



**The U.S. Commitment to Global Health:
Recommendations for the Public and Private
Sectors**

Committee on the U.S. Commitment to Global Health;
Institute of Medicine

ISBN: 0-309-13822-1, 298 pages, 6 x 9, (2009)

This free PDF was downloaded from:

<http://www.nap.edu/catalog/12642.html>

Visit the [National Academies Press](http://www.nap.edu) online, the authoritative source for all books from the [National Academy of Sciences](http://www.nap.edu), the [National Academy of Engineering](http://www.nap.edu), the [Institute of Medicine](http://www.nap.edu), and the [National Research Council](http://www.nap.edu):

- Download hundreds of free books in PDF
- Read thousands of books online, free
- Sign up to be notified when new books are published
- Purchase printed books
- Purchase PDFs
- Explore with our innovative research tools

Thank you for downloading this free PDF. If you have comments, questions or just want more information about the books published by the National Academies Press, you may contact our customer service department toll-free at 888-624-8373, [visit us online](http://www.nap.edu), or send an email to comments@nap.edu.

This free book plus thousands more books are available at <http://www.nap.edu>.

Copyright © National Academy of Sciences. Permission is granted for this material to be shared for noncommercial, educational purposes, provided that this notice appears on the reproduced materials, the Web address of the online, full authoritative version is retained, and copies are not altered. To disseminate otherwise or to republish requires written permission from the National Academies Press.

4

Invest in People, Institutions, and Capacity Building with Global Partners

While the United States can offer low- and middle-income countries partial solutions to help resolve the challenges they face in delivering basic health services, these countries require capable local leaders, managers, analysts, and researchers to identify solutions that work and are sustainable in their own countries. Capacity building efforts that help produce a critical mass of leaders, researchers, practitioners, and educators; create an enabling institutional environment through improved infrastructure and professional support; and fund a steady stream of diverse grants to sustain the efforts of researchers would benefit health in low- and middle-income countries and begin to address the severe deficits in their health sector workforce.

LONG-TERM INSTITUTIONAL CAPACITY BUILDING

Much of the international community's work in building the capacity of public health practitioners and researchers in low- and middle-income countries has borne noticeable results. Once dominated by health experts from advanced economies, the field of public health now reflects a more diverse and globally representative group of experts and organizations. Twenty-five years ago, global health experts gave guidance to health officials in low-income countries; today, the relationship is more a partnership than a tutorial. Low- and middle-income countries have health experts of their own who not only occupy a seat at the same table, but are often better informed about the health status and specific needs of their country or region than their international partners.

U.S. government agencies, such as the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC), have long-standing

capacity building programs aimed directly at strengthening researchers and public health practitioners in low- and middle-income countries (see Box 4-1). Universities, pharmaceutical companies, and more recently, public-private product development partnerships (PDPs) have trained the workforces of low- and middle-income countries in good research, laboratory, and clinical practices as a secondary outcome of their clinical trial work. While such efforts have helped to provide trained health workers and researchers, a lack of institutional support within these countries has often driven away the most promising and well-trained practitioners and researchers.

While many existing and new global institutions have received increased funding, research institutions in low- and middle-income countries (such as universities, public health schools, science academies, and research centers)

BOX 4-1
Building Capacity of Researchers: The Role of
U.S. Federal Executive Branch Agencies

U.S. government agencies have successfully contributed to building the capacity of international partners in health research. Two noteworthy efforts are those of the NIH's Fogarty International Center and the CDC's Field Epidemiology Training Program.

NIH's Fogarty International Center

The Fogarty International Center (FIC) at NIH runs a highly successful AIDS International Training and Research Program (AITRP) that brings scientists from low- and middle-income countries to the United States to train in multidisciplinary biomedical and behavioral research in HIV/AIDS and the related epidemic of tuberculosis in their countries.

AITRP trainees are sponsored for a master's or doctorate degree or hold postdoctoral positions. The program uses several scientific, political, and economic strategies to encourage scientists to return to their home countries after training. By focusing on research that is responsive to priorities in the home country—and maximizing the amount of training conducted there—trainees are better equipped to find jobs or funding in their home countries once training is complete. A trainee may be allowed to retain an e-mail address and access to journals through the U.S. host institution even after training. Trainees come to the United States under nonimmigrant temporary visas; some sign agreements that require them to reimburse their training costs if they do not return to their home country (Kupfer et al., 2004).

A 2002 survey of five of AITRP's longest-funded programs showed an average return rate of 80 percent among their 186 long-term trainees (Kupfer et al., 2004). An evaluation of the entire program this past year showed an 85 percent rate of return among trainees over 15 years (Kupfer, 2009). FIC recently built on the AITRP model and designed the Millennium Promise Awards to extend research

have not experienced commensurate growth or been sufficiently engaged in the global health arena. In the United States, academia, nonprofit organizations, and commercial entities play an important advisory role in domestic U.S. healthcare policy, but in resource-limited nations, indigenous scientific expertise is rarely sought when shaping national policies. As a result, research institutions in these countries are often neglected and bypassed as working partners by many external donors.

Yet the challenges faced by these nations in delivering quality and equitable health services require capable leaders, managers, analysts, practitioners, and researchers to identify problems and solutions that can influence public health policy. Many low-income countries have neither a critical mass of researchers and health workers nor sufficiently funded institutions to conduct the research

capacity to cancer, cerebrovascular disease, lung disease, obesity, lifestyle factors, and genetics as related to chronic diseases (FIC, 2008).

CDC's Field Epidemiology Training Programs

The Field Epidemiology Training Program (FETP) and the Field Epidemiology and Laboratory Training Program, which offers an added laboratory component, are applied epidemiology programs offered by the CDC's Division of Global Public Health Capacity Development (DGPCHD). Both programs help countries develop and implement dynamic public health strategies to improve their health systems and infrastructure.

An in-country resident adviser is assigned to provide training and technical assistance for four to six years. The curriculum of both two-year programs is modeled on CDC's Epidemic Intelligence Service, typically involving classroom instruction (25 percent) and field assignments (75 percent). In class, trainees take courses in epidemiology, communications, economics, and management, while learning quantitative and behavior-based strategies. In the field, trainees conduct epidemiologic investigations and field surveys, evaluate surveillance systems, perform disease control and prevention measures, report their findings to decision makers, and train other health workers.

Since 1980, DGPCHD has helped to establish 30 field epidemiology training programs that have produced more than 1,000 graduates. In 2008, the programs had 276 active trainees; together, trainees and graduates conducted more than 300 outbreak investigations and gave 280 presentations at international conferences. As of April 2009, 17 resident advisers for epidemiology and laboratory were supporting 12 programs in Central America, Asia, the Middle East, and Africa. Located at CDC's headquarters in Atlanta, Georgia, DGPCHD staff provide additional scientific support and advice to sustain FETPs and related programs around the globe. This division of CDC also supports the technical components of five other mature programs in Brazil, Egypt, Jordan, Saudi Arabia, and Thailand. Plans for the establishment of new programs are under way in 14 countries, including Afghanistan, Central Africa, Iraq, and Yemen (CDC, 2008).

and analytical work needed to find solutions (not to mention inform policy) to address the health problems endemic to their countries.

For example, universities in low-income countries—vital to human resource development—often face a host of problems. They suffer from lack of funds, weak infrastructure, outdated or misaligned training programs, overcrowded classrooms, and overburdened and underpaid staff (Dovlo, 2003; Tettey, 2006). In recent years, many health science schools in sub-Saharan Africa have been asked to double or even quadruple the number of students without concomitant increases in their budgets and despite significant staff vacancies (Effah, 2003; Houenou and Houenou-Agbo, 2003; Jibril, 2003; Taché et al., 2008). For students, the shortage of teachers means a lack of mentorship and academic support. Students often graduate without being equipped to address critical tasks pertinent to the burden of disease and epidemiologic scenarios for which their service is needed (Taché et al., 2008). Health practitioners are often unprepared to deal with the challenges of working in underresourced clinics and hospitals (WHO, 2006). Both researchers and faculty struggle to find resources for substantive research projects. The consequent overall lack of opportunity and career advancement results in low morale, providing little incentive to work in academia or the public sector or to remain in the country.

The committee finds that strengthening universities, research centers, and government institutes in low- and middle-income countries could have a direct impact on the ability of these countries to muster the internal resources needed to address their own health problems. In particular, the committee finds that by supporting these institutions, the United States can help to develop an environment of inquiry, entrepreneurship, and experimentation that brings together researchers, practitioners, and policy makers, across disciplines and borders, to solve some of the pressing health problems facing less wealthy nations.

Expand Commitment to Institutional Capacity Building

The United States still has much to contribute in building academic and research capacity in low- and middle-income countries, given its expertise in research, science, and technology. A global health field has recently emerged that has been defined as an area for study, research, and practice that places a priority on improving health and achieving equity in health for all people worldwide. The global health field emphasizes transnational health issues, determinants, and solutions; involves many disciplines within and beyond the health sciences; promotes interdisciplinary collaboration; and is a synthesis of population-based prevention and individual-level clinical care (Koplan et al., 2009). By building on successful programs and leveraging the growing involvement of U.S.-based universities, commercial entities, and foundations in global health, the United States has an opportunity to help redress the neglect of universities and other research and public health institutions in resource-limited settings.

Unprecedented energy and enthusiasm for global health now exist among students and medical residents in U.S. universities (Drain et al., 2007). U.S. academic institutions have a vast untapped potential to work with academic institutions in low- and middle-income countries to advance the academic environment in both sets of institutions by strengthening faculty and improving training programs and curriculums. Many examples in the past several years also illustrate the interest in the commercial sector and among professional associations in sharing their business and technical acumen for the greater social good.

Several U.S.-based foundations, such as Rockefeller, Carnegie, and Pew, were some of the first organizations to embark on capacity strengthening programs in low- and middle-income countries. For example, the Rockefeller Foundation—which contributed \$25 million in 1921 (equivalent to \$357 million today) to establish 21 schools of public health in cities such as London, Tokyo, Calcutta, and Sao Paulo—today continues to support many institutions and fellowship programs for health scientists worldwide (Fosdick, 1989).

U.S. philanthropies and the U.S. government should continue the tradition of funding capacity building initiatives and expand this commitment to leverage the growing interest of academia, nonprofit organizations, and commercial entities. With increased support, research institutes could adopt innovative methods and technologies for distance learning and collaboration and, thus, help to reshape education and research in global health.

Support Long-Term and Mutually Advantageous Institutional Partnerships

The committee finds that the United States can support institutional capacity building in low- and middle-income countries by funding and participating in long-term and mutually advantageous institutional partnership compacts. Through sustained partnerships, U.S. government agencies, universities, corporate entities, and foundations can strengthen the local capacity of researchers, practitioners, and policy makers, as well as their respective institutions, in low- and middle-income countries.

Many examples of capacity building partnerships among institutions exist, with different arrangements and varying benefits for participants. Traditionally, these partnerships have involved an institution from a high-income country and an institution from a low- or middle-income country (sometimes referred to as “twinning”), but increasingly, the partnerships involve partners from low- and middle-income countries only. For example, under the leadership of the Mexican government, the Mesoamerican Public Health Institute was established to support a virtual network of academic and research institutes in the Central American region (López, 2008). Both models have their advantages; in a partnership involving high-income countries, the high-income institution brings valuable expertise to the table but can overshadow the other partner, while a partnership between

low- and middle-income institutions tends to be more equitable and less costly but offers fewer opportunities to transfer expertise.

Given the importance of the emerging economies, another type of partnership called “triangulation” has been suggested to leverage the strengths of institutions from all three levels of economies: high, middle, and low income. The United States might, for example, establish a partnership with both Brazil and Mozambique. The International Association of National Public Health Institutes (IANPHI) is exploring this exact partnership, among others, in an attempt to build the capacity of public health institutes globally (see Box 4-2).

Such partnerships often result in the establishment of Centers of Expertise that serve entire regions. Centers of Expertise are promising, especially in the initial stages of capacity building, because they afford some coordination among multiple, differentiated institutions, which can help to propel and sustain entire professional fields.

BOX 4-2
National Public Health Institutes: Integrating Vertical Programs and Enhancing Public Health Capacity

National Public Health Institutes (NPHIs) are science-based governmental organizations, such as the CDC in the United States, FIOCRUZ in Brazil, RIVM in the Netherlands, and CDC in China, that provide expertise and leadership for core public health functions, including research, disease surveillance, outbreak investigation, laboratory science, policy formulation, and health education and promotion.

Coordinating core public health functions through an NPHI can result in a more efficient use of resources, improved delivery of public health services, and increased capacity to respond decisively to public health threats and opportunities. NPHIs are particularly beneficial in low-resource countries, where they provide public health professionals with a group of technically oriented colleagues and a prestigious career path, helping to stem the tide of experts leaving government service for higher-paying jobs with international nongovernmental organizations. NPHIs in low-resource countries also encourage governments to set science-based public health priorities and policies, better integrate and leverage funds from numerous vertical programs, and plan strategically and systematically for future human resource and infrastructure needs.

NPHIs vary in scope, function, and size along a continuum from fledgling institutes to organizations with comprehensive responsibility for research, programs, and policy for almost all public health threats. Most NPHIs, including the U.S. CDC, began as very focused public health or research institutes charged with identifying and combating infectious disease threats. Over time, CDC and many other NPHIs in mid- to higher-resource countries have evolved and expanded to meet new public health challenges, including death and disability from chronic diseases, environmental and occupational threats, and injury prevention. The growth of NPHIs over the years—including their successes and failures—provides

The committee finds that partnerships among institutions in advanced and emerging economies and resource-limited nations are a promising practice and should be expanded. Institutional partnerships—whether twinning, triangulation, or establishing Centers of Expertise—have proved an effective way to build capacity when they are conceived as a long-term commitment and based on an equitable relationship among participants. Numerous institutions in low- and middle-income countries have been able to take advantage of long-term partnerships to build their institutional capacity. Makerere University in Uganda is an example of an institution that has leveraged multiple partnership compacts with universities, commercial industry, foundations, and PDPs to reestablish the university as a leading institution in sub-Saharan Africa (see Box 4-3).

Although there has been little rigorous evaluation to parse the most promising aspects of the institutional partnership model, some lessons can already be

an important frame of reference for those with more limited current capacity as they consider how to move forward. Such a “road map” is invaluable not only to lower-resource economies, but also to countries such as the United Kingdom, Hong Kong, and Canada, which have created NPHIs only recently in response to public health challenges such as bovine spongiform encephalitis and severe acute respiratory syndrome.

Moving NPHIs forward along the continuum toward more technical depth and comprehensive capacity is the primary goal of the International Association of National Public Health Institutes, which serves as a professional organization for NPHI directors, assisting them in their professional and institutional growth through scientific meetings, leadership development activities, and seed grants for research and training. IANPHI’s fundamental philosophy is that the collective history, knowledge, and scientific expertise of its member institutes is a powerful force for transforming public health systems in low-resource countries.

IANPHI is collaborating with nine low-resource countries to create new NPHIs or to substantially increase capacity at fledgling institutes. IANPHI’s nine long-term NPHI development sites include Burkina Faso, Ethiopia, Guinea Bissau, Mozambique, and Tanzania, with projects being explored in Bangladesh, Cambodia, Central America, and Ghana. In addition to its strategic investments of up to \$670,000 in each of the nine long-term project sites, IANPHI leverages substantial strategic planning and organizational design expertise, scientific technical assistance, and public health training for each project from other IANPHI members. For example, Guinea Bissau received technical assistance and training from Brazil; Finland is providing technical assistance and training to Tanzania; the Netherlands and Norway have committed to providing assistance to Ethiopia; and Morocco has pledged technical assistance and training to Burkina Faso. In addition, IANPHI links into each project the specialized expertise of other partners, including WHO, and links with key funders and programs, including the Health Metrics Network, the Global Fund, bilateral aid groups, and the U.S. government.

BOX 4-3

Rebuilding Uganda's Makerere University Through Institutional Partnerships

Makerere University, established in 1922, is one of Africa's oldest universities. It has 30,000 undergraduate and 3,000 postgraduate students. Through international collaborations with a number of institutions, Makerere has established itself as a global center for research, especially on HIV-related health outcomes. Once reputed as the preeminent research institution in sub-Saharan Africa, Makerere University faced financial and institutional collapse during the late 1980s. The restructuring of administration, increases in enrollment, and a reallocation of private funding have been instrumental in rebuilding Makerere University as an example for surrounding institutions suffering similar infrastructure collapse (Task Force on Higher Education and Society, 2008).

Among the university's more notable collaborations has been its partnership with Johns Hopkins University in the United States to establish a College of Health Sciences. A two-year initial phase includes a needs assessment plan written by students and led by Makerere faculty members with support from Johns Hopkins, building on a long history of Johns Hopkins' collaboration with Makerere University. The plan will include an evaluation of how Makerere University might most effectively promote local health initiatives involving HIV; test innovative strategies such as voucher systems; and support implementation of health programs based on research—for example, the Makerere University finding that circumcision can reduce the risk of acquiring an HIV infection by 48 percent. Over the next eight years, a strategic plan will be implemented jointly by an advisory panel (made up of deans from Makerere's College of Health Sciences and Johns Hopkins faculty) and an advisory council drawn from Ugandan government and civil society. After identifying Uganda's health needs and drawing up a plan to meet them, Makerere University will expand its capacity to improve health outcomes in Uganda and East Africa (Gebel, 2009).

In another successful collaboration, Makerere University partnered with Pfizer Inc., Accordia Global Health Foundation, and the Academic Alliance to establish the Infectious Diseases Institute (IDI) in 2004. African-owned and African-led, IDI is now a preeminent center for infectious disease research, training, and treatment. By enhancing the stature and recognition of the Faculty of Medicine at Makerere University, IDI is helping to reverse the trend of African healthcare professionals' pursuing career opportunities abroad. The IDI model has proven extraordinarily productive, with far-reaching applications for similar disease-fighting efforts elsewhere in Africa (Accordia Global Health Foundation, 2009a).

Another collaborative effort by Makerere University, the IDI-based Sewankambo Scholarship Program, aims to build the next generation of academic medical researchers in Africa. The program couples outstanding African clinicians with at least one internationally recognized investigator who commits to providing five years of substantive, ongoing mentorship in a rigorous research program. During this process, scholars also develop their own research teams and mentor, in turn, another generation of young Ugandan investigators, thus expanding "in-country" clinical and applied research with little assistance from Western institutions (Accordia Global Health Foundation, 2009b).

learned from partnerships undertaken in health and other fields such as agriculture and science. Institutional partnerships should do the following:

- Represent a long-term financial commitment (5 to 10 years or more) with a focus on sustainability and creating self-reliance (Crisp et al., 2000; Drain et al., 2007; ODI, 2009).
- Be based on trust, ethical principles, transparency, and equity in exchange and ownership, where all partners find the relationship mutually advantageous and respect and understand differences in cultures and perspectives (Jones and Blunt, 1999; KFPE, 1998; Ofstad, 1999; Tsibani, 2005).
- Have leadership commitment from their respective Ministries of Health and Higher Education (among others) (Crisp et al., 2008; Nuyens, 2007).
- Focus on strengthening the institution and not a particular individual, paying attention to the crucial need for improving the institutional environment to enable problem solving and policy engagement.
- Incorporate an interdisciplinary approach that goes beyond the medical and health science schools and includes disciplines such as public health and policy, business, engineering, agriculture, and economics.
- Define goals and metrics of success at the beginning of the partnership; all parties involved must commit to evaluate the model and remain flexible to adjust as needed (Crisp et al., 2000; Ijsselmuiden et al., 2004; KFPE, 1998; ODI, 2009).
- Reach agreement at the start regarding the ownership of data, specimens, and intellectual property, as well as how information should be shared, given the existing information-sharing infrastructure.

While institutional partnerships should be flexible in order to build upon the strengths of their participants, they should endeavor to engage in the following five important and focused activities:

1. *Invest in training to help build a critical mass of researchers, practitioners, and educators.* Institutional partnerships should play an explicit role in helping to educate and train leaders, researchers, teaching faculty, health workers, and professionals (such as managers, public health practitioners, and policy analysts). Training must be based on a comprehensive approach to build long-term, sustainable, and independent leadership, research, and teaching capacity and should include investment in master's and doctoral training programs (Maziak et al., 2004; Nchinda, 2002). Adequately staffed universities, health science schools, and teaching hospitals will go a long way toward training leaders and managers while addressing the critical shortage in the health workforce (Crisp et al., 2008).

2. *Create an enabling institutional environment to rectify a development paradox.* Better training can lead to a depleted workforce if trained workers emigrate (Arah et al., 2008). Significant and long-term investments will be required to rectify the “push” factors that drive the health workforce out of underserved areas and discourage professionals from serving the public good. Investments in infrastructure (such as properly equipped labs and increased access to research tools and scientific journals) and professional support will help retain trained health workers among underserved populations (Dovlo, 2004). Examples of such support are compensating professionals for mentoring activities and providing opportunities for their career advancement through faculty development and exchange programs.

3. *Fund a steady stream of diverse grants to sustain the efforts of researchers.* To further support and sustain institutions, institutional partnerships should work to ensure a steady stream of grants to generate and share knowledge that can inform health policy. Grants could be directed to underfunded research areas, such as health systems research, and focus on critical needs such as improving the delivery of existing interventions.

4. *Generate demand for scientific and analytical work to influence public policy.* Once best practices are identified in relevant health areas by institutional partnerships, country leaders can take up the task of bridging the knowledge-action gap in their societies and create evidence-based guidelines to inform good practice for health workers, policy makers, leaders, professionals, and academicians.

5. *Build credibility by contributing to real and immediate health policy challenges.* By contributing to solving some of the most pressing global health challenges through a specific focus on, for example, human resource capacity issues, partnerships can have a meaningful and real-time effect on the ongoing delivery of care within a particular country or region. This will enhance the credibility of the local institution, both with local policy makers and with external donors who may be skeptical of the benefits of long-term capacity building investments, and offer opportunities to partner with service delivery programs such as the President’s Emergency Plan for AIDS Relief or President’s Malaria Initiative.

Recommendation 4-1. Federal executive branch agencies, along with U.S. private institutions, universities, nongovernmental organizations, and commercial entities, should provide financial support and engage in long-term and mutually advantageous partnerships with institutions—universities, public health and research institutes, and healthcare systems—in low- and middle-income countries with the goal of improving institutional capacity. These partnerships should enable local and global problem solving and policy engagement by

- Investing in training,
- Creating an enabling institutional environment,
- Funding a steady stream of diverse research grants,
- Generating demand for scientific and analytical work that influences public policy, and
- Contributing to the control of real and immediate health problems.

RECTIFY THE HEALTH WORKFORCE CRISIS

Many countries face critical health workforce deficits that directly affect health outcomes. National health resource strategies that go beyond simply increasing the number of health workers and endeavor to understand and improve the dynamics of the labor market have been successful in stemming the tide of workforce migration and in recruiting and retaining labor for underserved areas. While such strategies require commitments by governments to construct and finance human resource plans, the international community, too, needs to play an important role in supporting and financing these country-led plans.

Global Health Workforce Deficits Are of Crisis Proportions

Human resources are critical to improving global health. The density and quality of the health sector workforce directly affects health outcomes, with increased density being associated with reductions in maternal, infant, and under-5 child mortality (Anand and Barnighausen, 2007; Chen et al., 2004). On average, countries with fewer than 2.5 healthcare professionals (counting doctors, nurses, and midwives) per 1,000 people failed to achieve an 80 percent coverage rate for measles immunization or for deliveries by skilled birth attendants (Chen et al., 2004).

Such statistics have led the World Health Organization (WHO) to recommend that a country maintain a health workforce density of no less than 2.28 workers per 1,000 population (or 1 health worker for every 400 people) to achieve desired levels of key health intervention coverage (WHO, 2006). Based on this measure, the world has a global shortage of 2.4 million doctors, nurses, and midwives; when other health service providers such as medical technicians are included, the global shortage reaches 4.3 million health workers (WHO, 2006).

WHO estimates that 57 countries (36 of which are in sub-Saharan Africa) have critical health workforce shortages, making it difficult (if not impossible) for them to achieve the health-related Millennium Development Goals (MDGs) (WHO, 2006). For example, sub-Saharan Africa would need to increase its health workforce by 140 percent to support attainment of the MDGs (UN, 2008). A study to assess the human resources required to achieve the MDGs in Tanzania and Chad found that by 2015, Tanzania would require 98,000 full-time health workers, but would have only 36,000; in Chad the situation would be even worse,

with 19,000 workers required, but only 3,500 available—a deficit ratio of more than 5 (Vujcic, 2005).

Beyond the shortage of health workers, issues of productivity, absenteeism, and “ghost” workers exacerbate the problems of the health workforce. Public health systems are often characterized by a lack of capacity due to weak civil service and limited incentives for improving performance. Poor labor conditions such as low salaries, supply shortages, and work overload contribute to unsatisfactory working conditions that drive health workers out of government service—especially in underserved areas—and minimize the impact of those workers who do remain (Marchal and Kegels, 2003).

Low compensation leads to income supplementation strategies such as informal payments and dual practice in the private sector. Research on absenteeism has revealed “ghost” doctors—physicians absent from their salaried posts due to private sector obligations or higher-paying opportunities elsewhere (Chaudhury and Hammer, 2004; Chaudhury et al., 2006). A recent survey of six countries (Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda) shows an average absence rate of 35 percent among healthcare providers. In Peru, for example, 48 percent of doctors reported external income from private practice in addition to public sector work; not coincidentally, these providers also showed a higher absence rate compared to other practitioners (Chaudhury et al., 2006). High absentee rates often result in the diversion of patients to more accessible private providers, subjecting patients to care that is often costly and delivered by poorly or undertrained providers (Lagomarsino and Kundra, 2008).

The same poor working conditions that prevent health workers from performing at the highest level have also “pushed” many health professionals in resource-poor settings out of the public sector entirely, with many choosing to emigrate to higher-income countries that are experiencing a health workforce shortage (Aiken et al., 2004; Arah et al., 2008). An analysis of African-born nurses and doctors working domestically and abroad revealed that one-tenth of nurses (~70,000) and one-fifth of doctors (~65,000) were working overseas in a developed country in 2000 (Clemens and Pettersson, 2008). The fraction of health professionals abroad varied enormously across African countries. In the Gambia, for example, for every professional nurse working in the country, about two live in a developed country overseas (Clemens, 2007). While Niger has a tiny physician diaspora, Ghana’s is enormous (Clemens and Pettersson, 2007). Overall, 47 percent of the African countries sampled have lost more than 40 percent of their physicians, while nearly one-third of the countries lost more than 20 percent of their nurses (Clemens, 2007).

Given these migration statistics, it is not surprising that terms such as “brain drain” and “poaching” have become popular to characterize the health sector’s human resource crisis in poor countries. Low-income countries subsidize professional education to generate much-needed skilled professionals, but labor and credit market failures often prevent these professionals from being paid their

marginal social product. If they departed for countries where their private gain better reflects their contribution, they would be lost (brain drain) and a public good—the government-funded education of a health worker—would become a private good (poaching).

Health Workforce Plans Depend on Donor Support

To address the health workforce crisis, many countries have set out to establish human resource plans to deal with clinical workforce deficits, as well as shortages of administrators, managers, policy analysts, public health specialists, and academicians in higher learning institutions—all of whom are key to ensuring a well-functioning health system (see Box 4-4). Although the opportunities for donors to improve the health workforce in low- and middle-income countries are marginal, there is mounting recognition that without urgent attention to workforce shortages, other initiatives in global health will suffer. According to the *2006 World Health Report*, national strategies on their own (however well conceived) are insufficient to deal with the difficulties of health workforces today and in the future (WHO, 2006).

In many instances, severely resource-constrained countries are dependent upon donors to assist in supporting and financing country-owned human resource strategies (Crisp et al., 2008). The United States should work to improve the global human resource crisis in the health sector by first doing no harm; helping to finance “sound” country-owned plans to improve human resources for health; and considering partial solutions that leverage the U.S. workforce to address immediate workforce needs in low-income countries.

Donors Should First Do No Harm

Well-intentioned donor financing and programming can sometimes have unintentional consequences that undermine country-led efforts to improve the health workforce. For example, well-meaning foreign assistance often comes in the form of a large number of training workshops and short courses of study meant to improve the workforce. Too often, these short courses are not effective and lack evaluation or even a coherent or long-term strategic purpose. The trainers often fail to consider how, when, and where to conduct courses in order to minimize the disruption of care delivery. As a result, health workers are often pulled out of the care delivery setting in order to attend training courses, leaving clinics, hospitals, and teaching facilities further depleted.

Numerous examples of wage distortion can be found when health sector employment is financed internationally rather than locally (McCoy et al., 2008). In Malawi, a survey of local and international nongovernmental organizations in 2005 showed that the average salaries paid by international organizations were substantially higher than those paid by local ones (Imani Development,

BOX 4-4
**Health Sector Human Resource Strategies
to Address the Workforce Crisis**

Workforce policies focused on simply increasing the number of health workers to address health needs (without understanding the dynamics of the labor market, such as supply and demand) often fail to achieve their objectives (Glassman et al., 2008; Vujicic and Zurn, 2006). Policies that incorporate more explicitly the behavior of those who supply labor (doctors, nurses, midwives, and other providers) and those who demand labor (local governments, the private sector, and foreign governments) and endeavor to understand how each group responds to incentives can be successful (Vujicic and Zurn, 2006).

The supply of healthcare professionals at the country level can be thought of as the number of individuals with the necessary qualifications who are willing to work in the healthcare sector. Supply is influenced by opportunities to migrate, as well as access to training, labor conditions, and wages. By understanding how these factors influence the supply of viable healthcare professionals, countries can create public policies to address their health workforce shortages (Vujicic and Zurn, 2006).

Given that resources are limited, what is desirable or needed is not always feasible. Thus, the demand for healthcare services—the quantity of healthcare services that individuals or governments are willing to pay for—does not always correspond to healthcare needs. For example, in many cases, hospitals *need* more doctors and nurses to achieve the desired level of health service delivery, but do not have the resources to pay their wages and thus *do not demand* more healthcare providers. Other factors, such as the length of time required to educate physicians, can delay changes in the available supply, thus delaying balance in the labor market (Zurn et al., 2004).

Providing Educational Incentives

Targeted subsidies, grants, and scholarships are examples of incentives that can be used not only to attract more students, but also to retain students who are more likely to remain in the country and work in underserved areas (Marchal and Kegels, 2003). Thailand provides an example of such incentive-based placement of doctors to address urban and rural healthcare disparities (Wibulpolprasert and Pengpaibon, 2003). Another measure to retain health workers could be to identify,

2005; McCoy et al., 2008). Another study has found that in several countries the Global Fund has contributed to an exodus of employees from health ministries by paying higher salaries than the government (Drager et al., 2006). While wage discrepancies between locally financed positions and internationally financed positions exist and may be especially problematic in areas that receive significant international funding for programs such as HIV/AIDS (Shiffman, 2008), the

at the time of entry to health worker education, those candidates who are likely to stay in their country and work where they are most needed (Marchal and Kegels, 2003). A Ugandan study of nursing students found that those wanting to emigrate would be least likely to work in rural areas (Nguyen et al., 2008). Governments could then create incentives to target the students who do not aspire to migrate as being the most inclined to work in rural and underserved areas.

Improving Working Conditions

Wage increases, additional benefits, and flexibility in working hours are other examples of commonly used incentives to attract or retain workers. Yet recruiting and retaining health staff requires an *overall* conducive environment that offers opportunities and favorable working conditions. Health personnel working in underserved areas require special incentives that go beyond educational incentives and reasonable salaries, such as hardship and transportation allowances; subsidized school fees for children and housing; and opportunities for continued education and career development. Reducing the brain drain within countries among doctors requires “clear-cut, merit-based career structures that offer attractive posts in clinical or research fields, accompanied by adequate remuneration” (Marchal and Kegels, 2003).

Reforming the Skill Mix

In some instances, resource-limited countries are making greater use of mid-level health workers, such as assistant medical officers, clinical officers, and surgical technicians (Heller and Mills, 2002; Marchal and Kegels, 2003). These workers supplement the work of doctors and nurses to provide medical, obstetrical, and surgical care in underserved areas. Midlevel workers can provide quality care if appropriately trained, monitored, and given the opportunity to attend continuous skill improvement courses (Dovlo, 2003; Vaz et al., 1999).

Overall, such incentives and policies can bring more workers into the public health system and improve its effectiveness. National policies that improve labor conditions by offering a mix of these incentives have been successful, but they require a commitment by governments to formulate health resource plans. These plans should be led by countries because the policies to address the local labor market must be planned, implemented, and owned within national settings (Chen et al., 2004).

evidence in this area is still sparse and requires further evaluation to understand how international nongovernmental organizations and donor programming affect the health sector labor market. Donors should be cognizant of the potential effect their efforts to recruit health workers and professionals may have on local public health recruitment efforts.

The demand for health workers in the United States and other advanced

economies is also a factor that can contribute to the recruitment of health workers away from underserved areas in low- and middle-income countries. Trends over the last 25 years show that the number and percentage of foreign-trained nurses and doctors have increased significantly in most high-income countries (Dumont, 2007). For example, nurse immigration to the United States has tripled since 1994 to almost 15,000 entrants annually. In 2007, about 8 percent of all registered nurses were estimated to be foreign educated; of these, 80 percent were from lower-income countries (Aiken, 2007).

This has prompted many organizations to call for increased measures both to limit the recruitment of healthcare professionals from other countries, especially from countries most affected by human resource shortages, and to reduce U.S. dependency on an immigrant workforce in the health sector. An examination of U.S. migration, workforce, and training policies was not within the purview of the committee's charge.

The committee did consider the effect of migration of health workers on health outcomes in low- and middle-income countries and finds that global migration is not the main cause of the human resource crisis, nor would its reduction be the main solution, even though it does exacerbate the acuteness of the problem in some countries. Attempts to merely increase the supply of workers by restricting emigration visas or reversing migration might have a modest effect on the human resource crisis, but would not solve the problem and would put unnecessary restrictions on the right of workers to migrate. For example, the need for human resources in low-income countries, as estimated by WHO, largely outstrips the number of immigrant health workers in the United States and elsewhere (Dumont, 2007).

Moreover, at least one study examining the emigration of African physicians and nurses found no evidence that migration substantially affected the 11 indicators of mass primary care availability and public health outcomes (Clemens, 2007). If physicians or nurses abroad substantially degrade basic public health conditions, one would expect to see a positive correlation between the number of physicians abroad and childhood mortality. Yet the study found the exact opposite. Countries with higher migration tend to have lower mortality rates. Another analysis found similar results; higher physician migration density was significantly associated with relatively "higher wealth and less poverty, higher health spending, better development, and higher population health status" (Arah et al., 2008).

Therefore, the committee finds that while migration is a highly visible and volatile topic, it is a sign that even as a country is training internationally valuable resources, it is not providing enough incentives to prevent these resources from finding more promising opportunities elsewhere. Migration is a symptom of more serious issues of chronic lack of reinvestment in the health workforce and health systems of low- and middle-income countries that encourage workers to migrate to wealthier countries. Addressing the human resource crisis in the health sector

will require reversing deficits in capacity, infrastructure, and leadership within the health sectors of resource-limited countries.

Support Country-Led Health Sector Workforce Plans

The committee also finds that while low-income countries are the owners and drivers behind national strategic plans to improve the health workforce, in many instances, the success of these plans is dependent upon external donor assistance (HRET, 2007; JLI, 2004; WHO, 2006, 2008). As much as 50 to 85 percent of the recurrent healthcare budget of some countries in sub-Saharan Africa is consumed by salaries for healthcare providers (Vujicic, 2005). Large increases in funding, no matter what the source, are therefore necessary to scale up human resources for health.

The current model of donor assistance does not support the long-term, country-led investment that is required to help finance nationally owned strategies for developing human resources for health. Development assistance and donor grants tend to be unpredictable, volatile, and short term, making it difficult for recipient governments to make long-term investments or to plan budgets using external assistance (Lane and Glassman, 2007). Funds for hiring workers need to be stable and long term in order to cover recurrent costs, such as salaries. Governments, therefore, may not wish to expand their health workforce any faster than is sustainable in the long term with domestic resources (Vujicic, 2005).

In an interesting case in Malawi, a careful analysis of the health labor market found a mismatch between the government's great need for health workers and a large available pool of skilled workers in the private sector who were unwilling to work for public sector salaries. With assistance from the United Kingdom, the Malawi government initiated a six-year plan to increase salaries in the health sector by 50 percent (Glassman et al., 2008). Preliminary assessment of the Malawi program in its first three years of implementation shows an increase in practicing health professionals in the public sector. In 2007, the physician and nurse workforces increased 40 and 30 percent, respectively, compared to 2003. Medical training infrastructure also improved—observable in the quadrupling of medical training facilities between 2003 and 2006. To continue improvement in retention and recruitment in the priority health fields, the Malawi plan aims to improve incentives by offering a 52 percent salary increase (WHO and GHWA, 2008).

Recommendation 4-2. Federal executive branch agencies and departments, nongovernmental organizations, universities, and other U.S.-based organizations that conduct health programs in low-income countries should align assistance with the priorities of national health sector human resource plans and should commit and sustain funding in support of these plans.

Consider Partial Solutions for Leveraging the U.S. Workforce

Given the overwhelming interest in global health, a relatively small number of U.S. health professionals currently work in low- and middle-income countries. Many health professionals volunteer with faith-based or secular nongovernmental organizations, while several universities and corporations support health personnel in low-income countries through global health programs or research projects. The U.S. government also sends small numbers of health professionals through CDC and U.S. Agency for International Development projects (Mullan, 2007).

This relatively modest level of mobilization begs the question: If the resources were made available, would a greater number of Americans in medicine, nursing, public health, and the nontraditional health fields commit to service overseas? An equally important question is whether or not an increase in U.S. expatriates and volunteers would be a welcome resource in low-income countries. The level of analysis necessary to answer both questions requires further investigation.

A 2005 study of nongovernmental organizations in sub-Saharan Africa found a variety of volunteer opportunities ranging from two weeks to more than two years at an estimated cost between US\$36,000 and US\$50,000 per expatriate volunteer per year (Laleman et al., 2007). In general, the study found that most country experts had experienced some interaction with hard-working, highly motivated, and committed expatriate volunteers, who were willing to live and work in remote areas. However, the study also found that volunteers tended to be junior, inexperienced, and ill prepared to work in low-income countries for both cultural and professional reasons. The use of volunteers in low-income countries may require a more coordinated approach if this type of support is to provide a partial solution to the human resource crisis in the global health sector.

The 2005 Institute of Medicine report *Healers Abroad: Americans Responding to the Human Resource Crisis in HIV/AIDS* recommended that the federal government create and fund an umbrella organization called the United States Global Health Service (GHS) to mobilize the nation's best healthcare professionals and other experts to help combat HIV/AIDS in severely affected African, Caribbean, and Southeast Asian countries. With a goal of building the capacity of targeted countries to fight the pandemic over the long run (IOM, 2005), the GHS would include, among several elements, a pivotal "service corps" made up of full-time, salaried professionals. Other GHS staff would be stationed on the ground to provide medical care and drug therapy to affected populations, while offering their local counterparts training and assistance in clinical, technical, and managerial areas.

The committee finds that if a global health service model is deployed, the mandate of the program should be broadened to include global health issues beyond HIV/AIDS, emphasize training over service provision in the context of providing patient care, and support bidirectional engagement (with U.S. professionals going abroad but also having professionals from low-income countries come to the United States). Given that this type of program would require signifi-

cant resources, the committee considered whether or not scarce U.S. development assistance dollars could be better spent supporting local country staff. While such an investment would be an important opportunity for bidirectional knowledge transfer, the committee recommends more detailed studies to determine the demand for such a program (would mid- and advanced-career professionals be willing to commit to a multiyear program?) and the degree of public health benefit in recipient countries (would this type of support be well received by recipient countries and would it be the most appropriate use of U.S. resources to address the human resource crisis and improve global health outcomes?).

Another partial opportunity to address the global health resource crisis is by considering the possibilities of “circular” migration as part of the solution. Many migrants feel a strong sense of responsibility to their homelands and, having spent some time abroad, would like to return home, perhaps temporarily, if conditions for their return were right (International Organization for Migration, 2003). The International Organization for Migration (2001) has implemented several voluntary return programs in Europe, Latin America, and Asia. In Africa, a program called the Return and Reintegration of Qualified African Nationals successfully stimulated the selective return of 2,565 urgently needed professionals in many disciplines between 1983 and 1995. This still-fashionable paradigm continues to tap into the skills and resources of the African diaspora by hiring emigrants for short-term assignments and development activities in their home countries (International Organization for Migration, 2001, 2002, 2003).

Policy barriers now limit the ability of health workers in the United States to return to their country of origin to either train or practice their professions. These barriers include the process of acquiring residency and naturalization and the lack of portability of benefits, pensions, and insurance (Agunias, 2008). Yet there is a desire on the part of migrants to see more temporary and circular migration. The United States should consider more comprehensive policy options to encourage circular migration to benefit both the countries that need labor and the countries from which the workers come. A recent public opinion poll found that 81 percent of Americans surveyed would support such a policy (WorldPublicOpinion.org, 2009).

Recommendation 4-3. Congress should work with federal executive branch agencies and departments and U.S. universities to explore opportunities to leverage the U.S. workforce to contribute to solutions that partially address health workforce deficits in low- and middle-income countries. This exploration should include an inquiry into the willingness of Americans to participate in a global health service corps; a determination of whether this kind of assistance would be well received by recipient countries; and an examination of whether specific opportunities exist to help migrants from low-income countries return home to work temporarily or permanently.

REFERENCES

- Accordia Global Health Foundation. 2009a. *Infectious Disease Institute*. <http://www.accordiafoundation.org/programs/infectious-diseases-institute/index.html> (accessed April 16, 2009).
- . 2009b. *Sewankambo Scholarship Program*. <http://www.accordiafoundation.org/programs/fellowship-exchange-programs/sewankambo-scholarship-program/index.html> (accessed April 16, 2009).
- Agunias, D. R. 2008. *Learning by doing: Circular migration among health professionals*. Presentation to IOM Committee on the U.S. Commitment to Global Health, Washington, DC: Migration Policy Institute.
- Aiken, L. H. 2007. U.S. nurse labor market dynamics are key to global nurse sufficiency. *Health Services Research* 42(3 Pt 2):1299-1320.
- Aiken, L. H., J. Buchan, J. Sochalski, B. Nichols, and M. Powell. 2004. Trends in international nurse migration: The world's wealthy countries must be aware of how the "pull" of nurses from developing countries affects global health. *Health Affairs* 23(3):69-77.
- Anand, S., and T. Barnighausen. 2007. Health workers and vaccination coverage in developing countries: An econometric analysis. *Lancet* 369(9569):1277-1285.
- Arah, O. A., U. C. Ogbu, and C. E. Okeke. 2008. Too poor to leave, too rich to stay: Developmental and global health correlates of physician migration to the United States, Canada, Australia, and the United Kingdom. *American Journal of Public Health* 98(1):148-154.
- CDC (Centers for Disease Control and Prevention). 2008. *Division of Global Public Health Capacity Development*. <http://www.cdc.gov/cogh/dgphcd> (accessed May 17, 2009).
- Chaudhury, N., and J. Hammer. 2004. Ghost doctors: Absenteeism in rural Bangladeshi health facilities. *World Bank Economic Review* 18(3):423-441.
- Chaudhury, N., J. Hammer, M. Kremer, K. Muralidharan, and F. H. Rogers. 2006. Missing in action: Teacher and health worker absence in developing countries. *Journal of Economic Perspectives* 20(1):91-116.
- Chen, L., T. Evans, S. Anand, J. I. Boufford, H. Brown, M. Chowdhury, M. Cueto, L. Dare, G. Dussault, G. Elzinga, E. Fee, D. Habte, P. Hanvoravongchai, M. Jacobs, C. Kurowski, S. Michael, A. Pablos-Mendez, N. Sewankambo, G. Solimano, B. Stilwell, A. de Waal, and S. Wibulpolprasert. 2004. Human resources for health: Overcoming the crisis. *Lancet* 364(9449):1984-1990.
- Clemens, M. 2007. *Do visas kill? Health effects of African health professional emigration*. Washington, DC: Center for Global Development.
- Clemens, M., and G. Pettersson. 2007. *New data on African health professionals abroad*. Washington, DC: Center for Global Development.
- . 2008. New data on African health professionals abroad. *Human Resources for Health* 6:1.
- Crisp, B. R., H. Swerissen, and S. J. Duckett. 2000. Four approaches to capacity building in health: Consequences for measurement and accountability. *Health Promotion International* 15(2): 99-107.
- Crisp, N., B. Gawanas, and I. Sharp. 2008. Training the health workforce: Scaling up, saving lives. *Lancet* 371(9613):689-691.
- Dovlo, D. 2003. *The brain drain and retention of health professionals in Africa*. Paper presented at Regional Training Conference on Improving Tertiary Education in Sub-Saharan Africa: Things That Work! Accra, Ghana, September 23-25.
- . 2004. Managing the return and retention of national intellectual capacity. *Bulletin of the World Health Organization* 82(8):620-621.
- Drager, S., G. Gedik, and M. R. Dal Poz. 2006. Health workforce issues and the Global Fund to fight AIDS, Tuberculosis and Malaria: An analytical review. *Human Resources for Health* 4.
- Drain, P. K., A. Primack, D. D. Hunt, W. W. Fawzi, K. K. Holmes, and P. Gardner. 2007. Global health in medical education: A call for more training and opportunities. *Academic Medicine* 82(3):226-230.

- Dumont, J.-C. 2007. *Health workforce and migration: An OECD perspective*. Presentation to the Sixth Coordination Meeting on International Migration, United Nations, Population Division, November 26-27.
- Effah, P. 2003. Ghana. In *African higher education: An international reference handbook*, edited by D. Teferra and P. G. Altbach. Bloomington: Indiana University Press.
- FIC (Fogarty International Center). 2008. *Research training grants*. http://www.fic.nih.gov/programs/training_grants/ (accessed October 30, 2008).
- Fosdick, R. 1989. *The story of the Rockefeller Foundation*. New York: Transaction Publishers.
- Gebel, E. 2009. *University partnership aims to fight HIV/AIDS more effectively*. <http://www.america.gov/st/develop-english/2009/February/20090116144136abretnuh0.688741.html> (accessed April 21, 2009).
- Glassman, A., L. Becker, M. Makinen, and D. de Ferranti. 2008. Planning and costing human resources for health. *Lancet* 371(9613):693-695.
- Heller, P. S., and A. Mills. 2002. Health workers here and there: The brain drain. *International Herald Tribune*, July 25.
- Houenou, P. V., and Y. Houenou-Agbo. 2003. Cote d'Ivoire. In *African higher education: An international reference handbook*, edited by D. Teferra and P. G. Altbach. Bloomington: Indiana University Press.
- HRET (Health Research and Educational Trust). 2007 March 22-23. *A Call to Action: Ensuring global human resources for health*. Paper presented at International Health Workforce Conference, Geneva, Switzerland.
- Ijsselmuiden, C., S. Duale, and T. C. Nchinda. 2004. *Principles of good partnerships for strengthening public health education capacity in Africa*. Washington, DC: Council on Health Research for Development and the Academy for Educational Development.
- Imani Development. 2005. *Malawi NGO remuneration survey*. Blantyre, Malawi: Imani Enterprise.
- International Organization for Migration. 2001. *The link between migration and development in the least developed countries*. Geneva, Switzerland: International Organization for Migration.
- . 2002. *Migration for development in Africa*. Geneva, Switzerland: International Organization for Migration.
- . 2003. *Memorandum submitted by the International Organization for Migration. Migration and development: How to make migration work for poverty reduction*. London, UK: International Development Committee, House of Commons.
- IOM (Institute of Medicine). 2005. *Healers abroad: Americans responding to the human resource crisis in HIV/AIDS*. Washington, DC: The National Academies Press.
- Jibril, M. 2003. Nigeria. In *African higher education: An international reference handbook*, edited by D. Teferra and P. G. Altbach. Bloomington: Indiana University Press.
- JLI (Joint Learning Initiative). 2004. *Human resources for health: Overcoming the crisis*. Cambridge, MA: Global Equity Initiative, Harvard University.
- Jones, M. L., and P. Blunt. 1999. "Twinning" as a method of sustainable institutional capacity building. *Public Administration and Development* 19(4):381-402.
- KFPE (Swiss Commission for Research Partnership with Developing Countries). 1998. *Guidelines for research in partnership with developing countries*. Bern, Switzerland: KFPE.
- Koplan, J. P., T. C. Bond, M. H. Merson, K. S. Reddy, M. H. Rodriguez, N. K. Sewankambo, and J. N. Wasserheit. 2009. Towards a common definition of global health. *Lancet* 373(1).
- Kupfer, L. 2009. Comments on IOM meeting—April 3. Washington, DC.
- Kupfer, L., K. Hofman, R. Jarawan, J. McDermott, and K. Bridbord. 2004. Strategies to discourage brain drain. *Bulletin of the World Health Organization* 82(8):616-619.
- Lagomarsino, G., and S. S. Kundra. 2008. *Risk pooling: Challenges and opportunities*. Washington, DC: Results for Development Institute.

- Laleman, G., G. Kegels, B. Marchal, D. V. d. Roost, I. Bogaert, and W. V. Damme. 2007. The contribution of international health volunteers to the health workforce in sub-Saharan Africa. *Human Resources for Health* 5(19).
- Lane, C., and A. Glassman. 2007. Bigger and better? Scaling up and innovation in health aid. *Health Affairs* 26(4):935-948.
- López, M. H. R. 2008. *Mesoamerican Health System Initiative*. Presentation to IOM Committee on the U.S. Commitment to Global Health, Washington, DC: National Institute of Public Health, Mexico.
- Marchal, B., and G. Kegels. 2003. Health workforce imbalances in times of globalization: Brain drain or professional mobility. *International Journal of Health Planning and Management* 18(Suppl. 1):S89-S101.
- Maziak, W., K. D. Ward, T. Eissenberg, R. C. Klesges, and U. Keil. 2004. The Syrian Center for Tobacco Studies: A model of international partnership for the creation of sustainable research capacity in developing countries. *Promotion & Education* 11(2):93-97, 116, 134.
- McCoy, D., S. Bennett, S. Witter, B. Pond, B. Baker, J. Gow, S. Chand, T. Ensor, and B. McPake. 2008. Salaries and incomes of health workers in sub-Saharan Africa. *Lancet* 371(9613):675-681.
- Mullan, F. 2007. Responding to the global HIV/AIDS crisis—A peace corps for health. *Journal of the American Medical Association* 297(7):744-746.
- Nchinda, T. C. 2002. Research capacity strengthening in the south. *Social Science and Medicine* 54(11):1699-1711.
- Nguyen, L., S. Ropers, E. Nderitu, A. Zuyderduin, S. Luboga, and A. Hagopian. 2008. Intent to migrate among nursing students in Uganda: Measures of the brain drain in the next generation of health professionals. *Human Resources for Health* 6(1):5.
- Nuyens, Y. 2007. 10 best resources for . . . health research capacity strengthening. *Health Policy and Planning* 22(4):274-276.
- ODI (Overseas Development Institute). 2009. *Conclusions*. <http://www.odi.org.uk/rapid/Projects/R0008/conclusions.html> (accessed April 11, 2009).
- Ofstad, A. 1999. *Bergen Seminar on Development 1999: Making south-north organisational cooperation an effective instrument for institution building*. Bergen, Norway: Chr. Michelsen Institute.
- Shiffman, J. 2008. Has donor prioritization of HIV/AIDS displaced aid for other health issues? *Health Policy and Planning* 23(2):95-100.
- Taché, S., E. Kaaya, S. Omer, C. A. Mkony, E. Lyamuya, K. Pallangyo, H. T. Debas, and S. B. MacFarlane. 2008. University partnership to address the shortage of healthcare professionals in Africa. *Global Public Health* 3(2):137-148.
- Task Force on Higher Education and Society. 2008. *Higher education in developing countries: Peril and promise*. Washington, DC: The International Bank for Reconstruction and Development and the World Bank.
- Tetty, W. J. 2006. *Staff retention in African universities: Elements of a sustainable strategy*. Calgary, Alberta, Canada: University of Calgary (commissioned by the World Bank).
- Tsibani, F. G. 2005. A literature review of the twinning approach in supporting developmental water services by water services institutions (WSIs) and water services authorities (WSAs) in South Africa. *Water SA* 31(3):335-343.
- UN (United Nations). 2008. *What's going on?* <http://www.un.org/millenniumgoals/> (accessed April 16, 2009).
- Vaz, F., S. Bergström, M. D. L. Vaz, J. Langa, and A. Bugalho. 1999. Training medical assistants for surgery. *Bulletin of the World Health Organization* 77(8):688-691.
- Vujicic, M. 2005. *Macroeconomic and fiscal issues in scaling up human resources for health in low-income countries*. Washington, DC: The World Bank.
- Vujicic, M., and P. Zurn. 2006. The dynamics of the health labour market. *International Journal of Health Planning and Management* 21(2):101-115.

- WHO (World Health Organization). 2006. *The world health report 2006: Working together for health*. Geneva, Switzerland: WHO.
- . 2008. *The Kampala declaration and agenda for global action*. Geneva, Switzerland: WHO.
- WHO and GHWA (Global Health Workforce Alliance). 2008. *Country case study: Malawi's emergency human resources programme*. Geneva, Switzerland: WHO and GHWA.
- Wibulpolprasert, S., and P. Pengpaibon. 2003. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: Four decades of experience. *Human Resources for Health* 1(1):12.
- WorldPublicOpinion.org. 2009. *American public opinion and global health*. College Park, MD: The Program on International Policy Attitudes, University of Maryland.
- Zurn, P., M. R. Dal Poz, B. Stilwell, and O. Adams. 2004. Imbalance in the health workforce. *Human Resources for Health* 2(1):13.

