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System:
Paper #3

Knowledge Capacity:
A key element for optimal
health system performance in
sub-Saharan Africa

Prepared by

Aleida A. ter Kuile
& Vic Neufeld

CCGHR CCRSM
Canadian Coalition for   Coalition canadienne pour la
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Contributors:

Ken Bassett, Centre for Health Services and Policy Research, University of British Colombia
Colleen Davison, Markin Institute and Department of Community Health Sciences, University of Calgary
Lucy Gilson, Centre for Health Policy, University Witwatersrand, South Africa
Salim Sohani, Community Health Department, Aga Khan Health Services Kenya
Tom Rathwell, School of Health Services Administration, Dalhousie University

*K*NOWLEDGE *C*APACITY

A key element for optimal health system performance in sub-Saharan Africa

Why is the health of people in Africa so poor? In answering this question Sanders, Todd and Chopra argue that at the heart of the answer is poverty – poverty embedded through market and sector reforms that have left strict ceilings for social sector spending, through weakened national institutions open to corruption, through conflict and the devastation of HIV/AIDS.[1] This context requires that we take a broad view in discussing the ideal 21st century African Health System; that we ground our analysis in the fundamental requirements for equity, social inclusion and human rights as we build on two foundational messages:

Health is central to the social and economic development of Africa

Knowledge is a key 'driver' in achieving good health in Africa

* * *

Despite substantial advances in human health and well-being globally, in many African countries there are reversals. Health systems in Africa are under siege. They are substantially under-funded. There is a health workforce crisis, compounded by the ravages of HIV/AIDS. This situation affects the "knowledge system" component within Africa's health systems. Knowledge drives good health through health system strengthening. It is at the centre of evidence-based health system development and contributes to effective policy planning and resource allocation.

An analysis of health research in Africa for the International Conference on Health Research for Development noted three key challenges: building appropriate capacities to undertake research, developing effective national mechanisms, and creating "enabling environments". Specifically highlighted was a low research contribution from Africa, inadequate financing for health research, limited capacity in the sciences, a significant flight of human capital and sub-optimal networking and collaboration. The report acknowledged the central role of equity as a unifying concept in health research as well as the existing contributions of African researchers.[2] This report emphasised the vital role that health research, and more broadly knowledge, play in the empowerment and development of Africa.

Building on the health research argument, this paper will go a step further. We will argue for knowledge capacity as an essential element of a well-functioning 21st century African health

system; describe four components of knowledge capacity; and draw upon African examples to illustrate key strategies for building knowledge capacity within the ideal 21st century health system. At the centre of our work is the conviction that Africa already demonstrates innovative methods and ideas in strengthening knowledge capacity but more work is needed to support and extend these efforts in a sustainable and integrated way.

An Introduction to the Argument

African health systems face a number of unique challenges in ensuring knowledge is a strong and central part of health system strengthening. These challenges include major human resources for health shortages, weak institutional capacity, as well as inadequate health sector financing.

Retention of knowledge and capacity is severely undermined by human resource shortfalls at all levels of the health system. Human resources currently flow from public services serving low-income communities to urban private services, from low income to higher income countries in the region and from the southern Africa to UK, Canada, Australia and other high income countries.[3,4] All levels of human resources related to the health system are affected by poor morale created in part through inadequate remuneration, lack of educational opportunities, poor management and leadership.[5]

Institutional capacity to produce, synthesise and manage knowledge is constrained. Weak institutional capacity and lack of critical mass in most research institutions is linked with low spending as a proportion of overall health spending.

> "Over the past two decades the effects of economic decline, and of the structural adjustment programmes imposed on many countries, have led to drastic cuts in numbers of academic staff and salary levels, a lack of equipment and training opportunities, a sense of demoralisation, and isolation from international colleagues. Many researchers must moonlight in other jobs or do private practice to support their families, with inevitable effects on time available for research."[6](p.827)

Thus a vicious cycle exists in which small public institutions with few projects and a limited number of researchers are unable to access large funding.[7, 8]

The support of knowledge functions within health systems in Africa is severely limited by inadequate health funding. Health sector expenditure is below 10% in the majority of African countries and there is a heavy reliance on donor funding (accounting for over ¼ of total health

care funding in about 35% of African countries and over ½ in 5% of countries).[9] And yet, knowledge and knowledge capacity are essential to the development of health systems in Africa.

Controlling for income, studies have shown that major health improvements globally may be linked to the advancement of knowledge and its ability to develop powerful interventions as well as guide behaviour. As early as 1991, the Commission on Health Research for Development highlighted the central role health research and knowledge generation play in reducing the global burden of disease and fostering development.[10] More recently, the 2000 World Health Report critiqued of the performance of health systems globally and highlighted the need for information and knowledge in setting health system priorities.[11] The report outlined four health system components: provision of services; generation and allocation of resources; financing; and stewardship; each requiring knowledge, and more broadly knowledge capacity, for successful implementation and performance.

The 2004 World Report on Knowledge for Better Health emphasized the central role knowledge plays in the health and well-being of the global poor.[12] It demonstrated that while knowledge, science and technology have contributed to the vast improvements in health globally (penicillin, anaesthetics) there remain gross inequities in health, health systems are overburdened and strained, and effective interventions often do not reach those in most need. The Report argued that linking health research with the health system will generate knowledge that is relevant and will strengthen the capacity of the health system to respond to the needs of the population. Moreover, the Report argued that new knowledge *AND* the use and application of existing knowledge are significant to improving the capacity of health systems to be responsive. This perspective has gained significant support in recent years in discussions on 'bridging the know-do gap' (Box 1).[13,14]

> **Box 1: The 15th Grand Challenge**
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> *How we can better apply what is known in order to bridge the gap between knowing and doing?*
>
> Turning knowledge into action requires the translation of knowledge into useful interventions as well as the translation of knowledge into health decision-making and action. Bridging the gap is vital to ensure that cost-effective, equitable and high-quality interventions replace those which are ineffective or inefficient and thus help to strengthen health systems.[13]
>
> A review of child survival intervention uptake in 42 lower and middle income countries suggested that 60% of the 9.7 million deaths among children in the countries studied could be prevented by the use of effective and affordable interventions.[i] Harnessing knowledge is central to health system strengthening.[14]

Most recently, the Disease Control Priorities Project (DCPP-2) 2006 states that the acquisition and use of health research and development or its products becomes an essential

function of a country's health system.[15] The DCPP-2 argues that if gains in knowledge prove even partially as important for future health improvements as they have in the past century then investments in health research and development will continue to have high payoffs in health status and economic productivity. Thus knowledge functions as a key driver of good health.

Knowledge is defined as that which people believe to be true based on reason or experience.[16] In this, we consider three forms of knowledge:

- *Scientific (explicit) knowledge* gained through scientific research as well as through a well functioning health information system, such as the eighteen Demographic Surveillance Sites (DSS) in Africa linked through the INDEPTH network;
- *Experiential knowledge* derived from lessons learned through 'best practice' illustrated in the ability of district level managers to know how and why health interventions work (or not);
- *Local tacit knowledge* which includes indigenous knowledge or the 'wisdom of the community' and requires a relationship between the researcher, the district manager and the community to develop appropriate methods to collect this knowledge.

These forms of knowledge feed innovation. Health system innovation in Africa not only improves performance, but has implications for improved equity (Box 2).

However, innovation and health system strengthening is facilitated not simply by knowledge but by *knowledge capacity* - the capacity of the health system to produce, synthesise, use & apply knowledge, as well as foster a knowledge culture. This is intrinsic to the development of health systems in Africa.

Box 2: Innovation in Health Systems

Innovation occurs in many places. Gardner provides five examples of where innovation in health systems may occur.

- ***Incentives for health-seeking behaviour***
- ***Management innovation***
- ***Marketing innovation***
- ***Distribution innovation***
- ***Business innovation for service delivery***

For example, in 1987, Merck decided donate Mectizan™ free to affected countries for as long as it was needed. The World Health Organization, The Carter Center, and a consortium of aid agencies stepped in to help mobilize teams of health workers, who traveled across Africa to deliver the drug to every remote village. However, reaching remote areas remained a challenge. Nigerian public health expert Uche Amazigo and her team devised a low-cost, sustainable strategy to train volunteers to distribute the medicine in their local villages, and to take it by foot or bike to the most isolated areas. Mectizan™ has now been distributed by such means to more than 40 million people in 34 countries and to more than 60,000 villages worldwide.

Chad Gardner
Invited paper for Global Forum for Health Research
Cairo 2006

Knowledge capacity has the ability to feed innovation in areas such as recruitment and retention of health workers in the Southern African Development Community (SADC) region, in monitoring performance of the health system at the local level in Angola[17], in supporting equitable policy development and implementation in Zimbabwe[18], and in improving health service acceptability in communities in Benin.[19]

The remainder of this paper is broken into three sections. First, we explore the concept of knowledge capacity by looking at four components: knowledge production, knowledge synthesis, the use and application of knowledge and building a knowledge culture. Next we examine the place of knowledge in a health system, and finally the paper provides specific examples of strategies for knowledge capacity development for strengthening 21st Century health systems in Africa.

Knowledge Capacity

Building on the concepts of knowledge exchange[i] and translation[20,21], knowledge capacity is grounded in the ability for an ideal health system to do three things. First, the ability to *push* knowledge, through disseminating optimally packaged, high quality and highly relevant syntheses of knowledge. Next, the ability to foster *pull* – in which users of research, including policy makers and practitioners, actively seek new knowledge related to current issues, problems and interventions. And finally, the system's capacity to create *linkage and exchange* in which producers of knowledge connect and communicate with users of knowledge, each being informed in their work by the other.

These mechanisms of push-pull-linkage and exchange all occur within four central components of knowledge capacity: knowledge production, knowledge synthesis, knowledge use and application, and finally the underlying culture of knowledge use. The role of technology in fostering each of these areas is significant. We do not delve into the wealth of experience in Africa in adapting locally relevant technology to respond to knowledge system needs but

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[i] We use the definition put forward by the Canadian Foundation for Health Services Research (CHSRF): "Knowledge exchange is collaborative problem-solving between researchers and decision makers that happens through linkage and exchange. Effective knowledge exchange involves interaction between decision makers and researchers and results in mutual learning through the process of planning, producing, disseminating, and applying existing or new research in decision-making." From: http://www.fcrss.ca/keys/glossary_e.php

recognise the value innovation in information and communication technology brings to the process.

Knowledge Production

Research and knowledge production requires institutional and regulatory frameworks, infrastructure, investment, and skilled professionals engaged in both health systems research, (including economic, sociology, policy oriented) as well as basic science and discovery research.[22] Knowledge production is vital for evidence based decision-making as well as the development of effective and relevant interventions. And yet, in Africa, the balance between clinical and epidemiological research and health systems is off – broader health systems research finds less support than traditional scientific research[23] "Most health systems research project have been small, stand-alone, descriptive projects…results have had limited impact of implications for policy change" [24] (p. 75). This imbalance is being addressed by institutions such as EQUINET – a network of researchers, civil society, policy makers and state officials with an overall focus on health equity in the Southern African region.[25] Their research moves beyond epidemiologic studies to include studies considering the political economy of health, health economics as well as sociology; this contextualises the knowledge produced in the experiences of the region as well as integrates a wider system perspective into the analysis.

Knowledge Synthesis

Often in the form of systematic reviews and meta-analyses, knowledge synthesis also includes best-practice case study analysis as well as narrative analyses which capture community perspectives, ideas and knowledge. These syntheses set the results of individual studies, projects and experiences in the context of other relevant and related research. Garner and others argue that this globalises the evidence and localises the decision.[26] Knowledge synthesis has the capacity to directly inform decision-making as well as identify gaps in knowledge. As with knowledge production, it is dependent on institutional structures and investment, as well as human resources capable of using synthesis methods. There has been a recent move toward systematic reviews in the African region, supported in part by the establishment of the South Africa Cochrane Centre. Broader methods of synthesis such as policy analysis are limited.[27]

Such forms of synthesis are vital to the complete understanding of health systems and interactions.

Knowledge Use and Application

"Academic research, publication, and patents do not help the poor (or anyone else) unless they are turned into tangible products or improved practices and policies."[28] Knowledge capacity is determined by the ability to manage, identify, use and apply relevant knowledge in health planning, decision-making and system development. Managing information requires methods to acquire, store and make knowledge accessible. This demands locally appropriate technology and mechanisms – such as the piloting of computerised health management information systems in Kwale District, Kenya or the development of community-based health information boards which capture immunization rates and disease burden to inform community members as well as district planners in resource allocation discussions.[29, 30]

Beyond management, using evidence in decision-making is vital in health system development. The Health Research Unit within the Ministry of Health in Ghana specifically engages researchers directly with decision-makers and policy makers. But in general, evidence-based decision making in many African countries is undermined by the competing goals, interests and agendas among decision makers as well as the inaccessibility of data, evidence and knowledge. Decisions often reflect these forces more so than the relevant knowledge. This lack of capacity to use and apply knowledge, or more simply to even access relevant knowledge, is apparent among health professionals (Box 3).

> **Box 3: A Kenyan Example**
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> Health care is offered in Kenya through a chain of dispensaries in health centres (~1800), managed by nurses or clinical assistants. Chloroquine was the drug of choice for malaria treatment 20 years ago but was declared ineffective due to resistance approximately 8 years ago. Until recently, nurses and clinical assistants continued to use Chloroquine. Now, the latest development is resistance to SP therapy and yet this new knowledge is not accessible to health care providers, particularly in rural areas.
>
> *Salim Sohani*
> *Director, Community Health Department*
> *Aga Khan Health Services Kenya*

Knowledge Culture

Underpinning production, synthesis, use and application is a knowledge culture. This culture recognises and values the different sources of knowledge (explicit, tacit and experiential) and is central in the interaction between knowledge producers and users. In particular, a knowledge

culture or knowledge environment promotes communication between policy maker, practitioners and researchers; it develops the knowledge and research agenda through priority setting and resource allocation; and most significantly, individuals are prompted to ask of themselves and colleagues 'what do we already know?' and 'what do we need to know?'.

In Africa, we see that the culture of knowledge must compete and is challenged by the culture of political power that exists. This practice of power directly impacts the production, synthesis, use and application of knowledge as well as the overall culture of knowledge in the implementation of interventions as well as policies.[31] Developing and supporting a knowledge culture requires champions and leaders able to advocate for the investment and use of knowledge at all levels.[32] In particular, building on experience in policy development, leaders must promote and legitimise a knowledge culture as well as help establish active communication strategies between knowledge producers and users (Box 4).[33]

Given the central role knowledge and more broadly knowledge capacity play in the development of strong and vital African health systems, we propose seven strategies to further build and strengthen knowledge capacity in the 21st century.

> **Box 4: Legitimising Knowledge**
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> "Bureaucracies are top-down in their approach to decision making, limiting the power of local decision-makers to use knowledge in decision making…to strengthen the use of knowledge at the bottom we surely have to think about how to legitimise the practice, and how to enlarge the decision-making space at the bottom, as starters."
>
> *Lucy Gilson*
> *Associate Professor*
> *Centre for Health Policy*
> *University of Witwatersrand*

Strategies for Knowledge Capacity Development

The unique challenges facing African countries in the development of knowledge capacity and more broadly in the strengthening of health systems requires an integrated approach. In this section we propose seven strategies for knowledge capacity development. We recognise the wealth of experience that already exists and use many examples as illustration. The examples we use highlight the role knowledge can and does play in health systems – but we must move beyond individual projects. Our intent is to emphasise the need for strategic thinking in considering knowledge within a 21st century African health system. These strategies, built upon existing success, represent a coherent and strategic direction for knowledge capacity development.

Strategy 1: Fostering local (district and sub-regional) "action-learning coalitions"

It is the linkage of researchers and research users that most effectively ensures that knowledge is applied and that knowledge gaps are identified and filled. At the local level this action learning between different partners enables the sharing of available evidence and setting common research priorities. David Harrison points out that "…strategic research is most efficient when it is constantly interacting with, and learning from, real-life experience. Sharing, exchanging ideas and results as they emerge can be a powerful impetus for efficient research outcomes." In reference to Tanzania, he argues that considerable efficiency gains can be achieved simply by applying knowledge already available within Tanzania.[34]

Action learning through sharing evidence is central to the *District Health Interventions Profile Tool*. This tool developed by the Tanzania Essential Health Interventions Project (TEHIP), uses the Tanzanian Ministry of Health's National Sentinel Surveillance System (NSS) data to simplify, package, and communicate complex information on vital statistics and the local burden of disease in a practical, accessible format for district health planning. These profiles are aimed at the Council Health Management Teams (CHMT) in order to support priority setting for essential interventions. Using this data, teams can better link their budgets with health priorities. "In this way, CHMTs allocate scarce health resources to where they will have the greatest impact on the burden of disease". [35] The profiles use a pictorial, graphical, easy to use format for information presentation.

> "Before having this tool, our plans were not based on evidence. The District Medical Secretary would sit in an office with an accountant and add 10% - 20% to the previous year's budget. So it was not a plan in the real sense but a budget. With this kind of a budget, we concentrated on administrative issues rather than on interventions. Now we can prioritize more comfortably because we have concrete, reliable information from the population at large." Dr. Machibya, District Medical Officer for Morogoro Rural District.[36]

Such a tool successfully builds a culture of knowledge use among the Council Health Management Teams while integrating knowledge production from the NSS with synthesis, use and application in resource allocation and intervention selection.

In Ghana, a process of scaling up community based health services used a phased approach and effectively engaged multiple actors in learning throughout the process. *Navrongo Health Research Centre* successfully tested the integration of health services into communities

from clinical settings.[37] Through a phased process of debate, piloting, validation in a 2nd region, and full national expansion the Community-based Planning and Services Initiative engaged researchers, members of the Ministry of Health, public health officials, as well as community members and traditional leaders in a process of learning through action. Specific mechanisms included regional and national staff meetings, the Annual National Health Forum conferences, focus groups, and peer training.[38]

Strategy 2: Strengthening the knowledge culture in academic and training institutions

As emphasised earlier in this piece, institutional capacity in Africa is constrained by funding, resources and human capital. More than simply providing better funding (though this is obviously a basic criteria), the knowledge culture of institutions must be strengthened as well as their overall ability to contribute to the knowledge capacity of the health system. This will enable the next generation to effectively produce, synthesise, use and apply knowledge.

The Joint Learning Initiative on Human Resources for Health argues that building the capacity of research and knowledge institutions is central to effectively manage the health human resource crisis faced throughout Africa.[39] In this, we consider not simply research knowledge production institutions, but institutions training the next generation of researchers, practitioners, and decision-makers. A strengthened culture of knowledge use in these institutions will ensure those working in the health system will ask questions of evidence that is known, and will be able to effectively use knowledge in their professional lives - to set research priorities, to design interventions, or to decide on national policy and funding strategies.

There are many examples of on-going work to strengthen the knowledge culture of academic and training institutions in Africa. At the local level, *Aga Khan Health Services Kenya* has integrated the development of a Health Management Information System (HMIS) with training for health facility staff in data use and interpretation.[40] The *Training for Health Renewal Program* (THRP), a partnership between the Ministry of Health in Mozambique, University of Saskatchewan health science faculties, and the Prairie Region Health Promotion Research Centre, is specifically targeting health professionals. Training is focused on human-centred health and aims to foster personal development, enhance communication and group process skills, strengthen abilities in critical analysis, and learn effective teaching/learning skills.[41] This

program effectively trains health professionals to use knowledge (scientific, tacit, or experiential) as they analyse situations.

Regional examples of strengthening knowledge culture include HEPNet as well as the South African Cochrane Centre. HEPNet – the *Health Economics & Policy Network in Africa* – engages academic and governmental institutions in South Africa, Tanzania, Uganda, Zambia and Zimbabwe in order to build capacity in the use and application of health economics and policy research.[42] Through a variety of methods including workshops, newsletters, research report, HEPNet has increased the use of and value given to health economics knowledge and research.

The *South African Cochrane Centre,* part of the wider Cochrane Collaboration, is building the institutional capacity for knowledge synthesis. It aims to disseminate up-to-date reviews on the effects of healthcare interventions in order to help people make well-informed decisions. These reviews synthesise the existing evidence for particular health interventions in a systematic and rigorous way. The Centre is the only Cochrane Centre in Africa and serves individuals throughout Sub-Saharan African in the production of systematic reviews. The Centre aims to reflect local and regional priorities for research-based information and assist reviewers accordingly. It also aims to advise stakeholders on the relevance and importance of disseminating and using reviews in decision making. Overall the centre's mission is related to promoting the science of research synthesis and evidence-based health care in Africa.[43]

Strategy 3: Sentinel sites and demonstration projects for innovation

The development of sentinel sites and demonstration project across Africa represents an opportunity for innovation. Each site or project is built upon a strong commitment to knowledge generation and application. These activities have the capacity to directly inform the strengthening of health systems across Africa. Sentinel sites have predominately been created to track specific disease rates. The WHO estimated that in 2001 seventy percent of countries in the AFRO region were implementing HIV sentinel surveillance systems with antenatal clinic attendees as the sentinel population (surveys are conducted once a year or once every two years with sentinel sites mostly in urban areas).[44] There is an inherent focus on accurate knowledge collection and generation as well as the sharing of knowledge and this enables experimentation, testing and taking risks with new ideas for health interventions.

A widely known example of such a project is the *TEHIP*. One of the significant strengths of TEHIP is that it has an underlining focus on the health system and using knowledge to make effective decisions in a resource constrained setting. Engaging all four element of knowledge capacity TEHIP has had drastic results on the health outcomes of Tanzanians. One of the most dramatic outcomes is a reduction in child mortality by more than 40% in two districts.[45] In fact, by 2004 a 50% drop in child mortality was measured and when the 2005 values are analysed it may reach upwards of a 60% reduction.[46] TEHIP used surveillance data to generate knowledge about disease rates and population health indicators, this knowledge was synthesised and then used in planning and allocation of spending. TEHIP connected the national health system with district level managers and built a commitment to the use of knowledge and evidence in decision-making. Most importantly, according to TEHIP Research Manager, Don de Savigny, TEHIP fostered innovation by "…providing the fiscal space for [district health mangers] to invent, own and apply local solutions specific to the prevailing problems of the health system."[47]

In contrast to time-bound TEHIP, a long-standing and institutionalised example is the *Navrongo Health Research Centre* in Northern Ghana. It began as a field site to investigate the impact of repeated large doses of Vitamin A Supplementation on child survival in the Kassena-Nankana District of Upper East Region (The Ghana VAST Project). In 1992, the Ministry of Health adopted the facility and designated it a research centre with the mandate to investigate, and advise policy makers about, health problems of the Sahelian ecological belt of northern Ghana. Since then, the mandate of the Centre has broadened to include population and health problems of national and international significance. The work of the Centre is focused on the major causes of illness in the northern regions of Ghana and related problems of high fertility and maternal morbidity. NHRC has been engaged in the Community Health and Family Planning Project (also named the Navrongo Experiment) in which research priorities are guided by unanswered policy questions and the focus is evidence for decision-making and policy development.[48] The production of knowledge at NHRC, with a focus on what works in an effort to inform policy making, demonstrates a significant knowledge capacity accessible within the Ghanaian health system. Moreover, the political commitment and connection between decision-makers and researchers represents an opportunity for innovation, building on the intellectual capacity of researchers and the political will of decision makers.

These examples are both members of the international *INDEPTH network*. INDEPTH aims to "harness the collective potential of the world's community-based longitudinal demographic surveillance initiatives in resource constrained countries to provide a better, empirical understanding of health and social issues, and to apply this understanding to alleviate the most severe health and social challenges." Twenty-six of the thirty-seven INDEPTH sites worldwide are in Africa. The knowledge capacity within the network offers an important opportunity to learn from innovation in multiple countries and regions.

Strategy 4: Creating research-policy "think tanks"

Think tanks are mechanisms for learning across different policy and research spheres. The Council on Health Research for Development (COHRED) specifically advocates for the use of think tanks to better understand the actions and interactions that can make a real difference in improving research for health in developing countries. According to COHRED, think tanks can inform thinking on how to best respond to countries' needs as well as help define key activities, services and products.[49]

A recent development in this area is the *Regional East African Community Health (REACH) Policy Initiative.* REACH consists of an on-going consultation involving the governments of Uganda, Kenya and Tanzania. The goal of the consultation is: "To improve people's health and health equity in East African through more effective use and application of knowledge to strengthen health policy and practice". The specific mission of REACH is to access, synthesise, package and communicate evidence required for policy and practice and to advocate for a policy relevant research agenda in order to improve population health and health equity. The following are key participants: Chief Medical Officers for Ministries of Health from Kenya, Tanzania and Uganda; Director Generals of National Health Research Institutes (KEMRI, NIMR, UNHRO); Academic and NGO health research communities in Kenya, Tanzania, Uganda; East African Community; and an International sounding board of key experts from around the world.

In addition to international efforts, think tanks may also operate at the national level. As part of the Equity Gauge Alliance, Zambia National Health Systems Trust has established a *Zambia Equity Gauge* which has the purpose of working at district, provincial and national levels, to monitor health and health service delivery across social strata including: gender, socio-

economic status, religion, geographical location, provinces and districts. Specifically, the Gauge advocates for equity in health and monitoring the policies and provision of health services in Zambia. The ultimate aim of the work around the Gauge is to ensure that issues of equity in health and health service delivery are considered at the policy, planning and implementation levels. The Gauge has successfully engaged a wide number of key actors in Zambia including the National Assembly (Parliament), the House of Chiefs, the Health Centre Committees, the Medical Council of Zambia, the General Nursing Council, the NGO Coordinating Council, Women for Change, as well as a number of Churches. The Zambian Equity Gauge operates as a think tank by engaging multiple research users and research producers in discussion on equity and methods. It effectively influences policy-making through knowledge production and use. McCoy et al. 2003 captured the story:

> "Following public dissemination of the Zambia Gauge's assessment of health equity in four districts (Chama, Lusaka, Choma, Chingola) health-sector decision-makers withdrew a proposal to raise user-fees, and a fascinating saga has subsequently unfolded. Based on the publicity engendered by the Zambia Gauge's work, the Health Committee of the Zambian Parliament called for ending user-fees altogether. This move, however, met resistance from health workers in urban areas, who saw the user-fees as the only feasible means of maintaining services. The Gauge has responded with renewed efforts, involving drama, dance, songs, and poems, to make officials aware of people's perspectives on health equity.
>
> This story continues—a top official in one district was so moved by the people's testimony captured by the Gauge that he has committed to instituting measures to increase health workers' sensitivities to people's concerns. The Portfolio Committee on Health sees drama as a mechanism to strengthen advocacy for health equity within the legislature, since it provides a form of public feedback on priorities and creates political pressure for response."[50]

In Mali, the *Université de Montréal* has been working on the development of a monitoring and evaluation system the national maternal mortality reduction programme "Obstetrical care referral system and solidarity funds" (ORSSF). The project has engaged policy makers, donors, as well as researchers through seminars. These seminars have acted as think tanks by engaging all participants in data analysis, discussing policy developments, discussing the feasibility for improvements in the program, as well as making linkages between participants. It has been noted that the think tank seminars have increased the interest decision makers have in knowledge and

evidence as well as its application.[51] They have begun to foster a knowledge culture among decision makers.

Evident in each of these examples is the role think tanks play in capacity development for leadership and management. The capacity to use knowledge as well as build relationships is central to the effective management and overall stewardship of the health system.[52]

Strategy 5: Strengthening national health research systems

The fifty-eighth World Health Assembly urged developing countries to invest at least 2% of their national health expenditures in research and research capacity strengthening.[53] This resolution builds on the extensive experience and work carried out in the 1990s on Essential National Health Research.[54] A strong national health research system is a central mechanism and institutional structure in a functioning health system. National health research systems (NHRS) have been described as, "…the people, institutions and activities whose primary purpose in relation to research is to generate high-quality knowledge that can be used to promote, restore or maintain the health status of populations"[55] (p.816). NHRS also include actors and mechanisms involved in knowledge generation, research synthesis, and using research results in the public and private sectors. The existence of a rational framework for health research in a given country can help ensure that the production and use of research is valued and that there is a platform for more effective interaction between all stakeholders.

A well-developed and aligned national health research system enables country health priorities to be research priorities, priorities that have been identified internally. It also enables networking and relationship building nationally with the full range of knowledge actors. A national health research system provides a location for connection and interaction with global health partners. For example, the global work, priorities, assessment tools of WHO can be reflected and applied within national systems of health research (Box 5).[56]

Tanzania has taken an active approach to establishing mechanisms which support the National
Health Research System. In particular, the establishment of the *Tanzania National Health Forum*
has fostered the strengthening of capacity
among the research community through the
national health research coordinating
committee and the health research ethics
committee; the linking of researchers with
policy makers at the Ministry of Health in
order to improve the use of knowledge in
policy and planning; and finally, the
development of research priorities through
consultation and guideline setting (Box
6).[57,58]

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Similarly, Uganda established the *Uganda National Health Research Organisation* (UNHRO) in response to the Essential National Health Research movement. This organisation aims "to create and sustainable science culture in which health research plays a significant role in guiding policy formulation and action to improve the health and development of the people in Uganda."[59] An analysis of health research in Uganda found a number of institutions engaged in research but few partnerships between institutions or with policy makers. Further limitations were noted in ensuring results of research were communicated to communities and research users such as policy-makers and decision-makers limited, as well as in focused attention on setting national health research priorities.[60] The Ministry of Health has responded to these conclusions by specifically identifying research, and the coordination of research to support program planning and policy making, in its strategic objectives.[61]

Support for national health research systems in Tanzania and Uganda is fostering the development of knowledge capacity by supporting knowledge production and synthesis, encouraging users to apply research in their work, and building an environment emphasising the importance of knowledge.

Strategy 6: Supporting regional and pan-African fora

Opportunities are needed for African knowledge networks, national health research organizations, and relevant regional agencies to come together—sharing experiences, and discussing Africa-wide issues related to the production and use of knowledge. In the past, there have been some meetings of this nature, but they have been "one off" –not regular events. Examples include meetings during the 1990's of the Africa ENHR network, and occasional meetings of the Nigeria-based African Council on Sustainable Health Development (ACOSHED).

An organization with the potential to play a role to implement this strategy is *the African Health Research Forum (AfHRF)*. It was created in response to the African consultative process report described above (ref. 2) where the need for an "African voice" for health research was identified. The AfHRF was launched in Arusha in November 2002 with the stated goal *"to promote health research for development in Africa and to strengthen the African voice in setting and implementing the global health research agenda"*.[62] In collaboration with the WHO African Advisory Committee for Health Research for Development (AACHRD) the AfHRF published an

"Africa Voice" statement that was distributed at the November 2004 Ministerial Summit on Health Research in Mexico. The statement made several recommendations to achieve the goal of "positioning health research as an integral tool for development". It urged both national authorities and development partners to increase funding to achieve optimal knowledge production and usage in Africa, support a biannual forum, and publish an African Health Research Review. The AfHRF sees its niche as a "network of networks", along with national health research organizations. It is now a legal entity, created by several founding networks (including Equinet, ACOSHED, INCLEN Africa, INDEPTH, AMREF and others). The AfHRF conducted a survey of health research networks in Africa, identifying more than 40 such networks. The AfHRF also sponsors a pilot program—the African Health Research Fellowship program which aims to develop health research leadership and management competencies, working with teams of researchers and research users in four countries: Mali, Uganda, Benin and Zambia. The AfHRF maintains a liaison with African regional organizations such as NEPAD, WHO-AFRO and the African Union (AU). In collaboration with COHRED and the Global Forum for Health Research, AfHRF (along with some of its member networks) is organizing an African conference on "Human Resources for Health Research" to be held in Nairobi in July 2006. This event represents an opportunity to prepare for a strong African voice at the next Ministerial Summit scheduled for 2008, to be held somewhere in Africa.

A pan-African forum, along with more focused regional fora (such as the periodic meetings of the Equinet partners) should be encouraged to develop and use a variety of innovative communication strategies (such as web-based discussions) to share information, develop position papers, and plan joint African initiatives.

Strategy 7: Global health partner investment in knowledge systems

Investments in health are a significant percentage of overall global partner contribution to development. There has been a growing focus and interest in both investing in health systems as well as supporting specific disease-focused interventions. What is needed now is targeted funding to build knowledge capacity. Global partners are increasingly aware of the role of knowledge in health and development. The Canadian International Development Agency (CIDA) identified knowledge-based investment and the critical role of knowledge in development in their Policy Statement on Strengthening Aid Effectiveness.[63] The Department for

International Development UK (DFID) demonstrated its commitment to knowledge for health system development through the establishment of the Health Resource Centre, which produces and shares current knowledge and evidence, provide policy advice as well as training.[64] Investment patterns must begin to reflect this understanding. The World Health Assembly resolution set a target of 5% of health sector development aid from High Income Countries toward research and research capacity strengthening in health.[65] Given the compelling evidence from analysis in the DCPP2 described above, the investment should probably be 10% or more.

In 1997, the Swiss Agency for Development and Cooperation (SDC) provided support for the creation of the *Tanzania Health Research User's Trust Fund* (HRUTF). SDC believes that knowledge is essential to sustainable development, that "…health research [is] an essential tool to provide evidence for policy formulation and to translate policy into effective action."[66] In supporting the Trust Fund, SDC supports demand driven research as expressed by policy/decision makers, health care deliverers and communities at large. Their effective commitment to knowledge capacity in Tanzania is central in the overall aim to strengthen health systems.

Conclusion

In the final analysis, the role of a health "knowledge system" is to improve the ability of the health system to fulfill its functions in a way that is cost-effective, equitable and sustainable. Knowledge capacity is a multi-level component of any health system. This paper outlines seven potential strategies for building knowledge capacity and positively affecting health system development in Africa. We call for the facilitation of action-learning coalitions and research-policy think-tanks, for strengthening the knowledge culture of academic and training institutions and for the establishment of sentinel sites and demonstration projects which can be centers of innovation and learning within and across African nations. We also call for the strengthening of national health research systems and for support of African-wide forums. Finally, we argue that in addition to local institutions, global health partners must also recognise the importance of, and duly support, the development and strengthening of knowledge systems in Africa. The ideal 21st century African health system is knowledge based. Africa has demonstrated experience in building knowledge capacity, but we must now move beyond individual projects and donor

funded activities to a more strategic, integrated framework to support knowledge capacity for health system strengthening in Africa.

'Knowledge is a more powerful weapon in a nation's arsenal than any missile or mine'
Kofi Annan, *UN Secretary-General's Speech at United Nations University*, Tokyo, 5 May 2005.

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