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INVESTING IN GLOBAL HEALTH SYSTEMS
SUSTAINING GAINS, TRANSFORMING LIVES

Committee on Investing in Health Systems in Low- and Middle-Income Countries

Board on Global Health

Gillian J. Buckley, John E. Lange, and E. Anne Peterson, *Editors*

INSTITUTE OF MEDICINE
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"Knowing is not enough; we must apply.
Willing is not enough; we must do."
—Goethe

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Reviewers

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **David Challoner,** Vice President for Health Affairs, Emeritus, University of Florida; and **Charles E. Phelps,** Professor and Provost Emeritus, University of Rochester. Appointed by the National Research Council and the Institute of Medicine, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

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Acronyms and Abbreviations

AIDS	acquired immune deficiency syndrome
ART	antiretroviral therapy
CDC	Centers for Disease Control and Prevention
DOTS	Directly Observed Treatment, Short-course
G8	The Group of 8: Canada, France, Germany, Italy, Japan, Russia, the United Kingdom, and the United States
GDP	gross domestic product
Global Fund	The Global Fund to Fight AIDS, Tuberculosis and Malaria
HIV	human immunodeficiency virus
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
MDG	Millennium Development Goal
MDR-TB	multidrug-resistant tuberculosis
MEPI	The Medical Education Partnership Initiative
NGO	nongovernmental organization
PEPFAR	The President's Emergency Plan for AIDS Relief
PMI	The President's Malaria Initiative
SARS	severe acute respiratory syndrome

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TB	tuberculosis
UN	United Nations
USAID	U.S. Agency for International Development
WHO	World Health Organization

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Summary

The United States has been a generous sponsor of global health programs for the past 25 years or more. This investment has contributed to meaningful changes, especially for women and children, who suffer the brunt of the world's disease and disability. Women today are far less likely than they once were to die in childbirth; children are more likely to survive to their fifth birthdays. The promise of recent years has emboldened world leaders to identify progressively more ambitious international goals in health: ending preventable maternal and child deaths, eradicating malaria, and halting the transmission of HIV. Such transformative changes in the lives of the world's poorest people would be possible over the next 25 years, were it not for systemic obstacles that threaten to both impede further success and undo the gains already made.

Most of the world is now at a point where continuing progress depends on building the health system, the administrative and technical infrastructure that underlies all health services. Attention to clinical medicine and technological innovations (things like vaccines, contraceptives, diagnostics, drugs, and oral rehydration therapy) has driven much of the success in global health over the past two decades, but these solutions may be reaching a point of diminishing returns. Continuing progress in the future will not be possible using the same tools that worked in the past. Donors need to revise their strategy to account for epidemiological, economic, and demographic changes in their partner countries.

Now is a good time for the United States government and other donors to take stock of their investments in global health. The timeline on the Millennium Development Goals (MDGs), global targets that have driven international development work for the past 15 years, is running out, and there is ongoing discussion about a new development plan to replace them. With this in mind, the U.S. Agency for International

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BOX S-1
Statement of Task

An ad hoc committee under the auspices of the Institute of Medicine will prepare, over 6 months, a brief and focused report to Congress and other U.S. government authorities on the value of American investment in health systems in low- and middle-income countries. The report will summarize how health systems improvements can lead to better health, reduce poverty, and make donor investments in health sustainable. The committee should also describe an effective strategy for donor investment in health given the increasing self-sufficiency in USAID's partner countries. The study will not involve detailed technical comparisons of specific regional or country strategies, but rather will recommend broad priorities for health systems strengthening.

Development (USAID) Bureau on Global Health commissioned this short report. See Box S-1 for the Statement of Task.

This report sets the discussion of health systems in the context of several important, current themes in global health. Two topics of particular relevance for USAID are ending preventable maternal and child deaths and bringing about an AIDS-free generation. The agency is also part of a global discussion about universal health coverage, the provision of a basic package of essential health services to the entire population. There is an emerging consensus, backed by the World Bank and the World Health Organization (WHO), that universal coverage is the best way to improve population health in poor countries. Growing economies in many middle-income countries make it possible to fund this basic package of services from domestic sources. Such developments change the relationship between USAID and its partner countries, and have broad implications for the future of donor assistance for health.

This report discusses the past and future of global health. First, it gives context by laying out broad trends in global health. Next, it discusses the timeliness of American investment in health systems abroad and explains how functional health systems support health, encourage prosperity, and advance global security. Lastly, it lays out, in broad terms, an effective donor strategy for health, suggesting directions for both the manner and substance of foreign aid given.

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THE UNITED STATES' STRATEGIC IMPERATIVE TO INVEST IN HEALTH SYSTEMS

Development experts have long debated the relative merits of vertical health programming, targeted to a specific service or patient group, and horizontal programming, supporting more comprehensive care. Donors often favor vertical programs, which allow greater financial control and easier impact monitoring; such programs are also useful for acute emergency response. The U.S. government has invested heavily in vertical programs, most notably through the President's Emergency Plan for AIDS Relief (PEPFAR), its flagship initiative for HIV and AIDS. PEPFAR and programs like it have met with good success. Protecting these successes and continuing progress in the future depends on the judicious integration of vertical programs with local health systems.

Attention to Health Systems Cannot Wait

A strong health system is the best insurance developing countries can have against a disease burden that is shifting rapidly and in ways that history has not prepared us for. In many places, ancient problems such as hunger and infection exist in the same communities, even the same households, as the so-called diseases of affluence, things like diabetes and hypertension. At the same time, climate change is aggravating problems of seasonal disease, and globalization is driving new pandemic risks. In short, there is a tidal wave of health problems facing the developing world. Ministers of health confront increasingly complicated tradeoffs: between treating children and adults, between preventative and curative services, and among different ways to pay for health. There is still time to manage these tradeoffs and to make investments that support a range of health needs. Directing foreign assistance to health system improvements is an efficient way for donors to help their partner countries prepare for changing patterns of disease.

There are also practical constraints driving the need for more efficient donor support. The past 20 years have seen tremendous economic growth—nearly 1 billion people escaped extreme poverty. In 1990, almost 60 percent of the world lived in low-income countries, now only about 12 percent do. Emerging middle-income countries have become better at collecting taxes, making foreign assistance a proportionately smaller piece of countries' total health spending.

Using donor assistance to improve the lives of the billion people left in dire poverty poses a dilemma to donors. Three-quarters of the world's

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poorest people live in middle-income countries where foreign aid is not necessarily needed or welcome. Many of the rest are in fragile states, where political instability and poor infrastructure can prevent aid from reaching people. The challenge of reaching the poor is forcing governments to re-evaluate their aid strategies, identifying those investments with potential to transform the lives of the world's most marginalized people.

Functional Health Systems Abroad Encourage Health, Prosperity, and Security

There are bottlenecks in the organization of health services in many developing countries and these bottlenecks allow diseases to spread. Extending health services to rural areas and marginalized people could do much to improve population health, and the cost of doing so is affordable. A modest increase in health spending—less than $2.50 per person per year—could avert 37 percent of the global burden of diabetes and cardiovascular disease and 6 percent of global cancer.

Attention to the financing and infrastructure that support health services would also help grow the global economy. Every year 150 million people, mostly in low- and middle-income countries, fall into poverty because of health expenses; millions more stay poor because they are too sick to work. Health spending poses a financial hardship for about a third of households in sub-Saharan Africa and Southeast Asia. In response, patients may sell assets in distress, borrow at high interest, or forfeit future earning power through debt bondage. Donors can help avert these economically disastrous practices by helping their partner countries develop effective prepayment systems and sustainable revenue sources for health.

Reducing waste is another valuable consequence of investing in health systems. Governments in low- and middle-income countries often face pressure to allocate health monies unfairly, spending heavily, for example, on tertiary care centers that serve the relatively wealthy. Nongovernmental providers are an increasingly important source of care, especially for the poor. While competition from these providers could, in theory, drive broad improvements in service delivery, it is difficult to create market competition in health without extensive regulatory and enforcement capacity. As nongovernmental providers become more important, so does the government's oversight and management role.

The potential economic payoffs of investing in health systems are substantial. Recent analyses indicate that an increase of only $5 per person per year in the 74 countries that account for 95 percent of

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maternal and child deaths would yield nine times that in terms of lives saved, disability prevented, unplanned pregnancies averted, greater workforce participation, and increased savings and investments. A 2 percent increase in current health expenditures would be enough to underwrite this transformative investment. The effects of such spending go beyond health. Healthy workers are more productive; healthy children are better able to learn. In the long term, investment in health drives increased productivity and improves the lifetime earning power of workers and consumers in the developing world.

A strong health system also allows for effective response to pandemic disease, something only 20 percent of the world's nations are currently prepared for. The tools that enable emergency response—a well-trained workforce, an information system to support surveillance and data sharing, a solid infrastructure for clinical care and laboratory analysis, and strong management of the health sector—are essential pieces of the health system. The same investments that improve daily functioning also build capacity for emergency response. When health systems cannot respond to emergencies, there is a risk that a contained health problem will escalate into a protracted political crisis.

The governments of Guinea, Liberia, Nigeria, and Sierra Leone are currently confronting this risk as the Ebola virus, a disease of uncommon virulence and case fatality, spreads through their countries. Ebola response would tax any health system, but the West African nations affected have particular vulnerabilities. They must now cope with an increased burden on their limited surveillance, laboratory, and clinical infrastructure, while trying to contain what could be a devastating global epidemic. Ebola has drawn attention to the consequences of neglecting health systems development in low- and middle-income countries.

AN EFFECTIVE DONOR STRATEGY FOR HEALTH

The challenge of the future of aid programming is to sustain the successes of the past 25 years, while reducing dependence on foreign aid. The committee suggests changes to the U.S. government's foreign aid strategy that would build capacity in partner countries and make a clear statement about the United States' commitment to sustainable development.

Recommendation: Congress should respond to the social, economic, and epidemiological changes in developing countries

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by directing more health aid to health systems building. The committee sees three crucial components of this strategy.

a) **Future programing should emphasize technical cooperation and country ownership in health systems, making investments over a long time period, and giving more attention to measuring the outcomes of their contributions to health than the inputs.**
b) **The United States should make good use of its comparative advantage in science and technology by investing more in global health research and professional training for students in developing countries.**
c) **The United States should also invest in monitoring and management, and require rigorous, external impact evaluations for U.S. government global health projects that involve technical innovation or new models for service delivery.**

The committee concludes that health systems limitations are the binding constraint preventing further progress in global health. Building technical capacity in developing countries would help relieve this constraint and would show the U.S. government's commitment to a future when countries run their health programs independently.

A Transition in How to Give Development Aid for Health

Donors can foster country ownership of development programs by supporting their partner countries' national priorities and making donor funding for these priorities additive with local funding. Country ownership requires a complicated balancing of donor and recipient interests. But, when countries own their health and development programs and when their foreign partners set a standard of mutual transparency, citizens are better able to hold their governments accountable for the successes and failures of their health systems.

Improved government accountability is a long-term benefit of development, the sort often obscured by donors' short funding cycles. Fluctuations in development funding from year to year prevent sustainable programming. They force undue attention on the wrong measures of success, emphasizing what the donor contributes to health, not what that contribution produces. A longer time frame on foreign aid and a transition to measuring the outcomes of donor projects instead of the inputs would contribute to more effective, sustainable development.

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A Transition in What to Give as Development Aid for Health

Technical solutions and support for service provision have long been central to the U.S. government's foreign aid strategy. Over time, this kind of aid can cultivate dependence on foreign assistance. The development of knowledge and public goods, on the other hand, is a transformative investment and one that makes wise use of the United States' comparative advantage in science and technology. To this end, Congress could direct the attention of American scientists to questions that benefit the poor, especially in the emerging field of implementation research and in the development of medicines, vaccines, and diagnostics. Global health research also has a valuable capacity building component, developing cadres of researchers and managers in low- and middle-income countries.

Training should also be a central piece of the aid strategy, but it should be substantive, advanced training with some emphasis on administrative professions. The United States can help alleviate the health workforce crisis by supporting higher education in developing countries through scholarships and partnerships with American universities. Donors can also help identify innovative ways to make the best use of the trained staff available in countries.

Good project monitoring is a cornerstone of public management. Donors can invest in the capacity for civil registration in developing countries and should require more rigorous monitoring of their own projects. However, monitoring should not be conflated with project evaluation. An independent, formal impact evaluation is an indispensable piece of those health programs that involve technical innovations or new models for service delivery. Only by comparing donor activities to clear counterfactuals can all stakeholders be confident that their investment in health is eliciting meaningful change.

CONCLUSION

Foreign policy decisions are always shaped in part by the current social and political climate, but they are also partially predetermined by the trajectory of commitments already made. Attention to the management, financing, and infrastructure that support health is a priority by either calculation. Building health systems abroad is in the strategic interest of the United States and should be a priority for the U.S. Congress.

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1

Introduction

The health of women and children in poor countries has improved dramatically over the past 25 years. Child mortality has fallen by almost half since 1990 (You et al., 2013). Maternal deaths have declined by about the same amount (WHO, 2012c). Now there is good consensus that a package of life-saving services could vastly reduce child and maternal deaths in developing countries (Bhutta et al., 2005; Bryce et al., 2006; Jones et al., 2003; Stenberg et al., 2014; USAID Bureau for Global Health, 2013). Demographic models indicate that the widespread, equitable implementation of these simple interventions could eliminate preventable maternal and child deaths over the next 20 years (Jamison et al., 2013). For the first time in history, ending the world's preventable maternal and child deaths is a realistic goal.

Meeting this goal still presents challenges, however. Only 31 of 137 developing countries will meet Millennium Development Goal 4, dramatically reducing child mortality by 2015; far fewer will reduce maternal deaths to levels set in Millennium Development Goal 5[1] (Lozano et al., 2011). UN models indicate that the global child mortality rate will fall to the specified level around 2028 (UN, 2014). But, if current trends continue (see Figure 1-1), many countries will not meet the 2015 targets until 2040 or later (Lozano et al., 2011). This is not to say that countries must necessarily stay on their current trajectories—rapid change is possible. Improvements in health rarely take a linear path (Frøen and Temmerman, 2013; Walker et al., 2013). In maternal and

[1] The Millennium Development Goals are a set of global targets to improve health and standard of living in poor countries. They were developed at the UN Millennium Summit with the support of 189 countries (Oestergaard et al., 2013; Oxfam International, 2011). Millennium Development Goal 4 is to reduce child mortality by two-thirds of 1990 rates; Goal 5 includes a target for three-quarters reduction in maternal mortality ratio from 1990 levels (UNICEF, 2012).

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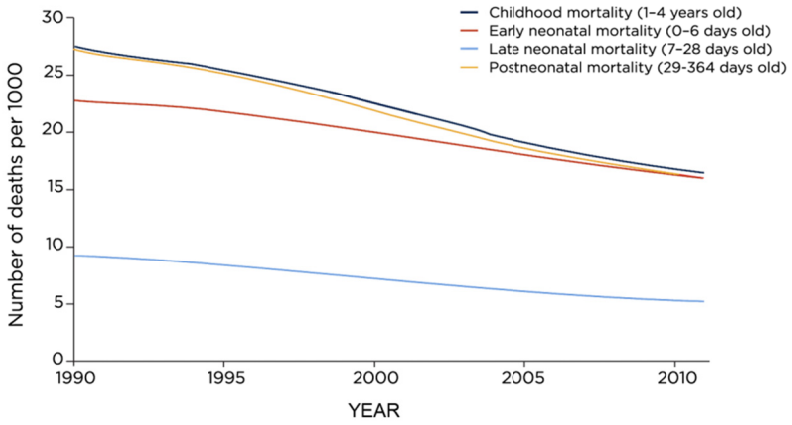

FIGURE 1-1 Worldwide early neonatal, late neonatal, post neonatal, and childhood mortality rates, 1990-2011.

SOURCE: Reprinted from *The Lancet*, Vol. 378, Lozano, et al., Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: An updated systematic analysis, pp. 1139-1165, Copyright 2011, with permission from Elsevier.

child health especially, progress for the poorest people in society will have disproportionate returns as the poor tend to have more children and a higher burden of disease (Victora et al., 2012). Continuing success in global health over the next 25 years will not, however, be possible using the methods of the 1990s and 2000s. In much of the world, the easy gains have already been made. The challenge for the future of global health is to deliver good services efficiently to an ever larger number of people.

Only a fraction of those who need lifesaving health services receive them (Victora et al., 2004). Even among those who get treatment, the effects can be variable. A study of maternal care in relatively large, functional, district health posts[2] in Africa, Asia, Latin America, and the Middle East found far higher maternal mortality than would be expected in what were mostly secondary and tertiary care hospitals. This failure was not due to neglect of the appropriate interventions, most of which were used nearly 90 percent of the time. Nor was it obscured by small numbers; the risk grew progressively worse—two to three times worse—

[2] Defined as those seeing at least 1,000 deliveries per year and having the capacity to perform a caesarean section.

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in parts of the world with the highest likelihood of death in childbirth (Souza et al., 2013). Rather, these deaths are the result of a dozen smaller failures: delays in treatment, lack of proper referrals, clinicians not trained in emergency case management, poor quality medicines, problems with blood banking, and stock outs of essential supplies. Making progress against maternal mortality requires addressing a constellation of related problems.

The same is true for deaths in children under five. Around the world, deaths in the first month of life, often on the first day, account for the greatest portion of child mortality (Liu et al., 2012). Newborn lives are protected with many of the same interventions in pregnancy and delivery that benefit their mothers. Other common killers of children, including pneumonia, diarrhea, and malaria, are greatly complicated by the potentiating effects of poor nutrition (Black et al., 2008; You et al., 2013). Although the relative burden of different infections varies by country, there is a resoundingly common problem with equity. Poor children are more likely to get sick; they are more exposed to disease vectors, contaminated water, poor housing, and crowding. Their poor nutrition and lowered immunity make ordinary infections more dangerous for them, but they are less likely to access any lifesaving measures, from routine immunizations to curative care (Gwatkin et al., 2004; Victora et al., 2003). Improving child survival means removing the barriers that keep the most vulnerable people from health (UNICEF, 2010).

Yet there is a risk to putting maternal and child health too much at the center of a global health agenda. Such emphasis, though helpful in building momentum for change and marshaling funding, can make pregnancy, delivery, and early childhood services a sort of vertical health program,[3] delivering good care selectively to a narrow group. The very importance of these services makes it necessary to deliver them as effectively as possible, integrating them with primary care. Women of childbearing age in poor countries have a range of health complaints, including noncommunicable conditions such as diabetes, hypertension, cancer, asthma, depression, and injury (Stenberg et al., 2014). Children, similarly, should not survive the routine infections of early childhood only to suffer at school age for want of basic surgery or trauma care. Indeed, recent analyses indicate that the world's overall burden of death from infections, malnutrition, maternal and neonatal causes, is decreasing; it fell by 9.2 percentage points between 1990 and 2010

[3] A health program targeted to a specific condition, often with specialized management, logistics, and delivery.

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(Lozano et al., 2012). At the same time, the share of deaths from cancer, injury, diabetes and heart disease has grown. Non-communicable causes now account for two-thirds of all deaths worldwide (Lozano et al., 2012).

EMERGING MOMENTUM FOR UNIVERSAL HEALTH COVERAGE

Balancing competing priorities in health is at center of an important discussion on how to plan for global development after 2015 (sometimes called the post-2015 development agenda). There is an emerging consensus, backed by the World Bank and the World Health Organization (WHO), that bringing health and economic stability to the most vulnerable people in the world can be best achieved though universal health coverage (Brearley et al., 2013; Latko et al., 2011). The goal of universal coverage is "to ensure that all people obtain the health services they need without suffering financial hardship when paying for them" (WHO, 2012b). As such, it is a means to an end, a way to bring the full benefits of a healthy life to everyone.

Universal health coverage aims to bring about a fairer distribution of essential health services. This is partly to correct a historical problem, whereby public spending in developing countries has favored the rich (Moreno-Serra and Smith, 2012). In countries that have implemented universal coverage, the removal of financial barriers to care and the investment in primary health services have been an effective remedy to this problem. In Thailand, for example, the benefits of universal coverage, especially the reduction in infant mortality, were more pronounced among the poor (Gruber et al., 2012; Vapattanawong et al., 2007).

That does not mean that the growing support for universal coverage is a promise to supply high-tech curative procedures to every patient. Universal coverage applies to priority conditions, conditions which are, ideally, identified from national epidemiological data (Bristol, 2014; WHO, 2012b). Furthermore, reaching universal coverage in a country can be long process—it took 127 years in Germany (Averill and Marriott, 2013). There is no reason, however, that developing countries should have to wait as long. Thailand has made rapid progress over the past 40 years, introducing a national coverage scheme in steps, starting with the people in formal employment and with basic coverage for the poor, and gradually expanding from there (Hanvoravongchai, 2013).

Women and children have the most to gain from universal coverage; they are the furthest behind (Quick et al., 2014). Because they are

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poorest, they are also the most deterred by costs. But they are not the only ones who stand to benefit. Building a cohesive health system in low- and middle-income countries, which universal coverage aims to do, is a necessary pre-requisite for all of the Millennium Development Goals in health (Travis et al., 2004). In a larger sense, building a reliable health infrastructure in developing countries has consequences that go beyond health, to advancing global prosperity and security. When implemented effectively, universal coverage can be an instrument for poverty reduction and government accountability as well as health. Such are the concerns of the U.S. Agency for International Development (USAID), the agency in the U.S. federal government, "that works to end extreme global poverty and enable resilient, democratic societies to realize their potential" (USAID, 2014).

THE CHARGE TO THE COMMITTEE

USAID's Bureau for Global Health commissioned this report to study the value of health system strengthening in low- and middle-income countries. This discussion is particularly important now, as the timeline on the Millennium Development Goals runs out and new goals for global development replace them. The U.S. government can use this time to take stock of its investment in global health, reviewing its changing role as a partner in development. To this end, USAID commissioned the Institute of Medicine (IOM) to bring together an expert committee to produce a short and focused report on investing in health systems in developing countries. Box 1-1 gives background on the study and statement of task.

This report aims to help government decision makers assess the rapidly changing social and economic situation in developing countries and its implications for effective development assistance. Many countries that have traditionally been recipients of donor assistance for health are now able to finance basic health services from domestic monies (Jamison et al., 2013). Even among countries that depend more on donor aid, the burden of disease and health needs is changing; donor strategy has to change with it. In light of these developments, this report will discuss why an investment in health systems is crucial to sustain the gains of the past 25 years. First, it will describe why it is in the United States' pressing national interest to improve health systems in developing countries and why that needs to be done now. Next, it will lay out what actions will best serve this goal and how to go about them.

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BOX 1-1
Statement of Task and Committee Process

This report was commissioned by the USAID Office in Health Systems, a division of the Bureau for Global Health, after consultation with the IOM Standing Committee to Support USAID's Engagement in Health Systems Strengthening in Response to the Economic Transition of Health. At their meeting in February 2014 the Standing Committee helped to develop the statement of task shown below. While doing this, the Standing Committee was sensitive to the fact that this report would be a narrowly focused project, and that its authoring committee would meet only once.

The Institute of Medicine convened an 11-person ad hoc consensus committee in March 2014 to examine the questions set out in the statement of task. These ad hoc committee members included some members of the Standing Committee and other experts with needed expertise. (See Appendix A for committee member biographies.) The committee met in April 2014 to hear testimony and deliberate. (See Appendix B for the meeting agenda.) The committee developed an approach to their task, considered the evidence and testimony, and came to tentative conclusions at this meeting. At this time, they determined that questions relating to corruption in donor aid, and the role of donor and recipient governments in controlling corruption, were outside the scope of this report.

Over the next months, the committee revised drafts, refined conclusions, and solidified references, resulting in the present report.

Statement of Task

An ad hoc committee under the auspices of the Institute of Medicine will prepare, over 6 months, a brief and focused report to Congress and other U.S. government authorities on the value of American investment in health systems in low- and middle-income countries. The report will summarize how health systems improvements can lead to better health, reduce poverty, and make donor investments in health sustainable. The committee should also describe an effective strategy for donor investment in health given the increasing self-sufficiency in USAID's partner countries. The study will not involve detailed technical comparisons of specific regional or country strategies, but rather will recommend broad priorities for health systems strengthening.

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Key Finding

- The health of women and children in poor countries has greatly improved over the past 25 years, but continued progress will not be possible without a better system to bring health services to the periphery of society.

Conclusions

- Improving maternal and child survival is an important goal, but there is a risk to making it the centerpiece of the global health agenda. The global disease burden is changing. Countries need a way to respond to these changes, and creating a targeted health program for maternal and child health is not a viable long-term solution.
- Bringing good services to a large number people is the next main challenge in global health.
- Developing a strong health infrastructure in low- and middle-income countries will improve health, and will have consequences that go beyond health to building a more stable and prosperous world.

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2

The United States' Strategic Imperative to Invest in Health Systems

The WHO has described the health system as, "the sum total of all the organizations, institutions, and resources whose primary purpose is to improve health" (WHO, 2005). As such, the health system includes much more than the health care delivery system, though this distinction can get lost in policy discussions. The WHO has identified six building blocks of a health system:

- *the leadership*, who steer the health sector and set the country's policies;
- *the information system* that supports vital registration, surveillance, and monitoring, financing, human resources, coverage, and quality of care;
- an accountable *financing system* to raise and pool funds;
- a productive *workforce* and tools to ensure they are deployed efficiently;
- an affordable supply of *essential medicines, vaccines, and technology* and a functional regulatory authority to protect their quality;
- and, lastly, a *service delivery system* that can work through public or private sector providers (WHO, 2007a, 2010a).

The health system is a social institution. It produces a set of essential public health functions, things like disease surveillance, medicines regulation, research, and policies (Khaleghian and Gupta, 2005). Curative and preventative health care are a part, but only a part, of the health system's essential services (CDC Office for State Tribal Local and

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Territorial Support, 2014). The health system is the foundation supporting effective health services.

A TRADITION OF SUPPORTING GLOBAL HEALTH

Health assistance is usually described as either vertical (or categorical, targeted programs) with systems dedicated to specific service or condition, or horizontal (or integrated programs), which support more comprehensive care. Vertical programs generally have separate management and logistics systems: this can include a separate workforce, surveillance system, and method of assuring drug quality (Victora et al., 2004). Horizontal programs, on the other hand, tend to work more generally through primary care systems (Sepúlveda et al., 2006; Victora et al., 2004). In practice, the distinction between vertical and horizontal health programs is not always clear; most services have a range of vertical and horizontal elements (Atun et al., 2008; Oliveira-Cruz et al., 2003). For example, immunizations delivered though primary care may be paid for with vertical, donor financing. Conversely, immunizations may be paid for from the general health budget, but provided at free-standing vaccine clinics or on vaccine campaign days (Atun et al., 2008).

Over time, donor interest in relatively more vertical or horizontal health aid has fluctuated. In 1988, Carl Taylor and Richard Jolly decried an emerging battle in development assistance between proponents of selective and comprehensive primary care (Taylor and Jolly, 1988). They concluded that functional health systems have both selective, or vertical, elements, and comprehensive, or horizontal, ones (Taylor and Jolly, 1988). Nevertheless, they cited "abundant experience" of vertical programs that have, "been started at the insistence of international donors so that they can monitor the flow of their dollars and take credit for their impact … leav[ing] countries with entrenched bureaucracies that resist eventual integration into [primary health care]" (Taylor and Jolly, 1988, p. 975). They acknowledged the value of technological innovations, but cautioned that these technologies would "not make much difference" without attention to organization, management, financing, and the training health personnel (Taylor and Jolly, 1988, p. 973). They also identified an "urgent question" for future debate: how to develop a sustainable infrastructure for primary care in developing countries (Taylor and Jolly, 1988, p. 975).

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Their concerns are as relevant today as they were 26 years ago. Vertical health programs have continued to enjoy some popularity among donors. Such arrangements work well when there is urgent need to respond to an epidemic or when international cooperative action is necessary for success (Peters et al., 2013b; Victora et al., 2004). Smallpox was eradicated in 1980 through an international, vertical health program (Atun et al., 2008; WHO, 2010d). More recently, the President's Emergency Plan for AIDS Relief (PEPFAR) has brought life-saving treatment to 6.7 million people in 65 countries (PEPFAR and Department of State HIU, 2014). At times, however, the free-standing structure of the vertical program can impede success. Malaria eradication efforts, for example, may have failed because case surveillance was not integrated into primary care (Atun et al., 2008; Bradley, 1998). There are also concerns with negative spillover effects of vertical programs: they create a hierarchy of diseases, encourage fragmentation, are often inefficient (Atun et al., 2008). Most of all, as Taylor and Jolly pointed out, vertical initiatives depend on dedicated funding and specialized management (Taylor and Jolly, 1988). They are designed for donor funding needs, and are not typically sustainable when outside funding ends.

Experts have debated the merits of vertical and horizontal health strategies for decades, but there is remarkably little scientific analysis on their relative effectiveness (Atun et al., 2008). It is clear, however, that vertical programs attract funding in places with weak health infrastructure and poor public management (Victora et al., 2004). When these programs are then run in a way that undermines the local health system, the initial management and infrastructure problems are not likely to improve. To put it another way, failure to plan for the careful integration of vertical programs with general health services aggravates the very staffing and organizational constraints that made foreign assistance necessary in the first place.

The future of global health will require building off established platforms, integrating HIV, tuberculosis, malaria, and maternal and child health programs with primary care systems, using targeted investments to improve the broader health infrastructure countries' depend on (Atun et al., 2013; Samb et al., 2009). In an era when donors aim to speed progress to health goals, duplicating pieces of the health system for vertical programs will not be a sustainable or sensible strategy.

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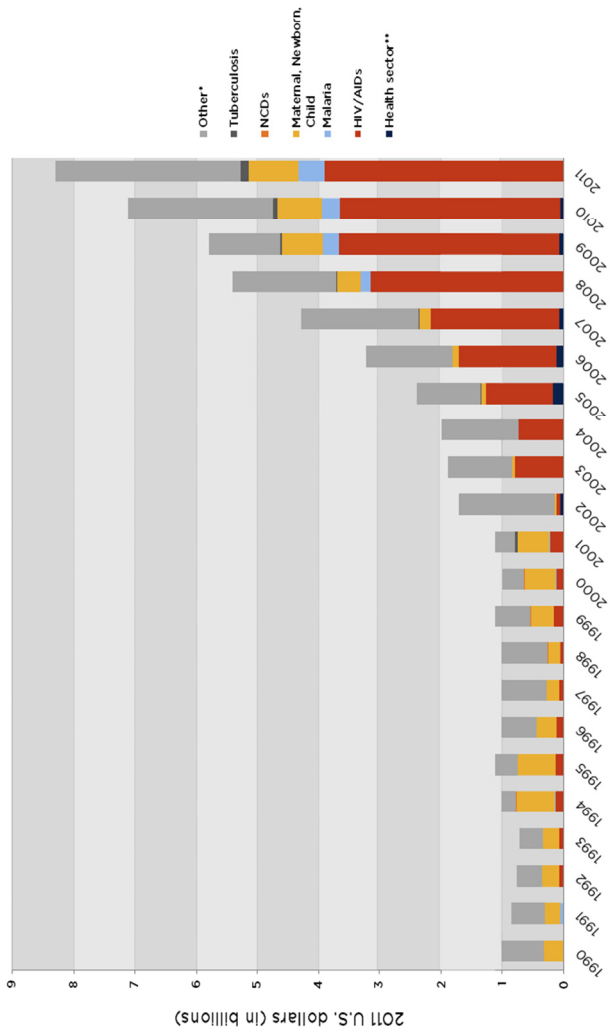

FIGURE 2-1 U.S. Bilateral Assistance for Health by Focus Area, 1990-2011.
* Other includes all development assistance for health that does not fall within any of the six categories tracked by the Institute for Health Metrics and Evaluation. Programs included in this category include road traffic safety and neglected tropical diseases.
** Health sector assistance is that given directly to developing country governments to spend on health system strengthening.
SOURCE: IHME, 2014.

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A concern with sustainability, the ability of a project to function effectively after outside support comes to an end, takes particular precedence now, as aid recipient countries are increasingly able to fund health services independently (WHO African Programme for Onchocerciasis Control, 2014). Sustainability and judicious integration of vertical programs with health systems are especially salient topics for the U.S. government, whose investment in health has grown over the past 25 years. Much of this spending is directed to targeted programs for maternal and child health, malaria, tuberculosis, and, most of all, HIV and AIDS. (See Figure 2-1.) PEPFAR, the U.S. government's flagship program in global health, has driven much of this increase and accounts for about half of its bilateral health aid (IHME, 2014). PEPFAR has helped stem the tide of the HIV epidemic and averted a humanitarian and political catastrophe. The success of this program alone compels a thoughtful appraisal of the United States' continued work in global health. In 2013, Secretary of State John Kerry lauded the birth of the millionth child protected from the vertical transmission of HIV because of PEPFAR (PEPFAR, 2013a). This child's future, already inextricably linked to the United States, will depend on a functional health system to support a healthy life. Through prompt and judicious development action, the United States can help provide this.

This chapter will discuss the value of transformative investment in health systems, emphasizing why such action is necessary now, and why it is in the best interest of the United States. The first section discusses the timeliness of health systems building. Years of successful action against communicable disease, especially against HIV and AIDS, drive an urgency to the need for stronger health systems. Global epidemiological and economic changes are at work to the same end. Economies are growing around the world and people are living longer. Donors need to respond to this success with a revision in their aid strategy. There is a unique opportunity to take stock of foreign aid now, as countries set development goals for 2015 and later. Next, the chapter will discuss the relationship between strong health systems and good health, prosperity, and security around the world.

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Key Finding

- Health assistance is usually described as either vertical or horizontal. Vertical programs are targeted to a specific disease or service; horizontal ones support more comprehensive care. Donors tend to value vertical health programs because of their immediate, but less sustainable, effects.

Conclusion

- When donors run vertical programs in a way that undermines the partner country's health system, or when they fail to integrate vertical programs with general health services, they only aggravate their partner countries' staffing and organizational problems.

ATTENTION TO HEALTH SYSTEMS CANNOT WAIT

There is pressing need for deliberate and prompt investment in health systems in low- and middle-income countries. The urgency of this need stems in part from the natural progression of decades of vertical health programming to strengthen curative and preventative services; larger demographic and political trends drive the rest. Deliberate and thoughtful action now can help ensure the success and sustainability of the U.S. government's targeted health investments.

Sustaining the Investment in HIV and AIDS

The U.S. taxpayer supported $7.4 billion dollars in bilateral aid for health in fiscal year 2014. Adding contributions made through multilateral and charitable organizations raises the total by about a quarter (IHME, 2014). The vast majority of this spending (75 percent for much of the 2000s) was dedicated to HIV and AIDS programs (Emanuel, 2012). The returns on this investment have been substantial. The first cycle of PEPFAR averted roughly 1.2 million deaths and contributed to the 19 percent reduction in HIV transmission (UNAIDS, 2010; Walensky and Kuritzkes, 2010). These early successes have allowed for a new target: eliminating new HIV cases in children by 2015, with a longer goal of eventually halting all transmission of the virus, ushering in an AIDS-free generation (Office of the Global AIDS Coordinator, 2012).

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In the early days of PEPFAR, the program's staggering logistics posed the biggest obstacle. The past decade has shown that it is possible to bring good quality antiretroviral drugs and the necessary supportive care to patients in remote places. The program is no longer in its emergency response phase. The next stage is in many ways more complicated—it depends on building technical depth in recipient countries (Bendavid and Miller, 2010; IOM, 2013). It will not be possible to halt HIV transmission or see an AIDS-free generation without systemic changes to the organization of health services. The 2013 PEPFAR strategy document acknowledges this, calling for increased ownership from partner country governments (Office of the Global AIDS Coordinator, 2012). This report emphasizes the importance of sharing the responsibility for AIDS programs and supporting countries to develop comprehensive health financing plans and systems for financial accountability (Office of the Global AIDS Coordinator, 2012).

PEPFAR began as a program with a relatively narrow, if ambitious, mandate to bring antiretroviral therapies to the world's poorest AIDS patients and prevent the spread of HIV in their communities. This was extremely successful, and its success will have consequences for the U.S. and developing country governments (IOM, 2013). The patients who, through American generosity, avoided an early AIDS death are now facing lifetimes managing HIV as a chronic disease. They will have to deal with the long-term comorbidities of HIV while facing the routine morbidities of aging, all of which depends on decent primary care and the underpinnings of a reliable health infrastructure. The purpose of prolonging lives threatened by HIV was not to lose them 10 years later to diabetes, also a gruesome and expensive disease. While the U.S. government cannot and should not fund treatment for every health problem as PEPFAR has done for HIV and AIDS, a responsibility to these patients will influence its future involvement in global health.

Foreign policy is shaped in part by the current social and political climate, and is partly predetermined by the trajectory of commitments already made. Attention to the management, financing, and infrastructure that support health services in poor countries is a priority by either calculation. A functional health system is the most important prerequisite to maintain ground against the HIV epidemic in Africa. A stronger health system in poor countries is also the best insurance against a complicated and changing future burden of disease. Finally, a stronger health system reduces the future dependence of low- and middle-income countries on foreign aid.

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Epidemiological Transitions

The burden of disease in developing countries is not just changing; it is changing in a way that history has not prepared us for. What demographers call the epidemiological transition, a shift in population-level causes of illness and death from infectious to chronic disease, took more than 100 years in western Europe (Omran, 2005). This process happens both more quickly and less directly in countries that started later (Kengne and Mayosi, 2014; Santosa et al., 2014). In the Micronesian island of Nauru, for example, diabetes, road traffic accidents, and circulatory disorders became prominent so suddenly and (especially with road traffic injuries) among the young, as to obscure any noticeable improvement in lifespan from reducing infectious disease (Santosa et al., 2014; Schooneveldt et al., 1988).

More often poor countries cope with the dual burden of infectious and chronic diseases in different sub-populations. Maternal and child mortality are much higher in South and Southeast Asia and sub-Saharan Africa than in the rest of the world, largely because the poorest people have remained outside the reach of the health system (WHO, 2014d; WHO et al., 2014). These same places have growing epidemics of cardiovascular disease, diabetes, and the co-morbidities of obesity. Now the differences in burden of disease are as pronounced within countries as among them. Different social classes have widely different lifestyles, diets, and access to health services, leading to an epidemiological polarization, the co-existence of both modern and ancient patterns of disease among different groups in the same country (Frenk et al., 1989).

Meanwhile, urbanization, which increases growth and access to health services, has contributed to a protracted epidemiological shift where problems of hunger and infection linger in the same community, even the same household as the so-called diseases of affluence (things like stroke, hypertension, chronic heart and kidney disease, and diabetes). Rural to urban migration has abruptly changed meal patterns and diet. Emigrants to cities no longer raise their own food, nor do they necessarily have common mealtimes. Cities offer women opportunities in the paid workforce, precluding extended breast feeding and leaving less time to cook. Packaged foods and vegetable fats are the cheapest and easiest way to eat. Such a diet will drive adults to obesity and its manifold co-morbidities, but provide little protein or appropriate weaning nutrition to children, who then fail to grow (Agyei-Mensah and de-Graft Aikins, 2010; Caballero, 2005). Starvation in utero and early

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childhood triggers a process of metabolic compensation that puts the underweight child, ironically, at increased risk of obesity in adulthood (Barker, 2012; Caballero, 2005). For all these reasons, the WHO reckons that adults under 70 in poor countries are more likely to die from a noncommunicable disease than their counterparts in rich ones (WHO, 2014c).

The health effects of globalization and climate change only complicate the picture. Poor countries struggle with industrial pollution, putting people at higher risk of chronic diseases like asthma (Shiru, 2011). The effects of climate change, felt harder close to the equator, will introduce vector-borne disease such as malaria and dengue to higher altitudes (McMichael, 2000; Miranda et al., 2011). More intense rainstorms could lead to a longer breeding season for mosquitoes (McMichael, 2000). At the same time, the worldwide threat of infectious epidemics has not receded as much as the classic epidemiological transition would have predicted. Anti-microbial resistance and globalization have contributed to the emergence of new pandemic viruses, such as H5N1 avian influenza (Santosa et al., 2014).

A tidal wave of health problems is pressing down on the developing world. Preparedness for these changes is understandably poor. A recent study in Tanzania found that, with the exception of HIV services, care for chronic diseases, such as hypertension, diabetes, and epilepsy, was woefully inadequate (Peck et al., 2014). Staff at the health posts and dispensaries closest to patients were not informed on how to manage these conditions; less than half of the nurses surveyed had even a fair knowledge of diabetes care, though 79 percent were competent to manage HIV (Peck et al., 2014). Even if the workers were better trained, diagnostic equipment and medicines were scarce. Thirty percent of the primary health posts visited did not even have a functional scale (Peck et al., 2014).

It is difficult to say what portion of the problem in the Tanzania study is specific to the challenge of noncommunicable disease care and how much is a reflection of a broader problem in the health system (Kengne and Mayosi, 2014). Either way, it is a reminder that shifting patterns of illness in poor countries are overwhelming the health infrastructure. Ministers of health in poor countries face increasingly complicated trade-offs: between preventative and curative services, between treating children and adults, and among different ways to pay for health. There is still time to manage these trade-offs, but decisions need to be made before the full force of the chronic disease epidemic hits

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the poorest countries. There are investments in health technology and the drug supply chain, for example, that can improve treatment for a range of conditions. In the opinion of this committee, directing foreign assistance at these kinds of systemic improvements is an efficient way for donors to help aid recipients prepare for the inevitably changing patterns of health and illness.

Economic and Demographic Changes

The past 25 years have seen tremendous global growth; almost a billion people have escaped extreme poverty[1] (Poverty: Not always with us, 2013). Their national economies have improved at the same time. In 1990, 57.8 percent of the world lived in what the World Bank classifies as a low-income country; by 2011, only 11.7 percent did (see Figure 2-2) (Jamison et al., 2013). Increasing national incomes mean a broader tax base, and governments have made commensurate improvements in their ability to collect revenue. Tax revenue as a percentage of gross domestic product (GDP) increased by four percentage points between 1990 and 2011 in low- and lower-middle-income countries, and by 6 percentage points in upper-middle income countries (Jamison et al., 2013). A broadening tax base will mean decreasing prominence of donor assistance for development. At the same, donor assistance has declined. The 2008-2009 financial crisis reduced the amount of aid money available; by 2011, growth in bilateral development assistance for health had slowed to its lowest annualized rate since 2001 (Leach-Kemon et al., 2012).

The growth of middle-income countries is something to celebrate, but important disparities often hide beneath the aggregate improvements. Most of the billion people left in dire poverty, by some estimates 75 percent of them, live in middle-income countries (Sumner, 2010; UN System Task Team, 2012). Using development assistance to change their lives is complicated. Foreign aid is becoming less welcome in emerging economies, most notably in India and China, two countries that together account for slightly less than half of the world's poorest people (Mohanty, 2012; Olinto and Uematsu, 2013). The challenge for the future of development is to use our remaining influence and a proportionately decreasing share of national budgets, to benefit the most

[1] Defined by the World Bank as <$1.25 a day, adjusted for 2005 purchasing power parity (Ravallion et al., 2008).

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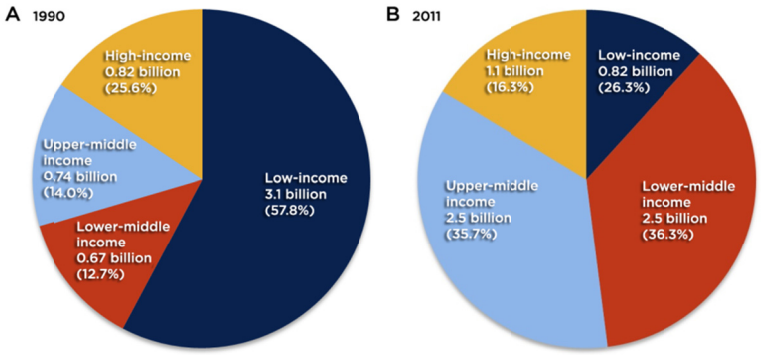

FIGURE 2-2 Movement of populations from low income to higher income between 1990 and 2011. Data refer to classifications based on (A) 1990 and (B) 2011 gross national income per head that were the basis for the World Bank's lending classifications for its financial year 1992 and financial year 2013, respectively. The World Bank did not classify all countries into income groups. Countries that were unclassified in either 1990 or 2011 were removed from the calculations.

SOURCE: Reprinted from *The Lancet*, 382, Jamison, et al., Global health 2035: A world converging within a generation, pp. 1898-1955, Copyright 2013, with permission from Elsevier.

vulnerable. As WHO Director-General Margaret Chan observed, "the health needs of the poor can be met by national budgets, this does not necessarily mean that they will be" (Chan, 2013, p. e35).

Meeting these needs will only get more difficult in the future. Today, as many as a third of the world's poorest people live in fragile states, places like Somalia and the Democratic Republic of the Congo (Chandy et al., 2013). In 4 years' time that share could rise to half and by 2030, to two-thirds (Chandy et al., 2013). This changing demographic drives what the *Economist* describes as the donor's dilemma: "middle-income countries do not really need aid, while fragile states cannot use it properly" (Poverty: Not always with us, 2013). The overstatement of this position is debatable, but it is clear that fragile states have, almost by definition, little service infrastructure and intense political volatility (Ralston, 2014). When donor aid to these countries fluctuates widely from year to year, it can aggravate instability (Chandy, 2011). Health aid for fragile states often comes as humanitarian relief without links to longer-term health systems development (Farmer, 2013; Hill, 2014).

In any case, the donor's dilemma will force the United States, like all governments and organizations working in development, to re-evaluate

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its aid strategy. The solution lies in identifying investments that transform lives for the people suffering the brunt of ill health and early death. To start, this means investing in health not just health services. In a letter to *The Lancet*, 16 ministers of health and foreign affairs and heads of global public health organizations explained that the future of global health lies in, "governance, management, and leadership to address inequalities, reach the most vulnerable and marginalized people, and create an enabling policy and legal environment" (Engström et al., 2013, p. 1862).

There is a window of time now when such transformative investment is not only possible but affordable. Stenberg and colleagues (2014) recently modeled the costs to support health systems, maternal and newborn health, pediatrics, immunization, family planning, HIV and AIDS, and malaria against their returns as measured by social and economic benefit to society. They found that a 2 percent increase in current spending for health could, over 30 years, yield nine times that value, not just in terms of an estimated 184 million lives saved, but in workforce participation, smaller family size and lower dependency rates, and increased savings, investment, and workforce productivity. Their models called for a substantial initial investment to health systems and the training of another 675,000 doctors, nurses, and midwives by 2035. The returns will come more slowly; many projected benefits cannot be realized until 2050 or later, as they affect the growth and development of infants and children who will not enter the workforce for decades (Stenberg et al., 2014). Regardless, aid for health still offers one of the best returns on investment available (Gates and Gates, 2014). As with most investments, rewards come from early action and a long time horizon.

The Post-2015 Development Agenda

Improving systemic effectiveness in poor countries, increasing social protection, and setting up resilient local management are important themes in post-2015 development discussion (OECD, 2013a; UN Open Working Group on Sustainable Development Goals; UN Secretary-General's High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, 2013; UN System Task Team, 2013). These are not necessarily new ideas. The 1993 World Development Report *Investing in Health* also emphasized efficiency, encouraging attention to the interventions that give the best value for their cost (World Bank,

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1993). The report recommended that a publicly financed basic package of essential services be available in all countries, and that increased donor aid should be used to meet this goal. Twenty years later, there is new enthusiasm for the same idea, now framed as the movement towards universal health coverage.

Donors would do well to invest in the infrastructure that will support universal health coverage in developing countries. Their investment would yield considerable returns to the world economy, and will have a substantial diplomatic value beyond that. As donors' proportional contribution to health spending in developing countries decreases, it will be more important to use donor influence judiciously. For the U.S. government this will mean making investments that reflect American values, including compassion for the most vulnerable.

Health diplomacy, a term used to describe diplomatic efforts to advance international cooperation on health, has the potential to generate goodwill, as it has done in the 65 PEPFAR recipient countries (Bendavid and Miller, 2010; U.S. Department of State). By the same token, there would be a serious reputational risk to the United States if any of the health gains we helped underwrite with PEPFAR were to be lost now. Such a loss is possible as long as deficiencies in national health systems prevent countries from managing the program effectively. In the opinion of this committee, a modest increase in spending and a few, judicious changes to the U.S. government's aid strategy would help keep as friends a growing and dynamic group of low- and middle-income countries. This action could have substantial payoffs in developing a more stable and prosperous world.

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Key Findings

- Countries with high child and maternal mortality also have growing epidemics of cardiovascular disease, diabetes, and obesity. The shifting patterns of illness are overwhelming the health systems in poor countries.
- Global economic growth has created a broader tax base in developing countries, making donor assistance a proportionately smaller piece of national funding for health.
- Using development aid to help the billion people left in dire poverty is complicated. Many of them live in increasingly self-sufficient middle-income countries or in fragile states, where political volatility makes them hard to reach.

Conclusions

- The success of the PEPFAR program alone compels thoughtful appraisal of the U.S. government's continued work in global health. It will not be possible to maintain the ground against the HIV and AIDS epidemic without attention to the management, financing, and infrastructure that support health services.
- There would be a serious reputational risk to the United States if any of the health gains of PEPFAR were to be lost now. Such a loss is possible as long as deficiencies in national health systems prevent countries from taking effecting ownership of HIV and AIDS care.
- Helping the poor requires transformative investments in health, not just health services. The United States should support the infrastructure underlying universal health coverage in developing countries.

FUNCTIONAL HEALTH SYSTEMS ABROAD ENCOURAGE HEALTH, PROSPERITY, AND SECURITY

Foreign aid has humanitarian, political, and development purposes; aid directly for global health serves all three (Bread for the World, 2010). The United States supports health in poor countries because it is a moral obligation and because health has an intrinsic value (IOM, 2009). Improving health abroad is also a wise investment to spur short- and long-term growth. There is an immediate dividend from deaths and illness averted, and delayed gains when healthy children grow up and contribute to their societies. Their health is of direct benefit to their home countries and of larger benefit to building a more stable, peaceful world.

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The epidemiological and demographic changes described in the previous section drive a need for donors to support health in developing countries, investing in the entire infrastructure, not just pieces of service delivery. Congress needs to consider support for health systems as an investment in health, prosperity, and global security.

Improving Health

U.S. action in global health has long addressed interventions, the pieces of clinical care that most immediately prevent death. Low- and middle-income countries may be approaching a point of diminishing marginal returns on such investments. Effective clinical medicine depends on a service infrastructure. While there is no one blueprint for how this infrastructure should look, there are certain common organizational features of good health systems (Mills, 2014). In an analysis of five parts of the world (Bangladesh; Ethiopia; Kyrgyzstan; Tamil Nadu, India; and Thailand) that have made better progress in health than their economically and geographically similar neighbors, Balabanova and colleagues (2013) identified political commitment, effective management and regulation, and the ability to adapt to limited resources as common precursors for success. Boxes 2-1, 2-2, and 2-3 give examples of innovative systemic changes that have improved health indicators or service delivery in poor countries.

Dysfunctional Health Systems Spread Disease, Good Health Systems Prevent It

Organization is often the biggest challenge in delivering health. The failure to control and treat tuberculosis in much of the former Eastern Bloc, for example, is primarily an organizational failure. The Soviet health system had four vertical programs for tuberculosis control: the penitentiary system, X-ray screening services, hospital care, and primary care. All four programs had separate management and funding streams; there was no sharing of staff or funding among programs (Atun and Coker, 2008). Treatment protocols called for lengthy hospital stays, not only wasting money and roughly 80,000 allocated hospital beds in Russia alone, but encouraging hospital-acquired tuberculosis (Atun and Coker, 2008; Atun et al., 2005a). The Soviet system persisted even after donors implemented DOTS,[2] the WHO standardized treatment.

[2] Directly Observed Treatment, Short-course.

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BOX 2-1
Hospital Reform in Kyrgyzstan

Kyrgyzstan inherited a Soviet health system that relied on hospitals for most treatment. Much public health spending went to fixed hospital costs and, despite having 429 doctors per 100,000 people in 1990, the primary care system was neglected and community health workers poorly trained. The system depended on revenues from Moscow, and was not viable after independence. Beginning in 1996, Ministry of Health reforms dramatically restructured health delivery to strengthen the Kyrgyz system.

Closing hospitals was central to these reforms. Under the Soviet system, a hospital's funding was based on its number of beds, a system that gave no incentives for preventative services. The reforms shifted to payment for performance, and rewarded faster patient turnover. Fewer hospitals could then serve the same number of patients, so 42 percent of hospitals closed between 2000 and 2003. The money saved from keeping half-empty hospitals open was used on drugs, food, and supplies, as well as improvements to primary care.

The reforms shifted health care to an outpatient system, requiring commensurate shifts in the workforce. The WHO and USAID supported the government to emphasize family practice in the medical education, both in medical school curricula and with continuing medical education. Community health posts, remnants from the Soviet era, were revamped and their staff retrained. These posts helped meet the increased demand for primary care, particularly in rural areas, where hospitals had closed.

The reforms allowed for nearly universal coverage in essential primary services, and drove improvements in health outcomes. Between 1997 and 2006, infant mortality fell by nearly 50 percent and under-five mortality fell by over a third. Adult mortality rates also improved. Life expectancy in Kyrgyzstan has risen since the mid-1990s and is higher than in the wealthier Kazakhstan and half a year higher than in Russia, where per capita gross national income is 13 times greater.

SOURCES: Balabanova et al., 2013; Ibraimova et al., 2011; Kutzin et al., 2009; WHO Regional Office for Europe, 2013.

Research in Russia indicates that clinicians and patients resisted DOTS, seeing it as a foreign imposition (Atun et al., 2005a). The program took off poorly. The Russian payment structure directly contradicted the DOTS protocol, rewarding surgery and inpatient treatment regardless of whether the patient recovered (Atun et al., 2005b). By 2003, DOTS coverage in Russia was roughly 35 percentage points lower than in other countries with a similar disease burden (Atun

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et al., 2005a). As of 2012, Russia had a tuberculosis incidence of 91 per 100,000, a figure that has declined relatively little since the 2000s, and parts of the country now report the world's highest rates of multi-drug resistant tuberculosis (WHO, 2010c, 2012a).

Tuberculosis control in Russia has not floundered because of a problem with DOTS, an elegant strategy that has helped control the disease in much of the world. The problem stems from bottlenecks in the national health system and a failure to integrate four competing vertical programs and a primary care system (Atun et al., 2010). It is also a cautionary example of how narrow, disease-specific health programs can

BOX 2-2
Grassroots Management and Health Worker Expansion in Ethiopia

Despite being one of the poorest countries in the world, Ethiopia is working towards a goal of universal primary care by 2017. The national strategy relies heavily on district health offices to plan and manage the delivery and financing of primary care. District officials are encouraged to choose suitable, local priorities and manage their budget to meet them.

The district system relies on reliable data and organization. Every district health office keeps family health folders containing demographic information and patient histories organized by household. Health extension workers manage the folders and feed the household data into a national health information system. These data inform district and federal health plans, making both more responsive to local realities, and allow for modern disease surveillance and monitoring.

District officials also manage the national Health Extension Programme, which trains local women to provide basic primary care. Though Ethiopia has only 2-3 doctors, nurses, and midwives for every 10,000 people, health extension training brought an additional 30,000 health workers to rural districts in 5 years. District health offices tailor the health worker trainings to suit local needs and, because the trainees are chosen from the communities they work in, they are well received by their clients.

District health planning and delivery has helped increase access to health posts from 38 percent in 1991 to 89 percent in 2011. Health outcomes are also improving. Between 1997 and 2011, under-5 mortality fell from 166 to 88 deaths per 1000 live births. During the same period, infant mortality fell 42 percent, and is now comparable to wealthier countries in the region.

SOURCES: Ageze, 2012; Banteyerga et al., 2011; Central Statistical Agency [Ethiopia] and ICF International, 2012.

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progress to a point of structural sclerosis. The Soviet health system developed in the 1920s and 1930s was appropriate to the disease burden and technology of the time. By the 1980s, it was already in decline (Atun and Coker, 2008; Fleck, 2013). Other countries in transition could soon face similar obstacles.

At the same time, changing the health systems and improving disease response can be mutually reinforcing. Before polio vaccination campaigns began in 1985, children in Mexico were only vaccinated at their mother's request, and vaccine coverage was low, probably below 40 percent (Sepúlveda et al., 2006). The polio immunization program greatly increased coverage, but a 1990 survey found that only 42 percent of children were fully immunized on schedule (Sepúlveda et al., 2006). Poor infrastructure for patient tracking was preventing proper quality control (Knaul et al., 2012; Sepúlveda et al., 2006). The introduction of computerized immunization records in 1990 brought the percentage of children immunized on schedule up to 92 percent in only 3 years (Sepúlveda et al., 2006). The health effects were immediate: polio and diphtheria disappeared from Mexico within a year, autochthonous measles, within 6 years (Sepúlveda et al., 2006).

Similarly, donor funding for HIV helped strengthen parts of the health system in Ghana (Atun et al., 2011). Global Fund[3] activities have improved the drug procurement system, and procurement for HIV supplies is now integrated with the national system; the Global Fund also supported health infrastructure improvements such as health post modernization, laboratory equipment, and vehicles for field supervision (Atun et al., 2011). Ghanaian health officials have credited these activities with creating an increased demand for health care (Atun et al., 2011).

Rwanda also used international grants for AIDS, tuberculosis, and malaria response to build stronger health systems (Binagwaho et al., 2014). During the last decade, health posts built for AIDS patients have been integrated with the primary care system; supply chains developed for distributing antiretrovirals have expanded to deliver medicines for a range of diseases (Binagwaho et al., 2014; Price et al., 2009). The benefits of these improvements have been felt disproportionately in the countryside, as the government made a deliberate decision to scale-up treatment in areas that would otherwise have been outside the reach of the health system (Binagwaho et al., 2014). After the 1994 genocide,

[3] Officially, the Global Fund to Fight AIDS, Tuberculosis and Malaria.

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Rwandan leaders made rebuilding the health system a priority. As a result, health indicators improved; child mortality and mortality from tuberculosis, have both roughly converged with global averages (Binagwaho et al., 2014).

BOX 2-3
Improving Medicines Procurement and Distribution, Tamil Nadu, India

Until 1995, the South Indian state of Tamil Nadu required government health posts and hospitals to run independent medicines procurement and distribution systems, managing funding from one of the directorates: Medical Education, Medical and Rural Services, or Public Health and Preventive Medicine. Persistent allegations of corruption plagued the purchasers, none of which was large enough to command an efficient economy of scale; distribution costs were high and stock outs, common. In an effort to make drug procurement more efficient and transparent, the state government created the Tamil Nadu Medical Services Corporation, an autonomous agency responsible for every level of essential drug procurement and distribution to all government hospitals and health centers.

Medical Services Corporation chooses its drug suppliers through a transparent open-tender process. The details of each bid, including manufacturers' licenses, quality standards, and prices, are visible to all prospective suppliers. Throughout the process, a system of checks and penalties helps keep quality consistent. Late deliveries face fines of 1.5 percent of the order's cost; suppliers are not paid until after the delivery passes quality testing. Any supplier failing more than one quality test is blacklisted.

The corporation supplies drugs directly to district warehouses. Each facility then draws its stock from its respective warehouse, according to specific needs. Both warehouses and health facilities keep up-to-date records of their stock levels and drug use; the corporation monitors statewide drug levels and movement. If the data suggest a likely stock out, the corporation can transfer supplies from a neighboring district.

Medicines account for about 15 percent of the state health budget in Tamil Nadu, and are essential to clinical care. The Medical Services Corporation commands a purchasing power that has brought down the cost of certain classes of drugs, resulting in savings that have been used to furnish district hospitals with diagnostic equipment previously available only at expensive private hospitals. The corporation's emphasis on openness, quality, and efficiency, has improved drug quality and patient confidence in the health system.

SOURCES: Lalitha, 2008; Muraleedharan et al., 2011.

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Efficient Financing Improves Health Outcomes

Health insurance and other means of financial protection are gaining momentum as a way to improve health in developing countries. Universal health coverage is a movement to promote access to essential services without financial hardship. Universal coverage has considerable economic benefits that will be discussed in the next section. There is also growing evidence that it improves health, especially among the poorest people in society for whom the real and opportunity costs of care present obstacles.

Thailand and Mexico are both middle-income countries where universal coverage has been a goal since the early 2000s. In both countries, universal coverage increased use of health services among the poor, especially among those who had been paying for services out-of-pocket (Gruber et al., 2012; Knaul et al., 2012). Child mortality was one of the most improved indicators in both countries. In Thailand, infant mortality among the poorest 30 percent of the population fell 30 percent in only 2 years (Gruber et al., 2012). In Mexico, the first 6 years of universal coverage saw child mortality decline by 11 percent among the newly insured; for the rest of the country, the improvement was a more modest 5 percent (Knaul et al., 2012). Perhaps the most dramatically-changed health indicator after Mexico's health reforms was the maternal mortality ratio, which dropped 32 percent among the previously uninsured and 3 percent among the rest of the country (Knaul et al., 2012).

A rapid improvement in maternal mortality ratio is a victory for the Mexican system. Ending preventable maternal deaths requires skilled attendants at every delivery and reliable emergency care; it is therefore notoriously slow to improve. Improvements in maternal health can therefore be seen as proxy measure of the strength of the health system. Ninety-nine percent of the world's maternal deaths are in developing countries, "mak[ing] maternal mortality ratio the most inequitably distributed health indicator in the world" (Frenk et al., 2012, p. 2). Universal health coverage has the potential to correct this inequity. Health coverage schemes that start in rural areas and offer free treatment for the conditions poor people suffer from, can improve health with minimal increased expense. In Thailand, universal coverage cost slightly less than $25 per capita (Gruber et al., 2012). In Mexico, where the package of covered services has increased more, now covering more than 95 percent of outpatient and general hospital visits, the government

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increased per capita spending on health by about $232[4] between 2000 and 2010 (Knaul et al., 2012).

The exact costs of universal coverage will vary by country. The Lancet Commission on Investing in Health estimates that bringing an essential package of clinical interventions to 80 percent of the population in low- and middle-income countries by 2025 would be inexpensive; cost estimates range from less than $1 to $2.50 per person per year (Jamison et al., 2013). This investment could avert 37 percent of the global diabetes and cardiovascular disease burden and 6 percent of global cancer (Jamison et al., 2013; WHO, 2011). The cost of inaction, though harder to calculate, is almost certainly higher. Healthy people are more productive members of society; healthy children are better able to learn (Kieny and Evans, 2013). Failure to correct health inequalities can deplete human capital in developing countries, which are the most desperate to keep it, and undermine all efforts at development (Brearley et al., 2013).

Key Findings

- There is more than one correct way to organize a health system, but good systems are invariably grounded in political commitment, effective management and regulation, and the ability to adapt to limited resources.
- A judiciously directed increase in spending of less than $2.50 per person per year could avert a large share of the world's cancer, diabetes, and cardiovascular disease.

Conclusion

- Narrow, disease specific programs best maintain their effectiveness when integrated with primary care.

[4] Adjusted for USD purchasing power parity.

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Fostering Prosperity

A way to raise money for health and pool it fairly across the population is an essential piece of the health system (WHO, 2010a). Attention to health financing promises particular returns for the broader global development agenda. Every year, 100 million people fall into poverty because of health expenses, and millions more stay poor because they are too sick to work (Averill and Marriott, 2013; Xu et al., 2007). Improving the social safety net and bringing basic health care to these people will be an essential piece of ending global poverty and building a more prosperous world.

Health Expenses Are Poverty Traps

The path out of poverty is not linear. The $1.25-per-day poverty line is somewhat arbitrary,[5] and many of the billion who crossed that line in past 20 years did so because they both started and remained close to the cutoff (Towards the end of poverty, 2013). While the middle class is growing in developing countries overall (see Figure 2-3), the relative prosperity of Latin America, Eastern Europe, and East Asia drives most of that success (Kapsos and Bourmpoula, 2013). The majority of sub-Saharan Africa and South Asia lives in some state of tenuous poverty. (See Figures 2-4 and 2-5.) The lines between extremely poor, moderately poor, and nearly poor are dynamic in these parts of the world. In rural India, Anirudh Krishna found that over 25 years, 11 percent of his sample had escaped poverty, while 8 percent who started out not poor had fallen below the poverty line, leading him to conclude that, "almost as many people have sunk into poverty over the past 25 years as have emerged from it" (Krishna, 2004, p. 131).

An illness or major accident is the main reason the poor in developing countries stay poor and the moderately less poor fall back (Krishna, 2004, 2011; Kristjanson et al., 2010). This problem often takes the form of "a succession of adverse events," starting with an expensive illness or accident (Krishna, 2011, p. 5). To pay for health care, households invariably reduce basic consumption, and then they may sell their assets in distress or take on high-interest debt (Krishna, 2011; Kruk et al., 2009). The episode can go on for years, as with a chronic disease,

[5] Economists derive the cut point from the average poverty lines in the world's 15 poorest countries, measured in 2005 dollars and adjusted for differences in purchasing power parity (Towards the end of poverty, 2013).

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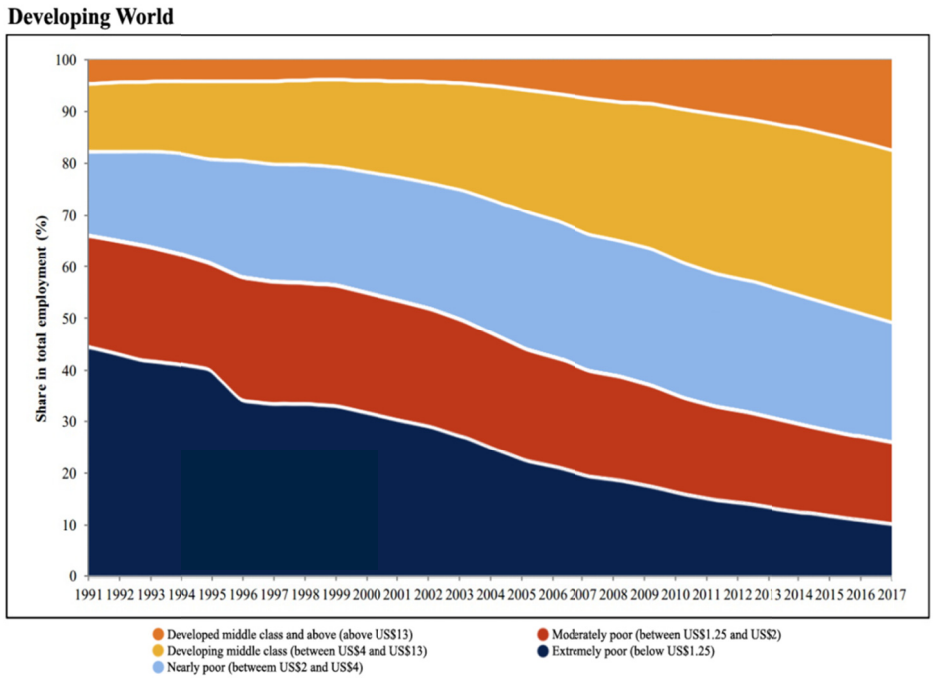

FIGURE 2-3 Employment by economic class (2005 constant $, adjusted for purchasing power parity, per day), from 1991-2011, as a percentage of total employment in all low- and middle-income countries (2005 $, adjusted for purchasing power parity, per day).

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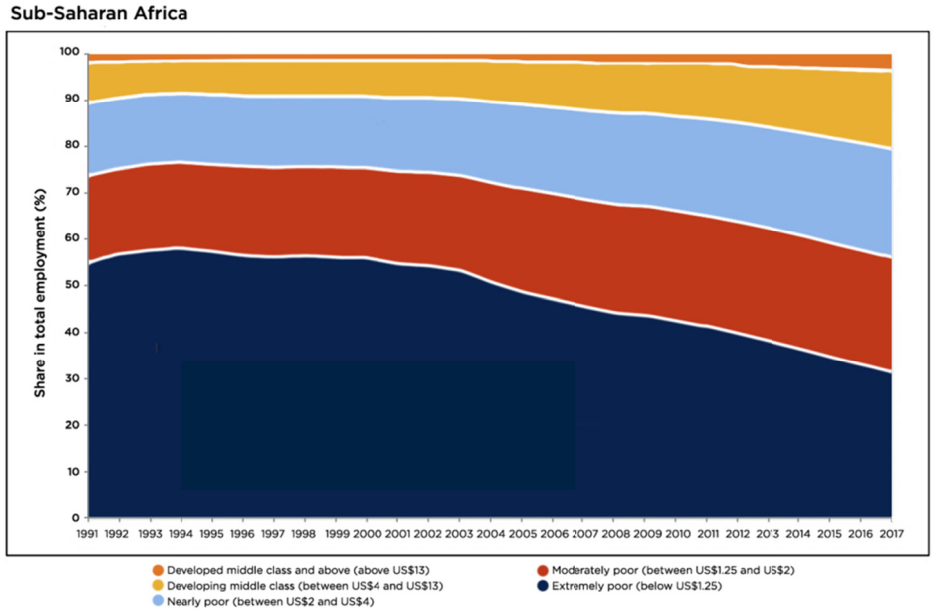

FIGURE 2-4 Employment by economic class (2005 constant $, adjusted for purchasing power parity, per day), in sub-Saharan Africa, 1991-2011, as a percentage of total employment.

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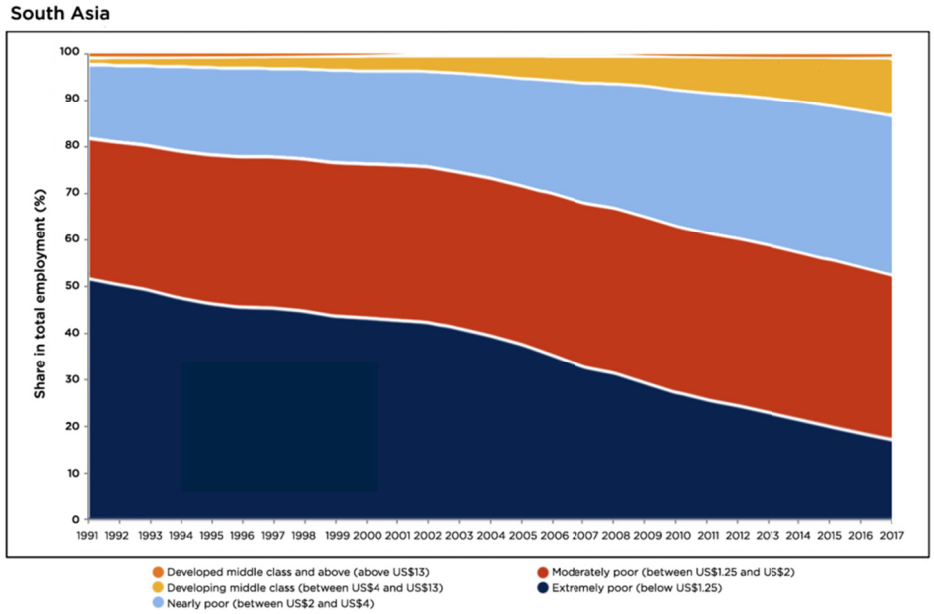

FIGURE 2-5 Employment by economic class (2005 constant $, adjusted for purchasing power parity, per day), in South Asia, 1991-2011, as a percentage of total employment.

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or end abruptly with unexpected funeral expenses. When the illness culminates in the death of the breadwinner, the household forfeits half or more of its long-term income (Krishna, 2011).

When patients have to pay a fee for health services, the fee can discourage use of preventative and curative medicine, but the effects of completely removing fees is not clear or consistent among countries (Lagarde, 2008; Waiswa, 2012). Removing the financial hardship of health expenses means reducing (or, for the poor, removing) the amount patients pay out-of-pocket, which accounts for about 70 percent of health spending in low-income countries (Kruk et al., 2009; Schieber et al., 2007; Xu et al., 2003). Requiring payment at the point of care can pose a catastrophic expense to the poorest patients (Xu et al., 2003).

Health expenses are described as a financial catastrophe if they exceed 40 percent of a household's income after basic subsistence needs are met (Xu et al., 2003). Using survey data from 89 counties covering almost 90 percent of the world, Xu and colleagues (2007) found that 150 million people per year face catastrophic spending for health. These 150 million people live all over the world, but are more likely to be found in low- and middle-income countries (see Figure 2-6).

Analyses of catastrophic health spending may underestimate the true hardship illness poses in poor countries, as they fail to account for the indirect costs associated with health care, things like transportation and

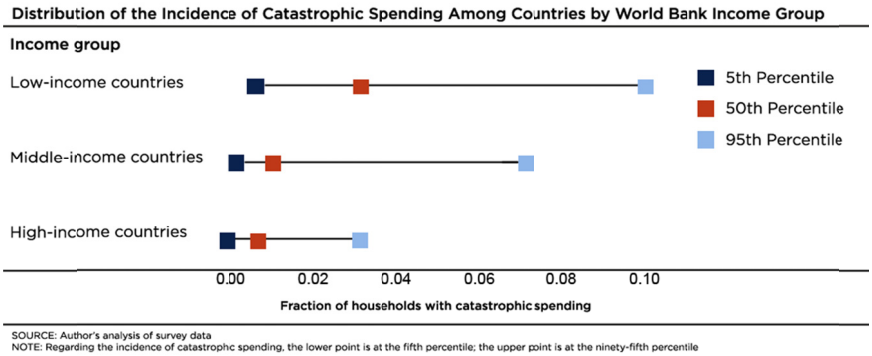

FIGURE 2-6 Distribution of the incidence of catastrophic spending among countries, by income group.

SOURCE: Copyrighted and published by Project HOPE/*Health Affairs* as Xu, et al., Protecting households from catastrophic health spending, *Health Affairs* (Millwood). 2007, 26(4):972-983. The published article is archived and available online at http://healthaffairs.org.

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lost wages (Kruk et al., 2009). Research on hardship financing, either selling assets in distress or borrowing (often at high interest) to pay for health care, suggests that health expenses pose a financial hardship to about a quarter of all households in developing countries, nearly a third in sub-Saharan Africa and Southeast Asia (Kruk et al., 2009). The poorest households, which lack assets to sell, may raise funds by signing away their future earning power into debt bondage (Krishna, 2011). Debt bondage sabotages emerging economies. The International Labour Organization estimates that, after deductions for housing, uncompensated overtime, and labor below market wage, bonded labor costs the global economy $19.6 billion in unpaid wages, roughly $9 billion in the Asia Pacific region and $1.5 in sub-Saharan Africa (ILO, 2009).

Even when health expenditures are not catastrophic, they can hold back economic development. Households that can often save to prepare for emergency health expenditures (Dupas and Robinson, 2013; IPA, 2014). Their savings, while protective to the individual household, could have a detrimental effect on financial growth, as money saved is withheld from basic expenditures, the transactions that grow the economy. Protecting households from out-of-pocket health expenses can allow them to direct their cash to increased economic activity, thereby supporting their nation's larger economic development (Frenk and de Ferranti, 2012).

Out-of-pocket health spending endangers patients, and prepayment (a system of collecting for health expenses before an illness) is one way to protect them (Xu et al., 2007). Prepayment comes from taxes, insurance, or both, and poses an obstacle for poor countries. Not only is it logistically complicated to collect revenues from people working in informal arrangements or at subsistence level, but many people are too poor to pay taxes at all (Xu et al., 2007). The most vulnerable people are also the least likely to buy insurance. Donors can help reduce their vulnerability by helping countries build effective prepayment systems. As the wealth in low- and middle-income countries increases, there are more potential revenue streams to draw from, but developing countries have little experience doing so effectively. Donor countries can provide valuable guidance on how to identify and collect taxes from sustainable sources.

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Strong Systems Avoid Waste

Restructuring health systems in developing countries can make for more efficient and equitable use of health budgets. Health services in low- and middle-income countries often fail to reach people in rural and remote areas. There are organizational reasons for this. It is expensive, for example, to run teaching hospitals and tertiary care centers, so there are few of them, usually in cities, where they serve a relatively affluent, politically-aware patient base (IFC, 2007). Urban hospitals absorb a high proportion of national budgets, contributing to a problem of unfair distribution of spending. In Mauritania, for instance, 72 percent of public spending on hospitals benefits the richest 40 percent of the population (IFC, 2007). Hospital spending may be especially discriminatory against the poor, but the pattern holds across a range of services (Akazili et al., 2012). Research in sub-Saharan Africa indicates that although the disease burden in heaviest among the poorest groups in society, the distribution of services benefits the richest (Mills et al., 2012). In India, government data indicates that about 9 percent of all public health spending benefits the poorest fifth of the population, while the richest fifth take about 40 percent (Chakraborty et al., 2013).

Distance and cost pose barriers to the equitable delivery of health care, as does patient satisfaction with services (Mills et al., 2012). Nevertheless, people need health care; when the public system cannot meet their needs, patients go elsewhere. In Liberia, for example, a 14 year civil war decimated the health system. By 2008, most licensed formal providers worked in barebones clinics (Kruk et al., 2011). People in rural areas then sought care from traditional healers and medicine sellers three times more often than from formal clinicians (Kruk et al., 2011). In other cases, people rely on nongovernmental organizations for healthcare. Faith-based organizations in particular provide up to 40 percent of all health care in developing countries, including a large portion of HIV and AIDS home care (Kagawa et al., 2012; Woldehanna et al., 2005).

The private sector, a group that includes both for-profit and nonprofit providers, accounts for the majority of health services among the poor in developing countries (Berendes et al., 2011; Das et al., 2012). In Ethiopia, Kenya, Nigeria, and Uganda, more than 40 percent of the poorest fifth of society get health care from private, for-profit providers (IFC, 2007). Competition from the private sector could help improve the quality and efficiency of public health services, but it is difficult to create

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market competition in health without extensive regulatory and enforcement capacity (Yip et al., 2012). As the relative importance of for-profit providers grows in developing countries, it will be important to build government capacity for oversight and regulation. Otherwise, there will be increased risk of waste and more money to be wasted as spending on health increases.

The WHO estimates that inefficiency causes the wasting of 20-40 percent of all health spending (WHO, 2010b). The key to reducing this waste lies in strengthening the basic building blocks of health systems. Table 2-1 shows the 10 leading sources of inefficiency in health and offers ways to improve them. Notably, all the main causes of waste are in failures of the health system.

Efficient Health Spending Improves Productivity

Making the most of financial contributions to the health system is one of the main challenges facing governments today. The potential payoffs for increasing efficiency are substantial. As described earlier, recent economic models indicate that a judiciously directed increase of $5 per person per year in the 74 countries that account for 95 percent of maternal and child deaths would yield a return of nine times that investment in terms of lives saved, disability averted, unplanned pregnancies avoided, greater workforce participation, increased savings and investment (Stenberg et al., 2014). A 2 percent increase in health spending could underwrite the additional $5 per person per year needed to realize tremendous societal gains (Engström et al., 2013; Stenberg et al., 2014). The cost of failure to act, in contrast, is steep. Maternal deaths alone take $15 billion per year from the global economy, acting through both the loss of a healthy adult and the vastly decreased prospects of her children (USAID, 2001).

Historical case studies suggest that improved health and nutrition accounted for about one-quarter of the GDP increase in Britain over from 1780-1979 (Fogel, 1997; Jamison et al., 2013). In the twentieth century, the effects appear to come more quickly. In an analysis of 53 countries' data, Jamison and colleagues (2005) estimated that health improvements between 1965 and 1990 accounted for about 11 percent of national economic growth. In either case, the full returns on investments in health become evident with a long time horizon (Belli et al., 2005).

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TABLE 2-1 Sources of Health System Waste

Source of inefficiency	Common reasons for inefficiency	Ways to address inefficiency	Health system building block
1. **Medicines: underuse of generics and higher than necessary prices for medicines**	Inadequate controls on supply-chain agents, prescribers and dispensers; lower perceived efficacy/safety of generic medicines; historical prescribing patterns and inefficient procurement/distribution systems; taxes and duties on medicines; excessive mark-ups	Improve prescribing guidance, information, training, and practice. Require, permit or offer incentives for generic substitution. Develop active purchasing based on assessment of costs and benefits of alternatives. Ensure transparency in purchasing and tenders. Remove taxes and duties. Control excessive mark-ups. Monitor and publicize medicine proves.	• Medical products, vaccines, and technologies • Health workforce
2. **Medicines: use of substandard and counterfeit medicines**	Inadequate pharmaceutical regulatory structures/mechanisms; weak procurement systems	Strengthen enforcement of quality standards in the manufacture of medicines; carry out product testing; enhance procurement systems with pre-qualification of suppliers	• Medical products, vaccines, and technologies • Leadership and governance
3. **Medicines: inappropriate and ineffective use**	Inappropriate prescriber incentives and unethical promotion practices; consumer demand/expectations; limited knowledge about therapeutic effects; inadequate regulatory framework	Separate prescribing and dispensing functions; regulate promotional activities; improve prescribing guidance, information, training and practice; disseminate public information	• Medical products, vaccines, and technologies • Health workforce

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4. Health care products and services: overuse or supply of equipment, investigations, and procedures	Supplier-induced demand; fee-for-service payment mechanisms; fear of litigation (defensive medicine)	Reform incentive payment structures (e.g. capitation or diagnosis-related group); develop and implement clinical guidance	• Medical products, vaccines, and technologies • Financing • Health workforce	
5. Health workers: inappropriate or costly staff mix, unmotivated workers	Conformity with pre-determined human resource policies and procedures; resistance by medical profession; fixed/inflexible contracts; inadequate salaries recruitment based on favoritism	Undertake needs-based assessment and training; revise remuneration policies; introduce flexible contracts and/or performance-related pay; implement task-shifting and other ways of matching skills to needs	• Health workforce • Information system	
6. Health care services: inappropriate hospital admissions and length of stay	Lack of alternative care arrangements; insufficient incentives to discharge; limited knowledge of best practice	Provide alternative care (e.g., day care); alter incentives to hospital providers; raise knowledge about efficient admission practice	• Service delivery	
7. Health care services	Inappropriate level of managerial resources for coordination and control; too many hospitals and inpatient beds in some areas, not enough in others. Often this reflects a lack of planning for health service infrastructure development.	Incorporate inputs and output estimation into hospital planning; match managerial capacity to size; reduce excess capacity to raise occupancy rate to 80-90% (while controlling length of stay)	• Service delivery	

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8.	**Health care services: medical errors and suboptimal quality of care**	Unclear resource guidance; lack of clinical care standards and protocols; lack of guidelines; inadequate supervision	Improve hygiene standards in hospitals; provide more continuity of care; undertake more clinical audits; monitor hospital performance	• Service delivery
9.	**Health system leakages: waster, corruption, and fraud**	Unclear resource allocation guidance; lack of transparency; poor accountability and governance mechanisms; low salaries	Improve regulation/governance, including strong sanction mechanisms; assess transparency/vulnerability to corruption; undertake public spending tracking surveys; promote codes of conduct	• Leadership and governance • Financing
10.	**Health interventions: inefficient mix and inappropriate level of strategies**	Funding high-cost, low-effect interventions when low-cost, high-impact options are unfunded. Inappropriate balance between levels of care, and/or between prevention, promotion and treatment	Regular evaluation and incorporation into policy of evidence on the costs and impact of interventions, technologies, medicines, and policy options	• Service delivery • Financing

SOURCES: Chisholm and Evans, 2010; WHO, 2010b. Adapted with the permission of the publisher, from "More health for the money" in *the World Health Report: Health systems financing: The path to universal coverage*. Geneva: World Health Organization, 2010 (Table 4.1, p. 63, http://www.who.int/whr/2010/10_chap04_en.pdf?ua=1, accessed June 3, 2014).

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Figure 2-7 shows the main channels through which health improves per-person income. As child survival and family planning improve, couples can choose to have fewer children. Working adults are therefore responsible for fewer dependents, meaning that workers make up a greater share of the national population. As life expectancies rise, there are more healthy adults contributing to workforce for more time, earning, saving, and investing for longer. Healthy workers are more productive; healthy children are better students. In time, the country becomes more attractive for foreign direct investment (Jamison et al., 2013).

There is also an inherent value of health and a worth simply to extending healthy years of life (Jamison et al., 2013). In analyses that account for both the increase in income and the value of added life years caused by improved health, the benefits of reducing infections and improving maternal and child health exceed the costs by a factor of 9 to 20 (Jamison et al., 2013).

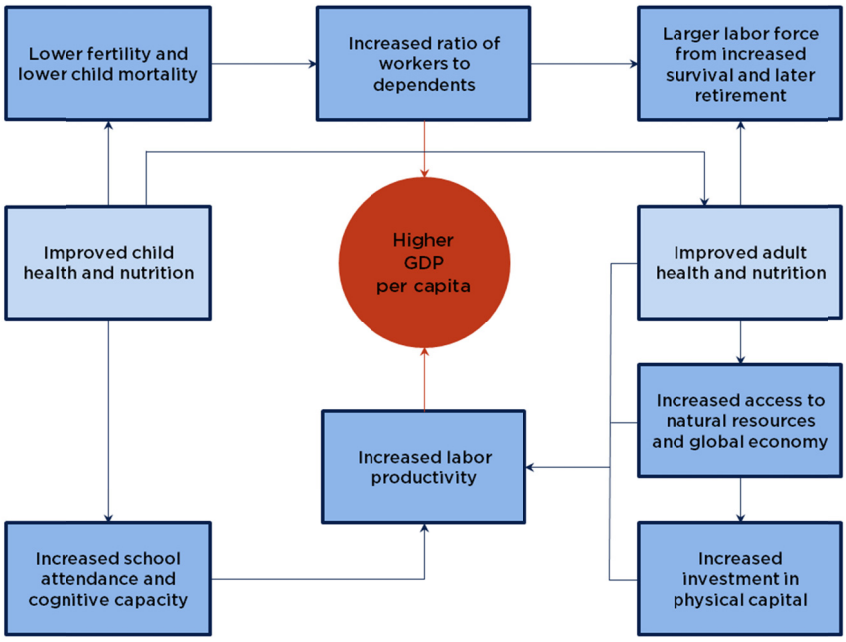

FIGURE 2-7 Pathways by which health improves GDP per person.

SOURCE: Jamison et al., 2013, adapted with permission from *The World Health Report 1999: Making a Difference,* Geneva: World Health Organization, 1999 (Figure 1.5, p. 11, http://www.who.int/whr/1999/en, accessed August 28, 2014). Reprinted with permission from the World Health Organization.

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Investing in health reduces poverty and is sound economic policy for all governments (Engström et al., 2013). American companies increasingly see their future in the emerging markets of Africa, Asia, and Latin America. Improving the productivity and lifetime earning potential of workers and consumers in these markets will have far-reaching reverberations, improving prosperity abroad and in the United States.

Key Findings

- The middle class is growing in developing countries overall, but prosperity in Latin America, East Asia, and Eastern Europe accounts for most of that growth. In sub-Saharan Africa and South Asia, almost as many people have fallen into poverty over the past 20 years as have escaped it.
- The poor stay poor and the less poor fall back because of health expenses. For one-third of all households in sub-Saharan Africa and Southeast Asia health expenses pose a financial hardship.
- Households respond to hardship by selling assets in distress, taking on high-interest debt, or forfeiting their future earnings through debt bondage. All these practices sabotage emerging economies.
- Charging patients at the point of care prevents the poorest people from seeking care, or at best, encourages them to delay treatment until the condition worsens.

Conclusions

- Governments can prevent people from falling into poverty by improving health financing, and building capacity for oversight and regulation.
- Efficient spending on health improves global productivity and is sound economic policy for all countries.

Advancing Global Security

The return on investment in health systems goes beyond economic gains. A strong health system allows for prompt and effective response to pandemic disease, natural and man-made disasters. When this response falters, there is an immediate health threat as well as a longer-term risk to political stability.

One of the biggest pandemic threats to emerge in recent years is Ebola virus disease (called simply Ebola), emerging in West Africa in the spring of 2014 (CDC, 2014c; WHO, 2014a). A disease of uncommon virulence and high case-fatality, Ebola would tax any health system, but the West African countries affected have particular vulnerabilities (Ebola

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virus: Liberia health system "overtaxed," 2014; Gostin et al., 2014; WHO, 2014a). As of August 28, 2014, the Centers for Disease Control and Prevention (CDC) records indicate 1,552 suspected deaths and 3,069 suspected and confirmed cases in Guinea, Liberia, Nigeria, and Sierra Leone (CDC, 2014a).

The clinical presentation of Ebola is similar to many other endemic tropical diseases. Confirming cases, the first step to effectively quarantining and treating them, requires a laboratory testing system (Green, 2014). Ebola patients require inpatient treatment, stressing limited hospital infrastructure; five of the largest hospitals in the Liberian capital closed in response to the epidemic (Ebola virus: Liberia health system "overtaxed," 2014; WHO, 2014a). The countries affected are now in a state of emergency response, with new control measures curtailing social gatherings (Gostin et al., 2014; Nossiter, 2014). The burden of controlling pandemic spread, combined with the risks of treating patients, led Sierra Leone President Ernest Bai Koroma to conclude, "the very essence of our nation is at stake" (Nossiter, 2014).

The Ebola crisis has drawn attention to the consequences of neglecting health systems development in developing countries. Only 20 percent of the world's nations are prepared for pandemic response (Kerry et al., 2014). The tools that would enable this response—a well-trained workforce, an information system to support surveillance and data sharing, a solid infrastructure for clinical care and laboratory analysis, and strong management of the health sector—are essential pieces of the health system. For this reason, the Department of Health and Human Services' Global Health Strategy gives as one of its main objectives the comprehensive strengthening of health systems (HHS, 2011). Building the health system in developing countries will protect people around the world from pandemic threats and contribute to more politically stable societies.

Health Infrastructure Supports Emergency Response

Concern with developing countries' public health systems has grown over the past 10 years, partly because of the threat of emerging pandemic diseases such as Ebola. In 2004, David Heymann and Guénaël Rodier observed that the SARS epidemic "made one lesson clear early in its course: inadequate surveillance and response capacity in a single country can endanger … the entire world" (Heymann and Rodier, 2004, p. 173).

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Sometimes society controls this danger. During the SARS outbreak, international collaboration helped contain the disease within a few weeks (Grady and Altman, 2003). In only 4 months, all transmission was interrupted in 27 countries (Heymann and Rodier, 2004). Other times, meaningful collaboration is lacking and response suffers. Two years have passed and at least 209[6] people have died since the Middle East respiratory syndrome coronavirus emerged, but the source of the virus is still unclear (PLOS Currents and PLOS Pathogens, 2014; McNabb et al., 2014; WHO, 2014e). There is similar doubt about Ebola's natural reservoir (CDC, 2014b). In any case, pandemic diseases disrupt people's lives and take a toll on the global economy long after the acute emergency response phase. SARS halted travel and hurt business in China and Southeast Asia, costing the region $50 billion (UN System Task Team, 2012). The World Bank estimates that Ebola will cost Guinea, an impoverished country hard hit by the epidemic, a full percentage point of annual economic growth (World Bank, 2014).

Building a system for international cooperation during an outbreak is the goal of the International Health Regulations, a set of legally binding rules on the surveillance and response to outbreaks of potential international public health consequence (WHO). The regulations are built around the premise that containing a disease while it is still local is the best way to prevent a global epidemic (Rodier et al., 2007). To comply with the regulations, countries need to develop the basic health infrastructure to detect and report potential threats and respond to national emergencies (Rodier et al., 2007).

Although 196 countries have adopted the International Health Regulations, only about 20 percent of those countries had fully implemented them by 2013 (Fischer and Katz, 2013; WHO). Implementing the regulations requires strength in eight basic capacities (Katz et al., 2012). As Table 2-2 indicates, these eight strengths are essentially components of the health system. It will be impossible to implement the International Health Regulations without improving the health system foundation they draw on.

Investments in the health system (such as laboratories, health information systems, communication, and human resource management) that improve daily functioning also strengthen the system's ability to respond to threats (Kruk, 2008a). The ability to respond to all diseases, even those that are not likely to become global threats, builds the same

[6] As of June 11, 2014.

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TABLE 2-2 The International Health Regulations Build on a Functional Health System

International Health Regulations' Core Capacities	Building Block of the Health System
Legislation to support and funding to implement the procedures	• Leadership and Governance • Health Financing
Leadership to coordinate a national emergency response	• Leadership and Governance
Early detection of public health events through routine surveillance and situational awareness of potential hazards	• Health Information Systems • Human Resources for Health
Outbreak response, including case management, infection prevention and control	• Service Delivery • Essential Medical Products and Technologies
Preparedness of a national emergency plan	• Leadership and Governance
Procedures for risk communication	• Leadership and Governance • Human Resources for Health
Human resources to implement the regulations	• Human Resources for Health
Laboratory and diagnostic tools, the means to collect and transport specimens, laboratory surveillance	• Essential Medical Products and Technologies • Health Information Systems
Surveillance and response at points of entry	• Health Information Systems

SOURCES: Katz et al., 2012; WHO.

technical depth required for emergency management (Frieden et al., 2014). Such was the logic behind the Global Health Security Agenda, a U.S. government program working in 30 partner countries to develop the capacity for outbreak response (HHS). One of the program's main targets for its partner countries over the next 5 years is to reach 90 percent of all one-year-olds with measles vaccine (HHS). This target recognizes that the groundwork necessary to prevent measles is the same as what would be needed for response to any epidemic threat (Frieden et al., 2014). Similarly, Box 2-4 describes how epidemic response in Uganda improved as part of the Global Health Security program.

Developed health systems have an emergency response capacity built into their operations. Such response capacity was evident after the Boston Marathon bombings. The city health system could absorb the shock of acute disaster response; "not a single patient who made it to a hospital died" (Farmer, 2013). Natural disasters and acts of violence are only more common in poor countries, so the need for resilience is even

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BOX 2-4
Building Epidemic Response in Uganda

Targeted investments in health infrastructure can improve emergency response relatively quickly. As part of the Global Health Security effort, the Uganda Ministry of Health and the CDC demonstrated how changes in laboratory management, informatics, and logistics could improve outbreak response. The Ugandan ministry selected three pathogens (MDR-TB, cholera, and Ebola) that pose serious risk to their population, and 17 pilot districts where there is both a history of cholera and, because of PEPFAR, some infrastructure for specimen transport and tuberculosis detection. Over six months, the program provided targeted training for laboratory staff, district surveillance officers, and coordinating logisticians. The collaborators developed protocols for packaging and shipping specimens safely on motorbikes and through the Ugandan post office. They stocked diagnostic kits at local hospitals, and developed a way to report suspected outbreaks using text messaging. They also updated the ministry's online database to allow field workers to immediately notify Kampala of a suspected case. After 6 months, 14 of the 16 pilot laboratories had improved their systems for recognizing outbreaks, communicating to the ministry, and transporting specimens.

The Ugandan government led the epidemic response pilot, a fact to which the CDC technical collaborators attribute much of its success. The program built on existing national informatics and surveillance systems. The system has been in regular use since the pilot program ended, leading to confirmation of cases of West Nile virus, Zika virus, Crimean-Congo hemorrhagic fever, hepatitis E, and MDR-tuberculosis. The ministry also used the new emergency response system twice in 2013: once a preventative measure at a large cultural event, and once to screen pilgrims returning from the Hajj for Middle East respiratory syndrome coronavirus.

SOURCE: Borchert et al., 2014

greater. When the health systems cannot respond to humanitarian emergencies, there is a risk of an acute problem growing into a protracted political crisis. Investments in health (such as laboratories, information systems, communication systems, and human resource management) improve general functioning and the system's ability to respond to threats.

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Unsustainable Health Systems Are a Political Risk

Financial sustainability in health means "having enough reliable funding to maintain current health services for a growing population and to cover the costs of raising quality and expanding availability to acceptable levels. Usually the financial sustainability goal also means achieving these funding levels with a country's own resources" (Leighton, 1995, p. 2). Determining what constitutes an acceptable level of coverage is up to the leaders running a country's health sector. Miscalculations in sustainable cost or coverage can have far-reaching political repercussions.

Political stability allows health systems to function. There is no doubt that prolonged conflict destroys health infrastructure, decimates the health workforce, and causes governments to decrease health expenditures (Waters et al., 2007). It is also true that neglect of the health system can undermine the stability of governments. People need health services. As the middle class grows, demand for health care increases; failure to respond to this demand spurs unrest.

An interesting example of this process comes from the Arab world, mostly upper-middle-income countries where health is not a high government priority (Coutts et al., 2013; UNDP, 2009). What money governments in the region do direct to health is generally spent on urban hospitals and the technology to support them, while more basic needs like infant care are unavailable in rural areas or to the urban poor (UNDP, 2009). There is a great deal of inefficient spending. Medical tourism is common. Even in Yemen, one of the poorest countries in the region, which has a maternal mortality ratio of 270 deaths per 100,000 live births, 29 percent of all health spending is on curative treatment abroad (UNDP, 2009; WHO et al., 2014). Medical tourism among the relatively wealthy depletes hard currency reserves in their home countries and rewards governments for spending on tertiary care centers at the expense of basic preventative services (UNDP, 2009).

At the same time, health costs in Arab countries are rising much faster than incomes (UNDP, 2009). High user fees (about 60 percent of total health spending in Egypt and Morocco and about 50 percent in Syria and Lebanon) put a financial burden on the middle class and exclude the poor (WHO, 2014b). For these reasons, discontent with rising out-of-pocket health spending has been cited as a catalyst of the Arab Spring (Alami and Karshenas, 2012; Economist Intelligence Unit, 2012).

Excessive out-of-pocket spending alone is not enough to cause political upheaval, but it is always a political risk; governments do well to

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control it. In China, for example, when out-of-pocket spending on health steadily rose from 20 percent in 1978 to about 60 percent in 2002, it ended in widespread protests (Yip and Hsiao, 2008). The government responded with a series of reforms that tripled health expenditures and made universal basic coverage a goal (Yip and Hsiao, 2008). High medical cost inflation could undermine this plan. The challenge facing the Chinese government now is to reform the payment system so the additional $25-$38 billion in health spending funds meaningful changes for the poor and is not captured in provider profits (Yip and Hsiao, 2008). Medical inflation threatens to undo the Chinese government's plan to expand insurance, because "no health insurance … can be adequate, affordable, and sustainable if cost inflation is unchecked" (Yip and Hsiao, 2008, p. 464).

Health reform, insurance expansion, and controlling medical inflation are topics of particular relevance to the United States as well. The U.S. government has an interest in understanding how different countries address these problems, and the best way to do that is to put American technical experts in positions of collaboration with their foreign counterparts. The United States can learn a great deal from these collaborations. Low- and middle-income countries, having fewer resources available, are often responsible for the most innovative overhauls in health financing and management (Quick, 2014). Investment in health systems abroad will also make a statement about the U.S. government's development priorities, showing an interest in building a strong foundation for equitable, sustainable health services.

Key Findings

- Efficient response to pandemic disease depends on surveillance and response capacity. The ability to respond to all disease threats builds the same technical depth that is required to respond to an outbreak. Now only 20 percent of countries have the health systems components to contain and control and emerging global epidemic.
- The emerging Ebola pandemic would tax any health system, but the West African countries affected have particular vulnerabilities.
- Neglect of health systems undermines governments, all of which have an interest in health reform and controlling medical inflation

Conclusions

- The Ebola pandemic has drawn attention to the consequences of neglecting health systems development in low- and middle-income countries.
- The U.S. government has an interest in understanding how countries control medical inflation and expand insurance. Putting American experts in positions of collaboration with their foreign counterparts is an effective means to this end.

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3

An Effective Donor Strategy for Health

Development experts make a distinction between transformative aid strategies that aim to bring about large, permanent change on broad social problems, and marginal ones that attempt to solve a specific problem for a narrow group (Bendavid and Miller, 2010). The United States' health aid has long favored the targeted solutions. The PEPFAR program was, at its outset, intended to address an immediate problem of HIV and AIDS in poor countries. The President's Malaria Initiative (PMI) had a similar mandate to reduce malaria mortality with four key interventions (PMI, 2014a). These programs have met with great success in recipient countries. Deaths from HIV and AIDS have declined in PEPFAR countries; child mortality has fallen in the 15 PMI countries (Bendavid and Bhattacharya, 2009; PMI, 2012, 2014a).

Vertical health programs, because of their very success, may be approaching the point of diminishing returns. In the early 2000s, providing antiretroviral drugs to AIDS patients in poor countries removed the main obstacle to their survival. Smallpox eradication, perhaps the most successful vertical health program of all time, though immensely complicated logistically, depended on one, simple tool—immunization—to end death and disability from a tragic disease. When a clear impediment, even if it is a large one, is ending lives, then removing that impediment can have immediate consequences. Such problems are less common now, and may soon disappear altogether. As the previous chapter explained, the future disease burden in low- and middle-income countries will be a complicated amalgam of chronic and infectious conditions, likely aggravated by climate change. A successful donor strategy in global health needs to respond to the epidemiological, political, economic, and demographic changes described earlier.

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Even as the health problems facing developing countries become more complicated, the goals we set become more ambitious. Ending transmission of HIV, eliminating malaria, and ending preventable maternal and child deaths are some of the next major targets in global health. There are no simple technical tools to help countries meet these goals. Stopping the spread of HIV will require, among other things, trained clinicians to oversee treatment and a laboratory infrastructure for patient monitoring. Similarly, eradicating malaria depends in part on building local capacity for the regulation and efficient distribution of medicines. Ending preventable maternal and child deaths means guaranteeing access to basic health services, especially among the poorest people on society's periphery. As a *Lancet* report observed, improving health is no longer about technical expertise or even money; "the real struggle is in creating efficient systems, working with local governments, and making sure that programs are fully implemented" (Loewenberg, 2007, p. 1893).

A functional health system is the foundation of all global health programs. The U.S. government could better support this foundation, thereby making its previous investments in global health sustainable and bringing about meaningful, structural change. The committee believes that adjustments to the nature of development aid and the manner in which the aid is given could have profound effects on health around the world. The recommended broad strategy for health systems strengthening follows.

Recommendation: Congress should respond to the social, economic, and epidemiological changes in developing countries by directing more health aid to health systems building. The committee sees three crucial components of this strategy.

a) Future programing should emphasize technical cooperation and country ownership in health systems, making investments over a long time period, and giving more attention to measuring the outcomes of their contributions to health than the inputs.
b) The United States should make good use of its comparative advantage in science and technology by investing more in global health research and professional training for students in developing countries.
c) The United States should also invest in monitoring and management, and require rigorous, external impact

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evaluations for U.S. government global health projects that involve technical innovation or new models for service delivery.

No one tool can improve health systems across all low- and middle-income countries. There is wide variation in the strategies countries use to improve their health systems and bring basic services to the poor (Gwatkin et al., 2005). With this in mind, the committee will describe in this section a broad donor strategy for health given the social, economic, and epidemiological changes of that past 25 years. First, it will describe changes in the manner in which aid is given, stressing the importance of country ownership, a long time horizon, and the outcomes (rather than the inputs) of development assistance. Next, it will outline what the United States can do to make its assistance for health most effective: investing in global public goods, supporting higher education and meaningful training, and making priorities of good management and monitoring in health programs.

A TRANSITION IN HOW TO GIVE DEVELOPMENT AID FOR HEALTH

From the mid-2000s on, the U.S. government's work in global health drew some criticism for "disproportionate emphasis on singular causes and unsustainable approaches" (Bendavid and Miller, 2010, p. 792; Garrett, 2007). The Global Health Initiative was formed partly in response to that criticism, to shift emphasis from emergency response to sustainable programs (Emanuel, 2012). From the start, the program identified problems with health systems as "a binding constraint" preventing further progress in global health (GHI, 2012, p. 3). Today, most of the U.S. government's support for health systems goes through vertical programs (GHI, 2012).

Exposure to the logistics and management required to implement these large health programs can help build local capacity. This committee believes, however, that capacity building is most valuable when it is intentional. Part of their reasoning is logistical. If capacity building is not intentional, then managers can neglect it in their daily work and quarterly reporting; they will not arrange for evaluation of the program's relative merits and weaknesses. Deliberate capacity building also makes a clear statement about donor priorities. When the U.S.

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government invests in the technical depth of its partner countries, it is showing a commitment to a future when countries run these programs independently.

Donor funding influences local plans and large cash influxes to poor countries create a power asymmetry. There is no reason to ignore this dynamic. But the influence that comes with large contributions should be directed in such a way that it supports host country governments and does not undermine them. Shifting the tone of U.S. action in global health from technical assistance to technical cooperation would be invaluable to supporting and empowering aid recipient countries.

Emphasis on Technical Cooperation

As the previous section explained, the past decades have seen tremendous economic growth in developing countries. Now most of the world, including 75 percent of world's poorest people, live in middle-income countries (UN System Task Team, 2012). These countries are gradually building their administrative capacity for core government functions, things like collecting taxes and providing basic education and public health services (Jamison et al., 2013; Khaleghian and Gupta, 2005). These improvements have brought an increasing self-sufficiency to many middle-income countries. The U.S. government should acknowledge these changes with a change in its support strategy.

One dimension of this change is to require that donor funding for health be additive with government funding. That is, donors should use their resources to complement their partners' national strategies, not to force new ones upon them. The 2005 Paris Declaration on Aid Effectiveness identified country ownership as one of the fundamental principles for making aid effective (OECD, 2005). The requirement puts an onus on recipient country governments to develop national strategies and to lead in carrying them out (OECD, 2005). At that point, the task for donors is to align their aid with the national priorities.

An emphasis on country leadership is a departure from the recent practice of setting ambitious global targets for health. Targets like the Millennium Development Goals help build political will to tackle global health problems but are sometimes seen as owned by donors, not developing countries (Fehling et al., 2013; Haines and Cassels, 2004). The emerging post-2015 development agenda gives somewhat greater emphasis to local ownership, local leadership, and local co-design (OECD, 2013b). Universal health coverage, an emerging cornerstone for

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the future of global health, depends on every country having a sense of its most pressing national needs and a strategy to respond to them. As countries work towards the free provision of a basic package of essential services, they will necessarily have to identify gaps in their systems. The task for the U.S. government and other donors is to work with countries to identify these structural gaps, and then tailor its development work to help close them.

Country ownership builds "mutually accountable partnerships" between donors and recipients (Lucas, 2011, p. 3). The promotion of partnership alone sets a productive, collaborative tone that has sometimes been missing in previous projects (Biesma et al., 2009). Foreign funding can skew the government's priorities and cause neglect of other health programs (Atun et al., 2011). Extensive donor financing of health delivery can also be counterproductive, as such assistance is difficult to sustain.

Attention to national leadership in health programming is not a new idea; it was central to the early 1990s sector-wide approach to health programming (Peters et al., 2013b). Sector-wide programming depends on strong government oversight and donor discipline in supporting the priorities their partner governments identify (Peters et al., 2013b). As such the capacity and will of the recipient country government were a common stumbling block to country ownership (Peters et al., 2013b).

The committee acknowledges that expectations of country leadership must be adjusted for fragile states. These politically volatile countries have, almost by definition, very limited capacity to take ownership of their health programming. The Paris Declaration makes it clear that the principles of effective aid apply to all countries, but in fragile states, donors may find it impossible to support the government's strategy (OECD, 2005). In such cases, donors can work through regional networks in ways that build local institutions (OECD, 2005).

Contracting and working with nongovernmental organizations can help build local capacity in fragile states (Newbrander et al., 2014). Starting in 2003, the rebuilding of the Afghan health system made use of nongovernmental organizations to provide basic health services (Ameli and Newbrander, 2008; Newbrander et al., 2014). The Afghan government worked with the donors to make and monitor contracts, so managerial skills improved (Newbrander et al., 2014). Now donors are in a position to make their contracts through the regular government budgeting process, evidence of fairly rapid improvement in government

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capacity for oversight (Ameli and Newbrander, 2008; Newbrander et al., 2014; USAID, 2008).

Even in stable, relatively prosperous countries, the principle of country ownership is difficult to execute. The Millennium Challenge Corporation, a U.S. government corporation that works in foreign aid, has made country ownership a central tenet of its strategy. Its policy papers acknowledge that, after 7 years of work, the organization "has a lot more humility about how demanding it is to live up to a commitment to country ownership and true partnership" (Lucas, 2011, p. 30). They describe the challenging balance of donor and recipient interests that country ownership requires, concluding that the effort was entirely worthwhile (Lucas, 2011). When countries own their health and development programs, and when their foreign partners set a standard of mutual transparency, citizens are able to hold their governments to account for how they are using resources (Lucas, 2011). People can then see the successes and failures of the health systems as their country's successes and failures, not the work of an amorphous foreign organization. Cooperative plans thereby encourage government accountability, and contribute to a virtuous cycle of sustainable development.

A Longer Time Frame

An annual funding cycle on development programs makes it difficult for USAID to appreciate the full effects of its programs. It is understandable that legislators take an interest in the immediate consequences of their spending. They need "rapid and hard-hitting results to feed back to their constituencies" (Victora et al., 2004, pp. 1543-44). But, when development funding for health is bound to short timelines, it leads donors to value vertical programs that deliver services to a large number of people quickly (Victora et al., 2004).

Congress values rapid results and requires agencies to regularly re-apply for federal funding. When programs are in an emergency response stage, the short project cycle does little harm. The number of AIDS patients on antiretroviral medicines, for instance, is easy to count quickly. Now the initial emergency response phase for PEPFAR has passed; the future challenge will be integrating vertical programs with the health system. The integration of PEPFAR patient monitoring systems with national systems will be a longer process. Furthermore, the health problems now facing developing countries are complicated,

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structural ones. Solutions to these problems involve building a managerial workforce, improving payment and financing systems, and bringing health services to the periphery of society. The short donor timeline is the direct enemy of such programming.

In development programming, the social benefits lag the costs, and the economic benefits lag even more acutely (Stenberg et al., 2014). When Stenberg and colleagues described the "demographic dividend" of child survival and reduced fertility, they explain that the most valuable economic and social gains are not evident until decades after the initial investment (Stenberg et al., 2014). When donors are overly concerned with their programs 5-year success rates, they risk ignoring the most effective, best value investments simply because it takes too long to see them.

Legislators might well maintain that annual funding cycles are a requirement of government appropriations, that there are too many variables in both donor and recipient countries to predict what aid will be appropriate more than a few years out. The committee acknowledges that matching sustainable aid to political cycles is challenging, but the challenge can be overcome as it was with PEPFAR. In 2003, Congress made a decision to fund large-scale antiretroviral therapy in poor countries, knowing that the moral obligation to continue treatment would last as long as PEPFAR beneficiaries live. At the time, AIDS posed an unprecedented humanitarian crisis in much of the world. The president and legislators recognized that controlling the epidemic would require a long time horizon. More recently, the U.S. government reaffirmed its commitment to fight HIV and AIDS until there is an AIDS-free generation (PEPFAR, 2013b). These choices show a commendable support for meaningful, long-term change. The challenge of translating the intellectual commitment into longer working project timelines remains.

Outcomes Not Inputs

Typically, donors measure the success of health programs by counting what their support buys: the number of patients on antiretroviral therapy or the number of children sleeping under bed nets, for instance. These indicators are essentially process indicators, valuable in so much as they show how the responsible agencies are spending taxpayer money. The point of foreign aid for health is not, however, to distribute pills or bed nets, but to improve people's lives: making them longer, healthier,

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and more productive (Emanuel, 2012). When donors' main concern is what they put into global health, they risk losing sight of what they get out of it.

Table 3-1 gives examples of different indicators donors could use to measure the effect of the processes and materials they contribute to global health programs. Many of the suggested outcomes are long-term ones. Over the shorter term, the proportion of the population receiving effective health interventions can be a useful measure of the reach of donor assistance. Integrating proven, effective interventions for child survival with primary care (sometimes called the diagonal approach to child survival) brought down child mortality in Mexico by almost 50 percent between 1990 and 2005 (Sepúlveda et al., 2006). For reasons discussed later in this report, only those interventions shown to be effective in rigorous impact evaluations should be considered acceptable indicators of aid effectiveness.

Public health *services* (things like vaccination, tuberculosis control, and child growth monitoring) are easy to measure; the effects of these services are not (Khaleghian and Gupta, 2005). It is conceptually important to separate the service from the outcome it aims to bring about. The goal of the President's Malaria Initiative is not to distribute bed nets but to control and eventually eliminate malaria. Tracking progress

TABLE 3-1 Moving from Inputs and Processes to Outcomes in Monitoring U.S. Assistance for Health: Illustrative Indicators

Inputs and Processes	Outcomes (short- and long-term)
Malaria: number of insecticide-treated bednets distributed	• % of children receiving effective malaria treatment within 24 hours • Malaria fraction of under-five mortality
Maternal health: % deliveries attended by doctor, nurse, or midwife	• % women receiving active management of third stage of labor • % women rating quality of delivery care as very good or excellent • Facility maternal case-fatality rates
HIV: Number of people enrolled in antiretroviral care	• Percent of adults and children known to be alive and on treatment 12 months after initiation of antiretroviral therapy • % of patients on ART with low viral loads (to be defined)
Health system: Doctors and nurses per 1000 population	• % of rural and urban populations able to obtain care when last needed (unmet need) • % of adults and children with symptoms of pneumonia (malaria, TB, etc.) receiving appropriate diagnosis and evidence-based treatment

SOURCE: Kruk, 2008.

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towards that goal is more complicated, and tied to public health *functions*, things like disease surveillance, regulatory enforcement, professional training, and policy development (Khaleghian and Gupta, 2005). When health outcomes are a donor priority, the relative value of the health system increases. An investment in national laboratory infrastructure, for example, improves monitoring of HIV patients' viral load, but that is not the only benefit. The same improvements allow for diagnosis of asymptomatic malaria and response to pandemic threats.

An emphasis on the volume of what donors put into health can impede recognition of the structural bottlenecks that prevent recipients from using it. The 67 million diagnostic kits PMI has supplied to its partner countries are of little use if malaria diagnosis only precedes treatment with a substandard medicine (PMI, 2014b). Ending malaria transmission depends on active, responsive surveillance systems to detect infections, even the asymptomatic ones, and laboratory infrastructure for the genotyping, serology, and diagnosis of low-parasite-density infections (Feachem et al., 2010; Moonen et al., 2010). As long as the health systems in the 19 PMI countries cannot support these functions, the U.S. taxpayers' investment in malaria will not realize its full value.

This does not mean that Congress should stop paying attention to what it puts into global health, or that PMI's essential interventions for malaria control are not valuable. Rather, it is a reminder to keep as little room as possible between the things we track and the things we care about (Ord, 2013a). Even powerful population health indicators like maternal and child mortality do not capture the full dimensions of good health that donors aim to improve (Ord, 2013a). Improving health means ensuring that people seek care when they need it and are not driven to bankruptcy by medical bills, that clinicians are knowledgeable, give appropriate treatment, and behave respectfully towards their patients. Measuring these and other outcomes of health care is at least as important to understanding the consequences of a donor funding as counting the volume what the funding buys.

Attention to the outcomes of global health programs can only drive better stewardship of taxpayer money. If the goal of investing in health is to improve people's lives, then there is an implied requirement to use donor funding efficiently, to help more people, not fewer, and to buy more health, not less (Ord, 2013b). An emphasis on what donors supply to recipient countries distorts this equation and forces agencies to give more attention to their contribution than to its product. Careful accounting for the outcome of development aid could prevent a

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misdirection of resources that, through shortsightedness alone, endangers millions of lives (Ord, 2013b).

Conclusions

- Health systems limitations are the binding constraint preventing further progress in global health. Building capacity in aid recipient countries can help relieve this constraint, and would show the United States' commitment to a future when countries run health programs independently.
- A transformative investment in global health is one that supports recipient countries' priorities, understanding the gaps they identify in their health systems and tailoring development work to help close them.
- Short project timelines are not conducive to sustainable development programming. When donors emphasize their programs' shorter-term successes, they risk ignoring the most meaningful investments because it takes too long to realize their effects.
- When donors concentrate on what they put into to global health, they risk losing sight of what they get out of it. Attention to the volume of what donor funding buys impedes recognition of the structural bottlenecks that prevent recipients from using it.

A TRANSITION IN WHAT TO GIVE IN DEVELOPMENT AID FOR HEALTH

It is important that Congress, as a steward of taxpayer money, get the best value possible for its contribution to global health. The question of value becomes more important as economic growth in poor countries decreases the proportionate weight of the donors' contributions. The aid strategy that the U.S. government has relied on in the past relies heavily on technical solutions and service provision. This type of support may not be sustainable in the future.

The most elegant interventions can be useless if they are not embedded in a functional health system (Atun and Coker, 2008). Furthermore, the problems facing low- and middle-income countries nowadays are not the sort that simple interventions can fix. A good donor strategy will acknowledge this, and support recipient countries to develop solutions suitable to the local disease burden and reflective of national priorities. The committee believes that through minor adjustments to what development funding supports, Congress could elicit a transformative shift in global health.

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Development of Global Public Goods

One of the best roles for the U.S. government's donor agencies is to invest in public goods, products that economists describe as nonrival (meaning that consumption by one person does not diminish consumption of the same good by others) and nonexclusionary (meaning the benefits of consumption are available to all, not restricted to a discrete group) (Khaleghian and Gupta, 2005; Woodward and Smith). Public goods are things that everyone needs, but few would pay for. If the production of public goods were left to the market alone, the amount produced would be less than is necessary, so providing them is one of the main responsibilities of governments (Smith and MacKellar, 2007).

There is a special subset of public goods whose production is to the collective benefit of a group of nations. These global public goods are produced for universal consumption; it benefits no one to exclude a nation from sharing in the good, regardless of whether that nation pays for the good's production (Smith and MacKellar, 2007). Disease surveillance is a global public good, as is the development of harmonized standards for quality control in the production of foods and medicines (Jamison et al., 2013). One of the most valuable global public goods that the United States produces is knowledge (IOM, 1997, 2009). American researchers produce some of the world's best tools for improving health. Directing their skills to questions that benefit the poor makes efficient use of the United States' comparative advantage in science and technology.

Funding Research

The private sector has little reason to develop products intended for markets that have no ability to pay (UN System Task Team, 2013). The medicines and tools used to treated tropical disease are a good example this. It costs between $2 and $10 million and takes 3 to 5 years to bring a new diagnostic test to market; a new drug costs many times more, often over billion dollars spanning nearly a decade (Kaitin, 2010; Moran, 2011). Products for neglected diseases (a category which, for accounting purposes, includes HIV/AIDS, tuberculosis, and malaria) accounted for $3.1 billion in 2008, or about 3 percent of global spending on pharmaceutical research and development (Guevara et al., 2008; Moran, 2011). HIV/AIDS, tuberculosis, and malaria products account for the vast majority of this spending; research on the 15 neglected tropical

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diseases amounted to less than half of 1 percent of global pharmaceutical research and development funding (Moran, 2011).

By 2011 estimates, controlling and eliminating neglected tropical diseases will require an increased $2-$3 billion in research costs over 5 years (Bush and Hopkins, 2011). Public-private partnerships, which have the potential to align the interests of the private sector with those of patients in low- and middle-income countries, are one novel way to finance this research. Such partnerships lead to important technical breakthroughs, as with the control of onchocerciasis (Bush and Hopkins, 2011). They also draw the attention of very profitable corporations to global health problems, thereby stimulating drug donations and other partnerships (Bush and Hopkins, 2011). Pharmaceutical companies are not the only private corporations working in private partnerships for global health. The international logistics company DHL Express, for example, has worked with government logisticians in sub-Saharan Africa to improve their warehousing and medicine distribution systems (Dalberg Global Development Advisors and the MIT-Zaragoza International Logistics Program, 2008).

Pharmaceutical development is only one area where the United States could use its comparative advantage in research to improve global health. The emerging field of implementation science[1] has great promise to improve health in developing countries by identifying the social, economic, and political factors that affect health programs (Peters et al., 2013a). Implementation research can explain why the essential interventions for maternal and child survival can fail in the real world. Understanding why programs succeed or fail will be essential for bringing services to a majority of the world's people, as universal health coverage aims to do.

Implementation research explains how contextual factors influence health; in global health, it requires extensive fieldwork and technical cooperation. This type of research is therefore an ideal target for donor support: it is collaborative and takes place in low- and middle-income countries. Collaborative research partnerships are the basis of scientific diplomacy; they also have the potential to produce tools suitable to poor countries. A partnership between American and Bengali scientists at the Cholera Research Laboratory (now the icddr,b[2]) led to the development of oral rehydration solution, a simple mix of water, sugar, and salt that

[1] Formerly called *operations research.*

[2] Officially, the International Centre for Diarrhoeal Disease Research, Bangladesh.

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restores electrolyte balance in patients with severe diarrhea (Yee, 2013). Oral rehydration therapy to treat child diarrhea is one of the most successful public health discoveries of the twentieth century. It has saved an estimated 50 million lives, most of them children (Yee, 2013).

The technical collaborations that started at the Cholera Research Laboratory helped build a local cadre of researchers and managers. The icddr,b now has three main centers in rural and urban Bangladesh, and a network of field stations supporting surveillance and health systems research (icddr,b, 2014b). Over the past 50 years, icddr,b experts have developed tools for managing childhood illness and treating severe malnutrition; tested new vaccines and developed innovative ways of delivering them; and drafted legislation to prevent violence against women (icddr,b, 2014a). The prominence of health research in Bangladesh is often cited as an explanation for the country's lower fertility rate, longer life expectancy and lower infant and child mortality rates than any other country in South Asia (Balabanova et al., 2013).

Catalyzing Innovative Changes

Part of the value in investing in global public goods is that their worth is not constrained to any one country; Americans stand to benefit from this research as well (IOM, 1997). In low- and middle-income countries, there are obvious constraints on the ability of patients and governments to pay for health, and this constraint drives creative changes in service delivery. Rich countries can learn from these programs, especially as the pressure to control costs grows (Mulley, 2013). Some of the most innovative changes in global health have come from developing countries, and are now being adapted for other parts of the world.

Task shifting, the delegation of appropriate tasks to workers with less specialized training, emerged as a response to a shortage of trained professionals in developing countries (WHO, 2006). Task shifting makes efficient use of the available workforce. Rolling out antiretroviral therapy in sub-Saharan Africa, for example, required the training of community health workers in voluntary counselling and testing, monitoring treatment adherence, medicines storage and dispensing, and clinical administrative tasks (WHO, 2007b). When health workers took on these tasks they removed a time burden from nurses, who, in turn, absorbed some tasks traditionally assigned to doctors (WHO, 2007b). Although it requires a significant starting investment in training, task shifting can reduce costs and improve worker satisfaction (WHO, 2007b).

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These are valuable ends in developed countries as well, where health systems struggle with rising costs. One novel strategy for dealing with these costs relies on task shifting to defray health expenses among the 5 percent of patients who account for almost half of health costs in the United States (Cohen and Yu, 2012; Gawande, 2011). An innovative program in New Jersey directed the management of these patients away from doctors in hospitals to a team that includes a nurse practitioner, a social worker, and a community health worker (RWJF, 2012). The use of task shifting, especially the efforts of the community health workers, greatly improved prognosis for these patients, and reduced their health costs by half (Gawande, 2011; RWJF, 2012).

The use of mobile phones to support public health and clinical medicine is another innovation from developing countries with the potential to improve health in the United States (Kahn et al., 2010). Bulk messaging of mobile subscribers is a commonly used health communication technique in sub-Saharan African and South Asia (Deglise et al., 2012). Americans use cheap mobile messaging for health far less. A recent survey of American cell phone owners found that, among the 80 percent of cell phone owners who send and receive text messages, only 9 percent have signed up for text health updates (Fox and Duggan, 2012). An analysis of the lessons learned from successful mobile messaging projects in poor countries could help adapt these tools for better use in rich ones.

The United States has a research infrastructure and technical depth in its universities and private businesses to support health systems innovation in low- and middle-income countries. Developing tools and processes for solving global health problems builds a knowledge base that benefits people around the world. Another important way the United States can build the global knowledge base is by supporting higher education for professional students from low- and middle-income countries. This training will help reduce the shortage of trained health workers, and build a cadre of professionals qualified to run their countries' health systems.

Supporting Higher Education and Meaningful Training

U.S. government agencies working in global health often emphasize training as an essential piece of their aid strategy. More than 2 million people a year take part in USAID trainings (USAID Bureau for Economic Growth Agriculture and Trade, 2012). Most of these trainings

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take the form of short workshops and seminars, however. One-off conferences cannot build the technical depth developing countries need to manage functional health systems. A better investment strategy would be to support the professional training of students in developing countries, taking care to improve the education available domestically and not creating occasions for talented students to emigrate.

Investing in the Education of Health Professionals

The recent Lancet Commission on Investing in Health identified a scarcity of qualified health workers as one of the main bottlenecks to expanding people's access to essential health services (Chen et al., 2004; Jamison et al., 2013). There are far too few doctors, nurses, midwives, pharmacists, and community health workers in developing countries. As Figure 3-1 indicates, sub-Saharan Africa and Southeast Asia have the lowest average ratios of nurses and midwives to population in the world. The actual staff presence in the field is even worse than these statistics suggest. Most clinicians in poor countries work in cities, where they can have a more stable working environment, higher standard of living, and better opportunities for their children (Conway et al., 2007; JLI, 2004; Rao et al., 2011). Rural areas and slums are poorly served. In rural India, for example, roughly 70 percent of practicing providers have no medical training (Das et al., 2012). Even among those who hold credentials, the

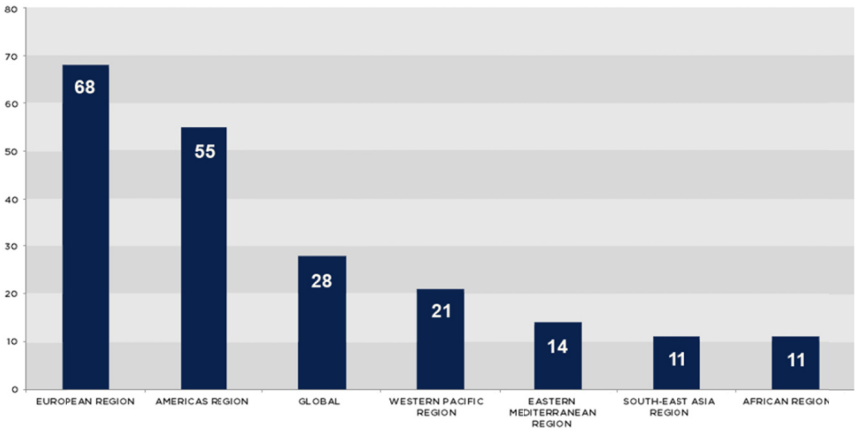

FIGURE 3-1 Ratio of nurses and midwives per 10,000 people, by WHO Region, 2000-2009 data.

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quality of the care they provide is questionable. A study in Delhi found that, in 80 percent of cases, the average practitioner's advice is more likely to harm the patient than help (Das, 2006). Two-thirds of women presenting with pre-eclampsia, for example, were given advice likely to lead to their or their child's death (Das, 2006).

As Box 2-2 explained, health extension training brought an additional 30,000 health workers to rural Ethiopia in 5 years (Banteyerga et al., 2011). The training of higher-level health professionals is even more complicated and central to most national health strategies. The Chinese government, for example, aims to train 300,000 additional doctors over the next 10 years (Lancet, 2011; Yip et al., 2012). Donor countries set similarly ambitious targets. As part of the Global Health Security Agenda, the United States has committed to helping low- and middle-income countries develop a workforce of doctors, veterinarians, basic scientists, and statisticians. The program highlights the need for one field epidemiologist for every 200,000 people—more than 10,000 field epidemiologists for India and the African continent alone (HHS). Such figures do not even account for the increased need for social scientists, administrators, accountants, and logisticians. The need for professional education far outpaces the capacity of the university systems in low- and middle-income countries to provide it. In Ghana, for example, public nursing schools turn away 60 percent of qualified candidates (Conway et al., 2007).

The United States could help alleviate this training crush by investing in the education of health professionals in low- and middle-income countries. There are many different methods for improving health professionals' education, and the appropriate methods will be different in different countries. In a country where there are not sufficient university places or instructors to teach the qualified student pool, donors might help identify ways to use online education or tuition support for study in neighboring countries. If the quality of professional education is a limitation, then partnerships between universities in the United States and in developing countries might be more effective. The Purdue Kenya Partnership, for instance, brings North American and Kenyan pharmacists together for year-long clinical residencies in western Kenya (Pastakia and Ogallo, 2014).

The U.S. government has sponsored training programs for health professionals since the 1970s and 1980s, roughly alternating attention

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between short-term trainings and investment in tertiary education.[3] Many of these programs have not been properly evaluated, in part because the full effects of investing in higher education require decades to come to fruition, and so require a long time frame to appreciate. The manner of training has also changed over time. In an effort to avoid the so-called brain drain (the emigration of trained professionals from developing countries) the National Institutes of Health began the Medical Education Partnership Initiative (MEPI) to improve health and medical education in sub-Saharan Africa (Glass et al., 2014; Kirby, 2014). The program has made grants to 13 African universities and recently expanded to include a somewhat greater emphasis on original investigation (Glass et al., 2014; Kirby, 2014; Saint Louis, 2014). These grants both encourage trained researchers to stay at their home country institutions and support the new inquiry that improves their country's health services (Kirby, 2014).

Through USAID, the U.S. government also funds the Higher Education for Development program, which aims to strengthen the universities and institutions that develop human potential in poor countries (Higher Education for Development, 2014). The program promotes collaboration between American and foreign universities, awarding the foreign institution grants and technical support to improve training (Higher Education for Development, 2014). In addition to supporting training, the U.S. government can provide valuable input as countries develop workforce strategies, plans for how to efficiently manage the existing workforce and train the next generation (JLI, 2004). Such programs require more attention and funding from donors. Despite resounding international consensus on the value of health professional training, it "remains chronically underfunded in national budgets and cooperative development efforts" (Frenk et al., 2010; Taylor et al., 2011, p. 2349).

A good workforce strategy helps make the best use of the trained staff in a country. India, for example, has only one allopathic doctor for every 1,700 people, barely enough to staff secondary and tertiary care hospitals (Kumar, 2013; Mor and Johar, 2012). There are many more people (roughly 750,000) qualified to practice traditional Indian medicine, who, because of constraints on their job market, are happy to work in rural areas (Jithendra and Johar, 2012; Mor and Johar, 2012). The IKP Centre for Technologies in Public Health and Sughavazhvu

[3] Emmy Simmons, email message to E. Anne Peterson. August 12, 2014.

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Healthcare recruit doctors of traditional Indian medicine to provide primary care in rural areas. The doctors take a 6-month bridging course on allopathic primary care, and are required to adhere to detailed treatment protocols (Jithendra and Johar, 2012; Mor and Johar, 2012). Donors could support programs like these that aim to improve the competency of primary care providers in rural areas.

Training more primary care clinicians will help alleviate some of the strain on health systems, but the shortage of health workers is only one dimension of the workforce problem. In many countries there are serious problems with the quality of the education available; in rural India, there fifteen times as many unqualified providers as qualified ones (Das et al., 2012). Even knowledgeable providers often provide poor care (Das, 2006). The problem is not confined to India. In a review of 80 quality studies from a range of low- and middle-income countries, Berendes and colleagues (2011) found providers' technical competence and clinical skills averaging less than 50 percent on a standardized, 100-point scale. In much of the world, the vast variability in medical education, combined with poor incentives to give good quality care, puts patients at risk (Berendes et al., 2011; Das et al., 2012).

Controlling this risk is the job of the administrators who run the health system, enforce its rules, and make its policies. The training of administrative professionals is at least as important to the functioning of the health system as the training of clinicians. Developing countries need administrative experts who can make strategic decisions about how to manage and integrate different components of the health system. One of the best investments donors can make is training the managerial core experts who steer the health system.

Building Management Capacity

Donor effort and research in global health has long given attention to developing clinical tools and programs to save lives. There has been considerably less attention paid to understanding if countries have core managers to deliver programs effectively (Victora et al., 2004). Limited administrative capacity is a serious problem in most developing countries. Simple tasks like record keeping and paying suppliers are often neglected; managers cannot easily fire incompetent workers or even perform more basic tasks, such as releasing pay (Khaleghian and Gupta, 2005; Russell et al., 1999). The administrative system is weakest in the areas of finance, accounting, and human resource management,

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which tends to frustrate good managers and make it difficult to keep them in public service (Khaleghian and Gupta, 2005; Russell et al., 1999; Yip et al., 2012).

Donor countries have good technical depth in public administration, and should make developing strong administrative systems in their partner countries a goal of development. A training component will be an important part of this, but technical exchange will be as important. Health systems in particular depend on administrative competency; different services and functions need different kinds of management and different incentives (Khaleghian and Gupta, 2005). Universal health coverage will require a reliable revenue stream, most of which countries will have to collect from taxes. Developed countries have systems for collecting taxes, and electronic tools that make tax collection more efficient. Helping low- and middle-income countries develop similar skills would be a good use of donor countries' experience.

Universal health coverage is going to make public administration and management a more prominent concern in low- and middle-income countries. It will require decision makers to balance competing priorities: the care of children and adults, preventative services and curative ones, primary care and more complicated secondary and tertiary care programs. There is no one right way to balance these priorities, no perfect "single blueprint for an ideal health care system" (Mills, 2014, pp. 552-53). It is clear, however, that countries with accountable, transparent governments get more for their spending. Improvements to public administration and provider accountability will be crucial for the success of universal coverage (Moreno-Serra and Smith, 2012).

Training and technical exchanges can help build capacity for public administration, but donors could also encourage better management in their partner countries by requiring it of their own projects. Changing the way U.S. government authorities manage their health programming could build momentum for more efficient administration in low- and middle-income countries and improve all stakeholders' understanding of how health systems work.

Making Monitoring and Management Priorities

Governments and donors now struggle to allocate resources wisely and to choose the best investments in global health. The political tradeoffs involved in their decisions are only complicated by the fact that the data informing policy decisions is deficient. The G8 Health Experts

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Group and UN General Assembly have publically commented on the need for accurate health statistics on which to base their decisions; ministers of health and finance need the same (AbouZahr et al., 2010). Until developing countries can track births and deaths, including cause of death, the evidence base informing health and social policy will be lacking. The ability to measure underlies all public health surveillance and response. Developing the capacity to monitor vital statistics should be main priority for the United States and other donors.

The committee acknowledges that building systems for civil registration is a long process; it took 300 years in Great Britain (Lopez et al., 2007). There is no reason that the process should be as onerous in developing countries. Modern information technology makes the collection, organization, and use of vital statistics vastly simpler (AbouZahr et al., 2007). South Africa, where the government facilitated the process, made excellent progress in a decade (Lopez et al., 2007; Statistics South Africa, 2007).

Effective population monitoring depends on local political commitment and legislative mandate (AbouZahr et al., 2007). When high-level commitment is missing, donors often work around their partner countries' deficiencies, setting up parallel monitoring programs for their vertical health programs. Such systems can distort government priorities; the target condition can, simply by being extensively tracked, garner disproportionate attention (Lopez et al., 2007). Over time, the continued use of parallel monitoring systems only undermines the national system (Atun et al., 2011). Donors would do better to use their funding and influence to stimulate political will to create and maintain civil registration systems (Lopez et al., 2007).

Monitoring in Donor Projects

Accurate measurement of vital statistics is one goal of building measurement capacity in developing countries. But routine monitoring and measurement in donor projects has value as well. Measurement drives action. One of the successes of the Millennium Development Goals was in naming obstacles to health and development, and setting clear targets to change them (World Vision, 2012). Collecting data and tracking progress towards national goals will continue to be valuable after 2015. Donors can encourage the measurement of meaningful targets by requiring the same in their projects.

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The information that donors and governments choose to track determines what lessons they learn. So, for example, when donors choose to measure the percentage of births attended by a skill provider, they can learn how to increase the numbers of skilled attendants at births, but not how to ensure those providers give good quality, evidence-based care. Donors should give as much attention to monitoring the consequences of their work as they do to the essential interventions they promote, because monitoring the quality and outcomes of health services "is not an essential intervention—it is simply essential" (Frøen and Temmerman, 2013, p. 1007).

Monitoring is essential because it is the cornerstone of good public management. Good managers monitor their projects in a constant iterative feedback loop. But too often in health, this main purpose of monitoring for efficient management gets lost. Instead, monitoring becomes a means to generate national statistics for global epidemiological analysis (Atun et al., 2011).

Donor projects should be subject to regular, detailed monitoring that accounts for all funding streams and links funding to end results. Such information allows all stakeholders to see how donor money is being spent and consider the trade-offs between different investments (Blanchet et al., 2013). Open sharing of this information helps donors and governments see the effectiveness of aid (Lozano et al., 2011). Evidence of this effectiveness is invaluable to everyone asked to make decisions about how to invest in health (Lozano et al., 2011).

The monitoring of health system projects is particularly weak. Donors often account for health systems expenses in terms of equipment bought and buildings refurbished, the things they put into the health system, not the way the system operates (House of Commons, 2014). Neglect of appropriate monitoring in previous projects has created gaps in our understanding of how to improve health infrastructure. As a result, the health systems literature provides better evidence of what the problems are than of how to fix them (Mills, 2014). There are many possible ways to improve the quality of health care and make services available to the whole population without introducing financial hardship. Policy makers need to experiment with different programs, monitor them carefully, and revise those that do not seem to work. Only after going through these steps in the program, can donors evaluate their investment in health and assess if the program offered an improvement on standard practice. Donors should insist on this, and require that the evaluation of their projects be kept separate from routine monitoring.

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Evaluation Is Separate from Monitoring

Program evaluation starts from the humble perspective that no one knows before doing a project how it will end. Programs can be based on other successful interventions and grounded in good theory, but there is never any guarantee that interventions will work in settings other than those in which they have been tried (Gwatkin et al., 2004). Governments and donors need to understand if the program that they are spending money on is better than the standard of care. This question needs to be put to a disinterested evaluator, an organization not involved with the project's daily management.

Previous expert committees have recommended rigorous evaluation of the impact of global health programs (IOM, 2009). USAID has responded to this suggestion; its current policies require that large projects[4] undergo a performance evaluation, an analysis that determines if the program has achieved its expected results (USAID Bureau for Policy Planning and Learning, 2011). An alternative and more rigorous analysis is an impact evaluation, which relies on a clear, credible counterfactual to establish if measured changes in health (or other development outcomes) are attributable to the program (USAID Bureau for Policy Planning and Learning, 2011). The agency's evaluation policy acknowledges the superior value of impact evaluations. Nevertheless, the agency allows implementing organizations considerable leeway, requiring impact evaluations only "if feasible" (USAID Bureau for Policy Planning and Learning, 2011, p. 8). Its policy maintains that, in development work, some environments are "so complex that standard linear [or] causal models may have little relevance" (USAID Bureau for Policy Planning and Learning, 2011, p. 8).

Understanding the full effects of programs and establishing the causal relationship between interventions and changes in health is often complicated, but never irrelevant. First, it is the government's obligation to the taxpayer to understand the effects of their investment. The need for impact evaluations also relates to donors' obligations to aid recipients. Any new health program has the potential to divert the partner country's attention, money, and staff from other activities. In places where resources are scarce, the opportunity cost of pursuing dead end programs is exceptionally high.

[4] A large project is one that "equals or exceeds in dollar value the mean … project size for the operating unit" (USAID Bureau for Policy Planning and Learning, 2011, p. 8).

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A failure of rigorous evaluation cost the Indian state of Gujarat considerable effort and expense on an institutional delivery program called *Chiranjeevi Yojana*. In an effort to improve the survival of mothers and infants and to increase hospital deliveries, the program paid the medical and travel expenses for expectant mothers below the poverty line, reimbursing a day's forgone wages for the person accompanying her (UNICEF, 2009). Initial evaluations based on before-and-after comparisons suggested that the program reduced maternal deaths by 90 percent, and neonatal deaths by 60 percent (Mohanan et al., 2014). *Chiranjeevi Yojana* won the Asian Innovations Award in 2006 (Ghosh, 2013). Later the same year, the government of Gujarat expanded the program throughout the state.

The staggered roll out of *Chiranjeevi Yojana* allowed for a useful comparison between those districts that implemented the program in early 2006 and those that waited. This more rigorous, quasi-experimental design found that the program effected no change in the probability of hospital delivery, maternal survival, or household spending on delivery (Ghosh, 2013; Mohanan et al., 2014). The improvements suggested in the initial before-and-after studies were driven instead by wider, secular changes. The program's start coincided with a period of rapid economic growth in Gujarat. Initial analysis failed to account for reporting inaccuracy at the hospitals, the self-selection of participants, and a general increase in hospital births over time (Ghosh, 2013; Mohanan et al., 2014).

Another study found that a similar cash incentive program, this one implemented throughout India, drove up fertility in some states, accounting for about 1.86 million additional births in the parts of the county most eager to encourage family planning (Nandi and Laxminarayan, 2012).

Analyses of *Chiranjeevi Yojana* and similar programs give cautionary examples of the cost of neglecting formal impact evaluation. The committee acknowledges that the most rigorous evaluation designs are not always politically feasible. Random selection of program and control areas sets up funders for an objective analysis of program effectiveness. This method can be used more often and more creatively. There are many other ways to do constructive post-factor comparisons, however. U.S. government agencies should require such comparisons in the programs they fund, especially for programs introducing technical innovations or new ways to deliver services.

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When it comes to understanding the effects of health programs, the way an intervention is delivered warrants as rigorous an evaluation as the intervention itself (Victora et al., 2004). The small African nation of Rwanda has given considerable attention to improving its service delivery system and has made rapid improvements in health, especially in use of health services among the poorest people (Sekabaraga et al., 2011). Between 2000 and 2007, the government invested in several novel health financing schemes to increase demand for and supply of health services. It also insisted on rigorous impact evaluation of these programs (Sekabaraga et al., 2011). This allowed them to establish that at least two of the new policies (micro-insurance and performance-based pay) had improved health outcomes and controlled out-of-pocket spending beyond what would have been expected by chance (Sekabaraga et al., 2011). The government's effort to measure and evaluate the effects of their programs allowed it, eventually, to direct more resources to the things that work, and avoid wasting effort on the things that do not.

Donor agencies and governments need to be confident that the programs they spend on are better than the alternatives. Formal, independent, impact evaluations are an indispensable step in establishing the value of any development project. The results of these evaluations should be made available to the taxpayer. In the same away that the National Institutes of Health requires results of the trials it funds be publically available, so should all U.S. government development agencies be required to publish the results of impact evaluations.

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Conclusions

- An investment in global public goods makes good use of the United States' comparative advantage in science and technology. Congress can direct scientific attention to questions that benefit the poor, especially research and development of medicines, vaccines, and diagnostics, and implementation science.
- Higher education and professional training for students from developing countries is a useful contribution to global development; short workshops and seminars are much less so.
- The United States can help alleviate the shortage of health professionals in developing countries by investing in their training. The training of experts in finance, accounting, and human resources management also requires significant attention.
- Donors can encourage an efficient management culture in their partner countries by modelling it in their own programs. Monitoring projects is part of everyday management and separate from formal evaluation.

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4

Conclusion

The world has changed rapidly over the past 25 years. Economies have grown, and people in the poorest parts of the world are living longer, healthier lives. The United States and other donors have contributed to this progress and have an interest in sustaining it. Reducing premature mortality in developing countries will depend on improvements to the health system: the workforce, leadership, information system, service delivery, and financing of the health sector. Building the infrastructure that supports health will reduce disease and lengthen lives, fostering economic growth and global security.

Every year, 150 million people fall into poverty because of health expenses. The threat of financial catastrophe keeps the poorest and most vulnerable people outside the formal health system. In an effort to mitigate their risks, countries are moving towards a universal health coverage system that would provide a basic package of essential services to the whole population. As low- and middle-income countries start to build universal coverage systems, weaknesses in their health systems are becoming a binding constraint.

Support for health systems will help protect the United States standing investments in malaria, HIV and AIDS, and child health. By building local capacity to manage the health system the United States would help reduce dependence of foreign aid. Capacity building is a long process, however. Success toward this goal should be measured in a longer time frame than Congress has previously allowed for development projects. Taking a longer view of global development and paying closer attention to the outcomes (rather than the inputs) of the United States' investment in health could do much to change the tone of foreign aid.

An aid strategy that emphasizes research and training, global public goods, efficient management, and rigorous program evaluation would go

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far to improving the health infrastructure in low- and middle-income countries, and making good use of the proportionately decreasing prominence of U.S. assistance in national health budgets. These few, simple changes could have far-reaching repercussions for building a healthier, more prosperous, and stable world.

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C o p y r i g h t N a t i o n a l A c a d e m

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Glossary

Allopathic medicine, or allopathy: The system of medical practice which treats disease by the use of remedies that produce effects different from those caused by the disease itself. Also called conventional, modern, or Western medicine.

Bilateral aid: Assistance given by one government directly to the government of another country. It is often employed strategically and directed according to political considerations, not only humanitarian ones.

Catastrophic health spending: Refers to health expenditure that is large relative to a patient's capacity to pay. The payment itself need not be large, and, conversely, even large payments may not be deemed catastrophic if there are resources available to pay. Such resources may be the patient's own or those available through external sources, such as insurance coverage. There is no consensus around the threshold for defining catastrophic health spending, and it varies throughout the literature. This report uses a more conservative approach, defining catastrophic health spending as that which exceeds 40 percent of a household's income after basic subsistence needs are met. (Wyszewianski, 1986; Xu et al., 2003, 2007)

Child mortality rate, or under-five mortality rate: The number of children who die by the age of 5 per thousand live births per year.

Civil registration: The system by which a government records the vital events of its citizens and residents. The resulting repository or database is called civil register or registry, or population registry. The primary

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purpose of civil registration is to create legal documents that are used to establish and protect the civil rights of individuals. A secondary purpose is to create a data source for the compilation of vital statistics.

Country ownership: The ability of a country's government, communities, civil society and private sector to lead, prioritize, implement, and be accountable for a country's health response.

Directly Observed Treatment, Short-course (DOTS): The internationally recommended strategy for tuberculosis control. It is a standardized treatment.

Epidemiological transition: A theory that focuses on the complex change in patterns of health and disease and on the interactions between these patterns and their demographic, economic and sociologic determinants and consequences. The transition portion of the theory is concerned with changes in population growth trajectories and composition, especially in the age distribution from younger to older. It also takes into account the changes in patterns of mortality, including increasing life expectancy and reordering of the relative importance of different causes of death. This reordering involves a shift in population-level causes of illness and death from infectious to chronic disease.

Health: As defined by the World Health Organization, a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Health care: The diagnosis, treatment, and prevention of disease, illness, injury, and other physical and mental impairments through services delivered by the medical and allied health professions. It refers primarily to the work done in providing primary care, secondary care, and tertiary care. In some health systems planning it may also include public health population based interventions. In this document, these types of interventions are included in health services.

Health diplomacy: The concept that global health has strategic value and is an important part of the foreign policy of the United States (IOM, 2009). It is one of the key objectives articulated in the Department of Health and Human Services' Global Health Strategy. Health diplomacy requires: "engag[ing] on health issues with diplomatic partners, whether

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individual countries or international organizations and strengthen[ing] peer-to-peer technical, public health, and scientific relationships" (HHS, 2011, p. 42).

Health, or service, infrastructure: Refers to the health care system, including hospitals, the financing of health care, including health insurance, the systems for regulation and testing of medications and medical procedures, the system for training, inspection and professional discipline of doctors and other medical professionals, public health monitoring and regulations, as well as coordination of measures taken during public health emergencies such as epidemics. For purposes of this report, it is synonymous with the term *health system*.

Health insurance: A mechanism by which money is raised to pay for health services by financial contributions to a fund; the fund then purchases health services from providers for the benefit of those who are covered by the scheme. Health insurance contributions may be combined with a payment for other social benefits, in which case the scheme is called social insurance. The payments may be voluntary or compulsory.

Health service: Any service aimed at contributing to improved health including population based services such as community education or vaccination as well as health care services such diagnosis, treatment, and rehabilitation of sick people. Health services can include health education, health promotion, and environmental services such as housing, sanitation, etc., which have a known health benefit.

Health system: The sum total of all the organizations, institutions, and resources whose primary purpose is to improve health.

Horizontal, or integrated, program: A type of health program that "incorporate[s] several health interventions as part of a comprehensive primary care approach, usually delivered through government health facilities" (Victora et al., 2004, p. 1542-3).

Implementation science/research: "The scientific inquiry into questions concerning implementation—the act of carrying an intention into effect, which in health research can be policies, programs, or individual practices (collectively called interventions)" (Peters et al., 2013a).

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Maternal death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Maternal mortality ratio: The number of maternal deaths per 1,000 live births.

Millennium Development Goals (MDGs): A set of eight goals and corresponding time-bound targets to improve health and the standard of living globally by 2015. The MDGs were derived from the UN Millennium Declaration, which was adopted by all 189 member states at the Millennium Summit of the United Nations in New York in 2000. Through this declaration, world leaders committed to a new global partnership to reduce extreme poverty and established a series of targets that became known as the MDGs. The goals are as follows: (1) to eradicate extreme poverty and hunger; (2) to achieve universal primary education; (3) to promote gender equality and empower women; (4) to reduce child mortality; (5) to improve maternal health; (6) to combat HIV/AIDS, malaria, and other diseases; (7) to ensure environmental sustainability; and (8) to develop a global partnership for development.

Multilateral aid: Assistance provided by a group of countries or an institution representing a group of countries, such as the United Nations or the World Bank, rather than by one specific country.

Out-of-pocket health expenditure: Any direct outlay by households for medical care and other goods and services whose primary intent is to contribute to improved health status. Out-of-pocket payments are those expenditures which are not reimbursable by insurers or other third parties; they can include official user fees (charges for service), co-payments, and deductibles as well as unofficial or informal payments. When measuring out-of-pocket health expenditure, the costs of transportation and related expenses are often not included.

Prepayment: A system of collecting funds for health expenses prior to the point-of-care. It may be in the form of taxes, insurance, or a combination of the two.

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Primary (health) care: The medical care a patient receives upon first contact with the health care system, before referral elsewhere within the system.

Secondary (health) care: Hospitals and outpatient specialist clinics to which people go, after referral from primary health care services. These services are generally more specialized and further from where people live. They often include a greater range of diagnostic services such as X-ray and pathological laboratory services; they may also include specialized treatment such as operating theatres, radiotherapy and certain drug therapies not normally available in primary care.

Stock out: Refers to when a pharmacy or other medical facility temporarily exhausts its inventory of medicine. Such an event may affect one or more medicines; in the worst case scenario, it might affect all medicines. A stock-out may occur at one point in time, or it may take place over a period of days, weeks, or even months.

Surveillance: A key component of epidemiology, it can be defined as the ongoing collection, analysis, interpretation, and dissemination of health-related data. Surveillance is one of a number of methods used by epidemiologists to gather information on a disease.

Sustainability: According to USAID, the capacity of a host-country entity to achieve long-term success and stability and to serve its clients and consumers without interruption and without reducing the quality of services after external assistance ends. The ultimate goal is a health sector element that is entirely owned and operated by local institutions and structures.

Task shifting: The rational redistribution of tasks among health workforce teams. Specific tasks are moved, where appropriate, from highly qualified health workers to health workers with shorter training and fewer qualifications in order to make more efficient use of the available human resources for health care delivery.

Technical assistance: A type of aid whose object is to provide less-developed countries with the expertise needed to promote development. It may involve sending experts into the field to teach skills and to help solve problems in their areas of specialization. Conversely, scholarships,

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study tours, or seminars in developed countries may be offered, giving individuals from less-developed countries the opportunity to learn special skills that they can apply when they return home.

Tertiary (health) care: Specialized care that offers a service to those referred from secondary care for diagnosis or treatment, and which is not available in primary or secondary care. This kind of care is generally only available at national or international referral centers. Tertiary care has become a common feature in certain specialties for rare conditions, or where the diagnostic or treatment facilities are scarce or require scarce combinations of resources, or which remain essentially the subject of research.

Universal (health) coverage: Defined as ensuring that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship. Its goal is "to ensure that all people obtain the health services they need without suffering financial hardship when paying for them" (WHO, 2012b).

User fees: Direct charges to users for health services. Such fees are a major component of out-of-pocket health expenditure, and the terms are used interchangeably throughout this report.

Vertical, or categorical, program: A type of health program that "deliver[s] selected interventions, often independently, with specialized management, logistics, and delivery mechanisms. These services could be delivered parallel to, or even outside, other essential interventions targeting the same populations" (Victora et al., 2004, p. 1543).

Vital statistics: Statistics on live births, deaths, fetal deaths, marriages, and divorces. The most common way of collecting information on these events is through civil registration, an administrative system used by governments to record vital events which occur in their populations.

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Appendix A

Committee Member Biographies

John E. Lange, J.D., M.S. (*Co-Chair*) is a former United States ambassador and Senior Fellow for Global Health Diplomacy at the United Nations (UN) Foundation. Ambassador Lange serves as the primary focal point for the UN Foundation's global health diplomacy activities. Prior to joining the Foundation in July 2013, Ambassador Lange spent 4 years at the Bill & Melinda Gates Foundation working with African governments to improve public health. He has served as co-chair of the Global Polio Eradication Initiative's Polio Partners Group since its launch in April 2012.

Ambassador Lange had a 28-year career in the Foreign Service at the U.S. Department of State, including service as Special Representative on Avian and Pandemic Influenza; Deputy Inspector General; Deputy U.S. Global AIDS Coordinator at the inception of the President's Emergency Plan for AIDS Relief; and Associate Dean at the Foreign Service Institute. He was Ambassador to Botswana from 1999 to 2002 and simultaneously served as Special Representative to the Southern African Development Community. Lange headed the U.S. Embassy in Dar es Salaam as Charge d'Affaires during the August 7, 1998, terrorist bombing, for which he received the State Department's Distinguished Honor Award for skilled leadership and extraordinary courage.

From 1991 to 1995 at the U.S. Mission to the United Nations in Geneva, Lange managed humanitarian and refugee assistance channeled through international organizations. He also had tours of duty in the State Department Bureaus of African Affairs, Western Hemisphere Affairs, and Management in Washington and at U.S. Embassies in Togo, France, and Mexico. Prior to joining the diplomatic service in 1981, he worked for 5 years at the UN Association of the USA in New York.

Ambassador Lange authored a first-person account of pandemic influenza negotiations for a book of case studies in global health diplomacy. He is a member of the University of Wisconsin International

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Studies Advisory Board; the Advisory Board of the Global Health Diplomacy Network; the Washington Institute of Foreign Affairs; the American Society of International Law; the American Foreign Service Association; and the Advisory Council of the Foreign Service Youth Foundation.

He has degrees from the National War College (M.S. in national security strategy), the University of Wisconsin Law School (J.D.), and the University of Wisconsin–Madison (B.A. in political science). He was admitted to the bar in Wisconsin and New York and has studied at The Hague Academy of International Law. He speaks English and Spanish and has limited proficiency in French.

E. Anne Peterson, M.D., M.P.H. (*Co-Chair*) is program director for the Public Health of the Ponce School of Medicine and Health Sciences and a research professor at George Washington University. She earned her M.D. degree for the Mayo Medical School in Rochester, Minnesota, and her M.P.H. and Preventive Medicine residency from Emory University in Atlanta, Georgia. She is a board certified in General Preventive Medicine and Public Health. Dr. Peterson has an extensive background in both U.S. and International Public Health and medical practice, and has become a decisive voice in global policy agendas. She is a research professor at George Washington University.

From 2000 to 2005, Dr. Peterson was Assistant Administrator for the Bureau for Global Health in the U.S. Agency for International Development. She helped guide U.S. government's international health policies, including PEPFAR (the President's Emergency Plan for AIDS Relief), served as U.S. representative on the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Dr. Peterson served for 3 years as the Health Commissioner for the State of Virginia. She has served as a consultant to the Centers for Disease Control and Prevention and the World Health Organization in Haiti and Brazil. She lived for almost 6 years in sub-Saharan Africa (Kenya and Zimbabwe). She has also been involved in U.S.-based research in chronic disease prevention.

Rifat Atun, M.B.B.S., M.B.A., FRCP, is a professor of global health systems at Harvard School of Public Health and the director of the Global Health Systems Cluster. He is an honorary professor at the London School of Hygiene and Tropical Medicine, and in 2006-2013, he was a professor of International Health Management at Imperial College London. Between 2008 and 2012 he was a member of the Executive Management Team of the Global Fund to Fight AIDS, Tuberculosis and

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Malaria in Switzerland as the Director of the Strategy, Performance and Evaluation Cluster.

His research is empirically oriented and focuses on health systems reform, diffusion of innovations in health systems and global health financing, including research and development. He has published extensively in these areas in *Lancet*, *PLOS Medicine*, *BMJ*, *Lancet Infectious Disease*, and *Cochrane Database of Systematic Reviews*.

Dr. Atun has worked at the UK Department for International Development Health Systems Resource Centre and has acted as a consultant for the World Bank, the World Health Organization, and a number of international agencies on the design, implementation and evaluation of health system reforms.

Professor Atun has served as a member of the Advisory Committee for the WHO Research Centre for Health Development in Japan. He is a member of the PEPFAR Scientific Advisory Board, the UK Medical Research Council's Global Health Group and a member of Advisory Board for the Norwegian Research Council's Programme for Global Health and Vaccination Research. He serves as a member of the National Academies' Institute of Medicine Standing Committee on Health Systems.

Dr. Atun studied medicine at University of London as a Commonwealth Scholar and subsequently completed his postgraduate medical studies and Masters in business administration at University of London and Imperial College London. He is a Fellow of the Faculty of Public Health of the Royal College of Physicians (UK), a Fellow of the Royal College of General Practitioners (UK), and a Fellow of the Royal College of Physicians (UK).

Georges Benjamin, M.D., is well-known in the world of public health as a leader, practitioner and administrator. Dr. Benjamin has been the executive director of the American Public Health Association (APHA), the nation's oldest and largest organization of public health professionals, since December 2002. He came to this position from his position as Health Secretary for the State of Maryland. Dr. Benjamin became secretary of health in Maryland in April 1999, following 4 years as its deputy secretary for public health services. As secretary, Dr. Benjamin oversaw the expansion and improvement in the state's Medicaid program and served on many committees to improve Maryland health services, including the Task Force on Quality of Care in Nursing Facilities.

Dr. Benjamin is a graduate of the Illinois Institute of Technology and the University of Illinois College of Medicine. He is board-certified in

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internal medicine and a fellow of the American College of Physicians, a fellow of the National Academy of Public Administration, a fellow emeritus of the American College of Emergency Physicians and an honorary fellow of the Royal Society of Public Health.

An established administrator, author, and orator, Benjamin started his post graduate medical career in the U.S. Army Medical Corps at the Madigan Army Medical Center in Tacoma, WA., where he managed a large ambulatory care service as chief of the Acute Illness Clinic and a attending physician within the Department of Emergency Medicine. Later, he was assigned to Walter Reed Army Medical Center where he served as chief of emergency medicine. After leaving the Army, he chaired the Department of Community Health and Ambulatory Care at the District of Columbia General Hospital. He was promoted to acting commissioner for public health for the District of Columbia and later directed one of the busiest ambulance services in the nation as interim director of the Emergency Ambulance Bureau of the District of Columbia Fire Department.

At APHA, Dr. Benjamin also serves as publisher of the nonprofit's monthly publication, *The Nation's Health*, the association's official newspaper, and the *American Journal of Public Health*, the profession's premier scientific publication. He is the author of more than 100 scientific articles and book chapters. His recent book *The Quest for Health Reform: A Satirical History* is an exposé of the nearly 100-year quest to ensure quality affordable health coverage for all through the use of political cartoons.

Dr. Benjamin also serves on the boards of Research!America, Partnership for Prevention, the Reagan-Udall Foundation and is a member of the Institute of Medicine of the National Academies. In 2008, he was named one of the top 25 minority executives in health care by *Modern Healthcare Magazine*, in addition to being voted among the 100 most influential people in health care from 2007-2013 and one of the nation's most influential physician executives from 2009-2013.

Tina Brock, Ed.D., M.S., joined the Department of Clinical Pharmacy in July 2010 and serves as the Associate Dean for Global Health and Educational Innovations for the School of Pharmacy at the University of California, San Francisco. She was previously the Director of Capacity Building at Management Sciences for Health, a Senior Lecturer at the University of London, and a Clinical Associate Professor at the University of North Carolina at Chapel Hill. She received the B.A. German, B.S. Pharmacy and M.S. Pharmaceutical Sciences from the

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University of Mississippi, and the Doctorate of Education from the University of North Carolina at Chapel Hill.

Dr. Brock's primary research interests are global health, interprofessional education, capacity building, human resources for health, technology-enhanced learning, curriculum development, medication access, rational medicines use, and pharmacovigilance systems.

She has done work in Germany, the United Kingdom, Japan, Indonesia, Kenya, Malawi, Rwanda, Uganda, Liberia, and Vietnam. She currently has active projects with Kabul University in Afghanistan and the University of Namibia.

Margaret E. Kruk, M.P.H., M.D., is an assistant professor of Health Policy and Management at the Mailman School of Public Health at Columbia University. Dr. Kruk focuses her research on health system effectiveness and population preferences for healthcare in sub-Saharan Africa. Dr. Kruk is particularly interested in the application of new methods, such as discrete choice experiments and systems dynamic modeling, in studying the interactions between health systems and populations in low-income countries. She works with governments and academic colleagues in several African countries, including Tanzania, Ethiopia, Liberia, and Ghana. She has published on women's preferences for maternal health care, policy options for human resource shortages, health care financing, and evaluation of large-scale health programs in low-income countries. Prior to coming to Columbia, Dr. Kruk was an assistant professor in health management and policy at the University of Michigan School of Public Health and policy advisor for Health at the Millennium Project, an advisory body to the UN Secretary-General on the Millennium Development Goals. She has also practiced family and emergency medicine in northern Ontario, Canada.

Charles MacCormack, Ph.D., is Executive-in-Residence at Middlebury College. From 1993-2011, Dr. MacCormack was president of Save the Children. Dr. MacCormack is on the Board of Directors of the International Save the Children Alliance, which implements programs totaling $1 billion for children in 120 countries.

Dr. MacCormack served as Board Chair of InterAction from 2006 to 2009. He also serves as Co-Chair of both the Basic Education Coalition and the Campaign for Effective Global Leadership, and is a founding board member of Malaria No More. He is also a member of the Council on Foreign Relations.

Dr. MacCormack sat on the Advisory Committee on Voluntary Foreign Aid and the Food Security Advisory Committee and was

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president of the Non-Governmental Committee on UNICEF. He was selected by the United Nations Secretary General to participate on the Founding Committee of the United Nations University and served as a member of the United States Delegation to the 1997 World Food Summit and the United States Delegation for the 2002 General Assembly Special Session on Children. He was awarded an honorary Doctor of Education by Middlebury College, and an honorary Doctor of Law by Clark University. He was made a member of the Grand Cordon of the Order of Al-Istiolal by former King Hussein of Jordan.

Prior to his position at Save the Children, Dr. MacCormack was President of World Learning (formerly known as the Experiment in International Living) from 1977 to 1992. His first experience at Save the Children was as Vice President of Programs in the 1970s and for 4 years he worked as the Director of the Masters Degree Program in International Management at the School for International Training. Before that, he was a research fellow in foreign policy studies at The Brookings Institution. He earlier served as Assistant to the Dean of the International Fellows Program at Columbia University. Dr. MacCormack was an instructor of Latin American Politics at the University of New Hampshire Summer School and was a staff associate for the First National City Bank International Division in Caracas, Venezuela.

Dr. MacCormack received his doctorate and master's degrees from Columbia University and his undergraduate degree from Middlebury College. He was a National Science Foundation Fellow at the Universidad Nacional Autonoma de Mexico in Mexico City and a Fulbright Fellow at the Universidad Central de Venezuela in Caracas. He participated in a special three-summer program at the Harvard Business School on the Leadership of Global Non-Profit Organizations.

Nachiket Mor, M.B.A., Ph.D., is the chairman of the board of CARE India, a board member of the Reserve Bank of India, and a board member of CRISIL. He has a background in finance and economics with a specific interest in financial access and health care. Dr. Mor worked with ICICI, India's second largest bank, from 1987 to 2007 and was a member of its Board of Directors from 2001 to 2007. From 2007 to 2011, he served as the founding president of the ICICI Foundation for Inclusive Growth and during this period was also the chair of the Governing Council of IFMR Trust and board chair of FINO, both leading participants in the field of financial inclusion in India. While at ICICI he also served as a board member of Wipro for 5 years and board chair of the Fixed Income Money Market and Derivatives Association of India for 2 years. During 2011-2012 he served as a member of the High Level

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Expert Group on Universal Health Coverage for India appointed by the Planning Commission of India, and during 2012-2013 as a member of the health sub-committee of the National Advisory Council of the Government of India. Dr. Mor is currently also a member of the Board of Directors of the IKP Centre for Technologies in Public Health and Sughavazhvu Healthcare. Dr. Mor is a Yale World Fellow, has a Ph.D. in economics from the University of Pennsylvania with a specialization in finance from the Wharton School, an M.B.A. from the Indian Institute of Management, Ahmadabad, and an undergraduate degree in Physics from the Mumbai University.

David Ross, Sc.D., is Director of the Public Health Informatics Institute. He became the Director of All Kids Count, a program of the Institute supported by the Robert Wood Johnson Foundation (RWJF), in 2000, and subsequently began the Institute, also with funding from RWJF. His experience spans the private healthcare and public health sectors. Before joining the Task Force for Global Health, Dr. Ross was an executive with a private health information systems firm, a Public Health Service officer with the Centers for Disease Control and Prevention (CDC), and an executive in a private health system.

Dr. Ross holds a doctoral degree in Operations Research from the Johns Hopkins University (1980) where he was involved in health services research. After serving as Director of the Health Service Research Center, Baltimore USPHS Hospital, he became Vice President for Administration with the Wyman Park Health System. In 1983, he joined the CDC's National Center for Environmental Health. During his career at CDC, he worked in environmental health, CDC's executive administration, and public health practice. Dr. Ross was founding director of the Information Network for Public Health Officials, CDC's national initiative to improve the information infrastructure of public health. His research and programmatic interests reflect those of the Institute: the strategic application of information technologies to improve public health practice.

Susan Scrimshaw, Ph.D., is currently the President of The Sage Colleges in Troy, New York. Prior to her appointment as President of The Sage Colleges, Dr. Scrimshaw was President of Simmons College in Boston, Massachusetts. She was dean of the School of Public Health, and professor of community health sciences and of anthropology at the University of Illinois at Chicago (UIC) from 1994 through June 2006. Prior to becoming dean at UIC in 1994, she was associate dean of public

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health and professor of public health and anthropology at the University of California, Los Angeles.

Dr. Scrimshaw is a graduate of Barnard College and obtained her M.A. and Ph.D. in anthropology from Columbia University. Her research includes community participatory research methods, addressing health disparities, improving pregnancy outcomes, violence prevention, health literacy, and culturally appropriate delivery of health care. She is a member of the Institute of Medicine (IOM) of the National Academies, where she has been elected a member of the governing council and serves on The Committee on Science, Engineering, and Public Policy (COSEPUP), a joint unit of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine. She is also a fellow of the American Association for the Advancement of Science, the American Anthropological Association, and the Institute of Medicine of Chicago.

While in Chicago, Dr. Scrimshaw was an appointed member of the Chicago Board of Health and Illinois State Board of Health. She chaired the IOM Committee on Communication for Behavior Change in the 21st Century: Improving the Health of Diverse Populations, and served as a member of the IOM Committee on Health Literacy. She is a past president of the board of directors of the U.S.-Mexico Foundation for Science, former chair of the Association of Schools of Public Health, and past president of the Society for Medical Anthropology. Her honors and awards include the Margaret Mead Award, a Hero of Public Health gold medal awarded by President Vicente Fox of Mexico, the UIC Mentor of the Year Award in 2002, and the Chicago Community Clinic Visionary Award in 2005.

Dr. Scrimshaw was raised in Guatemala until age 16. She is fluent in Spanish, and also speaks French and Portuguese.

Nana A. Y. Twum-Danso, M.D., M.P.H., FACPM, is a public health and preventive medicine physician with 14 years of experience in global health policy, strategy development, program design, project management, implementation, monitoring and evaluation. She has technical expertise in quality improvement; change management; health systems strengthening; community-based health care delivery; maternal, neonatal and child health (MNCH); parasitic disease control; and pharmacovigilance.

Currently, Dr. Twum-Danso is a Senior Program Officer in the MNCH Division of the Bill & Melinda Gates Foundation where she develops and manages grants across the continuum of care from home to hospital to improve MNCH outcomes at scale in several African countries and provides technical assistance to colleagues on quality

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improvement and behavior change strategies. Prior to that, she was the Executive Director for African Operations at the Institute for Healthcare Improvement (IHI) in Cambridge, Massachusetts, after 3.5 years as the Director of *Project Fives Alive!* in Ghana, a nationwide quality improvement initiative to accelerate the achievement of Millennium Development Goals Four and Five which was a partnership amongst IHI, the Ghana Health Service and the National Catholic Health Service of Ghana. Before IHI, Dr. Twum-Danso held several leadership positions at the Task Force for Global Health in Atlanta, Georgia, during which time she worked collaboratively with the World Health Organization, the United Nations Children's Fund, the World Food Program, pharmaceutical companies, and various international nongovernmental organizations to reduce the public health burden of onchocerciasis, lymphatic filariasis and soil-transmitted helminth infections in sub-Saharan Africa, Latin America and Southeast Asia. Dr. Twum-Danso was an adjunct faculty member with the Department of Family and Preventive Medicine at Emory University School of Medicine in Atlanta from 2001 to 2008. She is currently playing a similar role in the Department of Maternal and Child Health at the Gillings School of Global Public Health at the University of North Carolina in Chapel Hill, North Carolina.

Dr. Twum-Danso has a bachelor's degree in biochemical sciences and a medical degree, both from Harvard University. She received specialty training in preventive medicine and public health from Emory University, which included a master of public health degree in health policy and management. Dr. Twum-Danso has been a Fellow of the American College of Preventive Medicine since 2006 and a member of the International Society for Quality in Health Care since 2010.

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Appendix B

Meeting Agenda

APRIL 21-22, 2014
MEETING 1—AGENDA
Keck Center
500 Fifth Street NW
Washington, DC 20001

DAY ONE: MONDAY, APRIL 21, 2014
ROOM 201

8:00-8:30 Breakfast available

8:30-10:00

Session 1—Closed
IOM Committee Process and Charge to Committee

Objective: To review the National Academies' study process that includes a bias and conflict of interest discussion; to discuss the role of the committee in addressing the statement of task; and to ensure the committee understands its statement of task.

10:00-10:15 Break

Session 2—Open
The Health System and Global Health

10:15-10:30 Sponsor Orientation and Study Origin

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Karen Cavanaugh, *Director, Office of Health Systems*, USAID

10:30-10:50 The Health System and Sustained Progress Against Deadly Diseases
Michael Johnson, *Head, Technical Advice and Partnerships,* The Global Fund

10:50-11:10 Measuring Success, Investing in Health, and the Role of NGOs
Kent Hill, *Senior Vice President of International Programs,* World Vision

11:10-11:30 The Role of Health Ministries, Staff, and Information Management
Mirta Roses Periago, *Director Emeritus,* Pan American Health Organization (PAHO) (by video conference)

11:30-12:15 Facilitated Panel Discussion
Margaret Kruk, Moderator

- *What is the role of the public-private partnerships in developing the health system?*
- *What are the roles of the government, nongovernmental organizations (NGOs), and the private sector in universal health coverage?*

12:15-1:00 Lunch

1:00-5:00

Session 3—Closed
Committee Deliberation

Objective: To review the previous sessions, begin drafting an outline for the report, discuss potential conclusions, and make a plan for the following day.

5:00 Adjourn

6:00 Working dinner for committee and staff

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DAY TWO: TUESDAY, APRIL 22, 2014
ROOM 103

8:30-9:00 Breakfast available

Session 1—Open
Health Expenses and System Efficiency

9:00-9:10 Welcome and overview
Anne Peterson, *Committee Co-Chair*

9:10-9:30 PEPFAR Implementation and the Role of Health Systems
Eric Goosby, *Professor of Medicine,* University of California, San Francisco

9:30-9:50 Health Financing and Reaching the Poor
David Peters, *Professor and Department Chair,* Johns Hopkins Bloomberg School of Public Health

9:50-10:10 The Global Health Security Agenda
Laura Holgate, *Senior Director, WMD Terrorism & Threat Reduction*, National Security Council

10:10-10:25 Break

10:25-11:10 Facilitated Panel Discussion
Nana Twum-Danso, Moderator

- *What is the relationship between the health systems and the future of vertical health program?*
- *What happens to vertical programs if the rest of the health system stays as is?*

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11:10-5:00

Session 2—Closed
Committee Deliberation

Objective: To deliberate on gaps in the current donor strategy, review the main conclusions, and integrate these conclusions into the report outline.

5:00 Adjourn

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