, but these are few and are constrained by lack of research in Pakistan, which then requires that many such researchers train abroad and many then stay on after training.

One long term solution may be to promote research among medical students. This is being done increasingly although the quality of such research remains low. In part this is because there is little possibility of quality mentoring within most medical schools. Most potential mentors are not full time researchers and themselves struggle with research quality. In large measure, this can only be overcome if some faculty in medical colleges were allowed full time research career tracks which is uncommon in most medical universities. In the government, this is in part due to the low remuneration to government employees who then supplement their incomes by conducting private medical practice. Faculty at private medical colleges is also similarly obliged to conduct other activities. In this schema research has little room. Furthermore, lack of direct funding for research and consequent lack of other support (i.e. the research infrastructure that would be supported by such funding) also discourage serious research within the health sector. Thus development of career tracks for full time researchers is essential. This may be enhanced by participation in international programs such as the Fogarty Program of the US government

and collaborations offered by a number of internationally renowned universities, however, such opportunities are extremely competitive and rare. To promote a wide scale research culture, indigenous support for researchers with career tracks, dedicated funds and protected time along with other infrastructure is required. Much of this is a financial issue and is discussed in that section.

Some of the mentoring issue may be overcome by strategic partnerships with international universities etc who can mentor Pakistani faculty in the early phases. Other methods include the development (or co-opting) of research training modules, mandatory publication of certain quality for advancement even for trainees and for under graduate and post graduate levels, change in undergraduate curricula to incorporate meaningful research and courses on how to get funded, grant writing, reviewing research and how to give feedback. Another major consideration would be to institutionalize continuing career development for dedicated researchers.

Another means to develop research capacity will be if the Ministry were to contract out specific research projects to universities or institutions, and demand quality from these institutions. For those institutions that lack capacity for such research, the Ministry can use its leverage to ensure guidance or mentoring from national or international researchers that have such expertise. In this regard a business model may be considered where the universities periodically bid for these contracts from the government and the best one wins it for a period sufficient to produce results but not too long to stifle competition (i.e. about 5 years).

Another avenue that may be possible is the development of Contract Research Organizations (CROs) as an industry. This trend is evolving globally. CROs attract funds for specific projects that they conduct in the country. Due to low research costs in developing countries, the CRO industry is developing in these countries, particularly India. There are a few

CROs in Pakistan. This may be worth developing. The potential advantages include increased research jobs in the country leading to promotion of research capacity and inculcation of a research culture. However, certain concerns regarding ethical oversight, quality and the rights of the subjects of research will have to be addressed in the process. The following are recommended:

1. Allow government and higher educational procedures that allow career tracks for researchers.

2. For promotion, accept only those articles that are published in indexed journals

3. Allow mechanisms to provide competitive remuneration to government researchers and allow appropriately remunerated career tracks for full time researchers.

4. Develop national and international linkages to promote mentoring in research

5. Focus training to develop more specialist support (biostatisticians, data managers etc) for researchers

6. Involve and support universities in research on theme areas of interest to the government and help provide guidance to enhance their quality

7. Establish networking between researchers via conferences and fora

Funding Research

Beyond altruistic considerations, research must be at least revenue neutral for the institution for it to be sustained. For most universities this would mean a reconsideration of how they manage funds and pay their faculty. It is unclear exactly what amount of funding is available or used currently on health research in Pakistan. Funding comes from a number of sources. The government programs allocate some funds for research in their budgets, donors also support research studies. On the other hand a few individual investigators directly find funds for research from local (eg the Higher Education Commission) or foreign donors. However the overall perception among researchers is that there aren't enough funds

available for research. On the other hand, policy makers and programmers often feel that research funds remain underutilized and research allocations are often returned unused.

While the government cannot meet all or even most funding requirements for research for health in Pakistan, it can help investigators find funding. It can also streamline funding that it controls and make it adequate for the research that is funded from local moneys. Currently the awards made by the HEC and other government entities are too small to support career researchers. The government can ensure that instead of many small grants there are fewer but adequately funded grants. In addition it can advocate to donors or even help channel donor funds to competent investigators. **To improve funding for research the government should consider the following**:

1. Allocate more funds for research for health that follows the national agenda

2. The government must allocate more funds for research within its own budgets and also help advocate for more funding and facilitate researchers in accessing this funding

3. Earmark funds within its project for specific research to guide that particular program. This is beyond the funds that are allocated for M&E – which can be used for research purposes

4. Advocate for funds to donors

5. Consider establishing a research fund – with its own or donor funds – that awards adequate funds for career researchers based on merit. This will require establishment of a grant review system that involves competent national and international researchers to review grant requests. It should also allocate some funds for research that is outside the national agenda. Some of this may come from existing sources such as the Super Fund that draws on revenues from the Telecom industries and is earmarked for development. Alternatively, a similar fund may be established from the pharmaceutical sector where funds are pooled and used for health

research based on merit based awards and are overseen by a group of national experts.

6. Consider tax incentives for pharmaceutical industry for innovative research

Laboratories

Laboratories are a major component of the research infrastructure. Research laboratories exist in only a few private institutions and no public medical university; and only a handful of commercial laboratories maintain standards required for quality research. In the short term, some existing commercial laboratories, selected for their willingness to participate in and support quality research, may be supported to meet quality standards needed for research. Eventually, the goal should be to develop dedicated research laboratories in universities. Additionally, there is a need for a system of laboratory certification and a network via which laboratories can map and share their needs and capacities, particularly for providing uncommon tests. This would allow participation of existing laboratories in ongoing research and guide researchers about which laboratories to refer to for specific capacities and tests.

1. Enhance the quality standards of laboratories and develop networking between interested laboratories

Journals

The main aim of research is to develop new knowledge and to share it. Sharing of research is conventionally done by publication in peer reviewed journals. The peer review process is important and drives the quality of the research that is submitted to journals. However, there are only 5 Pakistani journals that are indexed in the PubMed/ Medline® which is the premier database of quality health journals. It is telling that despite the existence of 63 journals – many for decades – only 3 have managed to attain sufficient quality to be accepted to that database. In part this has to do with the quality of research that is submitted to and accepted by these journals. However, this is a circular problem as good researchers do not submit to non-indexed journals and these journals have to accept lesser quality articles to keep going. Few quality journals and with a number of journals willing to accept lower quality research, a situation is created where researchers are not particularly compelled to enhance their research quality. The PMRC may have a role to play by applying its resources to select better articles for a few journals and push them towards indexing. The following are recommended:

1. Foster the indexing of more Pakistani journals

2. For promotion, accept only those articles that are published in indexed journals

Research Standards

Research Quality

Volume, appropriateness to context and quality are important in research. To establish quality, criteria for evidence and data quality must be standardized. Some of this guidance may be available from the work by the Higher Education Commission (HEC) and the Pakistan Council for Science and Technology (PCST). Both cover somewhat different domains and there is need for consensus on detailed and evidence based criteria. Once criteria are agreed upon, there is a need to train (and provide refresher training periodically) researchers in research methodologies. An essential component of this training is to develop a cadre of qualified mentors. Finally a gold standard for quality that is traditionally accepted is peer reviewed publication, particularly in indexed journals.

Ethical Standards

Research for health is meant to help people and by its nature meant to be conscience driven. To achieve this, it is vital to inculcate ethics within the researchers themselves leading to a situation where good researchers are ethical researchers. The other side of this equation is that unethical events have occurred in research with human subjects worldwide and there are concerns that these may happen more in developing countries where the rights of people and therefore potential research subjects are not particularly sacrosanct. While not many of these violations have been described for Pakistan, there has been a consensus that these must be addressed in the new strategy. It was also observed that Pakistan has fewer research review committees/ review boards than most other regional countries and even among those that exist, fewer still are properly trained. In order to rectify these, the **following priority actions are recommended**:

Following are recommended:

1. Publish established criteria for quality in research and incorporate these in research training
2. Use peer reviewed publications in indexed journals as the final arbiter of quality
3. Revitalization and strengthening of the National Bioethics Commission to set national standards of ethical oversight for research with human subjects, accredits institutional review boards (IRB) and helps foster an ongoing dialogue on issues related to research ethics including those of moral relativism. While the commission currently exists, it must be appropriately funded and tasked with oversight of ethics of research.
4. Mandate that all human subjects research receive prior approval from an accredited IRB
5. Develop national accreditation standards for ethics committees, including the requirement for proper training in ethical oversight and refresher training to keep up the skills
6. Re-emphasize the legislation to ensures: 1) all human subjects research is IRB cleared and 2) all IRBs meet certain quality criteria
7. Develop/ enforce policies and guideline to protect the rights of the public during human subjects (including pharmaceutical) research and incorporate these in researcher training

Translating Data into Actionable Knowledge

Research is seldom usable by decision makers unless it can be translated into policy briefs or other specific information pieces that address the information needs of the decision makers. However, even when properly translated, this information may not be sufficient to yield actions. The process of research to actions may be depicted in Figure 1.

Where **data** are individual pieces of results that come out of any research project and may not be sufficient by themselves to fully explain that situation. Once these are interpreted in the context of the problem they are supposed to address – possibly along with data from other research or sources – they inform about that particular problem and are therefore called **information**. When end users understand this information and can use it to address the problems, it becomes **knowledge**. Once this knowledge is used to guide implementation, it is translated into **actions**. Implementation of actions should then produce data that guides future course of actions by giving **feedback** to the whole process.

Translation of research is recognized as a major gap in Pakistan as it is elsewhere. Researchers produce their work but it is seldom converted into information that decision makers can use. This is either because there is so much of research data (and sometimes these are mutually conflicting), the data are scattered across many sources or are too technical.

To address this problem it is recommended that there be a discrete entity that collates and synthesizes results from available research and produces discrete, succinct and (usually) brief reports on key subject areas that are directed at key end users. It is recognized that these may vary in their content and design to suit the needs of specific end users. For example within the same theme area the reports for program implementers, bureaucracy and politicians will necessarily vary in length and the details provided.

This role may be served by the Pakistan Medical Research Council at the federal level. Similar roles may be played by individual institutes for public health in provinces and perhaps by universities for either provinces or districts. While this role has been discussed previously, a formal attempt at doing so would be novel. Whichever entity is selected for the purpose, will have to work with the users of the information to identify and prioritize theme areas (ie maternal and child health, diarrheal diseases, injuries etc) and dedicate staff for work in each of the specific areas. It will also mean that the capacity for such analysis and communication will have to be developed. However, there are regional examples (Tehran University) to emulate in this respect. To make it meaningful, a formal mechanism would be required to link the knowledge production process with policy development and implementation. for example a collaboration between the unit with the Health Systems Strengthening and Policy Unit may be desirable where the HSSPU requests information on specific themes and the knowledge unit produces them. Either the knowledge unit or the HSSPU then monitors the extent to which the knowledge products informed decisions or policy.

Following actions are recommended to foster knowledge translation:

1. Establish units that are responsible for knowledge

Figure 1: Tranlation of Research in Actions
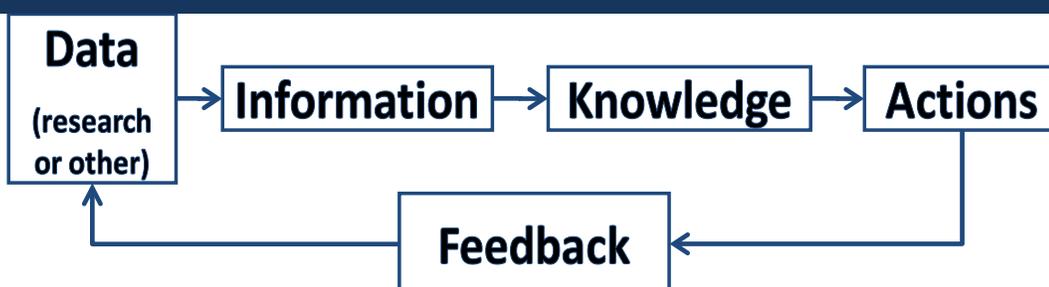
translation at federal, provincial and district levels. These must be legislated.

2. The units must work with decision makers– particularly the HSSPU and other provincial policy makers – professional organizations and other stakeholders to identify to identify priority area for their work. They must then dedicate staff for each of the theme areas so that these staff can develop theme specific expertise.

3. The units must start with collation of available data and its analysis for producing a situation analysis of key theme areas. These reports must be updated annually or at another suitable frequency. Other reports may be produced to address specific needs (outbreaks, key breakthroughs) including requests from information users.

4. The units must develop a repository where researchers can send the results of their work. This repository (or database) should have rules for the kind of the research that is entered and for coding its quality. Understanding that not all researchers would want their research shared immediately, the repository should establish accessibility and user policies.

5. The units track important ongoing research on key themes and liaisons with key research

producers (universities, government programs or NGOs) to collect and collate research data.

6. The units develop a project where existing theses from College of Physicians and Surgeons, Institutes of Public Health, the Health Services academy etc are collated and analyzed for particular information on key theme areas. If these data are found to be of sufficient quality, this exercise may be repeated every 1-3 years.

7. Government programs produce large volumes of data during implementation. Much of these can also be used for research/ analysis on these theme areas

8. The unit routinely and prospectively disseminates the results of their analysis to stakeholders within the government (Health, Finance, Planning, Education etc, as applicable), politicians (advocacy briefs) and to the civil society via websites, RSS feeds, reports, newsletters and other means.

9. The unit may organize annual conferences where key health research is presented

10. The units will advocate for the use of evidence to end users such as the civil society, government officials and politicians

Ensuring Evidence and Research are Used

Appropriate use of research requires: 1) availability of quality research 2) synthesis of available data into a coherent message that is usable (and understandable) by the end user and 3) training of the end users to be able to translate knowledge into actions.

In practice this means that not only is information from research synthesized into discrete information products that are tailored to the needs of the ultimate end users but also that key end users are trained in using information to guide policies and programs. For this to happen, the strategy seeks to identify end users and suggest measures to develop their skills at evidence use.

Information products are discussed in more detail in a later section, however, it is important to understand that while the analysis unit produces these products, it is important that their end users are trained in their usage.

Crucial stakeholders that would benefit from skills building for research or evidence use are: Health Ministry and Provincial Health Departments, District Health Administrations, Government Management Training Institutes, Universities (Public or Private), Other Educational Institutions, Research Organizations (CROs or NGOs), Civil Society/ Public representatives (politicians, NGOs, CBOs, Professional bodies - PMA, Press organizations etc. and Patient organizations), the Pharmaceutical Industry and the media. While funders will also benefit from such skills building, usually training of funders' staff is the purview of their own agencies rather than the Ministry of Health. Skills building will be both in the form of didactic lectures and workshops but also in the form of "hands on" work with actual information products (described below).

Specific recommendations for enhancing the use of research and evidence are:

1. Include the Ministries of Health and Finance and the Planning Commission in skills building efforts

2. Training should include both didactic elements (lectures and workshops, particularly at the Civil Services Academies) as well as hands on – and ongoing - work with information processing

3. Develop a monitoring framework to assess the use of research and evidence in policy and implementation. The latter may be enhanced by the use of checklists for decision makers

4. Constitute a forum where policy makers, researchers, community members and politicians can discuss how evidence was used in programs.

5. Research unit to develop a score card that measures the use of its information products

Building Skills for Using Research

There may be a formal process of building skills with didactic course work to initiate professional in research use along with some refresher courses and the development of resource material. However, this process must be followed up by "hands on" work with research and evidence use by professionals in their own work environments under the mentorship of trained mentors. The following are recommended:

1. National and provincial data analysis units to forward information to relevant end-users

2. Curricula and course work on information use at Public Services Academies

3. Establish feedback mechanisms between the national (or provincial) research analysis units and decision makers about the extent to which appropriate evidence was used and particularly about how to improve this usage

Information Products

Information products are the key tool to inform decision makers about specific issues. For example for the information about the effectiveness of outreach

as a means to enhance the use of oral substitution salts for children with diarrhea, a specific information product aimed at the Secretary Health may summarize the number of personnel that are providing this service, the ratio of households served per outreach worker and annual change in the trends of ORS use in the districts where such services were provided as compared to those where such services were not provided, along with the implications for these findings in terms of future program direction. It is envisioned that the analysis unit will have to develop a set of routine information products aimed as specific end users (ie, secretary health, DG health, community leaders, parliamentarians etc) that are produced at pre-determined intervals. In addition there will be occasional need for specific products that answer questions about specific uncommon events or that require unusual analyses. One note of caution about quality: poorly understand or misapplied information may be worse than no information at all. The following are recommended:

1. Develop information products based on program needs. Some suggestions would be to look at BoD, economics, program effectiveness, state of global science on the subject etc. other salient examples of information products would be 1) triangulation of data to identify the needs of failing or underperforming programs, 2) Review existing policies for evidence base, 3) Governance issues in implementation,

2. Define target audience when developing contents for Information products, the content of which are tailored to specific needs of different stakeholders. These can be aimed at government, public and media with the realization that the messages will vary for each target audience

3. Include communities as potential target audience for useable information from translated research and to disseminate it via appropriate and evidence based channels

4. Professional societies may be involved for development of annual reports

5. Develop a body at MoH (possibly within PMRC) to develop specific information products. Another option would be to consider variations of different body to oversee and a different group to identify problems to study. Or this could be a loose consortium that does the latter

Information Sharing and Dissemination

Information is seldom useful unless it can be transmitted to end users. Besides working on strategies to synthesize results, its equally important to work out the strategies to communicate these results to end users, with the realization that the modes of communication may vary according to the type of end user. The following may be considered:

1. Website for health information

2. Network of Researchers, along with a repository of names of researchers and institutions with theme areas and the involvement of professional associations

3. Annual research conference

4. Develop means to prevent suppression of research data

5. Identify crucial end users (hospitals, clinics and communities) and provide them feedback

6. Develop systems for data collation and information dissemination

7. Conduct research on the best means of reaching each type of end user

Research Priorities

There are many ways to approach this process. Since health is a wide subject and there are many theme areas, an exhaustive list of all necessary research activities will run too long and given the large number of stakeholders involved, there may not be relevant consensus on these. Alternatively, some general rules of research priority may be agreed upon. Guidance for this may come from the considerably rich international experience as well from the stakeholder consultations that have been a part of this strategy development process.

Research needs may be identified as: what is needed, minus what is known = research priorities. Currently, priorities for research for health are not established. In development of research priorities the following factors are likely to play an important role: 1) Magnitude of the problem, ie prevalence and burden of disease estimates or other means, 2) known status of knowledge to reduce the burden of diseases, 3) hindrances to reducing burden of disease, 4) implementation research for health programs 5) assessment of programs for effectiveness 6) economic analysis of ill health and 7) cost effectiveness of health programs. These are some guiding points in arriving at a list of research activities that will be needed to improve. These points may then be applied to each of the disease areas that are relevant. These areas too may be prioritized according to what is known about the burden of diseases in the country.

Social determinants of diseases are environmental (ie pollutions etc) and social factors (poverty, access etc) that impact how diseases and health play out for communities and persons. It is being increasingly understood that many public health problems can only be addressed when their social determinants are addressed.

Finally the determination of research themes and activities must be an institutionalized and transparent process. It would be worthwhile to involve government personnel, researchers, other experts and professional bodies in committees that determine these priorities. The members should be those with experience to balance out the oft felt tension between local priorities and international agendas.

Some proposed theme areas for research may be:

Burden of Diseases (BoD) and General Themes

1. The main categories of the national burden of diseases are depicted in Table 4, although the information for this table is adapted for a 2000 paper that used data from 1990. A newer assessment of BoD is indicated. This may include details such as prevalence, persistence, health impact, economic analysis, cost effectiveness analysis, strategic planning including resource needs

   Within these themes, the highest BoD is from respiratory infections, infectious and non-infectious childhood diseases, heart disease and diabetes, diarrhea and injuries. For these it would be useful to understand (when such information is not available)

2. A related approach would be to conduct exercises to determine in depth disease or theme focused research agendas

3. Emergencies such as the recent earthquake or conflict related displacement have exposed many weaknesses in the health set up and highlighted the need for disaster preparedness. This will be best served when based on evidence. Research should identify implementation modalities.

4. State of the science (available up to date

Table 4: Main Categories of BoD	
Communicable	31%
Non-communicable	62%
Both/ either	7%
Adult	38%
Child	29%
Both/ either	33%

information on each theme area) analysis

5. Operations research in health programs

6. Impact of MDGs on health programs

7. Health impact of policy decisions

8. Novel methods to reduce diseases

9. Risk, disability and economic cost of the disease.

Health Systems Research

Health systems form the basis of providing all preventive or treatment related health services. Weak health systems that are not results driven or inefficient have impeded the quality of the services provided and indirectly. The following areas were identified as key for upcoming research:

10. Access to Care is a major issue particularly for the poor and residents of less developed areas.

11. Address innovative solutions to health human resource constraints including contracting out (or in), extra incentives, alternate providers etc.

12. Occupational Health

13. Use of technology to improve governance. This may include electronic systems in health facilities and in health management offices so that records are better kept, collated and used. Other means would be the application of online services including bidding of contracts, secure data transfer protocols or for logistics management will enhance transparency. The research would identify implementation strategies and validate protocols for accuracy and reproducibility.

14. Assessment of health care technologies and of affordable lab technologies and an assessment Health of technology

15. Infection Control in facilities – surveillance, interventions and protection of staff

16. Quality control of Medicines

17. Validation studies for measuring the accuracy of existing data. For example, differing results on EPI program coverage from various sources led to considerable debate. It is understood that such differences may be due to methodological differences in the surveys but it would be helpful to have a formal mechanism in place to study these differences to understand them better so that these data are optimally used. Some of this analysis may be done with existing data but it is likely that some validation studies may be warranted.

18. Validation of the data from HMIS/DHIS, as this large database has potential for informing considerably about healthcare seeking in the country but suffers from lack of confidence due to validity and reliability issues.

19. Disease and Health Status Modeling. This is done in some countries and helps identify the path a particular disease of condition will take in upcoming years and also what the impact of interventions to control it would be. This is a powerful tool in setting priorities and can save valuable resources by directing their usage where make the most impact.

20. Innovative financing mechanisms such as Paying for Performance (P4P or Results Based Financing) that pay incentives for either providers to perform tasks at certain quality or to users of services to increase service usage. The research would apply to identify implementation modalities such as feasibility, costs, other implementation problems and details such as optimal rewards or penalties that are contextualized for Pakistan.

21. The current state of Health care financing in public and private spheres, details of how health spending occurs, where it occurs and who pays for which services.

Social determinants:

22. Impact of social determinants at primary health care, community or tertiary levels

23. Abortion (causes, permission, money and shame) and other social phenomena

24. Gender (sequestering of women at home, health and exercise, access to care and services, educating men to improve women's health) and women's empowerment

25. Study the role of empowerment of people and its impact on health

26. Environmental and Industrial pollution

27. Waste management

28. Link between community awareness of health promoting activities and associated changes in behaviors to apply such behaviors to individual lifestyles

29. Health human resource management and its impact on health

30. Within country differences in cultural and religious contexts

31. Consider research on the most marginalized as a means of giving social protection

Surveillance

32. Develop a national surveillance system for communicable and non-communicable diseases and develop coordination between individual surveillance systems

33. Research on indicators for diseases

34. Database research using DHIS data and other large databases such as the Pakistan Economic Survey, the Pakistan Demographic Survey, the Household Integrated Economic Survey and others that inform about aspects of health of the nation and communities.

Clinical Research

35. Adaptation of treatment of common disorders in Pakistani context. For example, how best to apply DOT for tuberculosis or optimal testing frequency during treatment of Hepatitis C

36. Common manifestations of common diseases in Pakistan

37. Risk profile of Pakistanis. For example cardiovascular risk profile of Pakistani women

38. State of Health including a National Health Survey.

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