What must be done to enhance capacity for Health Systems Research?

Sara Bennett[1], Ligia Paina[1], Christine Kim[1],
Irene Agyepong[2], Somsak Chunharas[3],
Di McIntyre[4], Stefan Nachuk[5]

1. Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, US. 2. Ghana Health Service, Accra, Ghana. 3. National Health Foundation, Bangkok, Thailand. 4. Health Economics Unit, University of Cape Town, South Africa. 5. Rockefeller Foundation, New York.

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TABLE OF CONTENTS

KEY MESSAGES

Overarching messages

- There is a major shortage of skilled individuals, and capable health systems research organizations that are able to produce timely, relevant and reliable research and analysis to guide country health systems. Governments, donors and non-governmental organizations need to invest in coordinated efforts to develop additional capacity for health systems research. This may be in part achieved through re-directing funding that currently goes to short term technical assistance.
- Capacity development interventions typically need to be (i) multi-faceted, responding to capacity needs at different levels (individual, organizational, and environment or network) and (ii) tailored to the context where they are being implemented.

Environment/network level interventions

- Donors, aid agencies and research funders need to put a larger share of their funding at the disposal of local stakeholders (such as governments) who use health systems research, while ensuring that these funds remain earmarked for research support. National governments also need to increase their own spending on health systems research and strengthen their capacity to administer this effectively.
- Many different types of actors are involved in health systems research, including universities, think tanks, ministries of health, and health service delivery organizations. Strengthening networks between these different actors, in the same country, is critical.
- Health workers and health service organizations have been a relatively neglected target of health systems research capacity development initiatives in developing countries. More capacity development initiatives should be targeted at this group and they should better link health staff to other groups engaged in health systems research in-country.

Organizational level interventions

- Groups engaged in health systems research often sit in host institutions such as universities or ministries of health. Strong support from such hosts is critical to success and health systems researchers need to more proactively engage with organizational leadership to advocate for health systems research.
- Multi-country networks and cross-country partnerships are important to capacity development, but research funders in particular need to be more realistic about the resources required to maintain such partnerships in a meaningful fashion and they should help nurture sustained partnerships and consortia.
- Predictable and sustainable core funding is critical to the success of HSR organizations and yet few such organizations possess this. The prospects for endowment funding should be actively explored.

Individual level interventions

- Funders and research organizations should experiment with innovative fellowship programs that help provide the financial incentive for senior researchers to stay in post, and also offer improved opportunities for intellectual stimulation and recognition to this group.
- A major collaborative effort is required to develop open access training curricula in health systems research that is relevant to the training needs of different types of individuals coming to this field (such as experienced social science researchers, health staff, and those seeking to be multi-disciplinary health systems researchers).

Strengthening the evidence base for capacity development

- The evidence base regarding effective strategies to develop health systems research capacity is woefully lacking and of a poor quality, this in itself may inhibit investment in capacity development. Evaluation methods should be developed and proper evaluation of capacity development initiatives should be conducted.

Executive Summary

Background: With the growing understanding of the importance of strong health systems to effective delivery of priority services, there has been a parallel growing interest in health systems research (HSR). While there are promising signs of greater investment in HSR, this does not yet appear to have translated into serious capacity development initiatives for HSR, however domestic capacity to conduct HSR and to address the implications of HSR for policy and practice appears critical to the development of stronger health systems.

Aims: This paper is concerned with how best to enhance capacity for HSR, with a particular focus on low and middle income countries. The paper aims to:-

- Map various facets of existing capacity for HSR, such as training opportunities for health systems researchers, and organizations conducting HSR, with a particular focus on low and middle income countries (LMICs);
- Identify the range of possible strategies to promote capacity development for HSR, review evidence on the effectiveness of alternative capacity development strategies and combinations of strategies, and identify promising sets of strategies for different contexts.

Concepts and Definitions: The paper considers three different levels of capacity relevant to HSR:-

- **Environmental and network capacity** – including the development of networks between different research organizations (both within countries and regionally or internationally), links to policy and decision makers within the health system, and established national systems for identifying priority HSR needs and supporting such research.
- **Organizational level capacity** – including establishment of appropriate organizational incentives and rewards for engaging in research, library and information technology, financial systems for grant management, established career pathways, research leadership etc.
- **Individual level capacity** – including skills in research, grant and report writing, communication of research findings etc.

A broad definition of HSR is adopted, including both health services and health systems research, as well as operational or intervention research. Health systems research has some specific characteristics relevant to capacity development initiatives. First, HSR is typically inter-disciplinary in nature, and consequently is unlikely to fit well into traditional disciplinary-focused departments at universities. Second, the highly applied and policy relevant nature of much HSR has affected prospects for capacity development; particularly in low income contexts, the types of policy-relevant questions and issues that many health systems researchers tackle, are often being addressed by short term consultants or technical assistance rather than by research institutions. Third, health systems researchers are likely to be scattered across different organizational homes – such as think tanks, university departments, NGOs and ministries of health

Methods: A variety of existing international databases were employed to describe the current status of capacity development for HSR in LMICs.

A systematic review was conducted of initiatives and interventions that have sought to enhance capacity for health systems research. The review sought to identify and include all papers that described a capacity development initiative for health systems or health services research. Articles were not restricted according to whether or not they had evaluated the intervention, as we were interested in gaining insights into implementation issues, as well as the impacts of initiatives, however only articles that reported interventions that had actually been implemented were included. No geographical restrictions were placed on the review.

Data extraction forms sought data on the nature of the intervention, the context in which the intervention was implemented, and perceived factors that facilitated or obstructed the implementation of the intervention.

From those papers which reported a proper evaluation, data on evaluation design, variables measured, findings of the evaluation and recommendations were also extracted.

Findings: HSR Capacity Landscape: A very approximate estimate of the number of researchers working in the field in low and middle income countries may be about 6-7500 people (compared to over 13,000 researchers working on HSR in the US). There are relatively few courses in LMICs designed to teach HSR skills. In terms of organizational capacity in 2010, the Alliance for Health Policy and Systems Research had 301 active partners working on HSR of which 251 were situated in LMICs (compared to an estimated 709 organizations working on HSR in the US). Of these partners 176 (58%) were universities or research organizations. The remainder took the form of government departments, NGOs, multilateral organizations and professional organizations[1].

Findings: Systematic review: Of the 73 identified papers which reported interventions to enhance capacity for HSR, the majority 49 (67%) were from high income countries, notably the US (15), the UK (13), Canada (10), and Australia (8). Of the 24 papers which concerned LMICs, 11 covered interventions in multiple countries.

The most commonly used capacity development strategies for HSR in LMIC contexts were training, particularly short course training but also post-graduate training. Networking, partnerships and research grants were the other commonly used strategies. High income countries exhibited a broader array of strategies with mentoring, research seminars, and fellowships or internships being most widely used.

The primary group targeted by training interventions was university researchers (43% of interventions in HIC and 54% LMIC). In HICs there were also a large number of interventions that targeted health service providers. This was less common in LMICs.

The most frequently cited barrier to implementation of capacity development initiatives was lack of time among participants in the program and/or competing priorites for their time, this appeared to be a problem for trainees and particularly for mentors. The second most commonly cited factor inhibiting implementation was financial issues, both for the implementation of the capacity development program itself, but more commonly for the sustainability of the capacity gains after the end of the program, and third was the significant transaction costs associated with managing complex networks and collaborations.

It was commonly the case that the intervention was judged to be effective at the particular "narrow" objective it sought to achieve (more trained staff, for example), but the overall effect was more limited due to other (organizational level or environmental level) constraints that were not addressed by the intervention. Mentoring emerged as a particularly effective strategy in several papers. Multiple papers, especially from HICs, emphasized the importance of flexible capacity development programs that could tailor support either to different individuals, teams or organizations, or over time as experience with a particular intervention package grows. While short course training was commonly used in LMICs, where it was not combined with other mechanisms (such as grants or mentoring) the effects were often not favorable.

Only 32 of the papers (43.8%) identified included a proper assessment, 23 of these papers came from HICs and just 9 from LMICs. The quality of the evaluations conducted was frequently problematic, for example only four of the evaluations were conducted by independent assessors.

Conclusions and recommendations: The articles found in the review focused primarily on the individual and organizational levels and paid less attention to the broader environment such as national research funding systems and their links to HSR, this may be because many of the papers were from HICs where the challenges faced are somewhat different in nature to LMICs. Given the very weak evidence found through the systematic review, the recommendations build upon the findings from the review, but also draw upon the experience of the authors, in order to identify promising avenues for capacity development in the future. Key recommendations are as follows:-

Overarching

- Capacity development interventions typically need to be (i) multi-faceted, responding to capacity needs at different levels (individual, organizational, and environment or network) and (ii) tailored to the context where they are being implemented.

Environment/network level interventions

- Donors, aid agencies and research funders need to put a larger share of their funding at the disposal of local stakeholders (such as governments) who use health systems research, while ensuring that these funds remain earmarked for research support. National governments also need to increase their own spending on health systems research and strengthen their capacity to administer this effectively.
- Many different types of actors are involved in health systems research, including universities, think tanks, ministries of health, and health service delivery organizations. Strengthening networks between these different actors, in the same country, is critical.
- Health workers and health service organizations have been a relatively neglected target of health systems research capacity development initiatives in developing countries. More capacity development initiatives should be targeted at this group and they should better link health staff to other groups engaged in health systems research in-country.

Organizational level interventions

- Groups engaged in health systems research often sit in host institutions such as universities or ministries of health. Strong support from such hosts is critical to success and health systems researchers need to more proactively engage with organizational leadership to advocate for health systems research.
- Multi-country networks and cross-country partnerships are important to capacity development, but research funders in particular need to be more realistic about the resources required to maintain such partnerships in a meaningful fashion and they should help nurture sustained partnerships and consortia.
- Predictable and sustainable core funding is critical to the success of HSR organizations and yet few such organizations possess this. The prospects for endowment funding should be actively explored.

Individual level interventions

- Funders and research organizations should experiment with innovative fellowship programs that help provide the financial incentive for senior researchers to stay in post, and also offer improved opportunities for intellectual stimulation and recognition to this group.
- A major collaborative effort is required to develop open access training curricula in health systems research that is relevant to the training needs of different types of individuals coming to this field (such as experienced social science researchers, health staff, and those seeking to be multi-disciplinary health systems researchers).

Strengthening the evidence base for capacity development

- The evidence base regarding effective strategies to develop health systems research capacity is woefully lacking and of a poor quality, this in itself may inhibit investment in capacity development. Evaluation methods should be developed and proper evaluation of capacity development initiatives should be conducted.

1. INTRODUCTION

The past decade has seen a growing consensus at the global level about the need to address the difficulties associated with weak health systems in low and middle income countries. This consensus, which started to emerge from the challenges faced in scaling up effective services particularly for HIV/AIDS, but also for other priority conditions, has expressed itself through international declarations, journal articles, organizational policies and shifts in funding patterns[2-4]. Alongside the increased attention to health systems, there has been a growing focus on aid alignment and a mounting commitment to country leadership, however there has been strikingly little recognition that critical to health system strengthening, is the development of local health systems research institutions. The urgent need to strengthen countries' own capacities for health systems research and analysis is further supported by our growing understanding of health systems as dynamic systems which are constantly changing, and are characterized by emergent behaviors and governed by multiple feedback mechanisms[5]. This emerging literature on systems thinking suggests that static, blueprints for health systems strengthening are unlikely to be effective, instead, national and local health systems need research and analysis that can inform system development in an ongoing fashion. Stronger health systems research institutions are needed, as well as skilled and motivated health systems researchers who can analyze health systems problems from a multi-disciplinary perspective, conduct applied research and inform policy.

There is a fairly extensive literature that addresses the imbalance in health research capacity between north and south, and articulates the importance of health research capacity strengthening in general [6-8]. For example, several previous papers have sought to document capacity development needs for health research with a particular focus on LMICs [9, 10], and there have been multiple initiatives aimed at strengthening health research capacity in developing countries[11, 12]. However previous papers (i) addressed the general need for health research capacity in LMICs rather than focusing on the more specific needs of HSR and (ii) rarely sought to establish the impact or effects of capacity development initiatives[13].

With the growing understanding of the importance of strong health systems to effective service delivery, there has been a parallel growing interest in HSR. This emerged particularly through the Mexico Ministerial Summit on health research and the follow-up Bamako Ministerial Forum[14-16]. A previous paper argued however that despite the repeated calls for greater investment in health systems research, and some very positive signs in terms of funding increases for this area of work, the capacity development agenda was still neglected[17].

While the commitments at ministerial fora have referred explicitly to HSR, other authors have called for greater investment in or attention to implementation science, operational research and health services research[18-20]. There are clearly distinctions between these various fields, but we have chosen to interpret the boundaries of health systems research in a relatively inclusive manner, so that HSR encompasses not only academic health systems and policy research, but also more applied operational or implementation research that may be conducted by health workers at multiple levels of the health system. Further, this paper takes a broad look at capacity, focusing not just on the development of individual skills for HSR, but more broadly upon the development of organizations that might employ health systems researchers, and the institutional incentives necessary to ensure the further development of the field.

This paper is concerned with how best to enhance capacity for health systems research (HSR), with a particular focus on low and middle income countries. The paper aims to:-

- Map various facets of existing capacity for HSR, such as training opportunities for health systems researchers, and organizations conducting HSR, with a particular focus on low and middle income countries (LMICs);

- Identify the range of possible strategies to promote capacity development for HSR, review evidence on the effectiveness of alternative capacity development strategies and combinations of strategies, and identify promising sets of strategies for different contexts.

In this paper, we begin by providing a brief overview of relevant concepts and definitions in order to better situate the concepts and components related to HSR and research capacity development. We also describe the methods employed to gather the data we present here. Second, we depict the current health system research landscape and map the various facets of existing capacity for health systems research, such as training opportunities for health systems researchers, and organizations conducting HSR, with a particular focus on LMICs. Third, we present findings from a systematic review which aimed to identify the range of possible strategies to promote capacity development for health systems research, review evidence on the effectiveness of alternative strategies and combinations of strategies, and identify promising sets of strategies for different contexts. Finally, we conclude with a discussion of our findings and recommendations for the future.

2. CONCEPTS AND DEFINITIONS

Definitions of capacity are frequently frustratingly vague and typically focus, in a rather circular fashion, on the ability of an organization or a system to perform the roles that they are meant to[13]. While historically, much of the emphasis in developing research capacity has been on training and skill development for individuals, more recent conceptual models of capacity, emphasize the need for capacity at several inter-linked levels [9, 21]. For example, the production of high quality research does not depend upon skilled personnel alone but also functional organizations within which these individuals can work, and broader systems that enable researchers to access funds, or consult with policy makers on research priorities. While there are alternative formulations of the key levels at which capacity is required, in this paper we employ a simple scheme that considers:-

- **Environmental and network capacity** – including the development of networks between different research organizations (both within countries and regionally or internationally), links to policy and decision makers within the health system, and established national systems for identifying priority HSR needs and supporting such research.
- **Organizational level capacity** – including establishment of appropriate organizational incentives and rewards for engaging in research, library and information technology, financial systems for grant management, established career pathways, research leadership etc.
- **Individual level capacity** – including skills in research, grant and report writing, communication of research findings etc.

These three different levels of capacity have been used both to structure the capacity mapping exercise and guide the systematic review of capacity development interventions.

There has been much debate around the definition and scope of health systems research, and there is no single, universally accepted definition. Definitional issues have been complicated by the fact that the boundaries between health systems research and related fields such as operational research, implementation research, and health services research are often not clear. However, there is consensus around the following:

- Health systems research draws on a variety of disciplines: economics, sociology, anthropology, political science and epidemiology
- Health systems research is predominantly an applied field that starts with a problem or topic that arises from practical policy or implementation experience, and selects methods, whether qualitative or quantitative, that address this in the most appropriate manner

- Health systems research is different to classical public health research in that it has less of a focus on diseases and disease interventions than on the generic structures and processes through which these interventions are implemented.

While the term "health services research" is more commonly used than "health systems research" in high income countries, and there is a view that health services research typically focuses upon lower level more micro (service) issues, rather than broader health systems issues, in practice this distinction appears to be eroding, and the two terms are now rather similar. For example a recent paper suggested the following definition for health services research, which could equally well apply to health systems research.

> "the multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health are, the quality and cost of health care and ultimately our health and well-being. Its research domains are individuals, families, organizations, institutions, communities, and populations." [22]

In approaching this paper we have intentionally adopted a relatively broad and inclusive definition of HSR.

Health systems research has some specific characteristics relevant to capacity development initiatives that need to be teased out and better understood. First, HSR is typically inter-disciplinary in nature. This has several ramifications: HSR does not necessarily have a "natural" home in disciplinary-focused university departments and it may be looked down upon as being a highly applied and less clearly defined field. Further, applied HSR which addresses policy maker questions in a timely fashion may not always be publishable in peer reviewed journals. As a consequence academic researchers who are under pressure to publish may have highly relevant skills but be reluctant to bring their expertise to bear on this applied field of study. People may enter the field with the intention of being broad, multi-disciplinary researchers, or alternatively with a view to applying specific disciplinary skills (such as health economics) to health systems questions[23]. The training needs for these different types of health systems researchers differ.

Second, the highly applied and policy relevant nature of much HSR has also affected prospects for capacity development. Particularly in low income contexts, the types of policy-relevant questions and issues that many health systems researchers tackle, are often addressed by short term consultants or technical assistance rather than by research institutions. Sometimes such policy advice is provided by external consultants or staff of international organizations; such arrangements typically have limited positive impact on the development of domestic analytical capacity. Alternatively policy advice may be sought by hiring local researchers as consultants. Particularly in low income contexts where university sector pay is poor, such jobs can be very attractive to researchers and indeed there are contexts where this type of work forms the "bread and butter" for local researchers. However it has been argued that this practice undermines the development of institutional capacity through diverting the attention of university staff to short term projects, rather than longer term collaborative research contracts [24]. Further such work is often paid for through individual consulting agreements rather than through institutional contracts and thus may not bring any financial benefit to the university or research institute. These types of consulting practices can be damaging in other respects too: they are likely to inhibit the uptake of research and analysis in policy and decision making because they depend upon short term agreements, often with consultants from outside the country, and as such undermine the development of longer term, trust-based relationships between policy makers, and researchers or policy analysts which have been shown to favorably influence evidence uptake.[25, 26]. More clinical, or less applied fields of health research rarely suffer from this same set of problems, or at least not to the same degree. Finally, and also related to the applied or multi-disciplinary nature of HSR, health systems researchers are likely to be scattered across different organizational homes – such as think tanks, university departments, NGOs and ministries of health – and as a consequence, there is perhaps no common understanding of what capacity development needs are.

3. METHODS

3.1 Mapping current capacity

The mapping of current capacity draws upon several existing international databases, namely:-

A database of training opportunities in the HSR field - in 2008, colleagues at Duke University developed a database of formal training opportunities in the field of health management, health systems, health economics and health policy[27]. Their work drew upon existing databases (on health management from WHO, and on health economics, policy and systems from the Alliance for Health Policy and Systems Research) as well as a web-based search for relevant training programs. For this current paper the database was updated through a web-search, and selectively re-analyzed. In particular the analysis for this paper excluded programs which focused exclusively on health management, as such programs typically lead to careers in health services management rather than HSR.

The Alliance for Health Policy and Systems Research partners' database – The Alliance has over 300 partners. While these partners have previously been surveyed and results reported elsewhere[17], the whole database has recently been reviewed and revised so as to include only those organizations that are active partners of the Alliance. At this point in time, the database includes limited information on each partner including their organizational type and their country location.

A database of health policy analysis institutes – this database was developed by the Alliance for Health Policy and Systems Research with a grant from the Rockefeller Foundation[28]. The database was developed in 2009 building upon the Alliance for Health Policy and Systems Research partners database, the Global Development Network partners database and a web search. The database includes information on organizations active in providing health policy analysis and health policy advice in low and middle income countries.

Data from these databases are compared with similar indicators from a recent study that sought to depict the state of health services research in the US[23].

3.2 Systematic review of HSR capacity development initiatives

As part of the process for preparation of this paper a systematic review was conducted of initiatives and interventions that have sought to enhance capacity for health systems research. Due to limitations of space the full systematic review is reported separately, but this section outlines the methods used for the review and section 5 highlights key findings from the review.

The review sought to identify and include all papers that described a capacity development initiative for health systems or health services research. Articles were not restricted according to whether or not they had evaluated the intervention, as we were interested in gaining insights into implementation issues, as well as the impacts of the initiatives, however only articles that reported interventions that had actually been implemented were included in the study. Further, while we were interested in learning about interventions that were relevant to low and middle income countries, we did not place any geographical restrictions on the study. The data extracted from the papers included information about the context in which the intervention took place and this information was used to consider the relevance of the intervention to LMIC contexts. The term "health systems research" was interpreted broadly so that studies that addressed capacity development

for health systems research, health services research, operational research, or implementation research or similar fields were all included.

For published literature the following databases were searched: Scopus, PubMed, Embase and Global Health, and for the grey and regional literature the following regional databases were searched: Scirus, Proquest, IMEMR, Virtual Health Library (limited to LILACS), and Africa-wide Nipad. Search terms combined different phrases referring to "health services research" or "health systems research" or related research fields, with phrases referring to capacity development or capacity building. Annex 1 shows the search terms used in the search. The searches were not restricted by language of the published article, although relatively few non-English language articles ended up being included in the review.

A total of 2,597 unique articles were retrieved from the search. These articles were independently screened by two reviewers, and any differences resolved through discussion , so as to identify which papers should be retained for data extraction. From the search 71 papers were finally screened for inclusion in the review and a further two papers from the grey literature[29, 30] were found by the authors in their own libraries, making a total of 73 papers for inclusion. In addition a number of papers that were relevant to the topic of this paper but did not meet the inclusion criteria were identified as being of secondary interest.

Data extraction forms sought data on the nature of the intervention, the context in which the intervention was implemented, and perceived factors that facilitated or obstructed the implementation of the intervention. If authors expressed an opinion about the effectiveness of the intervention this was also noted. From those papers which reported a proper evaluation, data on evaluation design, variables measured, findings of the evaluation and recommendations were also extracted.

4. THE CURRENT HSR CAPACITY LANDSCAPE

4.1 Individual Level

There is very limited international or regional evidence on the number of people working in the HSR field. Getting such information can be complicated by the multi-disciplinary nature of the field and definitional difficulties, so any estimates that can be made are partial and unreliable. The Alliance for Health Policy and Systems Research has 301 organizations registered with it as partners, or which 251 are situated in LMICs[1]. A recent survey of Alliance partners found that the mean number of professional staff for such organizations in low income countries was 40 and in middle income countries was 16 [17]. Thus a very approximate estimate of the number of scientists working in the field in low and middle income countries may be about 6-7500 people. In Sub-Saharan Africa a more serious attempt has been made to document the number of health economists: a total of 93 Africans have graduated from the Masters in Health Economics programs at the University of Cape Town and the University of York since the mid 1990s through till 2005 [31]. The African Health Economics Association currently has a total of 210 individual members, of which it is estimated that about 110 are health economists, and the remainder are engaged in health policy (personal communication Chris Atim). For comparison purposes, a recent AcademyHealth study estimated the total number of health service researchers in the US alone to be over 13,000[23].

There is also limited available information about the training opportunities for those wishing to pursue a career in health systems research. Table 1 shows the estimated current number of Masters and Doctoral courses in three main regions, including only low and middle income countries. While there were a significant number of courses in Africa, five of the Masters courses and both of the Doctoral programs identified are

located in South Africa. For Asia, the figures represented here are likely to be an under-estimate given that it was not possible to search for Masters and doctoral programs in Chinese.

Table 1 – Masters and Doctoral courses in health systems, policy and economics in Low and Middle Income Countries

Region	Number of institutions offering health systems or policy MScs	Number of institutions offering health systems or policy PhDs or DrPHs	Types of course offerings
Africa	10	2	Health services planning and management, health economics, health systems and policy
Americas	20	7	Politics and planning, public policy and health, politics of health
Asia	9	5	Health economics, Health policy and systems, Health financing

Source: Adapted from [27]

In addition to the two Masters programs in health economics in Africa identified above, McIntyre and Wayling found 11 Masters courses (both economics and MPH programs) that offered a module on health economics as part of a broader masters course [31]. Again, for comparison, it has been estimated that each year in the US 4,500 Masters students and between 150-300 doctoral students graduate in the HSR field, although it should be acknowledged that some of these are international students[23].

It is unclear the extent to which any of the programs identified in Table 1 above offer integrated training in health systems research, as opposed to courses that are likely to lead participants towards careers in fields that are not research based (such as health planning positions in government). The University of Cape Town is currently in the process of developing a course on health systems research as part of its MPH program (personal communication Helen Schneider). While universities in the north offer health services research courses, these are typically targeted towards domestic rather than international audiences, and at this point in time there is no widely agreed or publicly available curriculum for HSR with a focus on LMIC contexts, although there are plans to develop such an open access curriculum using EU funding (personal communication Lucy Gilson and Merrick Zwarenstein).

4.2 Organizational Level

In the US it was estimated, using the HSRProj database[1] that in 2009 there were a total of 709 different organizations that housed principal investigators of health services research projects. There is no similar database for health services research projects in LMICs, but a partial picture of organizations engaged in HSR can be pieced together. In 2010, the Alliance for Health Policy and Systems Research has 301 active partners. Table 2 shows the breakdown of these partners by region. Of these partners 176 (58%) were universities or research organizations. The remainder took the form of government departments, NGOs, multilateral organizations and professional organizations[1].

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[1] See http://wwwcf.nlm.nih.gov/hsr_project/home_proj.cfm

Table 2 – Breakdown of Alliance HPSR partners by region

Region	No. of Partners
Sub-Saharan Africa	76
East Asia & Pacific	55
South Asia	51
Latin America & Caribbean	48
Europe & Central Asia	42
Middle East & North Africa	15
North America	14
Total	*301*

Source: Alliance for Health Policy and Systems Research, Partners Survey

Another study focused specifically on health policy analysis institutes, that is autonomous or semi-autonomous institutes with the overall *purpose* of supporting health policy development and implementation through analysis and research[28]. It is estimated that in 2009 there was a total of 78 health policy analysis institutes in LMICs, the bulk of these were in Asia (38) and Africa (21), although institutes in Latin America may have been missed as they are perhaps less likely to join Anglophone networks. There appeared to have been particularly rapid growth among health policy analysis institutes during recent years, with 81% of the institutes having been established since 1990[28].

An earlier survey conducted by the Alliance in 2008 found that the majority of the Directors of partner organizations in low and middle income countries had more than 10 years of experience in the field (66.7% and 76.2% respectively), however a relatively low proportion of staff (34.0% in low income countries and 22.3 in middle income countries) had PhDs[17]. While staff at HSR organizations in middle income countries had near universal exclusive access to computers and internet, only two thirds of staff in low income countries had these facilities.

4.3 Environmental and Network Level

There are a number of regional networks that are actively engaged in HSR, these include for example EQUINET and HEPNet in Southern Africa and the Asia Pacific Health Economics Network. Some, particularly larger countries, have their own networks (such as the China Health Economics Network). The International Health Economics Association has actively fostered similar associations within different regions, such as the recently established African Health Economics and Policy Association, but there are no similar associations focused on HSR. Further many regional networks are established, work actively for a while and then decline to very low levels of activity.

While recent years have seen efforts to map national health research systems[32, 33] these initiatives are still in relatively early stages of development, nonetheless they suggest that many LMICs do not have basic

structures for national management of health research such as research funding councils, or national agencies that determine research priorities. These problems clearly apply to health systems research, as well as other types of health research. Other environmental issues that undermine HSR include the lack of reliable national health information systems, and often a limited culture of evidence-informed policy and decision making. In a recent study of health policy analysis institutes, lack of demand for research evidence from policy and decision makers was perceived to be a critical constraint upon the sustainability and success of health policy analysis institutes[28].

5. TYPES OF CAPACITY DEVELOPMENT STRATEGIES AND THEIR EFFECTIVENESS

From the systematic review, of the 73 papers which reported interventions to enhance capacity for HSR, the majority 49 (67%) were from high income countries, notably the US (15), the UK (13), Canada (10), and Australia (8). Of the 24 papers which concerned LMICs, 11 covered interventions in multiple countries. The large majority of HIC papers were limited to only one country. Several papers were concerned with similar initiatives, or the same broad initiative that had been implemented differently in different contexts. We chose to analyze each paper as a stand-alone study as, due to the differences in settings and how an initiative had been interpreted, it would have been impossible to merge papers without losing substantial richness.

5.1 Interventions implemented

Capacity development interventions reported, typically involved multiple components. 69% of the HIC articles and 62% of the LMIC papers reported more than one element to the intervention package, with most papers reporting 2-3 interventions combined into the package. Table 3 below shows the main interventions implemented as part of HSR capacity development initiatives, separating out high income countries and LMICs. The most commonly used strategies in LMIC contexts were training, particularly short course training but also post-graduate training. Networking, partnerships and research grants were the other commonly used strategies. High income countries exhibited a broader array of strategies with mentoring, research seminars, and fellowships or internships being most widely used. While strategies that targeted the individual level (such as mentoring, training, and fellowships) predominated, there were also a number of organizational level strategies such as the development of research infrastructure, research support committees, the establishment of a research facilitator post and strategic planning. Very few interventions addressed the environmental level, although many supported some form of networking across organizations. When interventions did address the environment, they typically did so as part of a much broader package of interlinked interventions. For example, Thomas et al report on initiatives to support the development of primary care research networks in the UK which included support to the development of research governance mechanisms and resource allocation mechanisms for HSR[34].

Table 3 – Nature of capacity development interventions identified

High Income Countries (N=49)			Low and Middle Income Countries (N=24)		
Intervention	N	% articles citing	Intervention	N	% articles citing
mentoring	15	31%	short course training	14	58%
research seminars/conferences	13	27%	networking	9	38%
fellowships/internships	12	24%	grants/production of original research	7	29%
grants/production original research	12	24%	post-graduate training	7	29%
Partnerships	10	20%	Partnerships	6	25%
short course training	10	20%	basic training	4	17%
Networking	9	18%	mentoring	4	17%
post-graduate training (masters and doctoral)	5	10%	research infrastructure support	2	8%
research infrastructure & new research centers	5	10%	strategic plan	1	4%
writing and publications support	4	8%	production literature synthesis	1	4%
basic training	3	6%	research seminars/conferences	1	4%
research facilitator	3	6%			
research support mechanisms eg. committee	3	6%			
faculty support/protected time	3	6%			
Other	12	24%			

About 43% of the interventions in HICs and 54% of the interventions in LMIC contexts targeted university researchers (including papers that focused specifically on junior researchers). In HICs there was a large number of interventions (49% of the total) that targeted service providers, particularly general practitioners (20% of the total) and nurses (16%). While some of these programs were focused on providers alone, others sought to strengthen research networks that included university-based researchers, health care providers and decision

makers too. For example Thomas et al report on an initiative in London, UK to develop primary care research networks as a means to enhance service quality[34]. Antil et al, describe a somewhat similar initiative in Quebec,Canada and note that the program aimed:

> "to consolidate a critical mass of university researchers willing to work in partnership with representatives from practice, intervention and policy settings.." as well as " introducing a culture of research within action settings".[35]

In LMIC contexts, after university researchers the next most commonly targeted groups were government officials and policy makers (33%) and then health staff 29%. Some interventions targeted service providers alone, such as the development of an annual training course for TB officers in Malawi[36]. A few initiatives in LMICs such as the International Health Policy Program[29] and an IDRC and PAHO supported program in Latin America[37] sought to develop networks between policy makers and researchers, but only one[38] appeared to engage health workers in these research networks.

In many of the studies included in the review, the intervention sought to improve capacity for health systems or health services research (27 of the papers), but there were also a significant number concerned with general or family practice research (11 papers) and nursing research (11 papers). Only three studies had a primary focus on developing capacity for knowledge translation ([37, 39, 40], although several included this as a sub-objective.

5.2 Implementation Issues

Data was extracted from all papers on implementation issues, and in particular reviewers extracted information about factors that had facilitated the implementation of the intervention, or package of interventions, and factors that had inhibited implementation. These facilitators and inhibitors are summarized in Table 4, in approximate order of importance (ie. reflecting the number of times they were cited by different papers). Typically papers were more likely to list barriers to implementation rather than factors that had supported implementation. The most frequently cited barrier was lack of time among participants in the program and/or competing priorities for their time, this appeared to be a problem for trainees and particularly for mentors. In one study 59% of respondents identified time as the major factor affecting their ability to benefit from the program[41], and in another paper, lack of time was the second most commonly given reason for participants failing to achieve goals[42]. In several cases the intervention was designed to free up participants time to participate in research and research capacity development through "buying" them out of teaching or service provision commitments. In some cases this seemed to work well[43], but in other instances only lip service had been paid to this requirement and/or participants had still found it difficult to set aside time to participate fully in the program[44]. Another major and related problem concerned short time frames for the intervention, which sometimes led to difficult tensions between getting the necessary work done and doing it properly. This affected many different types of intervention, for example a paper discussing training workshops in Laos observed:

> ""time spent in training was too short to really learn, understand and absorb all the new knowledge." [40]

The second most commonly cited factor inhibiting implementation was financial issues, both for the implementation of the capacity development program itself, but more commonly for the sustainability of the capacity gains after the end of the program, and third was the significant transaction costs associated with managing complex networks and collaborations.

In terms of facilitators, enthusiasm and motivation among participants was the most frequently cited facilitator. Some papers linked this to careful selection of participants. Strong institutional support for the intervention was also perceived to be very important: presumably managerial support helps motivate program participants and may also help them in freeing up time to dedicate to the initiative. Several papers also talked about the importance of flexibility in intervention design, both so that the intervention can be adapted to reflect different starting positions for individuals or organizations involved, but also so that it can be adapted over time as implementers learn what is and is not working.

While many of the implementation constraints were common to both HIC and LMIC contexts, there were some issues that appeared to be particularly problematic in LMIC contexts, these included for example the issue of financial sustainability[38, 45, 46], language barriers [40, 47], and, in some contexts, staff turnover [48].

Table 4 – Commonly cited facilitators and inhibitors to the implementation of capacity development interventions

Facilitators	References	Inhibitors	References
Enthusiasm and motivation among participants	[49], [39], [50], [51], [52]	Lack of time – for staff, for participants, and especially for mentors	[53], [42, 50, 51, 54-61], [62]
Institutional support, from parent organization, senior management or government	[47, 63-65]	Insufficient funding, particularly inadequate funding to ensure sustainability beyond initial grant. A particular concern with respect to administrative costs.	[39, 45, 55, 66],[46, 65, 67, 68],
Flexibility in the program design	[30, 35, 49, 69],	Amount of time and energy spent on communication and coordination, especially if there is a great physical distance between collaborators, or a competitive environment	[34, 58, 59, 67, 70-72]
Strong leadership	[35, 39, 57]	Timeline too short, and tensions experienced between doing things well and following right procedures versus finishing in time	[40, 42, 53, 58, 59, 73]
Builds on existing partnerships	[48, 64]	Lack of institutional support for trainees, limited managerial support	[42, 54] [66]
Participatory approach	[38] [73]	Lack of support from trainees host institution	[42, 54, 74] [66]
Being part of a broader program with similar goals	[63], [75]	Lack of confidence in research abilities (especially with respect to nursing staff) and/or lack of a research culture	[44, 55, 58, 61]
		Language barriers	[40, 72], [47]
		Differing levels of experience or educational backgrounds among participants	[36, 76]

5.3 Key Findings

The majority of articles were extremely positive about the nature of the impacts that the interventions had. This was particularly true of those papers where no evaluation was conducted. Only three of the papers were directly negative about the impact of an intervention. Hicks reports an unsuccessful initiative to engage middle managers in the UK in health services in research[54]. Of the 12 managers who initially expressed interest in the package of training and research support, only 7 attempted to conduct research upon completion of training, and of these only 3 had, by the end of the study period, a draft outline for their research report. The author attributes the lack of success to a combination of the significant workload that participants already faced, the lack of an organizational research culture, and the loss of motivation and commitment on the part of participants. Birden predicted (but did not measure) minimal effects from an intervention that provided fellowships to general practitioners and attached them to primary health care research centers[59]. His concerns pivoted on the short duration of the intervention (1 year) and the fact that the program did not address the issue of competing demands for general practitioners time. The final paper that was directly negative was a personal reflection rather than a scientific paper, in which the author compared two different training courses in which he had participated and argued that one of these (of 5 days duration) was insufficiently long for participants to really absorb their learning[77].

Several papers offered more mixed assessments of the intervention (see table 5), and in many respects the gaps or problems that the papers noted in terms of achieving overarching goals are of greatest interest. In many cases, where mixed assessments were made, the intervention was judged to be effective at the particular "narrow" objective it sought to achieve (more trained staff, for example), but the overall effect was more limited due to other (organizational level or environmental level) constraints that were not addressed by the intervention.

Table 5 – Key findings of papers stating mixed impacts of interventions

Paper	Intervention	Nature of impacts
Individual level interventions		
[78]	Mentoring program for minority students	Had some beneficial impacts but was challenged by high workload of mentors and difficulty in retaining students
[42]*	Grants to family physicians for development of research capacity	Very diverse use of funds across different physicians led to differing outcomes
[79]	Support to family medicine researchers to get their first large grant	Individual level support provided was helpful, but organizational support (which program did not address) is also very important.
[40]*	Series of HSR training programs, with practical hands-on support	Researchers had benefited from the training, but Laos (country of implementation) still lacks a critical mass of HS researchers

[43]	Award scheme for primary care professionals to enhance research capacity	Scheme itself had positive impact, but authors concerned about overall long term impacts, without a follow-on scheme to support research.
[36]	Establishment of annual 4 day training workshop in operational research for TB officers in Malawi	Intervention was "less successful than expected" due in part to lack of additional support besides the training workshop.
[30]*	Scholarships for students from Sub-Saharan Africa to undertake a MSc in health economics	Contributions to the development of a critical mass had been made, but much more long-term investments were needed to achieve a critical mass
Organizational level interventions		
[50]	Development of strategic plan in university in Ireland to promote nursing research	Had some beneficial impacts but did not achieve critical mass. Lack of research leadership and need for more research training identified as problems
[44]*	Establishment of research facilitator post in hospital trust in East London	The intervention needed to be part of a bigger package, particularly with more high level leadership, if it was to have full impact
[48]*	Institutional linkages comprising, joint research, partnerships, post-graduate training	Program had strong impacts on the individual level, but much less certain effects at the organizational level
[80]*	Development of a new virtual Institute of Health Services and Policy Research	The Institute was quite successful in developing capacity for HSR, but for greater sustainability, better links to universities were needed and universities needed to play a more active role in supporting HSR capacity
Environmental and network level interventions		
[34]	Development of primary care research networks	Mixed results across different research networks. High transaction costs associated with running research networks is noted.
[30]*	Development of a health economics and policy network	While the network was functional, there were concerns that it was insufficiently institutionalized and tended to be linked to individuals not institutions

* Indicates that this paper was one where an assessment had been conducted.

Unfortunately few papers sought to attribute the impact observed to different elements of the intervention package. This, combined with the fact that most evaluations were relatively weak, means that it is difficult to conclude which specific interventions are effective and which are not. Nonetheless a few dominant themes can be identified.

First, mentoring emerged as a critical strategy. In one study, 22 out of 27 respondents cited mentoring as the most critical element of a multi-faceted program[42] and in several other papers mentoring was also held to be key. But there were also many comments about the difficulties of delivering effective mentoring, particularly where mentors had many competing demands upon their time[78, 79]. One of the unexpected impacts of two programs was that trainees became better mentors themselves[74, 79]. Mentoring was a less commonly used strategy in LMICs, but there is some indication that a similar set of issues concerning mentoring might apply. For example, in a program of institutional partnering, the long term secondment of one senior staff member to a LMIC institution, and the day-to-day opportunities for mentoring that this gave rise to was seen as a critical contributor to capacity development[48]. In another instance, where an intervention aimed to build capacity for policy analysis research on tobacco control into existing biomedical research centres, the availability of senior staff with experience in policy analysis was held to be key. This was in part due to the mentoring services that they could provide but more broadly because they had the ability to "influence the nature of discussions" within the teams[81].

Multiple papers, especially from HICs, emphasized the importance of flexible capacity development programs that could tailor support either to different individuals, teams or organizations, or over time as experience with a particular intervention package grows [30, 49, 58, 81, 82]. Kobus & Mermelstein add that this approach is particularly effective if there is some kind of central project office that can capture innovations and learnings from different sites and use them to fertilize thinking elsewhere[81]. In contrast some of the LMIC programs presented were multi-country studies that used somewhat standardized approaches across countries.

As previously noted many of the LMIC interventions involved short course training. The effects of this strategy appeared to be mixed. Frequently the short course training was packaged with another form of support, for example in Brazil, short course training was combined with small funding to conduct a research study and with support from a facilitator, and this overall package appeared effective[83]. In other instances where short course training was not supported by other mechanisms the effects were less favorable, for example in Malawi an initiative to provide TB officers with research skills through a four day training course was perceived to be "less successful than envisaged"[36]. It was quite frequently the case with such workshops that participants felt the need for more time to process new concepts and practice new skills[40, 77]. One circumstance in which short course training, with relatively limited other inputs, did appear to have promise was in terms of encouraging qualified and experienced researchers from outside the HSR sphere to focus on HSR issues. For example Vlassoff and Manderson note that short course training and small grants were, in the Latin American context, effective at encouraging qualified social science researchers to apply their skills to health sector challenges[52].

5.4 Assessment of Interventions

Only 32 of the papers (43.8%) identified included an assessment of the intervention. 23 of the papers which included assessments came from HICs and just 9 from LMICs. The quality of the assessments conducted was frequently problematic. Only four of the evaluations were conducted by independent assessors. While in a few other cases the assessor was associated with the program, but not a core implementer, in the large majority of cases the assessment had been conducted by someone who had been closely involved in the implementation of the program. Occasionally measures had been taken to protect the objectivity of the assessment, but this was commonly not the case. Reviewers were asked to identify strengths and weaknesses of evaluation design, and many weaknesses were found including: no baseline data available, no comparison group, limited elapse of time since the implementation of the intervention, weak study design, participants in the study are self-

selecting, and data collection including qualitative interviews on effectiveness of intervention led by the implementers leading to potential respondent bias. Further, relatively few of the papers (16 of the total) included any data on cost.

Many of the more rigorous evaluations covered relatively limited interventions such as training interventions, and focused on assessing changes in knowledge or attitudes pre and post training eg. Bates, Ansong et al[63].

6. Discussion, Conclusions and Recommendations

While the data to describe the current status of HSR capacity, particularly for LMICs is somewhat partial and unreliable, it is clear that there are large capacity differentials between LMICs and a high income country such as the US. Globally we estimate there to be approximately 6-7,500 people working on HSR in LMICs however this is based upon very weak data. There are clearly substantial differences between countries and regions. In Sub-Saharan Africa it seems likely that there are many countries where no more than a handful of researchers (4-5 people) are working in this field. Without investing in coordinated efforts to develop additional capacity for HSR – at all three levels, individual, organizational and environment/network - additional funding for global health may not be well spent, and the achievement of the MDGs could remain a distant goal[84].

It is now generally well accepted that there are different levels at which capacity development is important, and these different levels are intimately linked. The articles found in the review focused primarily on the individual and organizational levels and paid less attention to the broader environment. None of the papers found described interventions that sought to change funding patterns for HSR, or rewards and incentive mechanisms for HSR. This may be because many of the papers were from HICs where the challenges faced are somewhat different in nature to challenges in LMICs. In particular, it seems likely that efforts to generate HSR capacity in HICs are less likely to be hindered by weak health research systems. In contrast, in many LMICs, it will be necessary to develop capacity in the broader health research system, for example developing the capacity of national research funding agencies to set priorities and link research to research users, in order to sustain capacity for health systems research.

Many of the problems found by the systematic review were due to the fact that capacity development initiatives addressed specific issues at one level, but did not take adequate account of linkages to other levels. For example, initiatives to strengthen individual skills were undermined by lack of organizational support, or necessary systems were not in place to ensure the long-term sustainability of organizational development initiatives. Capacity development interventions typically need to be multi-faceted and to anticipate different types of capacity development needs in different parts of the system.

The literature from HICs appears to identify a clear advantage to tailoring programs to match specific capacity development needs, rather than following fixed blueprints. "Cookie cutter" approaches, whereby somewhat standardized approaches are applied across different contexts or countries, seemed more common in LMICs. While there is limited evidence about the strengths and weaknesses of these different types of approaches, due to the considerable differences between country contexts and in recognition of the importance of local ownership and leadership of capacity development, we believe that more tailored approaches to capacity development in LMIC contexts are required than what is currently commonly used.

Given the very weak evidence found through the systematic review, in this concluding section, we build upon the findings from the review, but also draw upon the experience of the authors, in terms of our own practical engagement with and critical reflection on capacity development initiatives so as to identify promising avenues for capacity development in the future. Some of our conclusions below are fully based on evidence from the

systematic review, others are inspired by the evidence and others still are not based on evidence from the review, but are issues that we believe are sufficiently critical that readers should be alerted to them, even if there is only weak evidence to support them. We have sought to distinguish between the status of the evidence in each of the paragraphs below. Our remaining conclusions are structured by level.

6.1 Network and Environmental level

Much lip-service has been paid to the need for national leadership of health system strengthening efforts. However, in our view, very few foreign donors or international organizations have to-date focused their efforts on the need to develop capacity for health systems research and analysis in LMICs. While research evidence on this topic is lacking, we believe it critical that donor and international agencies incrementally reduce their reliance on short term technical assistance and replace it with longer term institutional grants for developing capacity in policy research and analysis.

HSR which is relevant to the needs of policy makers, managers and health workers, timely and delivered in an accessible fashion, helps to stimulate the demand for more of such research. However, in many low income countries, and some middle income countries, this virtuous circle is broken. Domestic funding for HSR is extremely limited and most funding for HSR is provided by external stakeholders (aid agencies and research funders). They may support research which is not well aligned with the needs and interests of domestic stakeholders. In addition researchers are often under pressure to conduct the type of research which may be acceptable to international peer review journals. There is a danger therefore that HSR becomes overly abstract and academic, and of limited practical use. In such a case, the prospects for increasing domestic support for such research recede further. Donors and aid agencies need to put more funding for HSR at the disposal of those local stakeholders who will use the research, while still ensuring that these funds are earmarked for research support. Research evidence to support this conclusion is lacking and such initiatives should be properly evaluated.

Unlike less applied branches of health research, HSR takes place in many different settings, including universities, ministries of health, think tanks or research institutes, and health care facilities. Capacity development strategies can be targeted at any of these settings. HSR appears most likely to thrive as a field when capacity exists across multiple settings. The review demonstrated that HIC capacity development initiatives have frequently focused on building networks among different organizations within a particular city or country. This strategy has been less commonly pursued in LMICs where much support to networking has been international in nature. In our experience, in LMICs, the shortage of health system researchers and HSR organizations is exacerbated by the fact that linkages between these individuals and organizations are often not well established, so that relevant skills may be available but are difficult to identify and bring to bear on health policy and system issues. In LMICs greater investment is needed in developing networks between relevant actors within the same country or local context. The review highlighted how labor and time intensive the development of networks and collaborative relationships can be, initiatives that focus on strengthening networks and collaboration need to budget appropriately for this task.

Also the review demonstrated that in LMICs compared to HICs, the critical role that health staff can play in HSR has been relatively neglected. Some LMIC countries have sought to implement strategies to engage health staff in research. For example in Ghana, when the Ministry of Health, Health Research Unit was established in 1989 it was planned that it would support HSR training for health system managers. After some initial experimentation however, this strategy was not sustained. Greater engagement by health staff in HSR needs to be nurtured through the development of an organizational culture that supports applied learning and research among health staff, the organizations they work in and the broader health system.

6.2 Organizational Level

Strong institutional support was found, in the review, to be critical to the implementation of HSR capacity development initiatives, whether this comes from the broader university, a Ministry of Health or other institutional home. While at one level, institutional support is important in terms of leadership, facilitating links to policy makers and opening up linkages with other related organizations within the country, institutional support is also very important in practical terms and particularly with respect to securing core funding. If the host institution is supportive of HSR then it is likely that it can find a way to protect the time of those engaged in HSR, and/or fund, or help find funding for, their work. Health systems researchers or units engaged in HSR, may need to take conscious steps to convince institutional leadership of the importance of their work, particularly as HSR may not always be seen as academically strong.

Many of the LMIC initiatives reviewed involved partnerships between different organizations as a means to develop capacity, particularly at the weaker organizations. It is primarily through longer term collaborations between different organizations that trust and mutual respect are built. In our experience this mutual respect contributes to ensuring that there are capacity strengthening initiatives (and not just collaborative research projects) and to the willingness to invest time and energy in them. Many HSR funding opportunities now require "southern partners" within the consortium. While in many respects this is critical, it has the unfortunate side-effect of meaning that some LMIC institutions are inundated by requests to partner with organizations that they are not very familiar with. HSR funders, and HSR capacity development initiatives, need to ensure that partnerships help strengthen capacity (not undermine it) and that the costs of developing partnerships and networks are fully acknowledged and supported.

While the issue of funding for HSR fell outside the scope of our review, there is one particular aspect of HSR funding that we believe requires special mention due to its importance to capacity development, and which has been highlighted by other reports[28, 85], this is the need to generate predictable and sustainable core funding for HSR organizations. Many HSR organizations in LMICs do not receive any core funding support and rely largely upon multiple, frequently small, research grants to sustain themselves. This reliance is damaging to organizational capacity in several respects: much effort goes to bidding on competitive research proposals, there is no or limited scope for HSR that responds to policy needs (unless funders are willing to support it), and the lack of predictability may make it difficult to retain staff, particularly more senior staff. While government core funding to HSR organizations is highly desirable, we are uncertain of its feasibility particularly in low income contexts and believe that options such as endowment funding should be actively investigated.

6.3 Individual Level

The review showed that senior researchers are critical to effective capacity development for HSR – as mentors, as research leaders, and as participants who can re-shape the nature of policy discussions. Yet it is the same senior staff who are most marketable on the global economy and most likely to be recruited by development agencies based in HIC countries. There is an urgent need to develop innovative remuneration schemes to create incentives for such highly qualified personnel to stay in their home countries and conduct research, so that they can play a critical role in mentoring future generations of health system researchers. In addition to remuneration, there is also a need for supportive work environments. Obviously this includes the availability of IT and infrastructure, but less obviously it includes the need for intellectual challenge, the scope for further career development, and recognition. In many LMIC institutions, the organizational culture and environment does not sufficiently support these factors. Funders and research organizations need to experiment with innovative fellowship programs that help provide the financial incentive for senior researchers to stay in post, while also offering opportunities for intellectual stimulation and recognition.

There are many different pathways through which the individual researcher may end up pursuing a career in HSR: some researchers will come from a background in service provision, others may have pursued a PhD

training in a single discipline such as sociology, political science, economics or anthropology, still others may approach HSR as a generalist able to work across multiple disciplines. While this diversity of entry-points into HSR is recognized, at the moment there are not clearly established curricula or courses that facilitate entry for different groups. Curricula are also needed to teach people to work in multi-disciplinary teams, and bring the expertise of their particular disciplinary focus to bear on common problems. This would involve giving trainees a basic understanding of what other disciplines can contribute to HSR. Open-access curricula in HSR that can be shared across different sites would facilitate the rapid development of skills relevant to different entrants to the field, as would further regional linkages between the few programs that already exist in this field.

6.4 Evaluation and building an evidence base for capacity development

This paper has demonstrated that there is a weak evidence base on which to build capacity development interventions. It is difficult to determine why this is the case, though the lack of standardized methods and approaches for evaluating capacity development may be a factor. Given the available literature it is extremely difficult to know which interventions are likely to be effective and which are not, let alone what constitutes good value for money. Further, the weak evidence demonstrating the impact of capacity development initiatives is likely to make it harder for donors to invest in this field. As investment in capacity development is ramped up, so should be evaluations of the effectiveness of such efforts.

The review conducted for this paper hints at some general lessons about what constitutes effective practice in the field of capacity development for HSR. For example the papers reviewed suggested that with respect to individual capacity development programs:-

- Selection of participants is critical, participants need to be highly motivated and enthusiastic so as to sustain interest throughout the program
- The parent organization for individual participants in programs also needs to provide full support and in particular to guarantee that the individual will be given sufficient time and organizational support to complete the program of work.
- Programs frequently allow insufficient time for participants to fully process the ideas presented, or for them to complete the tasks required appropriately.

A program of evaluative work could help systematize knowledge regarding best practice in HSR capacity development.

ANNEX 1 - SEARCH TERMS USED

PubMed
("health services research"[MeSH Terms] OR "health systems"[All Fields] OR "health services"[All Fields] OR "health service"[All Fields] OR "health system"[All Fields] OR "operational research"[All Fields] OR "operations research"[All Fields] OR "family practice research"[All Fields] OR HPSR[All Fields] OR ("health policy" AND "systems research") OR "research support as topic"[MeSH Terms]) AND (("research support as topic"[majr] AND ("health services research"[mesh] OR "health services research"[all fields] OR "health systems"[All Fields] OR "Health system"[All Fields])) OR "research capacity"[All Fields] OR "research capabilities"[All Fields] OR "research capability"[All Fields] OR ("health services research" [mesh] OR "health services research"[All Fields] OR "health systems research"[All Fields] AND ("capacity building"[All Fields] OR "building capacity"[All Fields]))) OR ("health policy AND "systems research")

EMBASE

'research capacity' OR 'research capabilities' OR 'research capability' OR 'research capacity strengthening' OR ('health systems' OR 'health system'/exp OR 'health-system' OR 'health-systems' OR 'health care planning'/exp OR 'health care system'/exp OR 'health care systems' AND ('health services research'/exp OR 'health service research'/exp OR 'system analysis'/exp OR 'interdisciplinary research'/exp OR 'health systems research' OR 'health system research' OR 'health-system research' OR 'health-systems research' OR 'operations research'/exp OR 'operational research'/exp) AND ('health services research'/exp OR 'health service research'/exp OR 'building research capacity' OR 'research capacity' OR 'capacity building'/exp OR 'health systems research' OR 'health system research' OR 'health-system research' OR 'health-systems research' OR 'hpsr' OR 'health policy and systems research') AND ('funding'/exp OR 'research support')) OR 'health policy and systems research' OR ('health care system'/mj AND 'medical research'/mj AND 'health care policy'/de)

Global Health

((("health services research" or "health service" or "health system" or "health systems" or "operational research" or "HPSR" or "health policy and systems research").mp. or (health services.mp. or exp health services/) or (operations research.mp. or exp operations research/)) and ("system research" or "systems research").mp.) or (("research capacity" or "research capabilities" or "research capability" or "research capacity strengthening" or "research funding").mp. or (research support.mp. or exp research support/))

Scirus"health services research" or "health policy and systems research" or "health systems research" AND "research capacity" or "research capacities" or "research capability" or "research capabilities" **Regional Grey literature Databases:IMEMR** Search on : "health services research" or "health systems research" or "health policy and systems research" [Subject] **LILACS** – interface not working well so searched **Virtual Health Library** – limit to LILACS

"health services research" – selected "research support as topic" 25 records.

Africa-wide NIPAD 109 – two searches: (ZU "health services research [economics] [manpower] [methods] [organization & administration]") or (ZU "health services research [organization & administration]") or (ZU "health services research [organization & administration] [utilization]") or (ZU "health services research [organization and administration]")("health services research" or "health policy and systems research" or "health systems research") and ("research capacity" or "research capacities" or "research capability" or "research capabilities")

Proquest   Dissertations2 documents found for: *("health services" or "health systems" or" health policy and systems research") AND ("research capacity" or "research capability" or "research capabilities")*

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