The Role of Public-Private Partnerships in Health Systems Strengthening: Workshop Summary

DETAILS

120 pages | 6 x 9 | PAPERBACK
ISBN 978-0-309-38139-0 | DOI: 10.17226/21861

AUTHORS

Rachel M. Taylor and Jennifer Christian, Rapporteurs; Forum on Public-Private Partnerships for Global Health and Safety; Board on Global Health; Institute of Medicine; National Academies of Sciences, Engineering, and Medicine

The Role of Public–Private Partnerships in Health Systems Strengthening

Workshop Summary

Rachel M. Taylor and Jennifer Christian, *Rapporteurs*

Forum on Public–Private Partnerships for Global Health and Safety

Board on Global Health

Institute of Medicine

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, DC
www.nap.edu

PREPUBLICATION COPY: UNCORRECTED PROOFS

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, NW Washington, DC 20001

Financial support for this activity was provided by Anheuser-Busch InBev; Becton, Dickinson and Company; The Bill & Melinda Gates Foundation; CARE USA; Catholic Health Association of the United States; Estée Lauder Companies; ExxonMobil; Fogarty International Center of the National Institutes of Health; General Electric; Global Health Innovative Technology Fund; Johnson & Johnson; Lockheed Martin Corporation; Medtronic; Merck; Novartis Foundation; PATH; PepsiCo; Pfizer; Procter & Gamble Co.; Rockefeller Foundation; Takeda Pharmaceuticals; United Nations Foundation; University of Notre Dame; UPS Foundation; U.S. Agency for International Development; U.S. Department of Health and Human Services Office for Global Affairs; U.S. Department of State/Office of the Global AIDS Coordinator; U.S. Food and Drug Administration; Verizon Foundation; and The Vitality Group. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

International Standard Book Number-13: 978-0-309-XXXXX-X
International Standard Book Number-10: 0-309-XXXXX-X

Additional copies of this workshop summary are available for sale from the National Academies Press, 500 Fifth Street, NW, Keck 360, Washington, DC 20001; (800) 624-6242 or (202) 334-3313; http://www.nap.edu.

Printed in the United States of America

Suggested citation: National Academies of Sciences, Engineering, and Medicine. 2016. *The role of public–private partnerships in health systems strengthening: Workshop summary.* Washington, DC: The National Academies Press.

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

The **National Academy of Sciences** was established in 1863 by an Act of Congress, signed by President Lincoln, as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Dr. Ralph J. Cicerone is president.

The **National Academy of Engineering** was established in 1964 under the charter of the National Academy of Sciences to bring the practices of engineering to advising the nation. Members are elected by their peers for extraordinary contributions to engineering. Dr. C. D. Mote, Jr., is president.

The **National Academy of Medicine** (formerly the Institute of Medicine) was established in 1970 under the charter of the National Academy of Sciences to advise the nation on medical and health issues. Members are elected by their peers for distinguished contributions to medicine and health. Dr. Victor J. Dzau is president.

The three Academies work together as the **National Academies of Sciences, Engineering, and Medicine** to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions. The Academies also encourage education and research, recognize outstanding contributions to knowledge, and increase public understanding in matters of science, engineering, and medicine.

Learn more about the National Academies of Sciences, Engineering, and Medicine at **www.national-academies.org**.

PREPUBLICATION COPY: UNCORRECTED PROOFS

PLANNING COMMITTEE ON THE LONG-TERM PICTURE FOR HEALTH SYSTEMS: THE ROLE OF PUBLIC–PRIVATE PARTNERSHIPS IN HEALTH SYSTEMS STRENGTHENING[1]

SIMON BLAND (*Co-Chair*), Director, New York Liaison Office, United Nations Programme on HIV/AIDS
KATHERINE BOND (*Co-Chair*), Vice President, International Regulatory Affairs, U.S. Pharmacopeia
ROBERT BOLLINGER, Professor of Medicine, Public Health and Nursing, Johns Hopkins University School of Medicine
JO IVEY BOUFFORD, President, New York Academy of Medicine
BRUCE COMPTON, Senior Director of International Outreach, Catholic Health Association of the United States
TREVOR GUNN, Vice President, International Relations, Medtronic

[1] Institute of Medicine planning committees are solely responsible for organizing the workshop, identifying topics, and choosing speakers. The responsibility for the published workshop summary rests with the workshop rapporteurs and the institution.

FORUM ON PUBLIC–PRIVATE PARTNERSHIPS FOR GLOBAL HEALTH AND SAFETY[1]

JO IVEY BOUFFORD (*Co-Chair*), President, New York Academy of Medicine
CLARION JOHNSON (*Co-Chair*), Private Consultant, ExxonMobil
TARA ACHARYA, Senior Director, Strategic Nutrition Risks in Global R&D, PepsiCo
SIR GEORGE ALLEYNE, Director Emeritus, Pan American Health Organization; Chancellor, University of the West Indies
RAJESH ANANDAN, Senior Vice President, Strategic Partnerships and UNICEF Ventures, U.S. Fund for UNICEF
MARLEECE BARBER, Director of Health and Wellness and Chief Medical Officer, Lockheed Martin Corporation
SIMON BLAND, Director, New York Liaison Office, United Nations Programme on HIV/AIDS
ROBERT BOLLINGER, Professor of Medicine, Public Health and Nursing, Johns Hopkins University School of Medicine
KIM C. BUSH, Director, Life Sciences Partnerships, Global Health Program, The Bill & Melinda Gates Foundation
GARY M. COHEN, Executive Vice President, Becton, Dickinson and Company
BRENDA D. COLATRELLA, Executive Director, Corporate Responsibility, Merck
BRUCE COMPTON, Senior Director of International Outreach, Catholic Health Association of the United States
PATRICIA DALY, Senior Director, Save the Children
PATRICIA J. GARCIA, Dean, School of Public Health, Cayetano Heredia University
HELENE D. GAYLE, President and Chief Executive Officer, CARE USA (until July 2015)
ELAINE GIBBONS, Executive Director, Corporate Engagement, PATH
ROGER GLASS, Director, Fogarty International Center
LOUISE GRESHAM, President and Chief Executive Officer, Fondation Mérieux USA (until January 2015)
RICHARD GUERRANT, Thomas H. Hunter Professor of International Medicine, University of Virginia
TREVOR GUNN, Vice President, International Relations, Medtronic
JESSICA HERZSTEIN, Member, U.S. Preventive Services Task Force
BEN HOFFMAN, Chief Medical Officer, GE Energy
JAMES JONES, Manager, Community Investment Programs, ExxonMobil
ALLISON TUMMON KAMPHUIS, Leader, Children's Safe Drinking Water Program, Social Sustainability, Procter & Gamble Co.
ROSE STUCKEY KIRK, President, Verizon Foundation
SEEMA KUMAR, Vice President, Global R&D Communications, Johnson & Johnson
AMBASSADOR JOHN E. LANGE, Senior Fellow, Global Health Diplomacy, United Nations Foundation
NANCY MAHON, Senior Vice President, Philanthropy and Social Initiatives, Estée Lauder Companies

[1] Institute of Medicine forums and roundtables do not issue, review, or approve individual documents. The responsibility for the published workshop summary rests with the workshop rapporteurs and the institution.

EDUARDO MARTINEZ, President, UPS Foundation
MICHAEL MYERS, Managing Director, Rockefeller Foundation
REGINA RABINOVICH, ExxonMobil Malaria Scholar in Residence, Harvard T.H. Chan School of Public Health
SCOTT C. RATZAN, Vice President, Global Corporate Affairs, Anheuser-Busch InBev
B.T. SLINGSBY, Chief Executive Officer and Executive Director, Global Health Innovative Technology Fund
KATHERINE TAYLOR, Research Professor, Director of Operations, Eck Institute for Global Health, University of Notre Dame
WENDY TAYLOR, Director, Center for Accelerating Innovation and Impact, U.S. Agency for International Development
MARY LOU VALDEZ, Associate Commissioner for International Programs, Director, Office of International Programs, U.S. Food and Drug Administration
JACK WATTERS, Vice President for External Medical Affairs, Pfizer
HOLLY WONG, Principal Deputy Assistant Secretary for Global Affairs, U.S. Department of Health and Human Services
DEREK YACH, Chief Health Officer, The Vitality Group
TADATAKA "TACHI" YAMADA, Chief Medical and Scientific Officer, Executive Vice President, Takeda Pharmaceuticals

IOM Staff

RACHEL M. TAYLOR, Program Officer
FRANCIS AMANKWAH, Research Associate
PRIYANKA NALAMADA, Senior Program Assistant
FAYE HILLMAN, Financial Officer
PATRICK KELLEY, Director, Board on Global Health

Reviewers

This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary 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 process. We wish to thank the following individuals for their review of this workshop summary:

MUSHTAQUE CHOWDHURY, BRAC, Dhaka, Bangladesh
ANDREW JONES, Tropical Health and Education Trust, London, UK
LOLA ADEDOKUN, Doris Duke Foundation, New York, NY
MARION JACOBS, University of Cape Town, Cape Town, South Africa

Although the reviewers listed above have provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this workshop summary was overseen by **David R. Challoner** of the University of Florida**.** He was responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteurs and the institution.

Acknowledgments

The National Academies of Sciences, Engineering, and Medicine Forum on Public–Private Partnerships for Global Health and Safety (PPP Forum) has been established to illuminate opportunities that strengthen the role of public–private partnerships (PPPs) in meeting the health and safety needs of individuals and communities around the globe. The PPP Forum seeks to foster a collaborative community of multisectoral health and safety leaders to leverage the strengths of varying sectors and multiple disciplines to yield benefits for global health and safety.

A number of individuals contributed to the development of this workshop and report. These include a number of staff members from the Institute of Medicine (IOM) and the Academies: Marton Cavani, Greta Gorman, Faye Hillman, Patrick Kelley, Sarah Kelley, Priyanka Nalamada, Bettina Ritter, and Kimberly Scott. The planning committee contributed several hours of service to develop and execute the agenda. Reviewers also provided thoughtful remarks in reading the draft manuscript.

The overall successful functioning of the forum and its activities depends on the generosity of its sponsors. Financial support for this activity was provided by Anheuser-Busch InBev; Becton, Dickinson and Company; The Bill & Melinda Gates Foundation; CARE USA; Catholic Health Association of the United States; Estée Lauder Companies; ExxonMobil; Fogarty International Center of the National Institutes of Health; General Electric; Global Health Innovative Technology Fund; Johnson & Johnson; Lockheed Martin Corporation; Medtronic; Merck; Novartis Foundation; PATH; PepsiCo; Pfizer; Procter & Gamble Co.; Rockefeller Foundation; Takeda Pharmaceuticals; United Nations Foundation; University of Notre Dame; UPS Foundation; U.S. Agency for International Development; U.S. Department of Health and Human Services Office for Global Affairs; U.S. Department of State/Office of the Global AIDS Coordinator; U.S. Food and Drug Administration; Verizon Foundation; and The Vitality Group.

Contents

1

Introduction[1]

Over the past several decades, the public and private sectors made significant investments in global health, leading to meaningful changes for many of the world's poor. These investments and the resulting progress are often concentrated in vertical health programs, such as child and maternal health, malaria, and HIV, where donors may have a strategic interest. Frequently, partnerships between donors and other stakeholders form around these vertical disease or condition-specific programs, as stakeholders can coalesce on a specific topical area of expertise and interest. However, to sustain these successes and continue progress, there is a growing recognition of the need to strengthen health systems more broadly and build functional administrative and technical infrastructure that can support health services for all, improve the health of populations, increase the purchasing and earning power of consumers and workers, and advance global security (IOM, 2014).

On June 25–26, 2015, the National Academies of Sciences, Engineering, and Medicine Forum on Public–Private Partnerships for Global Health and Safety (PPP Forum) held a workshop on the role of public–private partnerships (PPPs) in health systems strengthening. The PPP Forum was established in late 2013 to illuminate opportunities for strengthening the role of PPPs in meeting the health and safety needs of individuals and communities around the globe. The PPP Forum seeks to foster a collaborative community of multisectoral health and safety leaders to leverage the strengths of varying sectors and multiple disciplines to achieve benefits for global health and safety. By regularly gathering and learning from leaders of diverse, exemplary, and innovative entities, the PPP Forum focuses on catalyzing more effective global health initiatives that will capitalize on the complementary assets and motivations of the sectors involved. The membership is committed to engaging the expertise of its members and broader groups of stakeholders, its resources, and its networks to explore opportunities to catalyze partnerships; to elaborate norms that will protect the interests of those partnered and those served; to capture and share best insights, evidence, and practices for decision making and resource allocation for partnerships; and to foster innovations that may increase efficiencies of and equitable access to effective care. This workshop was the first public convening of the PPP Forum.

The workshop brought together stakeholders from the public and private sectors to examine a range of incentives, innovations, and opportunities for relevant sectors and stakeholders in strengthening health systems through partnerships; to explore lessons

[1] The planning committee's role was limited to planning the workshop. The workshop summary has been prepared by the rapporteurs as a factual account of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants and are not necessarily endorsed or verified by the Institute of Medicine. They should not be construed as reflecting any group consensus.

learned from previous and ongoing efforts with the goal of illuminating how to improve performance and outcomes going forward; and to discuss measuring the value and outcomes of investments and documenting success in partnerships focused on health systems strengthening.

For the purposes of the workshop, the term "health system" comprises all actors, organizations, and resources working toward improved health. It is inclusive of personal health care delivery services, public and population health services, health research systems, and policies and programs within other sectors that address the broader determinants of health. The World Health Organization (WHO) identified six building blocks of the health system—leadership and governance, financing, workforce, medical products and technology, information systems, and service delivery (WHO, 2007). Additionally, a health system with robust public health services includes mechanisms for monitoring health status to identify and solve community health problems; diagnosing and investigating health problems and health hazards in the community; promoting health; encouraging community participation in health; developing policies and plans that support individual and community health efforts; enforcing laws and regulations that protect health and ensure safety; promoting equitable access; developing and training human resources in public health; assuring quality; conducting public health research; and reducing the impact of emergencies and disasters on health (PAHO, 2008).

Further, recognizing that the health of individuals and communities is influenced by factors that are often outside the purview of the tradition health sector—such as the social, economic, and built environments—for this workshop, the "health system" has been operationalized to include policies and programs within other sectors that address these determinants. Among such sectors are finance, education, transportation, and information communication technology.

To strengthen health systems across these domains, different actors from the public and private sectors have unique resources that they can bring to bear, for example, information and technical systems development, human resources management, financing mechanisms, and product development and delivery capacity. For the purpose of this workshop, the private sector includes all nongovernmental actors, including for-profit companies, private providers, nonprofit organizations, and foundations. Partnerships are an opportunity for stakeholders to come together around a common set of objectives, with the ultimate goal of health systems strengthening, and identify not only how to work together but also where each stakeholder can contribute the most effectively. Within the current context of the post-2015 development agenda, a discussion on the role of partnerships in building sustainable and resilient health systems is particularly timely.

ORGANIZATION OF THE REPORT

This report provides a summary account of the presentations given at the workshop. Opinions expressed within this summary are not those of the Institute of Medicine, the PPP Forum, or their agents, but rather of the presenters themselves. Such statements are the views of the speakers and do not reflect conclusions or recommendations of a formally appointed committee. This summary was authored by designated rapporteurs based on the workshop presentations and discussions and does not represent the views of the institution, nor does it constitute a full or exhaustive overview

of the field. The summary report is complemented by an individually authored literature review of public–private partnership activities in health systems strengthening that is included in Appendix A.

During the workshop, many of the sessions touched on more than one of the topics within the Statement of Task (see Box 1-1). Given the overlap of the issues and topics discussed at the workshop, this summary is organized topically rather than chronologically. The workshop agenda and a complete list of workshop speakers are included in Appendix B and Appendix C, respectively.

BOX 1-1
Statement of Task

The Long-Term Picture for Health Systems: The Role of Public–Private Partnerships in Health Systems Strengthening: A Workshop

An ad hoc committee will be appointed to plan a 2-day public workshop to examine the role of public–private partnerships (PPPs) in strengthening health systems in low- and middle-income countries. The workshop will feature invited presentations and discussions to examine the following questions:

- How can strengthening health systems sustain and improve progress in global health and safety, increase the purchasing and earning power of consumers and workers, and advance global security?
- Where and how are partnerships investing in systems strengthening, and where are the gaps and opportunities? Where are the opportunities for sectors that have not been traditionally engaged in global health and safety to provide valuable technical expertise and resources? What are the roles and responsibilities of different sectors?
- With the current discussion on the post-2015 development agenda, how can partnerships be positioned to focus on long-term investments in building health systems? Are there models and best practices for evaluating the impacts of partnerships that are focused on long-term systems-level outcomes?
- Are there examples of partnerships that are addressing health systems strengthening? If so, how did they develop and evolve, and how are their successes and failures being evaluated?

The committee will develop the workshop agenda, select and invite speakers and discussants, and moderate the discussions. Experts will be drawn from the public and private sectors, as well as academic institutions, to allow for multilateral, evidence-based discussions. An individually authored summary of the presentations and discussions at the workshop will be prepared by a designated rapporteur in accordance with institutional guidelines.

2

Setting the Context

In the context of the current global health and development agendas, several workshop speakers emphasized the relevance of health systems strengthening and public–private partnerships (PPPs) to the global Sustainable Development Goals (SDGs). Simon Bland, from the United Nations Programme on HIV/AIDS, set the context by first describing the predecessor of the SDGs, the Millennium Development Goals (MDGs), which created a global development agenda from 2000 to 2015. Despite some debate over the legacy of the MDGs, Bland suggested that the MDGs created several overarching changes in the global development community. One such change was the establishment of a blueprint for tackling the most pressing global challenges. With the objective of making progress on this articulated blueprint, additional overarching changes followed, including political pressure and momentum, measurement and tracking of progress, resource mobilization, and prioritization and channeling of resources. Since the adoption of the MDGs, governments have been held more closely accountable and official development assistance has increased, with global aid reaching record levels in both 2013 and 2014.

Bland enumerated several measurable outcomes of the MDGs: global poverty was halved 5 years ahead of the MDGs target; 9 out of 10 children are enrolled in primary school, with as many girls as boys in school; remarkable gains have been made in the fights against malaria, tuberculosis, and HIV/AIDS; the likelihood of a child dying before the age of 5 has been nearly cut in half; and the number of people who lack access to water has been halved. These MDG outcomes, on the whole, have made a profound difference in the lives of many people. However, as Bland noted, the MDGs gave limited attention to the private sector's role in their advancement and to economic growth and institutional capacity and development.

During the era of the MDGs, the global health agenda and investments expanded and progressed, Bland said. Development assistance focused on health grew from 2000 to 2010 by more than 10 percent. New institutions and partnerships based on PPPs were developed, including the GAVI Alliance, the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund), and UNITAID, and have mobilized significant resources for specific issues and vertical programs in health. Bland suggested, however, that there is an increasing awareness that verticality and a single-issue approach may not be the most sustainable model going forward.

Moving into the era of the SDGs, which will be defined as 2015 to 2030, Bland emphasized that this new set of goals is not intended to be an updated version of the MDGs, but rather transformational through combining the social, economic, and environmental pillars of sustainable development. Within the health-focused SDGs, there are nine targets governing maternal health, child health, communicable diseases, non-communicable diseases, substance abuse, road traffic safety, sexual and reproductive

health services, universal health coverage, hazardous chemicals, and air, water, and soil pollution. These targets span a broad range of issues and conditions, and many indicators will cascade from them.

Considering this expansive range of targets, Bland argued that they will not be achievable without strong health systems. Strong ownership and country leadership are imperative for the robust, resilient, and sustainable health systems that are needed to achieve the ambition of the SDGs. A deep recognition of the determinants of health and related behaviors is also essential to achieve the SDGs, particularly in terms of non-communicable diseases and injuries. Additionally, Bland believes that multistakeholder approaches, inclusive development, and community engagement are required for success. Without the private sector—and without public, private, and nongovernmental organization (NGO) sectors learning to collaborate evermore closely and effectively—Bland suggested the SDGs will not be realized.

Bland also stressed the importance of ambitious financing focused not only on growth but on efficiencies and reallocation. Currently, the private sector is playing a large role in transforming financing. He suggested that this role needs to be better defined and better understood—as a role that understands the SDGs are good for business and business is good for the SDGs. This includes an improved understanding of and greater focus on PPPs, where the values are understood and shared; trust is built and sustained; and market failures, gaps, and weaknesses are identified; and where incentives are aligned with the interest of the poor. Achieving the SDGs will require more than financial resources alone, Bland acknowledged. It will require a global change in mindset, approaches, and accountabilities to reflect and transform a new reality of a developing world withy highly varied country contexts. He argued that PPPs in the health sphere that are specifically focused on health systems and multisectoral collaboration are an important part of getting the agenda right. The MDGs saw significant progress, but many of the gains are fragile, unfinished, and reversible. Now, there is an opportunity for the SDGs to be smarter, to utilize new technologies, to benefit from connectivity, and to harness grassroots innovations and bidirectional learning. The Ebola virus outbreak in West Africa and the resulting increased attention on global health security created a moment where health systems are more in focus than before.

DEVELOPMENT GOALS AND PUBLIC–PRIVATE PARTNERSHIPS: LESSONS LEARNED FROM THE INFORMATION COMMUNICATIONS TECHNOLOGY SECTOR

Building on Bland's comments, Reza Jafari from e-Development International shared experiences and lessons learned from the information communications technology (ICT) sector during the implementation of the MDGs to illuminate the importance of PPPs and their relevance for meeting the health-focused targets of the SDGs.

In 2000 when the MDGs were initiated, the Internet was in existence but received little attention within the global community or as part of the development agenda. During the past 15 years, however, both the Internet and the ICT sector have acted as important facilitators to spur progress across the development goals and to bring together vertical sectors in the process. As an example, Jafari highlighted the Broadband Commission for Digital Development, which was established in 2010 at the suggestion of the United

Nations, with the intention to boost the importance of broadband on the international policy agenda and to create ecosystems based on a PPP business model that can facilitate and enable cross-sector implementation (e.g., the health, agriculture, education, and manufacturing sectors) of development goals and objectives.

The PPP model employed by the Broadband Commission has evolved to be highly inclusive as a result of the commission's experiences with facilitating progress on the MDGs. Jafari further defined this PPP model as multilateral, multistakeholder, multilevel partnerships that involve government at the local, state, national, and international levels; the private sector at the local, regional, and international levels; academia; NGOs; and representatives of the end-user community. When is this PPP model needed? Jafari suggested the intersection of a necessity and an opportunity to make a difference created the space for developing and implementing such a partnership.

Jafari identified the Smart Africa initiative as an example of this inclusive PPP model. Rwandan President Paul Kagame, who is co-chair of the Broadband Commission, developed the idea of Smart Africa, which is using the proven PPP business model to develop a single interface and provide an all-encompassing service to international software product companies that want to conduct business within Africa. Smart Africa is small, agile, and aggressive and provides a platform for practical engagement. For this initiative, multisectoral partners, including ministers from nine countries representing the agriculture, education, finance, health, and ICT sectors, are collaborating to more effectively achieve their individual objectives. For years, each of these partners has faced a lack of resources. The inclusive PPP model of Smart Africa recognizes that, through cooperation and collaboration, there is potential to achieve results more efficiently and at scale.

Experiences in the ICT sector that led to the development of the inclusive PPP model and initiatives such as Smart Africa illuminated several critical success factors for PPPs, which Jafari summarized:

- Focus on the end-user;
- Joint vision and deliverable results;
- Sustainable business model;
- Shared risks and rewards;
- Transformational regulatory environment/framework;
- Transparent and accountable governance;
- Contingency plan for unintended consequences;
- Collaborative innovation; and
- Continuous improvement of processes.

As a result of sharing these success factors from the ICT sector and illuminating the facilitative potential of ICT, Jafari hopes to contribute to the development of successful, inclusive, and multisectoral PPPs within the health sector.

EVOLUTION OF PUBLIC–PRIVATE PARTNERSHIPS AND HEALTH SYSTEMS STRENGTHENING

Rifat Atun from the Harvard T.H. Chan School of Public Health built on Jafari's comments on the value of PPPs for solving complex problems and discussed specifically how PPPs are essential within the health sector and for health systems strengthening. Atun proposed two primary reasons why partnerships are critically important in health: (1) health is everyone's responsibility and thus all sectors have a responsibility to contribute to it, and (2) the current and future problems in health require collective action. Globally, individuals are living longer but with greater disability and morbidity and increased prevalence of multimorbidity; and, as Atun noted, the complexity of these conditions and co-occurrences demands coordinated collective action (IHME, 2010).

Emergence of Proto-Institutions

Since 2000, there has been an emergence of proto-institutions in health at the global level, Atun explained. These proto-institutions are characterized by inclusive governance with the involvement and embeddedness of state actors, shared responsibility, and action for joint-solution development and delivery of these solutions (see Figure 2-1). Prominent examples of these proto-institutions are the Global Fund, the Gavi Alliance, and UNITAID. Atun noted that, together, these three proto-institutions account for 25 percent of the total funding in global health. Other large global health partnerships exist and include the Stop TB Partnership, the Roll Back Malaria Partnership, and the Partnership for Maternal, Neonatal & Child Health. There are also many effective smaller partnerships coordinated by organizations such as PATH, the United Nations Foundation, and the International AIDS Vaccine Initiative.

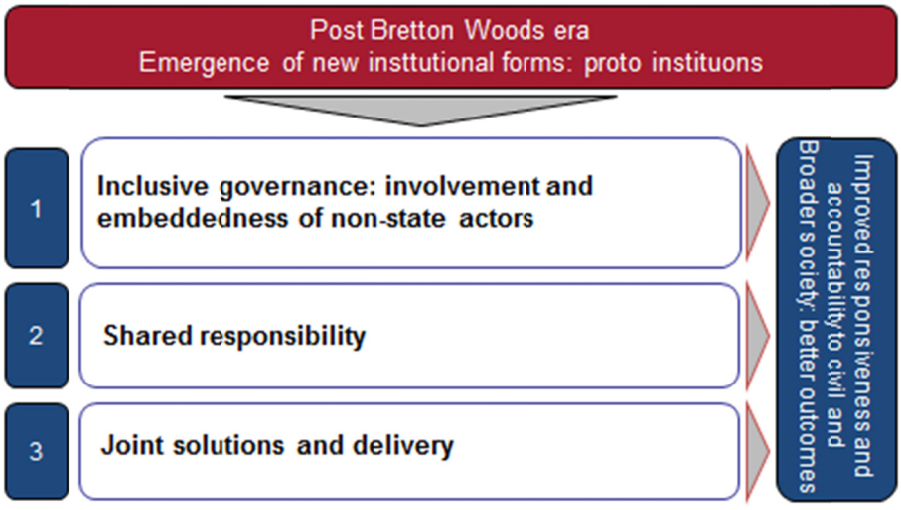

FIGURE 2-1 Emergence of new institutional forms: proto-institutions.
SOURCE: Presented by Rifat Atun on June 25, 2015.

The emergence of these proto-institutions has led to improved responsiveness and accountability to society and, in many cases, better outcomes in shorter timeframes. Atun explained that proto-institutions have not only channeled large amounts of funding to the public sector in host countries but also to non-state actors; and these non-state actors are frequently able to catalyze change on the ground. When he was at the Global Fund, Atun saw non-state actors often acting as catalysts for achieving change and holding a proto-institution's executive board and secretariat accountable for ensuring that funds were channeled appropriately and results achieved. In his opinion, an important reason these proto-institutions have been successful is the involvement of civil society, affected communities, and other non-state actors. Atun believes these inclusive coalitions, which comprise proto-institutions, the public sector, civil society, and the private sector, are what have characterized the global health partnerships of the last decade.

Along with changes to the makeup and structure of global health partnerships, Atun explained that the role of these partnerships has also evolved. In 1993, the primary players were the World Health Organization (WHO), the World Bank, bilateral agencies, and foundations. Today, there is a range of new actors who are playing a role in all the main functions of global collective action. Further, the landscape of global health is very different now than it was in 1993 (see Table 2-1) (Blanchet et al., 2013).

TABLE 2-1 Global health organizations and essential functions, 1993 and 2013.

Main Functions of Global Collective Action	Function	Sub-function	Substantial Role in the Activity Today?									
			Selected Actors (1993) (not exhaustive)				Selected New Actors Since 1993					
			WHO	World Bank	HIC Bilaterals	Foundations (non-Gates)	MIC Bilaterals	Global Fund	GAVI	UNITAID	Gates	Academics and Think Tanks
Core	Promotion of global public goods	Research and development	✓		✓	✓				✓	✓	✓
		Information and databases for shared learning	✓	✓	✓	✓		✓	✓	✓	✓	✓
		Comparative evidence and analysis		✓								✓

		Harmonizing norms and standards for national use and international regulation	✓					✓	✓	✓		
	Management of externalities	Border control, especially during epidemic outbreaks	✓		✓							✓
	Stewardship	Convening for consensus building, priority setting, and cross-sector health advocacy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Supportive	Act as agent for disposessed, mobilize global solidarity	Provision of basic needs in failed states		✓	✓							
		Assistance in natural or artificial disasters	✓	✓	✓		✓				✓	
		Protection of vulnerable groups		✓	✓	✓	✓	✓	✓	✓		
	Support development	International technical co-operation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Development financing		✓	✓	✓	✓	✓	✓	✓	✓	

SOURCE: Blanchet et al, 2013; Presented by Rifat Atun on June 25, 2015.

Health Systems Strengthening

In addition to the proto-institutions and inclusive coalitions through which they work, Atun suggested that partnerships are also critically important at the country-level for health systems strengthening. Before discussing the role of partnerships in health systems strengthening, he summarized what health systems are trying to achieve. In a health system, there are a number of functions that, when combined, produce a set of outputs, including public health outputs at the individual and population levels and health care services for individuals or communities (see Figure 2-2). These outputs, in turn, often generate a set of outcomes: improvement of the level and distribution of health, provision of financial protection, and an increase in user satisfaction.

Strengthening health systems, Atun continued, requires working along these functions and outputs to yield the desired outcomes in a balanced way. Specifically, the framework in which partnerships for health systems strengthening will work is dependent on balancing equity, efficiency, effectiveness, and responsiveness in relation to the outputs of the system to achieve the right outcomes. The appropriate balance will vary depending on the political context in a country at a given the time.

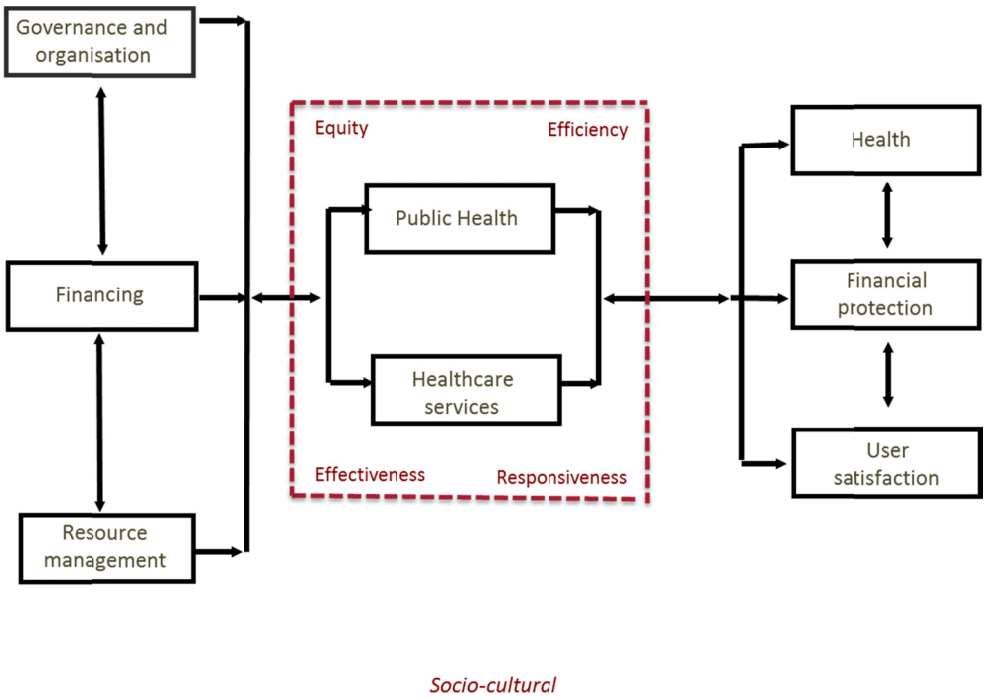

FIGURE 2-2 Strengthening health systems.
SOURCE: Presented by Rifat Atun on June 25, 2015.

Partnerships for Health Systems Strengthening

Where are the opportunities for partnerships in strengthening health systems? Atun suggested several promising prospects:

- Redefining the role of ministries of health as stewards of the system. Atun suggested that in most countries around the world, there is an evolution of responsibilities of the government. Many countries are redefining the role of ministries of health as the stewards of the system, setting the regulatory framework, the principles, and fair playing field for all actors in the sector—thus, opening the space for private actors in the functions of the health system;
- Structural changes to enhance contestability, use of available assets, and achieve scaled economies;
- Regulatory oversight delegated to quasi-autonomous bodies for functions such as quality and safety; and
- PPPs for financing and service delivery.

There is a continuum of types and functions of PPPs for health systems strengthening, Atun suggested. On one side is public-sector transformation from within, through learning from and applying private-sector principles; on the opposite side is outsourcing and outright privatization; and in the middle are hybrid organizations (see Figure 2-3). An example of a hybrid organization is the autonomous hospital, which is

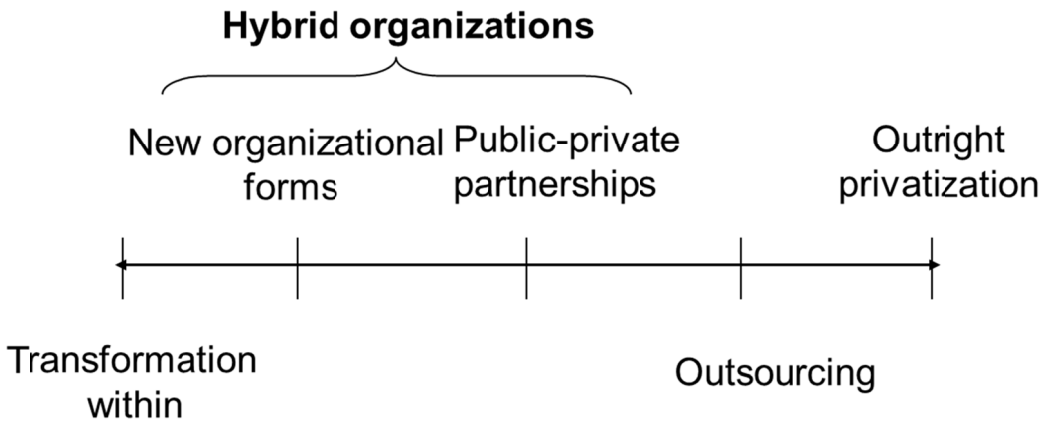

FIGURE 2-3 The public–private partnership continuum.
SOURCE: Atun, 2007. Presented by Rifat Atun on June 25, 2015.

neither public nor private. These new hybrid organizational forms have emerged in many settings, at the primary, secondary, and tertiary care levels. In addition to hybrid organizations, more traditionally structured PPPs have arisen. These PPPs range from private financing initiatives where the private sector provides financing based on a risk-and-reward calculus, to operating the entity that was developed through a joint venture, to managing the whole operation for decades. Like hybrid organizations, these partnerships exist at the primary, secondary, and tertiary care levels, as well as in public health.

Outsourcing and outright privatization of public-sector functions to the private sector is focused on activities that can be better performed by entities whose core business is to provide the particular function; ICT being one such example. Atun noted that many countries are outsourcing a set of health systems functions. Most countries start with outsourcing services that have limited direct impact on health, such as hotel or ancillary services, and, once they establish some experience, additional services are outsourced, including clinical support services such as the management of a hospital or an entire network of providers (see Figure 2-4).

Within health systems, much time is lost managing operations inefficiently. The WHO estimates that 20 to 40 percent of resources spent on health are wasted. The most common causes of such inefficiency include inappropriate and ineffective use of medicines, medical errors, suboptimal quality of care, waste, corruption, and fraud (WHO, 2010). Collectively, management of human resources productivity, procurement, and supply chain management account for almost 50 percent of the waste, which, if remedied, could be used to create fiscal space to invest in health. Atun noted that there are efficiency gains to be had in managing health systems, and the private sector, through relentless innovation, provides an opportunity to realize these gains, which may be missed when partnerships are not in place.

Beyond clinical support services, Atun suggested there are opportunities to improve efficiencies through PPPs in the areas of information technology and accounting, among others. He provided an example in which the medical device company Medtronic is managing catheter labs with substantial efficiency gains in several countries and seeing good results in terms of user satisfaction, improved flow of patients, reduced waiting times, and improved consistency in quality of services provided.

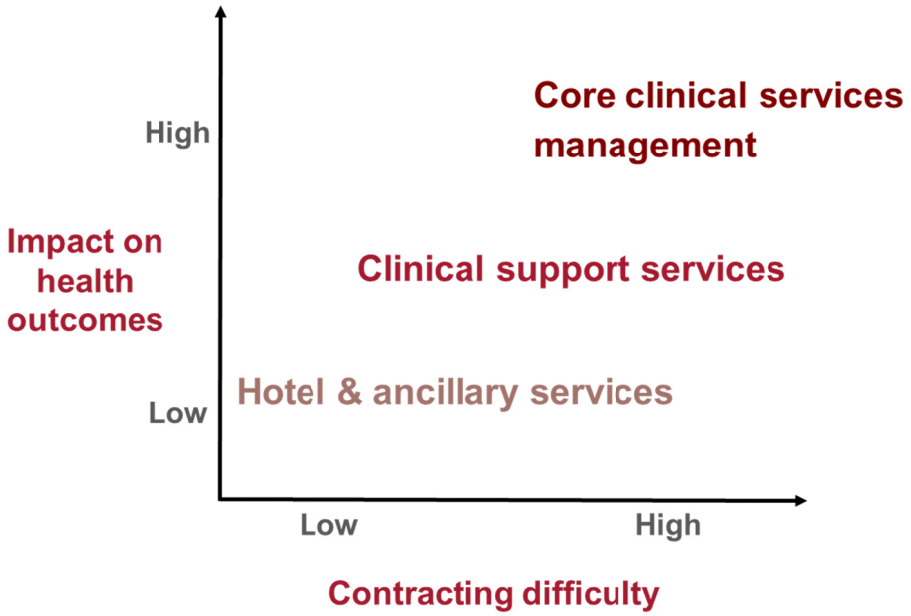

FIGURE 2-4 Public–private mix and outsourcing.
SOURCE: Presented by Rifat Atun on June 25, 2015.

To strengthen health systems, effective information systems and managerial capability are needed but often not present, Atun revealed. PPPs are an opportunity to build this capacity. He presented a figure showing where the private sector is actively involved and where PPP opportunities exist (see Figure 2-5). In his opinion, one important area in which to foster the development of PPPs is enabling platforms, specifically the management of information through big data. This includes understanding how data can be captured, but more importantly, how data can be analyzed and then translated to improve real-time management of individual patients as well as the populations. Other areas ripe for PPPs based on private-sector expertise include the management of: the supply chain, single-procedure providers, specialty hospitals, disease conditions, intermediaries such as managed care organizations, general hospitals, and primary care or primary care networks or provider networks for an entire district, region, or province. Atun remarked that there are examples of PPPs in each of these areas.

While there are significant opportunities to strengthen health systems through PPPs, Atun acknowledged the lack of evidence to inform decision making. There are numerous examples of effective projects; however, in terms of large-scale interventions, the evidence base is not strongly established. This dearth of evidence is due, in part, to the findings not being published appropriately. Atun strongly urged those involved in PPPs to evaluate achievements and demonstrate successes in relation to improved outcomes and outputs to achieve equity, efficiency, effectiveness, and responsiveness to user needs. Despite the need for more evidence, Atun concluded that, indeed, there are roles for PPPs in health systems strengthening, but the question is how to best do it in differing contexts.

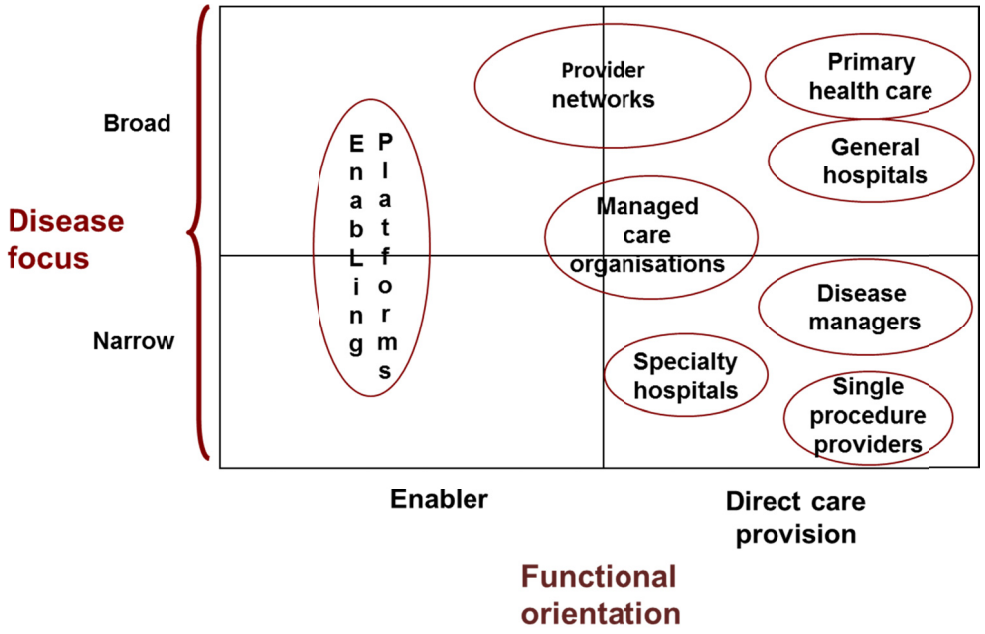

FIGURE 2-5 Strategic positioning of new players in health care provisions.
SOURCE: Presented by Rifat Atun on June 25, 2015.

In response to a question about opportunities for PPPs within the national public health infrastructure, Atun stated that the biggest barrier to progress in public health–focused PPPs is the structure of primary care. In most countries, primary care is still being defined and administered based on the 1920 Dawson Report, which sought to distinguish primary care centers as regional centers for health services.[1] However, recent advances in technology have enabled countries to change how primary care is administered by moving primary care services outside of the hospital and closer to patients. Further, patients can now take part in managing their health conditions through technology. If a country modifies how primary care is defined and administered, then providing the necessary infrastructure for and investments in primary care or public health will be better integrated. Atun added that payment models are outdated and recommended the creation of new models based on rewarding health outcomes, as opposed to discrete activities focused on components of disease. If the focus is on the individual, with contracts based on the management and outcomes of a population, then the challenges of funding primary care versus public health can be overcome. However, he acknowledged that this transition requires changes in the way health systems have been defined over the past 100 years.

In response to a question about balancing treatment versus prevention, Atun commented that the balance between managing the consequences of disease and managing health is an essential question for health systems, and the transition from disease to health is critical. If the focus is on population-level health and outcomes, then targets can be set to improve or maintain health and rewards developed accordingly.

[1] See http://www.jstor.org/stable/20341070?seq=1#page_scan_tab_contents (accessed December 11, 2015).

Patrick Kelley, from the Institute of Medicine (IOM), commented that the IOM is exploring potential activities focused on quality of care in low- and middle-income countries; however, it has been challenging to identify the priority areas to address as there are many potential avenues to explore within this topic. Kelley asked Atun what he would identify as the priority areas in global quality of care for PPPs. Atun referred again to Figure 2-5 and suggested focusing on developing enablers, such as data systems that demonstrate variance from the standard in quality and safety across multiple conditions. The first investments, he continued, would need to be in developing information sets and datasets to generate baseline knowledge and in identifying and predicting risk for individuals and populations with regard to safety and quality errors. With respect to quality, Atun said the priority areas for investment are understanding determinants of antimicrobial resistance, reducing medication errors, and using supply chain management expertise for administration of guidelines or critical pathways to reduce errors in patient transition.

3

Multistakeholder Perspectives on Public–Private Partnerships for Health Systems Strengthening

All sectors and stakeholders benefit when individuals and communities have access to affordable and high-quality care, markets exist for new technologies and promising interventions for health improvements are implemented effectively, the labor force is healthy and productive, and public health systems are in place to detect and respond to emerging threats. A strong health system underpins these conditions and their sustainability. With this growing recognition, both public and private stakeholders are realizing not only the opportunities for partnerships for health systems strengthening, as described in the previous chapter, but also the related incentives. Trevor Gunn, from Medtronic, noted that there are numerous examples of successful public–private partnerships (PPPs) developed to improve infrastructure, such as building roads, and he attributed the success, in part, to a shared value and worthwhile incentives for all contributing partners. Yet, when it comes to developing PPPs for strengthening health systems, Gunn observed that such development can be incredibly challenging because the incentives are not well understood for all parties. This chapter illuminates the incentives for investing in health systems that were discussed at the workshop through descriptions of motivations and case examples.

PUBLIC-SECTOR PERSPECTIVE FROM THE CHILEAN NATIONAL HEALTH SYSTEM

Jeanette Vega, from the National Health Foundation in Chile, spoke about her experiences as the director of the National Health Insurance Agency (FONASA), which covers 80 percent of the Chilean population. She stated that PPPs are complex, particularly in delivering health care. Evaluating such programs involves having a system for assessing the finances and making sure the government is able to classify, measure, and allocate risk appropriately to each partner.

From Vega's perspective, the most important requirement for PPPs is an established governance process, which can be extremely challenging because it requires institutional stability and effective decision making with a clear vision of the country's needs. The other important requirement is for the host government to have a clear, predictable, and well-regulated legal framework before investing heavily in PPPs. In particular, the government must be certain about the level of profitability, compared with the specific sector average, that it is willing to pay or accept in any partnership with the private sector. For example, what are the comparative costs of operation when the government uses the private sector to deliver care compared with when the public sector provides the same care? Vega also acknowledged that the government must conduct a

thorough risk assessment to identify the risks, costs, and quality tradeoffs, as well as a risk-sharing model to ensure greater value for investment.

The next step is to define clearly what the desired deliverable should be for every potential partnership. To illustrate, Vega detailed how the Chilean health system is structured. First, every citizen who works in the formal sector pays a compulsory contribution of 7 percent of their salary for health (Missoni and Solimano, 2010). Those unable to pay—informal workers with no stable work or who have income below the poverty level—are subsidized from general budget revenues to fund their health services Through this system, every citizen in Chile is insured. Citizens can opt-out and seek private insurance if they prefer or they can be insured by the Social National Health Insurance Agency, Fonasa, which is responsible for all the revenue collection, pooling, and purchasing of health services for those insured, generally the lower- and middle-income people, while high-income workers and their families are usually insured by private insurers. In practice, Fonasa administers most of the country's health resources, as it covers almost 80% of the population in the country. The provision of services is mixed using private and public providers in the case of Fonasa and private in the case of the private insures. In both cases there is a national compulsory health plan.

The Chilean national public health system provides a range of services from hospitals to primary health outpatient services. There are also private providers. Currently, the government is working toward an innovative PPP by strengthening the connections of FONASA with the private providers. This partnership is the result of a necessity, as there is a shortage of hospital beds (an estimated shortage of 2,000 beds) and services in the public sector. The government also believes that an innovative PPP could be advantageous to both sectors. Through the partnership, the public sector could extend coverage to its members and the private sector could expand its business model. For example, the government has modified its pay structure to rationalize and improve the public system while purchasing access to hospital beds, outpatient care, and hospitalized care as needed from the private sector. In addition, the government is negotiating with the private sector to equalize pay across both sectors and to provide accessible health care to their citizens.

Another innovative example that has led to stronger information systems is the introduction of chronic disease care through "telemonitoring" for case management. The government, in partnership with a private company, has introduced telehealth services for chronic care of diabetic and hypertensive patients in the largest health system of the capital city Santiago that covers more than 1 million people. In brief, each primary, public health care center in the area offers program enrollment to all patients seeking better control of their diabetes and hypertension. The program is financed on a per capita basis, based on a definition of care according to the level of complexity of each patient enrolled. The frequency and type of specific care activities are defined by the complexity of each case, with the goal of keeping the patient clinically compensated. At entry, each patient is monitored for 15 days, during which time the patient is classified on stage of disease. Then, each patient is provided a set of services, including biological monitoring from home and transfer of the information to a central care unit that is managed by the private partner, plus the use of SMS (short message service), telephone, and virtual communications to manage his or her symptoms and biological parameters. All of these services are provided remotely while the patient remains at home. Devices are used to

monitor the patient's blood sugar level and his or her parameters for blood pressure, and results are sent to the center. Clinical feedback is provided to the patient for education and medication adjustments. If the patient requires consultational hospitalization, he or she is referred to the public facilities of the health system, with follow-up through online communication between the private and public providers.

Interestingly, this program is provided to a community with more than 1 million people, of which 26 percent have hypertension and around 8 percent have diabetes. After 6 months of implementation, the program has provided care to a greater number of individuals and saved an average of 56 percent in the costs of providing patient care. Through these innovative PPPs, FONASA and the Chilean health system have demonstrated effective ways to improve the health care system, leading the system toward preventive health care and promoting a culture of healthy living.

The development of these successful PPPs was not without its challenges, Vega continued. An underlying tension exists among Chilean policy makers over which health care services should be provided by the public sector and which should be supported by private clinical organizations. Further, Vega noted that there is often a fundamental difference in what is considered public and what is deemed private. For example, although the Canadian health system is not considered a private one, many of the services in Canada are indeed provided by private clinicians. In Chile, forming partnerships with private businesses also proved to be challenging, Vega explained. Instead of contracting with large private companies that can offer health care more efficiently, the Chilean government is supplementing the income of private physicians by allowing them to use public facilities to provide care. The availability of facilities and services within the public sector remains a challenge.

In response to Vega's presentation Jo Boufford from the New York Academy of Medicine, noted that Chile has made substantial progress in developing the governmental infrastructure, legal framework, regulatory environment, and capacity to manage the delivery of universal health care. Boufford asked Vega to discuss the process for developing the infrastructure. Vega responded by stating that, over time, there have been many lessons learned, often through failed or difficult processes. To provide context, Vega offered a historical perspective of the Chilean government. Chile was the first Latin American country that introduced socialism by democracy, and then it was run by a military dictatorship for 17 years. During this time, several initial experiments were conducted, with support from the World Bank, to create a social space to lead to a free market. With each failure, the key issues were a lack of governance and legal frameworks to manage relationships between the Chilean government and other entities. This translated into unsuccessful contracts, poor monitoring, and ineffective and untimely measures, making it challenging to respond to and/or develop solutions to resolve the issues. Vega acknowledged the more than 20 years of failure in implementing successful health information systems in Chile. The main implementation issue has been the challenges of the Chilean government to partner with the private sector. FONASA will be initiating its third attempt to develop a health care information system for the entire country, with the aim of integrating all segments of care. As part of this current process, the government is adopting proven approaches from the private sector.

More recently, Vega helped develop a partnership with the private company Oracle to redesign the national health care information system. The primary purpose for

this contract with the private sector is financial, as well as to have access to two well-established, high-quality products from Oracle. One of the products is called OIPA (Oracle Insurance Policy Administration), which develops individual health care accounts that trace care and costs associated to each insured individual. The other product is OHI (Oracle Health Insurance) software. The most challenging issue was to convince FONASA's workers, as well as the general public, why this model is going to be successful and why this contract should not be considered as privatizing. Vega explained, "Basically, we have a very clear underlying objective for us it is to introduce a system that works. For Oracle, it is to basically introduce a system that they have working right now in one country that is quite influential in the region. If we do it right, it is going to be—in addition to the margin of commercial profit—a win-win situation in terms of the outcome, which is to improve health systems. It is a very long answer to our question, but I am basically trying to say it is from failure [that the infrastructure has been developed]. That is usually the way it is."

PRIVATE-SECTOR PERSPECTIVE FROM BECTON, DICKINSON AND COMPANY

Gary Cohen, from Becton, Dickinson and Company (BD), spoke about his experience working across sectors. Cohen argued that companies that focus on unmet societal needs, and partner with governments and other stakeholders across sectors to address those needs utilizing the core competencies of the company, can identify ways to enter and grow in new markets. Cohen reflected on a quote, "The bottom of the pyramid today is the middle of the diamond in the future," stating that over the past 15 or 20 years in many emerging countries, a growing middle class has created prosperity and enables, in theory, companies to expand their access. But, unless companies learn how to function in new markets and work with the public sector, expansion will be difficult. Cohen explained that the traditional business models of sales people carrying bags and pushing their products into the market may not be effective; rather, business models that are based on building trust and partnering to address unmet needs will be more effective ways to expand in new markets.

Although the term "public–private partnerships" is relatively new, and perhaps the definitions of such partnerships may differ, Cohen described several experiences over the past 20 years that changed his thinking on what can be accomplished when working together across sectors. To begin, he shared an experience from December 2003 when he traveled with a delegation of approximately 100 health leaders to sub-Saharan Africa to study the HIV and AIDS pandemic. As a result of that trip, he and the top executives at BD mapped out all areas in which the company could contribute to addressing the HIV and AIDS pandemic. At the time, the primary emphasis in HIV and AIDS was on the delivery of treatments, not on health systems strengthening, laboratory testing, and other components. This mapping of unmet need resulted in BD establishing a new global health function within the company dedicated to cross-sector partnership to address HIV and AIDS and other highly prioritized health needs.

Cohen categorized PPPs from the perspective of BD into three primary categories: social investing, corporate social responsibility, and shared value creation. The first, social investing or philanthropy, is when the private partner's role is as a hands-

on, active donor of cash or in-kind product. For example, BD partnered with US fund for UNICEF in the late 1990s to eliminate maternal and neonatal tetanus (MNT). Cohen stated that BD supplied approximately 60 or 70 million safe, auto-disable immunization devices and about $10 million in funding, and between 1999 and today, MNT deaths have been reduced by over 70%. During this same time period, about 6 billion immunizations have been administered safely, primarily to children, using this type of technology, helping to eliminate an entire category of disease spread from reuse of single use immunization devices.

The second category, corporate social responsibility, is when private companies use their core competencies to accomplish a social good. For example, BD partnered with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the Centers for Disease Control and Prevention (CDC) in developing Labs for Life, where the goal is to strengthen laboratory systems in five countries in sub-Saharan Africa and India. This work also led to another partnership with the same partners focused on strengthening phlebotomy and blood drawing practices, for safety, accuracy of diagnosis, and transport. In both of these examples, BD is using its experiences and expertise to improve the quality of care provided, with no direct commercial objective or benefit obtained.

The third category is called shared value creation, where intentionally and specifically, the partnership focuses on an unmet societal need in a manner that also provides a business opportunity. In January 2004, BD partnered with the Clinton Foundation to make CD4 monitoring widely accessible; CD4 monitoring measures the immune system of people living with HIV and AIDS, so clinicians know when to begin antiretroviral therapy. The timing of this work was right on the cusp of the scale-up of antiretroviral therapy, providing a shared value opportunity. BD offered low-access pricing and opened up opportunities to expand the market to 55 developing and emerging countries. Within a few years, CD4 testing was widely accessible. In the process of that partnership, BD trained more than 8,000 laboratory technicians on how to perform immune system monitoring, which contributed to laboratory systems strengthening.

Building on that work, in 2005 BD established a volunteer program to deploy associates to developing countries to help strengthen health systems locally; and from there, it entered into the first laboratory systems strengthening partnership with PEPFAR. This PPP, which became Labs for Life, was more broadly based, with the objective to assist laboratories through the accreditation process. At the time very few labs, particularly in sub-Saharan Africa, were at an accredited level. This BD–PEPFAR partnership was highly successful and led toward a reduction in the turnaround time for tuberculosis (TB) testing in Uganda from 3 weeks to 3 days. Indeed, 14 percent of TB treatment cases in Uganda were identified as multiple-drug resistant, and treated accordingly. In Ethiopia, this partnership facilitated the implementation of a nationally integrated specimen referral and handling system, including involving the postal service in transport. In Mozambique, the partnership supported development of a national laboratory quality system. BD was working very much in the spirit of PPPs at the national level, with the national government, CDC, and BD working together on the ground with the local governments implementing the program.

Another partnership that Cohen discussed was with the International Council of Nurses (ICN). This PPP focused on wellness centers for health workers, in response to the emigration of health workers from developing countries to developed countries,

presumably due to low wages in their home countries. Intolerable working conditions and the high potential of contracting disease occupationally in the health care environment were also important indicators for this health worker emigration. In response, the ICN, BD, PEPFAR, and the Stephen Lewis Foundation entered into a partnership to establish wellness centers, safe havens where health workers and their families can go for discrete testing, counseling, and treatment. Swaziland was the first country where a wellness center was implemented, and the partnership tracked the migration of nurses after establishing the wellness center. The migrant level was brought down to zero, and the partnership provided a highly efficient, high return on investment.

In closing, Cohen imparted one final example of a shared value creation. BD recently entered into a collaboration with the World Health Organization (WHO) and Saving Lives at Birth partners to develop the BD Odon Device™, a new innovation aimed at replacing forceps and vacuum assistance for delivery of newborns during circumstances of prolonged, troublesome second-stage labor—one of the primary causes of both maternal and newborn mortality. As of 2015, newborn mortality represented 44-45 percent of all under age 5 mortality, with nearly 2.7 million newborns dying in the first 28 days of life; not including another 2.6 million stillborn births, which were not necessarily tracked, and 289,000 women and girls dying in childbirth in2013 and more than 10 million having severe complications. BD is leading the product development process and the WHO is conducting the clinical trials of the BD Odon Device. The International Federation of Gynecology and Obstetrics (FIGO) is expected to develop the usage guidelines and training, which it will implement through its country chapters. The Saving Lives at Birth partners, which include The Bill & Melinda Gates Foundation and the governments of Canada, Sweden, the United Kingdom and United States, are providing support through multiple mechanisms, such as funding for the clinical trials.

Based on the significant unmet need of high rates of maternal and newborn mortality, BD made a strategic decision to deploy its resources and capabilities to develop a broader range of innovations that can address leading causes of maternal and newborn mortality, taking advantage of the scale capabilities within a global company. BD is working on a blended finance model with the Global Health Investment Fund to develop two new point-of-care tests to address two of the leading causes of maternal mortality, preeclampsia and gestational diabetes.

These efforts are helping to establish the next generation of finance models using blended finance and risk and providing an opportunity for shared value creation, with the aim of developing sustainable business models with high access in the highest-burden countries. In distilling some common principles that led to the success of BD's PPPs, Cohen listed establishing trust as extremely important and needed from all partners, as well as identifying the right leaders and champions and aligning purpose and motivations.

PUBLIC-SECTOR PERSPECTIVE FROM EXPERIENCE WITH THE UK DEPARTMENT FOR INTERNATIONAL DEVELOPMENT

Simon Bland reflected on his experience at the Department for International Development in the United Kingdom and its interface with two global funds, the Gavi Alliance (GAVI) and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global

Fund), identifying incentives that were effective in engaging partners and raising funds, as well as suggesting future directions for establishing multistakeholder partnerships.

To begin, Bland stated that regardless of whether one comes from the public or private sectors, individuals have their own experiences, prejudices and biases that must be acknowledged, understood, and broken-down to build trust and to identify and agree on common values. Bland observed that only recently has there been a stronger recognition, drive and capacity within the public sector to engage with the private sector in international development. There were perceptions of conflicts of interest, of providing unfair commercial advantage and a lack of understanding, common skills and language across public and private sectors. He believes that this mentality has changed substantially and there have been numerous successful examples of PPPs demonstrating the value and impact they can have on strengthening health care systems.

Another observation Bland made was that in the public sector, domestic politics and public opinion have had a major impact on priorities. Indeed, incentives have been developed as a result of national debates and the resulting perceptions of the issues. That said, Bland remarked that official development assistance represents an important but relatively small proportion of the overall resources available for strengthening health care systems and, in particular, for supporting the Sustainable Development Goals (SDGs). He noted in Africa alone, official development assistance in 2012 was $50 billion while domestic resources mobilization was $530 billion. Importantly, health systems are going to be funded by domestic resources through whatever financing mechanisms are available. The challenge of the future is figuring out how development assistance can be best focused in a way that is directed toward the greatest needs of the system, addressing the market failures and creating the right incentives for broader leverage, change, and improvements.

Bland pointed out that the United Kingdom was the first G7 country to reach the Monterrey Consensus commitment of 0.7 percent of gross national income (GNI), and the government is now seeking support from other countries to make the same international commitments for financing (Townsend, 2014). Bland also highlighted a challenge in the United Kingdom of maintainging public approval for development assistance globally. Historically, public opinion in the United Kingdom has been more supportive of providing financial assistance for development through local charities and projects rather than through governments and international organizations. As such, providing funds to support the delivery of global health care through large PPPs, global funds, or the international organizations does not always garner public support. Nevertheless, the House of Commons International Development Committee recently released a report stating that the United Kingdom has been an active investor in health systems globally through its bilateral programs, working with national governments to try to build those systems (House of Commons, 2014). Increasingly, though, the UK relies on the international system including the Global Fund, GAVI, and other international organizations to channel this support.

The United Kingdom recently conducted an assessment of 43 international organizations in terms of relevance to their development priorities, their added value, cost effectiveness, and their ability to deliver results. The primary findings suggested that the single-issue-focused funds that are often supporting vertical programs perform remarkably well in terms of being a good investment. Bland stated that a comparative

review of this nature introduces competition and edge into the market to drive performance and efficiency, but it fails to assess the systemic issues of how the broader international system comes together to deliver health care and that the synergies and reliance between organizations are often ignored. To be effective and address the global health care delivery systems, Bland believes the needs of health systems must be communicated more effectively to donor governments, including how the health system is defined, why it is important, how to build and strengthen it, and how investing in it yields results and why, without this, the results achieved by GAVI and the Global Fund would suffer considerably. Although the United Kingdom has supported health systems strengthening investments through both GAVI and the Global Fund, as well as bilaterally and through others, GAVI and the Global Fund investments have been a small fraction of the total resources that these funds have invested. While there have clearly been system benefits from GAVI and Global Fund investments these have not yet translated into vast improvements across health systems.

The Global Fund, GAVI, the World Bank, and WHO agreed to try and harmonize their investments to strengthen health care systems. Together, they developed a Health Systems Funding Platform that aimed to streamline funding and collaborations with host governments to deliver the targeted program while also strengthening the health system to deliver the program. Though the concept was strong and could have been transformative, Bland stated that operationally it took more than 2 years to develop a common, shared mechanism to harmonize approaches to health systems strengthening in countries and that the scheme never progressed from the long planning process. That said, Bland has observed vast differences across developing countries with respect to the strength of their leadership and governance and, as a result, he suspects that the approach to health systems strengthening may need to be tailored for each country to assist in building its capacity, leverage resources, negotiate effectively, target priority areas, and provide technical assistance and training that can meet the national contextual needs.

Bland believes that although the Global Fund and GAVI and other similar organizations will continue to support the strengthening of global health systems, they are unlikely to expand significantly in the future. Instead, he believes there will be numerous national and subnational partnerships developed that significantly drive improvements and innovations through specific programs, contextual circumstances, and strong leadership. There is complexity within each country and sometimes several tracks are needed at the same time, he added. For example, in Kenya, the Department for International Development (DFID) supported twin tracks. The first targeted the short-term delivery of results, where intermediaries, such as Population Services International (PSI) and other nongovernmental organizations (NGOs), as well as working directly with government, contributed. At the same time, broader efforts were undertaken to help support and strengthen the building blocks for a stronger health care system.

The perceptions of risk remain high. Concerns of corruption and illicit finance are pervasive. Yet, as Bland pointed out, recent research suggests that infrastructure investments across the globe, regardless of the level of wealth within the country, demonstrated little difference in return on investment, while the perceptions of risks of returns are significantly different. Collectively, there is a need to challenge this assumption, Bland suggested, and promote stronger private sector investment in ways that support national development and free up public finance for the social sectors.

Ambassador John Lange, from the United Nations Foundation, noted that Bland highlighted the vertical programs that have been successful, but suggested that the future is in the national and subnational levels for partnerships. Indeed, one of the SDGs is universal health coverage. Lange remarked that currently there is not one entity that provides financing facilities for improving health care systems globally and wondered how the multilateral, global approach to strengthening health systems through PPPs will be operationalized. In response, Bland stated that it is difficult to predict and wondered if a global fund for health is needed or if an institution should be established to deliver on health systems strengthening. Bland also pointed out that global funds for areas such as education and agriculture are being promoted by some. But more funds could mean more fragmentation, when a more coherent approach is required. While the Global Fund and GAVI are remarkable institutions, they are primarily financing institutions and neither has a country-level presence and, as such, both work through intermediaries. That said, Bland commented that further change is needed to create incentives to drive global impact on building health systems at the national and subnational levels.

In response to Bland's comments, Gunn noted that successful capacity building highlights the importance of and necessity for education and training. Gunn has observed that the PPPs dedicated to improving education and providing training have had the least resistance from governments and provide one of the highest degrees of societal value regardless of who provided the original training. Cohen agreed with Gunn that education and training can have a fundamental impact in improving health care globally. As an example, Cohen cited India as one of the most privatized health systems in the world, with more than 70 percent of health delivery provided by private clinicians. India is also one of the most rural countries, which makes it extremely difficult to reach the entire population through the informal health sectors in rural areas. In addition, the level of care provided does not necessarily meet any local, national, or international standards. In Cohen's experience, most of the development work provided by global agencies targets the public health sector. In a place like India, Cohen believes that there is an increasing acknowledgment that development goals cannot be met without addressing the private health sector. In other countries, Cohen noted, private equity investments through organizations such as The Abraaj Group are resulting in more accredited health delivery systems. Using this approach, Cohen postulated that private investment could include training and education for these private practitioners (as opposed to excluding them) and strengthen the accreditation system. Cohen experienced this successful model at BD, where significant investments have been made toward training, whether it is provided within laboratories or clinical practices, and he encourages the promotion of a sustainable business model that incorporates PPPs. He believes that if accomplished, it could add tremendous value in multiple ways toward strengthening a global health care system.

Bland reflected on Cohen's points and stated that many of these ideas, concepts, and instruments have been around for a while and are referred to as PPPs. In terms of funding, however, there is far less money donated from private industries and the majority of global development comes from publicly funded organizations. That said, these models can work, and the private industry is comparable in terms of competence, innovative solutions, and important experiences. As an example, Bland mentioned when the British government worked with The Bill & Melinda Gates Foundation to incentivize private-sector donations with public funds. The British government agreed to a matching

fund—every dollar donated by the private industry was matched by the government, dollar for dollar. It started small, but Bland said it was successful because once private funding was received it fundamentally changed the dynamic and reflected a PPP. Bland recalled that the first round of fundraising may have raised $8 or $10 million from the private sector, compared with the $4.3 billion that was raised by the public sector. Currently, Bland believes that about $300 to $400 million is donated by the private sector. This model reflects sharing risk across sectors. Bland also commented that the challenge has been to explain the innovative solutions and global impact in a meaningful way.

Vega offered another example of innovative financial incentives, stating that public-sector financing can be used to improve efficiencies within the private sector. In Chile, for example, the government has introduced a system to pay for treating and improving the condition rather than paying by number of days that the patient stays in the hospital. The government purchases a set number of beds each year from the private sector, but then negotiates a rate for a specific diagnosis; thus, encouraging the private system to benchmark care and introduce efficiencies into the management of cases that are hospitalized. Vega summarized by observing that incentives can be from the private sector to the public sector, as well as from the public sector to private industries.

Cohen shared examples of innovative financing incentives, as well. At GBCHealth, Cohen in collaboration with others has been working on social impact bonds and other innovative funding mechanisms. Within this working group, the measurement of the ultimate impact of the work was felt to be lacking in many projects. One reason for this lack of long-term assessment was that most funds are provided prospectively, prior to impact. To address this work, the team has been collaborating with Paul Farmer, from Partners in Health, to develop a measurement system that leads to sustainable funding in conjunction with demonstrated results. The team believes that this system may expand the opportunity for increased private-sector financing and private donor financing, among those motivated to reinforce the positive outcomes. Another innovative financing concept that Cohen and his colleagues have been considering focuses on social impact credits or health impact credits. This concept is akin to what has been accomplished with carbon tax credits. In this scenario, there could be an incentive for private investment, such as easing regulatory barriers and/or accelerating review of new innovations. There are a number of incentives that could be used that have substantial benefits without actually requiring funding. These credits could become a secondary market, as they have become with carbon tax credits. For example, Tesla Motors makes more profit selling its carbon tax credits than it does on the manufacture of its cars. These credits have indeed become a key element of Tesla's business model. Yet, this innovative approach has been lacking in the global health arena. Cohen suggested that these credits could be linked directly to the SDGs when they are launched. For example, could the SDG targets become the means by which social impact credits can be afforded to organizations that otherwise would not invest? Finally, Cohen pointed out that a lot of private capital is not currently being accessed. One of the models that BD is implementing is around strengthening the health care delivery for maternal and newborn health. To do this, BD has requested private capital to limit the impact this work has on profit and loss for the year; instead, providing a solid return to the private investors. This approach requires BD to prolong returns into the future, but overcomes near-term constraints and therefore avoids having

to redeploy funds from existing core business operations while still supporting societal needs. This model could unleash large sums of private capital.

TRANSPARENCY, COOPERATION, AND ACHIEVING THE SDGS

Jeffrey Sturchio from Rabin Martin provided a perspective not only on the incentives for different sectors to engage in PPPs for health systems strengthening, but also the importance of being transparent about those incentives. When developing a new partnership, it is necessary to be honest about what is in it for the private sector, what is in it for the government, what is in it for the NGOs, and what is in it for any other partners, Sturchio explained. Health systems strengthening partnerships provide companies with the opportunity to move into new markets and to conduct business in a different way in places where they have not had access before. Also, companies are as affected by poor health and the productivity impact of poor health as governments are, as well as anyone else living in a society. For that reason alone—because businesses have a stake in the societies in which they operate because they depend on workforces that are able to produce and not be affected by ill health—the private sector has a stake in health as a global public good.

Sturchio concluded by noting that there is clearly value for the public sector to engage with the private sector. Countries are trying to meet the targets set by the SDGs and, in his opinion, the only way to deal effectively with the complexities of the SDGs is for everybody who has skills and resources to contribute to potential solutions to be at the table and to find ways to collaborate. He believes this is a key reason why it is important for the private sector to be engaged. From a public-sector point of view, Sturchio added, engaging the private sector will also enhance economic growth and development.

4

Promising Innovations and Models

Steve Davis from PATH presented several innovative partnerships for health systems strengthening that are engaging multiple sectors and partners to develop unique solutions. Davis introduced these partnerships by first describing PATH's mission and model for partnership engagement. He emphasized that PATH's work as the leading organization in global health innovation extends beyond technologies and technological innovation. Innovations require disruptive approaches but not necessarily technology solutions or large budgets, as Davis highlighted with the examples he provided.

The focus of PATH's mission is to address health inequities in the world, specifically in the lowest-resource settings. With the focus over the past 15 years on the Millennium Development Goals (MDGs) and the new focus on the Sustainable Development Goals (SDGs) for the next 15 years, Davis remarked that it is an exciting time to be working in this space. He shared data on the progress of the global health–focused MDGs to demonstrate the gains that have been made, the current trajectory, and the accelerated targets that have been set for 2035 (see Figure 4-1).

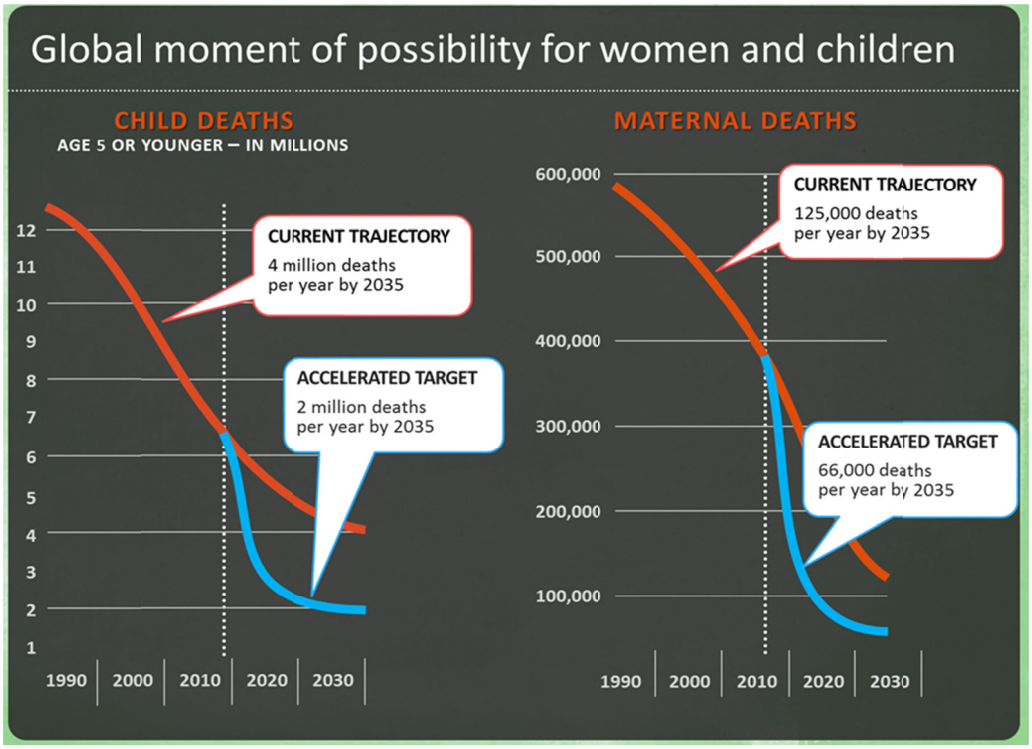

FIGURE 4-1 Progress on global health goals.
SOURCE: PATH; Presented by Steve Davis on June 25, 2015; data from World Bank Development Indicators. Projections adapted from the Lancet Commission on Investing in Health, "Global Health 2035: A World Converging with in a Generation," Lancet, December 3, 2013, Appendix 5.

Davis stated that PATH's goal is to figure out how to bend the curve, in that, to progress from a trajectory that has been driven by substantial growth, economic progress, innovation, and better services and actually bend the curve on maternal and child mortality and morbidity within the next 15 years. Davis sees intentional innovation as a mechanism for bending the curve. If innovation is planned, more can be achieved than only through accidental discoveries, and PATH is seeking to bring planning and discipline to the field of innovation in global health.

One of PATH's core platforms is system and service innovation and, through this platform, PATH focuses on health systems strengthening. Davis explained that the organization's approach to health systems strengthening includes three areas: (1) behavior change communication and demand-generation innovations; (2) health care workforce and capacity-building tools; and (3) data collection, management, and use innovations. In his opinion, the third area is where the most potential exists for health systems strengthening.

In terms of how PATH approaches its work, Davis stressed that in almost all instances, the work is done through partnerships. The partnerships typically include an academic partner, a government partner, and in most cases, an industry partner. On a related point, Davis noted that lately there has been increased discussion on reshaping partnerships and a push toward partnerships based on shared value creation—where there are recognized business benefits from addressing social needs. In his own view, portfolios of partnerships are complex and include those based on a spectrum from philanthropy to shared value.

EXAMPLES OF INNOVATIVE PARTNERSHIPS FOR HEALTH SYSTEMS STRENGTHENING

Davis shared several examples to explain how PATH is carrying out its work in health systems strengthening through partnerships. Some of the examples focus on creating new tools or new systems while others focus on innovation in the operating model or business pipeline.

Healthy Households Initiative in Cambodia

In this example from Cambodia, Davis noted that the focus has not been on creating new tools or products. Rather, the problem was that existing tools and products were too fragmented, not at scale, and the connection to channels was too weak. There were a number of different partnership opportunities with these basic household commodities, and PATH's model was to reshape the market (see Figure 4-2). The focus of the partnership was to take an ecosystem approach to reshape the market to connect the products with a more sustainable channel for development and then provide product design, aggregation, technical assistance, and more knowledge management.

Tuberculosis Care in Mumbai

Davis shared a partnership for tuberculosis (TB) care in Mumbai, India, that exemplifies the confluence of urbanization, health, and economic empowerment. In the

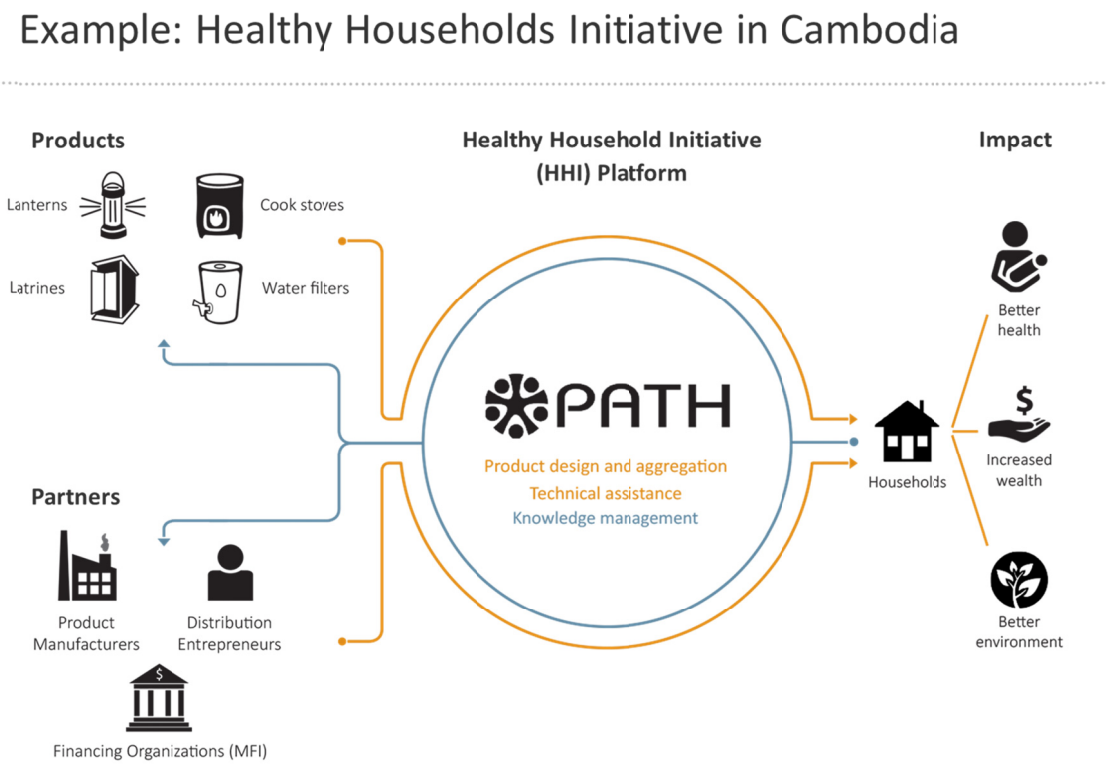

FIGURE 4-2 Healthy households initiative in Cambodia.
SOURCE: PATH; Presented by Steve Davis on June 25, 2015.

slums of Mumbai, there is enormous TB prevalence. About 40 percent of the residents were receiving their TB treatments through private-sector providers. In these areas, there are about 1,100 different types of pharmacies, which are all small, private-sector models. If these small, private providers reported incidences of TB to the Ministry of Health and Family Welfare or the subnational ministry, the patients would often be moved into the public system, thus dis-incentivizing the providers to report. PATH worked with the government leadership to reshape the incentive system to create more incentive to register and get patients into ongoing treatment. It required a reshaping of who was paid for what. Rather than taking consumers away, the idea was to actually take what part of that public dollar would have been used to pay for that patient and give it as a payment voucher to the private-sector provider. PATH is working with several organizations to create a digital platform for these voucher payments. The program is still a work in progress, Davis acknowledged, but the early data after approximately 9 months show that about 6,000 new patients were registered. In his opinion, these data are an early indicator of opportunity for urban health system transformation.

Safe Births and Newborn Care in Southern Africa

Davis shared an example of a partnership in six districts in South Africa and Mozambique, where PATH is partnering with BHP Billiton to design a multiyear set of activities to redesign the clinic-level health model, targeted toward integrated care for mothers and children in the first 1,000 days. The partnership is providing more services

and incentives for digital tools to get women into the clinic earlier for prenatal care. Davis noted that PATH is seeing some early data emerging after a couple of years of the project that are showing significant reductions in certain target categories.

The models Davis shared are focused on strengthening components of the health system and addressing broader determinants of health. In response to a question about how to move from partnerships and innovations focused on components of health systems to models that address the whole system more broadly, Davis acknowledged that a broad, whole-systems approach is challenging and he believes it is important not to dismiss the ability to incrementalize in the health systems space. From Davis's view, the role of an organization like PATH is to provide assistance at the request of countries; thus, it is up to the country to develop a more comprehensive approach, themselves, with better data and better ideas and tools, and to engage partners to drive the solutions they want.

INNOVATIVE MODELS FOR HEALTH SYSTEMS STRENGTHENING FROM NARAYANA HEALTH

Devi Shetty from Narayana Health in Bangalore, India, discussed how Narayana Health is developing and implementing models to provide high-quality care at lower costs. Building on Davis's closing comment that it is up to the countries to drive the solutions they want, the examples Shetty shared address specific needs and gaps in providing care that were identified by Narayana Health. The partnerships developed to address these needs and gaps were driven by Narayana Health as a local provider, and partners were sought based on the specifics needed.

Narayana Hrudayalaya in Bangalore is a 3,000-bed health city with four hospitals in one complex, including a cardiac hospital, multispecialty and cancer hospital, orthopedic hospital, and eye hospital. Narayana Health additionally has 30 hospitals across India, and 12 percent of all heart surgeries in India are performed by Narayana.

Before discussing the specifics of Narayana's model, Shetty remarked that the economy of the 21st century will be driven by the health sector, as it is the one industry that can create the maximum number of jobs that are desperately required. Global health care is a $7 trillion industry—the second largest industry in the world. However, Shetty suggested policy makers have not understood the employment-creating ability of the health industry nor the ability of the health sector to drive the global economy. Poor people in isolation are weak individually, but together they are very strong, Shetty explained. He believes that India will become the first country in the world to dissociate health care from affluence and prove that the wealth of the nation has nothing to do with the quality of health care its citizens can enjoy. Within this context, Shetty shared several of the innovative models Narayana Health has developed to fill the gaps in its journey to providing this level of care and access.

Yeshaswini Micro-Health Insurance

Narayana has worked closely with the state government of Karnataka, where it has operated for the past 15 years. Eleven years ago there was drought in the state, creating even greater vulnerability and instability for the local farmers. Narayana engaged

the government to launch a health insurance program for the poor farmers, in which every farmer paid USD 0.11 per month and the government agreed to become the re-insurer. At the end of 10 years, through this system, 710,000 farmers had a variety of sub-surgeries and more than 95,000 farmers underwent a heart operation. In the first year, 1.7 million farmers paid USD 0.11 per month. The program has grown to include 4 million farmers paying USD 0.22 each per month. Taking the success of this model, Narayana is seeking to tap into the 900 million mobile phone subscribers across India to collect every month about USD 0.50; if Narayana can do this, Shetty believes that 900 million people can be covered for surgical treatment.

Building New Hospitals

For a major transformation in health to happen, Shetty suggested there is a need to build different types of hospitals. There are 100 towns in India, with populations ranging from 500,000 to 1 million, which do not have a sub-specialty hospital that can perform heart or brain surgeries. These towns cannot afford to build a hospital in the traditional manner. Normally, it takes approximately USD 25 million and 2 to 3 years to construct a hospital of this size in India. Narayana worked with the largest construction company in India to build and equip a 300-bed sub-specialty hospital with the goal of doing it for USD 6 million in 6 months' time. Shetty noted that the hospital was built, but it took USD7 million and 8 months' time. The next one, Shetty believes, can be built for USD 6 million in 6 months.

Care Companion

Recognizing that family members of patients were not being empowered to be caregivers when patients were discharged, 4 years ago Narayana Health launched a program called Care Companion with students from the Stanford Business School. Narayana challenged the students to create a curriculum of short films that teach family members how to care for a patient at home, including recording blood pressure and pulse rate, dressing wounds, administering medications on time, and using physical therapy. As a result of this program, re-admission rates were reduced significantly. Shetty stressed that this model was created in partnership with the students at no cost.

Elimination of Bed Sores

The incidence of bed sores following heart operations across the world is 7 percent to 40 percent. Around 4 years ago, Shetty and his team worked with hospital nurses to develop a model to eliminate bed sores. Bed sores could start at various points during a patient's hospital stay and frequently went unnoticed until a full-fledged bed sore developed, and determining when it started is hard. The model Narayana created assigns responsibility for the bed sores, and thus nurses are now inspecting all pressure points to make sure a bed sore did not start while the patient was in the previous nurse's care. By doing this over the past 3 years, they have eliminated bed sores completely. Now, quite a few hospitals in Europe and the United States are following this protocol. Again, this intervention was developed without any financial investment.

Amaryllis Surgical Gowns and Drapes

Ninety-nine percent of the hospitals in India still use linen for surgical gowns and for draping the patient. Shetty explained that linen is not the safest choice because it is difficult to clean, but disposable gowns and drapes are significantly more expensive. Narayana negotiated with two multinational companies for disposable gowns and drapes for heart operations, and the companies asked for approximately USD 20 to 30 for each. Narayana wanted to pay half that amount, but the companies refused. Narayana then contacted and worked with local business graduates to have disposable gowns and drapes made by local garment workers. In doing so, they reduced the cost of the disposable gowns and drapes to less than the cost of linen ones. Now, Narayana is in the process of getting U.S. Food and Drug Administration approval for the disposable gowns and drapes, and they believe they can reduce the cost of these gowns and drapes for an entire heart operation to about USD 10 or less per operation. Essentially, Shetty emphasized, these changes were made without compromising quality.

Daily Profit and Loss Statement

Shetty shared that every day by noon the senior doctors and senior administrators at Narayana get an SMS (short message service) on their mobile number with the previous day's expenses and profit and loss statement. He explained that looking at the profit and loss statement at the end of the month is like reading a post-mortem report. But getting the profit and loss statement on a daily basis is a diagnostic tool that helps the senior leadership make the right decisions.

Information and Communications Technology

Shetty stated that the next big thing in health care will be information technology. He believes it will reduce mortality inside hospitals by 50 percent, reduce the cost by 25 percent, and help to provide health care to 100 percent of the population. Narayana is using technology heavily, for example, to connect patients with doctors and pharmacists remotely, to replace intensive care unit (ICU) charts in the ICU, and for online clinics.

Essentially, Shetty concluded, at Narayana Health they are "bullish" about the health care opportunities across the world and are proving that innovative solutions to providing better access and care do not need to be costly to be effective. Their decisions to engage partners in the innovations they create are based on recognized gaps and a need to tap the potential for external partners to find solutions that are safe, high-quality, effective, accessible, and low cost.

5

Lessons from Partnership Experiences

BOX 5-1
Lessons Learned from Partnerships as Identified by Individual Speakers and Participants

- Understand motivations and objectives (Jones, Longuet)
- Build trust (Johnson, Jones, Longuet)
- Understand your partners' language (Daly, Sturchio)
- Develop clear agreements and be flexible (Longuet)
- Catalyst action and give ownership (Jones, Longuet)
- View partnerships as a mindset not a formula (Jones)
- Learn from your partners (Longuet)
- Share and learn from failures (Jones)

The previous chapters have included the context, motivations, opportunities, and examples of innovations for public–private partnerships (PPPs) for health systems strengthening. In addition to these factors, Bruce Compton from the Catholic Health Association of the United States emphasized the need to learn from lessons and experiences in partnerships for health systems strengthening to improve efforts going forward. This chapter distills the lessons learned from both the successes and the failures that were presented and discussed at the workshop.

LESSONS LEARNED

Andrew Jones from the Tropical Health & Education Trust (THET), Christophe Longuet from Fondation Mérieux, and Clarion Johnson from ExxonMobil shared lessons learned from developing and maintaining partnerships through their individual organizations. Despite differences among their organizations, their roles within the organizations, and the specific focus of their partnerships, they shared common experiences and lessons. This section synthesizes these lessons and includes a summary in Box 5-1.

Understand Motivations and Objectives

Christophe Longuet from the Fondation Mérieux acknowledged that partners often have different motivations and objectives. While partnerships among stakeholders with differing motivations and objectives can be successful, it is important to understand each other's perspective when entering the partnership. For instance, Longuet explained Fondation Mérieux typically enters partnerships with a focus on medium- or long-term objectives;

whereas, their partners in Africa frequently are faced with short-term issues and resource needs that drive their motivations and objectives. Additionally, the foundation's external funding partners often have specific interests in supporting parts of an overall project, such as a particular region or program component, rather than supporting the program overall. These divergent motivations and objectives can be managed; however, they need to be understood by all partners in order to be manageable.

Andrew Jones from THET also emphasized the importance of understanding your partners' motivations and objectives. Specifically, when partnering with the corporate sector, even if the company is funding the partnership through its corporate philanthropy or social responsibility, there will be expectations on what the company delivers as if it was any other business-line activity. Jones said, when starting a relationship with a potential partner, get to know their motivations, talk to individuals, and learn how to work jointly for mutual benefit.

Build Trust

The panelists explained how they build trust with their local partners, as well as how they determine the trustworthiness of those with whom they partner. Johnson shared that to build trust with partners on the ground he starts with the mindset that they are invested in their communities, have been there longer than him, and have knowledge about what has failed in the past and what is needed going forward. In terms of choosing trustworthy partners, Johnson noted that his company performs incredible due diligence with all of its partners to determine if they can be trusted. He must demonstrate to his senior leadership that he knows and understands the partners with which he engages and will be prepared to answer questions about the motivations, strategic plan, and flexibility of the partners if needed. Thus, he asks potential partners questions about how they are credentialed, how they work in a country, and, above all, if they are willing to share their procedures with the company's auditors.

Jones commented that trust is about a number of different components, including mutual accountability, respect for each other, and the ability to acknowledge that there are mutual benefits. In the end, it is about how you act it out rather than what you say. Like Johnson, Jones noted that his organization also performs thorough due diligence on the partners with which it engages, all partners including those on the ground and corporate partners. Jones explained, "If I am going to enter into a meaningful partnership with you or with a corporate or another NGO (nongovernmental organization) or a government agency…I need to know and believe that not only do you want good things to flow from this relationship, you actually want the best. Of course, for this to work, you need to know and believe the same of me, too."

Longuet added that it takes time and a demonstration that trust can be given to you. When it comes to selecting trustworthy partners with which to engage, sometimes it is not a choice. Occasionally, a partner is predetermined, and then decisions are made regarding what will and will not be accepted in the partnership.

Workshop participant Patricia Daly from Save the Children commented on the issue of trust from her perspective at a large, long-standing international NGO. She noted that often NGOs have been in communities for a long time and they have built trust with the community and the local government. When an NGO adds a partner, doing due diligence is

incredibly important to maintain those trusted relationships. If the trust is lost, the organization cannot continue its work there.

Understanding Your Partners' Language

Daly added that a common language is important and much time is spent educating each other on specific language, whether it is from an NGO or a corporate partner or a foundation. Language barriers can be overcome, but doing so requires having the right people in the room who are willing to learn from each other. Drawing on this point about language, Jeff Sturchio from Rabin Martin commented that it is hard to overestimate just how little individuals from different sectors understand about how other sectors operate. Even when using the same words, different sectors may not mean the same thing. Referring to a particular partnership experience that involved a company, a foundation, and a national government, Sturchio said that it took years to develop a common understanding of what the partnership was trying to accomplish.

Develop Clear Agreements and Be Flexible

Appropriately managed expectations are vital to successful partnerships, Jones emphasized. Either partner is capable of letting the other partner down. Well-managed expectations and clear agreements at the outset will mitigate this likelihood. Longuet agreed but used the example of the Ebola epidemic in West Africa to illuminate the importance of being flexible within agreements. The epidemic required a reallocation of the foundation's resources and the establishment of new objectives for its partnerships. Some original objectives were placed on hold while the foundation focused for one year on laboratory capacity building for hemorrhagic fevers. Because of the flexibility built into the agreements with its partners, the foundation was able to reallocate its resources as needed.

Catalyze Actions and Give Ownership

Longuet explained that through Fondation Mérieux's partnership model, its partners in country own and implement the projects. The foundation sees its role as supporting actions and implementation, but the countries have the ownership. The reasoning behind this model is that those on the ground know best what they want to accomplish and they know how to do it. However, Longuet admitted there can be challenges when the capacity and infrastructure on the ground to implement projects is limited and needs to first be assessed and addressed to create the necessary environment to implement the program.

Jones noted that much of the current work in global health and international development is based on the principles set out in the Paris Declaration on Aid Effectiveness in 2005. The Paris Declaration placed an emphasis on development interventions being led by developing countries. This created a parallel emphasis on partnerships and country ownership rather than one on traditional development and donor models.

Learn from Your Partners

Partnership is a learning process. Longuet stressed the need to be open to learn from other partners, particularly those in country where activities are being implemented. They have a lot to teach about the community needs and local context and how to develop and create more sustainable results.

View Partnerships as a Mindset Not a Formula

Jones emphasized that successful partnerships are based more on relationships than on systems. Rather than developing a "formula" for successful partnerships, sectors should focus on developing a partnership mindset. When partnerships are based on relationships, even when the funded activities end, the relationship continues and there is an opportunity for ongoing and sustainable support to the overseas institution. Jones noted that in his organization, they need to constantly remind themselves that there is a difference between the time-bound project into which they invest and the partnership itself, which provides the basic infrastructure for and the relationship to deliver the project.

Share and Learn from Failures

Jones commented on the importance of learning when partnerships fail. To improve partnerships and create a better chance for success, it is important for partners to assess why the partnership failed and begin to learn from it. Those lessons are reiterated and then incorporated into the next partnership. In the end, success is understanding the application of the principles of partnership. Failure lies in ignoring them. To share the knowledge THET has learned from its successes and failures, the organization has developed a set of partnership principles.[1]

THE MACRO CONTEXT

Based on workshop discussions and his experiences working in global health across sectors, Sturchio shared several lessons learned when considering the macro context in which partnerships are being developed.

New Paradigm of Global Health Governance

Referring to the context Rifat Atun set regarding the post–Bretton Woods Agreement environment, Sturchio commented that a new paradigm of global health governance is emerging in which all sectors will need to conduct business in a new way—not just the private sector but also governments and NGOs. New mechanisms will be required, reflecting the principles of good governance, transparency, participation and engagement; clear accountability for success and failure; coordination and coherence; and a new eye on priority setting to achieve ambitious global goals while balancing equity and efficiency. Within this

[1] THET Principles of Partnership is available at http://www.thet.org/health-partnership-scheme/resources/principles-of-partnership (accessed December 15, 2015).

framework of broader issues around politics and public policy, Sturchio suggested global health needs to be better positioned as a critical factor in achieving the new Sustainable Development Goals. He added that new ventures within this context will require not "just-all-government" but also "whole-of-society" approaches with practical mechanisms to ensure participating stakeholders have the opportunity to contribute to new solutions, both in defining goals and priorities and working together in implementation. Sturchio added that, at the country level, these new mechanisms will only be successful with high-level political commitment and engagement.

Managing Complexity

Within this context, Sturchio noted that currently there is already significant investment in health care in the developing world, from international donors, private sector partners and domestic government resources. In many countries, more than half of health care services are delivered through the private sector. It is not a question of whether the private sector can help, but rather how best to manage the complexity. That complexity includes the entire spectrum of prevention, care, and treatment. At the country level, there are private clinics, private pharmacies, drug kiosks, social franchises, and even informal practitioners. Further, the private sector is involved at all stages of the value chain. Like the lessons shared for partnership experiences, this complexity and the macro context in which individual partnerships are developed are factors that influence both the prospects for new partnerships and their potential for success.

6

Measuring Performance and Progress in Public–Private Partnerships for Health Systems Strengthening

Multiple perspectives were shared on how both success and failure in partnerships for health systems strengthening have been defined and measured in the past, with the goal of illuminating opportunities for developing a shared vision among partners for what is valued and should be measured. Robert Bollinger from the Johns Hopkins Bloomberg School of Public Health stated that it is important at the beginning of a public–private partnership (PPP) to develop a shared vision, identify and define the shared values, and then recognize that as programs develop over time some of those metrics may change, so it may be important to revisit and redefine metrics as the program continues. The emphasis in this session was to explore which metrics matter for evaluating the effectiveness of PPPs.

DEVELOPING METRICS FOR HEALTH SYSTEMS

Sally Stansfield from Deloitte emphasized that when measuring the impact of a PPP on strengthening a health system, the most critical measurements will be assessing their effect on improving health outcomes. She has observed that it is the measurement and impact on health outcomes that will drive a shared commitment, and ultimately influence the resources, time, energy, and productivity committed by each partner.

The other domain of metrics to consider is the quality of the partnering process. Stansfield shared an example from the Global Malaria Action Plan that demonstrated how the organization considered measuring the process of partnering. Some of the measures included reviewing the key players and sectors committed to the partnership and assessing the representativeness and the balance between the public and private sectors and the appropriateness to the task.

Stansfield stated that information is considered by the WHO as one of the six building blocks of the health system. However, she suggested it underpins it. Without the collection of high-quality information, the metrics are useless. Imagine managing human resources or a supply chain, or providing governance, or developing policies without meaningful information. At the core of developing metrics is the consideration of the quality of the information system through which data can be collected and used for decision making. When considering a new investment, Stansfield noted that metrics should be evidence driven. Indeed, metrics and the way in which they are used to measure progress and communicate to partners can build momentum and trust during the project.

While health information is critically important for measuring the impact of PPPs and demonstrating the value to each partner, Stansfield stated that this information is also tremendously valuable to the communities, patients, and customers who are involved in

the project. As an example, Stanfield shared her experience conducting a study in Malawi that demonstrated the impact information can have on an entire community. In this study, villages were randomized to receive two different levels of information on how well they were doing with regard to utilization and coverage of life-saving maternal and child health services, such as bed nets and contraceptives. All villages received summary information of their collective progress, while half of the villages also received information about how their own village was doing and how five of their nearest neighbor villages were doing. The villages that received locally disaggregated information about how they were doing and how their neighbors were doing were empowered. They realized that the interventions were intervenable, it was changeable, and they could fix it. These villages took charge of their own health, and there was a nearly 50 percent increase in coverage and utilization in those villages relative to the ones who only received summary information. This study demonstrated the power of metrics, not just for the partnership and for mobilizing resources, but also for empowering and motivating people and communities to take charge of their own health.

Jo Boufford from the New York Academy of Medicine commented that metrics, such as the ones Stansfield described, can be motivational but, unfortunately, the rate-limiting step is often the capacity at the local and country levels to gather the information. Though vital statistics are generally maintained, other information routinely captured is highly variable. Boufford also pointed out that metric systems often measure what is important now, but they may or may not be relevant to the future. Stansfield responded that there has been progress in country ownership of information systems. This ownership is, in part, a result of the new technologies that help with district health management, including open-source software packages such as DHIS 2 that can make the information readily accessible and useful. More is being learned about how to use the information-and-benchmark progress, such that there can be increased accountability and rewards for effective local interventions. Finally, Stanfield noted the growing focus on domestic resources mobilization, rather than continuous donor funding, is changing the dynamics, such that the data are owned at the country level and therefore the problems, the solutions, and the successful interventions are now being owned at the country level, too.

In terms of measuring relevant endpoints for shaping the future, Stansfield has observed that a big problem with the global architecture in health is that the funders tend to drive and shape what is measured. For example, the Centers for Disease Control and Prevention (CDC) conducts disease surveillance but not public health surveillance. As learned from the Ebola virus outbreak, CDC is not conducting surveillance for unexplained clusters of deaths or conducting surveillance for the unexpected. Stansfield stated that she would welcome a transition away from disease surveillance toward country-owned health information and targeted data collection for community issues.

Aye Aye Thwin from the U.S. Agency for International Development (USAID) also conveyed the importance of metrics for understanding how successful PPPs have been in improving health systems. Health outcomes are critically important she stated, but so are consumer satisfaction and the extent to which the partnerships can demonstrate improvements across the health system and ultimately impact the target population. Thwin added that the outcomes often used to measure the success of PPPs include examining effectiveness, efficiency, and equity. Other metrics include compliance and

quality and whether or not partnerships have improved value and provided a benefit to the population.

She noted that it is important to develop an analytical framework that distinguishes contribution from attribution. When evaluating the success of the partnership, one must establish baseline measures and then examine changes over time. Thwin suggested that when evaluating incremental changes and near-time results, it is important to measure the periodic progress and allow for appropriate modifications. That said, flexible tools and systems are needed to measure and track progress. Indeed, there is a substantial need for evidence when evaluating investments for improving health systems.

Process metrics are also important to consider when evaluating the performance and progress of PPPs. Thwin shared her experiences in setting up PPPs and observed that there is often a lot of lag time in establishing the agreements, developing the shared values and vision, executing the plan, and tracking the results. It is important to measure the time for each step in the process and assess the reasons for delays. For example, did both partners have access to the metrics being captured and utilize them for process improvement?

Another metric to include in the evaluation of successful PPPs is the investments that each partner garnered for the program, the alliance that was built, and the number of people impacted from the partnership. Specifically, evaluating the impact on equity is important, such as through the types of people who directly benefited. Was the entire health system strengthened, including reaching vulnerable populations? As an example, Thwin described her work on preventing drug-resistant malaria in the Mekong region of Asia. This is a region where, because of the job market, there is frequent cross-border passage (between Laos and Thailand). Although Thailand is a model for universal health coverage, there are almost 4 million of these migrant workers who are not accessing health services. She suggested partnerships are needed across countries to develop solutions that address these complex and often political health issues.

Finally, Thwin suggested it is important to measure the level of human resources required to deliver high-quality health care and improve health systems. USAID prioritizes setting up national health workforce accounts for both the public and the private sector. However, the metrics do not necessarily measure the ability to deliver high-quality care. She indicated the continued need to consider how new technologies can improve efficiencies and quality of care without necessarily increasing the workforce.

John Lange from the United Nations Foundation reflected on the complexities of reporting mechanisms that require a massive number of metrics and the associated expense of collecting and analyzing the metrics for each program. Lange agreed on the fundamental importance of metrics being evaluated for their utility because of the expense and effort required globally to use them; he wondered what coordination efforts are currently taking place by the European Commission, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), USAID, CDC, and others to address the issue that each agency has a separate, long list of indicators and metrics, which actually increases the burden on the countries receiving funding. Thwin responded that there are many ongoing efforts by USAID and others to streamline the information collected and used. *The*

Roadmap for Health Measurement and Accountability[1] is one such example as well as the PPPs metrics used in the past. There is also an active movement in USAID to start documenting interventions that were not successful.

Justin Koester from Medtronic spoke about the importance of PPPs and how to improve health systems on a greater scale. The key metrics he noted were patient outcomes over time, impact on quality of life, and overall patient satisfaction and customer service. In developing devices that are meaningful to patients, Koester noted that partnerships were critical for Medtronic to ensure that the health care infrastructure and health care delivery systems were of high quality to successfully deliver the devices. Indeed, to make a difference in patients' lives, partnerships have been developed to improve the efficiency and delivery of care within operating rooms, cardiac catheter labs, and surgical centers. For example, a PPP in the Netherlands was developed to evaluate and improve patient diagnostic time at a hospital. Over a 6-month period, this partnership reduced the time of diagnosis from the moment a patient enters the facility to the time they are appropriately diagnosed from 2 weeks to 24–48 hours.

Koester suggested that metrics are needed at every level of the health care system. This includes primary care, secondary care, and tertiary care, as well as pre-hospital, in-hospital, and post-hospital care, and at every level of abstraction at the health system, as well as whether that is from the health facilities perspective, the payer's perspective, or the overall health system's perspective.

Metrics are most effective in driving change when they are transparently collected and shared. Koester noted that the example shared by Devi Shetty from Narayana Health is an excellent example of transparent metrics, whereby all physicians in the hospital receive daily profits and losses for their hospital and are held accountable for these metrics, which significantly impacts their daily decisions of health care treatment.

Katherine Taylor from the University of Notre Dame shared her perspective on metrics and accountability. She noted that the majority of metrics utilized in a university setting are in regard to conducting research and training; the metrics used to examine specific implementation programs can be quite different. Therefore, when considering PPPs from a university perspective, the research questions that might be embedded in the partnership may take on a whole other set of resources and needs, in terms of data collection and evaluation, than some partners are typically accustomed to experiencing. Reporting might be different, as well as data collection, program design, impacts and outcomes measured, and timeframes.

Taylor suggested that when considering the appropriate metrics for measuring performance and progress in a PPP that is strengthening health systems, the goal should be to improve and sustain country-level health improvements and systems for accountability. This agenda was outlined in *The Roadmap for Health Measurement and Accountability and a Five-Point Call to Action.*[2] The Roadmap aims to ensure that countries have the necessary information and capacity to plan, manage, and measure their health programs, as well as monitor and achieve their national health goals and the health-related Sustainable Development Goals (SDGs). Taylor mentioned that many

[1] See http://ma4health.hsaccess.org/docs/support-documents/the-roadmap-for-health-measurement-and-accountability.pdf?sfvrsn=0 (accessed December 15, 2015).
[2] See http://ma4health.hsaccess.org/docs/support-documents/5-point-call-to-action.pdf?sfvrsn=0 (accessed December 15, 2015).

workshop participants have indirectly stated these same principles of research regarding what data get collected, how the data are analyzed, who has access and/or ownership of the data, appropriate use of the data to drive decisions, and that the data must all reside at the country level. She suggested that this concept will really change the nature of some of PPPs.

Questions about who is the data for, how will the data be used, what resources will be required to collect, store, share, and analyze the data are all important; but because resources are spent on collecting data, there must be a value that serves the health needs of the country. Taylor noted that too often research projects are just serving the data needs of the partners and, while those are important, the primary goal must be the health needs of the countries and communities.

Over the past 10 years, there has been a proliferation of global health organizations that have driven dramatic advances in improving health and health systems in many low-income countries. Taylor noted that these accomplishments have been primarily driven by vertical programs whereby the data collection and evaluations can be very specific for the purposes of the program. While the accomplishments have been important, the large numbers of health organizations involved have also driven a complexity in the donor environment and expectations. Indeed, a new minister of health in a low-income country lamented that too much time was spent on organizing donors, Taylor mentioned. With increasing donors and partners, Taylor suggested there is frequently a demand for more indicators and metrics with less transparency. A clear purpose for additional indicators and dissemination plans for results need to be clarified early in the process.

The risk is that the information flow becomes one-way and is not available for informing decisions about the local and national health systems. Taylor once observed a community health center with one little room and a stack of forms that needed to be filled in for each project, for each donor, and for the ministry, and a significant amount of resources are used to complete those forms. Reporting is conducted on a monthly basis, and little to no information returns to the clinic. This system is not sustainable or informative for improving health systems. Taylor encouraged the movement toward pushing the ownership of these research responsibilities to the country level and the required change in the paradigm over the next few years.

Margaret Kruk from the Harvard T.H. Chan School of Public Health stated that she has recently been working within sub-Saharan Africa, where many people are living on a few dollars a day, where health systems are spending USD 30 or USD 40 per person per year, not USD 8,000 per year as in the U.S. health system. She suggested, in a region such as sub-Saharan Africa, private partners are able to shift the way patients are perceived. She also spoke about the new perspectives that PPPs can bring to the delivery of health care, the functioning of health systems, and the promotion of global health goals.

Kruk shared three broad areas to which private partners bring a tremendous value to partnerships that aim to strengthen global health systems. The first area is a customer-first focus. Historically, global health provisions have not been focused on customer and patient satisfaction, but rather on delivery and access to health care. She argued that the focus has been on getting people to facilities at all costs. Whereas, the private sector is concerned with what happens once they get there. What is the patient's experience? What

is the customer's experience? The philosophical difference may be that government partners think patient experiences are nice to have, while the private sector believes it is a must-have. Connecting with the patient builds trust and is the basis for greater adherence and continuity of care—all these important measures are often not addressed adequately but can improve health care and health systems. Populations in even the lowest-income countries are now facing chronic diseases as the primary burden of disease. Leveraging the experience and expertise from the private sector to improve loyalty, faith, and build trust among patients can ultimately improve the delivery of public health care.

Certainly, the issue of patient satisfaction ties directly into the Patient Protection and Affordable Care Act. The issue of developing a process for universal health coverage relies on a fundamental assumption that patients will support greater spending in health care and the purchase of insurance. Again, developing a system that patients want to use is essential. Kruk believes that trust and patient satisfaction are not simply side effects, they are one of the main jobs of the health system.

The second area of focus, she noted, is outcomes. Health care must demonstrate value by lengthening lives, improving quality of life, and reducing morbidity. In addition to these critical measures, however, it is important to measure a patient's own sense of the quality of his or her health. As people live longer, Kruk suggested that patient-reported outcomes on the global assessment of health issues become increasingly important. To demonstrate this point, Kruk spoke about the Oregon Health Study, which found that despite broad Medicaid health insurance coverage, hemoglobin A1C levels did not improve. In fact, many outcomes did not improve. But what was notable to Kruk, was what did improve. Depression scores improved and patients' own assessment of their health improved. As a trained family physician, Kruk spoke about her experience working in northern Canada. There, she observed a sense of trust and security when the health system was working well and health services were covered. She suggested that improving the patient's sense of his or her own health is an equally important outcome after reducing the hard outcomes.

Kruk concluded with a final set of metrics: examining the process for developing and delivering the program. She reminded attendees that many examples demonstrating the need to tackle the process have been shared; to open the "black box" and ask how do we reduce wait times, how do we improve queuing strategies, and how do we reduce diagnosis delays? The private sector can help the public systems be highly critical in examining the process for the delivery of care. Too often, Kruk suggested, failed public health programs continue without accountability and flexibility to end them quickly. Another area where private industries can assist in the process is around parsimny and transparency of metrics. Indeed, the number of metrics utilized within PPPs is flourishing, including massive lists of indicators. Kruk noted that metrics are expensive to collect, so they must demonstrate value just as any other health care service or investment. She also stated that partners must be diligent in reducing metrics to those that add value and that reporting is critical. Comparison among countries and among regions generates important peer pressures and positive effects, but the information needs to be provided both locally and regionally. Kuk notes that if the information does not trickle down in a readily useful form, the utility of that information will be limited. As an example, she described working on a field study in Tanzania where she and her team reviewed a 200-question survey. For each question, her team deliberated on the value of

the metric. How will the measure be used? How will it be analyzed? If it was not deemed important enough, then the question was deleted. Kruk suggested that everyone needs to be parsimonious and diligent in the reduction of the burden of metrics, while simultaneously improving their utility. In determining which metrics are most useful, Kruk stated that patients and consumers will increasingly demand information—not just their own information, but also the aggregate information about the performance of their local health system and their doctors. Patients should be better informed to make personal health decisions. Based on research conducted in Tanzania, Kruk's team found that women who have a cell phone and who listen to radio or television are increasingly bypassing their local health facility to seek treatment within a hospital, and they are reporting better care there. They are not waiting around. Kruk stated that this is not a Manhattan consumer, "let me assure you." This is often an illiterate person with very modest wealth to be able to do this, and yet, he or she is doing it. They are acting on the information they receive to seek better health care—a desire that is a global one in the health system, both here and in lower-income countries.

Patrick Kelley reflected on the discussion by stating that metrics seem to be used to manage health care, but also to motivate individuals and communities locally. Therefore, it is not only important to collect the right metrics, but also to identify the right people at the right time who can achieve the change with the information collected. To which Kruk agreed and stated that for any enterprise partnership to be sustained, a useful and cost-effective set of metrics must be developed and delivered in a timely manner. She stated that we must ask, "[are the data] reaching the right people on time, and is it the smallest set of data that we need to create change?"

METRICS FOR PUBLIC–PRIVATE PARTNERSHIPS FOCUSED ON HEALTH SYSTEMS STRENGTHENING

In conclusion, each panelist was asked to prioritize two to three metrics for measuring the impact of PPPs on health systems strengthening.

Kruk stated that the patient's view of quality is critically important and has been linked to better outcomes, improved adherence, and greater retention in the health systems. Then, sustainability of the program, including the ability of the program to adapt to the market, is an important indicator of success.

BOX 6-1
Priority Metrics for Measuring the Impact of PPPs on Health Systems Strengthening Identified by Individual Panelists

- User satisfaction with quality of care and experience (Koester, Kruk, Stansfield, Taylor, Thwin)
- Health outcomes (Stansfield, Taylor, Thwin)
- Sustainability (Kruk, Stansfield, Thwin)
- Metrics tailored to the outcomes prioritized by individual stakeholders (Bollinger, Koester, Stansfield)

Taylor agreed and stated that, as a society, we should be measuring the quality of health care and the quality of the experience within the community, as well as the health of those populations and their satisfaction with how they received health care services, how they are financed, and how they participate in their health care.

Koester reiterated the need for patient centricity. In addition, he suggested that an adequate follow-up time be used, as well as measuring success from different stakeholders. He believes that market forces, health information technology, and information transparency are all driving significant changes to the metrics of the health care system at all levels.

Thwin agreed that consumer satisfaction should be part of the partnership evaluation. The U.S. legislation on migrant farm workers (The Migrant and Seasonal Agricultural Worker Protection Act) states that the migrant workers themselves should represent the majority on the board of the migrant health care centers that have been set up, so they have more than 50 percent representation. Collectively, we need to be considering similar models, Thwin stated. Another key area of focus is to conduct fewer partnerships so that higher-quality partnerships can be developed. This includes addressing what has gone wrong in the past to move forward, tracking the necessary metrics, and driving improvements. Finally, sustainability is important, as well. Thwin stated that after the funding ends, we need to be disciplined in examining the impacts and sustainability of benefits. She shared how KfW, the German Development Bank would go back 2 years after their program ended to assess the impact of what they contributed. She notes that this practice is not always routinely conducted and could be applied more widely.

Stansfield agreed with the priority metrics presented. She emphasized the need to balance the dynamic tension between privacy and the benefit to public health and quality of care of data sharing. Another important point, she noted, is that there is funding for analytics at the global level, but there is little investment in country-level and peripheral analytics. As such, she believes that there is a great opportunity for PPPs as they expand to national and subnational levels to invest in analytics to support the investment case for the highest health priorities within countries.

Bollinger concluded by saying that the ideal PPP should focus on outcomes that matter to the community and to the patients. However, he emphasized that that while there may be agreement that community health outcomes matter, all partners must come to the same definition of what those outcomes really mean in order to move forward.

7

Sustaining and Increasing Long-Term Investments in Health Systems

Jo Boufford from the New York Academy of Medicine opened the workshop session on sustaining and increasing long-term investments in health systems by noting that the issue of sustainability and long-term investments has come up throughout the workshop in discussions on creating business plans and market models that can succeed and be sustained. This session built on those discussions and the panelists highlighted intentional opportunities and mechanisms for sustainable public–private partnerships (PPPs) with an emphasis on financing and governance.

SUSTAINABLE FINANCING FOR HEALTH SYSTEMS

Soji Adeyi from the World Bank began his remarks on sustainable financing for health systems by first describing what he sees as the biggest drivers of trends in health markets.

Drivers of Health Market Trends

1. Demographic shifts based on population growth and change in the composition of populations. The global population is predicted to increase fairly rapidly over the next 30 years and, within that increase, the proportion of the elderly—a subpopulation that consumes a larger portion of health care—will increase.
2. Growth of economies. As income per capita increases, total health expenditure per capita also increases. As countries move from low-income status to lower-middle income to upper-middle income status, a significant portion of the increase in health expenditure is within the private sector and within that portion, a significant amount private, out-of-pocket expenditure at the point of service delivery.
3. Anticipated expansion and improvement in health care infrastructure in emerging markets.
4. Push for universal health coverage. The achievement of universal coverage, which is included in the Sustainable Development Goals (SDGs), will be a priority target for countries and will emphasis effective coverage and protection from poverty due to catastrophic cost of care.
5. Trade-offs between equity and efficiency goals.
6. Government and market failures.

Opportunities for Public–Private Synergies

After describing the major drivers within health markets that will affect the efficiencies and sustainability of health systems, Adeyi suggested several opportunities for synergies between the public and private sectors to increase the sustainability of health systems.

1. Including the private sector in service delivery under an umbrella that is publicly managed or publicly convened. Adeyi commented that Turkey's health transformation model, which is mixing public and private sector resources toward the obtainment of universal coverage, is a promising example.
2. Addressing failures in pharmaceutical supply chains. This could include a switch to the private sector contracted by the public sector, or even quasi-public entities that are less beholden to the current system.
3. Improving the use of appropriate medical technology and equipment. Adeyi noted that recent reports have shown that in African countries roughly 40 percent to 70 percent of medical equipment lies idle. There is a need not only for equipment, but for training and services performed with the equipment.
4. Involving the private sector in human resources for health. A labor-market approach to analyzing the demand and the supply within human resources, compared with the populations, could more effectively identify imbalances and opportunities.
5. Interfacing between financing of health systems and disease control.

In considering these opportunities, Adeyi shared some current promising approaches for sustainable financing of health systems through a mix of the public and private sectors. Using a working definition of sustainability as the "attributes through which a program can continue to be adequately financed from a combination of domestic and global sources with a progressive shift toward domestic financing," Adeyi suggested the necessary elements of a sustainable program are: financing on budget, with the host country contributing the first funding; providing demonstrable value; and explicit agreement among the partners to progressively increase the use of domestic resources. If these three conditions are not there, Adeyi feels the prospects for medium- to long-term sustainability are bleak.

In the recent past and to some extent currently, Adeyi noted that some large programs are almost purely bilaterally financed by external agencies and they have not been sustainable because there is no ownership as they face a steep cliff as external financing dries up. Adeyi added that several countries have attempted sector-wide approaches with the promise of harmonization and reduction in transaction costs. These approaches, however, have some drawbacks because they are somewhat weak in terms of explicit results for cost—in that, a heavy emphasis on process and a relative weakness in outcomes.

Adeyi shared that recently there was a move on the part of the World Bank toward the Program for Results, which is explicitly anchored on measurable results and crowds in funds from all sources. The idea is to unify the promise of being on budget, the promise of being system-wide, and the promise of being results-focused.

A recent example is the new global financing facility in support of Every Woman, Every Child, which Adeyi shared as an example of attempts by multiple partners, including the World Bank, to address the large disparities in maternal and child health while fostering new ways of financing for development in the post-2015 era. The promise of this initiative includes a focus on achieving and measuring results, large scale use of country systems, and emphasis on transitional financing as a route to sustainability. A final example discussed by Adeyi was the Affordable Medicine Facility-Malaria (AMFm). The intent of the AMFm was to bring together the public and private sectors to increase access to antimalarial medications, using a new architecture to finance development assistance. The partnership succeeded in cutting the price of antimalarials at the point of consumption and increasing availability, even in remote regions. However, AMFm has not been sustained; this illustrates, from Adeyi's perspective, the limit of the appetite of the global health financing community for evidence that is not politically convenient. An independent evaluation provided strong evidence of the success of the AMFm, but the political will to back it was lacking.

THE ROLE OF THE PUBLIC SECTOR IN SUSTAINING PARTNERSHIPS FOR HEALTH SYSTEMS STRENGTHENING

Jeffrey Sturchio from Rabin Martin discussed the role of the public sector in ensuring health systems partnerships are mobilized and sustained. Current estimates indicate the health sector makes up about 10 percent of global gross domestic product (GDP), Sturchio explained. He suggested that, as the global community focuses on the transition to universal health coverage, it will be important to mobilize all stakeholders who are involved in that health economy. Businesses provide employment and run programs across the economy—everything from developing new medicines, vaccines, diagnostics and medical devices, to health care delivery and pharmacy care to health insurance. By contributing to the health economy, businesses across all industry sectors are also helping to contribute to health outcomes. Sturchio suggested that this contribution tends to be overlooked in discussions about universal health coverage and health systems strengthening. As government policies are developed for achieving universal health coverage, Sturchio argued that there has not been enough attention to focusing on how to stimulate partnerships to ensure the most efficient use of all the resources available. To sustain long-term private-sector investments in universal coverage and health systems, Sturchio named three areas where governments should focus: mobilizing and utilizing market forces in a constructive way, identifying gaps in the system and ways that partnerships can help to bridge them, and being more open to and engaged in reaching out to the private sector. He also suggested several ways in which governments can change the way they operate to help provide for more partnerships to achieve scale for universal health coverage:

- Have a clear policy to work with the private sector to encourage dialogue and partnerships.
- Make sure there is accurate information about the scale and scope of private health care resources in the country.
- Use regulation, registration, and other public sector tools as creative ways to support partnerships with the private sector.
- Think more about incentives, financing support, and other ways to encourage the private sector to become involved in public provision in a way that expands the envelope for health care coverage.

SCALING UP AND SUSTAINING PARTNERSHIPS FOR HUMAN RESOURCES FOR HEALTH

Noting the importance of addressing human resources for health as part of health systems strengthening, Mushtaque Chowdhury from BRAC presented a partnership to promote community health workers that has proven to be scalable and sustainable. Community health workers have been integral to the BRAC model for more than 40 years. After the Alma Alta Conference in 1978, where the role of community health workers was discussed, there were numerous experiments to train community health workers and, unfortunately, most of them failed in many parts of the world. BRAC started training community health workers in the late 1970s, and now has about 105,000 of them working alone in Bangladesh and another 30,000 working in other countries.

What are the partnerships within BRAC's community health worker model? The partnerships exist at several levels: the village-based community partnerships that select one of their members to be a community health worker; the pharmaceutical company partnerships through which pharmaceutical companies provide medications to community health workers to sell; and the partnerships with the government health system. There have been extensive studies in Bangladesh and elsewhere to assess the effectiveness of community health workers, and BRAC has seen that these workers are able to provide treatment for all kinds of diseases, including complex diseases such as tuberculosis (TB). Additional evidence demonstrates a significant level of community satisfaction with the role of community health workers. Recently, a randomized controlled trial was conducted in Uganda using the BRAC model to assess the impact of community health workers on child mortality. The findings showed up to a 25 percent reduction in child mortality resulting from the community health worker model.

While the evidence base for the effectiveness of the BRAC community health worker model is growing, Chowdhury acknowledged that many community health worker models have failed. He suggested two issues leading to these failures. One is that community health workers are often trained and then left on their own, with no connection to the health system. The second issue is the lack of incentive for the health workers. In most cases, community health workers are women from poor families who are working without any incentive. BRAC's model includes incentives in the form of micro-credit, financial benefits from selling medications (in countries where it is allowed). Additionally, in places where they are working on a particular program (such as TB) that is funded by the Global Fund, community health workers receive a financial incentive after identifying a TB patient and providing DOTS (directly observed

treatment, short course) treatment. Through these mechanisms, BRAC's community health worker model has been sustainable and scaled up within and across countries.

In response to a question about the issue of regulatory frameworks and licensure for the community health workers, Chowdhury commented that it varies from country to country. In Bangladesh, for example, regulatory issues exist. Nevertheless, 95 percent of the health workforce is in the private sector and the informal sector. Although by law "village doctors" are not allowed to practice, BRAC knows they are all over South Asia; so it is not enforced. BRAC is facing problems in some countries, Chowdhury noted. For example, in Sierra Leone, the government does not allow community health workers to sell medications without a license, and the sale of such medications is an important incentive of the community health worker model in most countries. It varies from country to country depending on what the regulations are and how these regulations are enforced, and requires specific understanding and development based on the local context.

COMMUNITY OWNERSHIP AS A MODEL FOR SUSTAINABILITY

Rajesh Anandan, from the U.S. Fund for UNICEF, addressed the trade-off between equity and efficiency and suggested that there does not always need to be a trade-off between the two, particularly when ownership is given to the consumers. The funding available for health systems strengthening is not expected to increase significantly: foreign assistance budgets are not increasing, tax bases in the least-developed countries are not growing fast enough to meet demand, and private provision is not able to provide an equitable service for those at the base of the pyramid. Considering the limited resources available, many discussions are revolving around how to become more efficient with what is available. However, Anandan suggested that one of the most powerful tools would be to create community ownership.

In terms of country ownership, Anandan noted that the development community has shifted. Development aid is now seen as partnering with communities and serving the needs of the community, rather than being viewed as something done to communities. Anandan discussed a few development models that are based on the premise of community ownership as central to sustainability.

Cash Transfers

UNICEF is experimenting with cash transfers in a couple dozen countries as a way to give ownership at the household level for decision making related to the health system. In Liberia, for example, UNICEF has seen cash being used for transport to health services. There is also great potential in countries such as Kenya, where two-thirds of the population of 45 million people has mobile phones and half of mobile subscribers have mobile cash. Suddenly, the ability of even the poorest citizen to have access to information, services, and money, changes dramatically.

Last year, the largest crowd-funding platform in the world was GoFundMe, which raised about $480 million. GoFundMe is direct peer-to-peer giving, and the most common cause that individuals and families were raising money for was emergency health care expenses. If the percentage of philanthropy that goes to international causes is

applied to crowd-funding (about 5 percent to 6 percent),it would total USD 5 billion of household-to-household giving in one decade.

There are other ways to finance. Anandan provided an example of a program in Rwanda and Kenya that is providing oxygen. For this program, UNICEF partners with General Electric (GE), Frog Design, and a few local nongovernmental organizations to build oxygen plants in both countries. The availability of reliable, cheap oxygen is not easy to come by and this dearth leads to many infant deaths. GE donated equipment that creates oxygen from the air, then UNICEF developed local ownership structures. Frog Design, a U.S. design agency with experience in emerging markets, wrote the business plan. The board included the Ministry of Health, the local host hospital that was the primary customer these businesses started serving, and a local team who were trained to run the business. The first obstacle identified was the lack of demand. Consequently, the program pivoted and started training health care workers and administrators on why oxygen was beneficial, which, in turn, created the demand. Thereafter, the program moved quickly, and now the businesses are close to being self-sustaining.

Another innovative example Anandan described is You Report, which is currently running in about 12 countries. A simple idea, You Report is a way for young people to communicate their needs and the needs of their communities and to get information in real time. UNICEF identified almost 1 million "You Reporters" under the age of 30 across 12 African countries. The initiative is scaling quickly: an estimated 5 million You Reporters will be engaged by the end of next year. When UNICEF sends a question to the You Reporters, it is receiving a 30 percent response rate. Think about that, Anandan stressed. In Uganda, a question went out asking You Reporters about corporal punishment in the school system—99 percent said they did not agree with it. Within 2 weeks, Parliament passed legislation that banned corporal punishment around the country. Through You Report, they have started getting unsolicited messages that actually required a real response, such as "I have HIV" or "My clinic ran out of drugs." The cost of having the monitoring and evaluation resources to gather this information would be prohibitive, but the impact of having a couple hundred thousand You Reporters in Uganda spread out geographically and not biased by income was priceless.

References

Atun, R. A. 2007. *Privatization as Decentralization Strategy*, in Decentralization in Health Care. Saltman, R., Bankauskaite, V., Vrangbaek, K., eds. Open University Press: 246-272.

Berkley, S., J. L. Bobadilla, R. Hecht, K. Hill, D. T. Jamison, C. J. L. Murray, P. Musgrove, Philip, H. Saxenian, and J. P. Tan. 1993. *World development report 1993: Investing in health. World development report; World Development Indicators*. Washington, DC: World Bank Group.

Blanchet, N., M. Thomas, R. Atun, D. Jamison, F. Knaul, and R. Hecht. 2013. *Global collective action in health: The WDR+20 landscape of core and supportive functions.* Working paper for The Lancet Commission on Investing in Health. Helsinki, Finland: UNU-WIDER.

The British Medical Journal. 1920. Future Provision of Medical Services. Lord Dawson on the Consultative Council's Report. *The British Medical Journal* 1(3102):800-802.

House of Commons International Development Committee. 2014. *Strengthening Health Systems in Developing Countries: Fifth Report of Session 2014–15*. London: House of Commons.

IHME (Institute for Health Metrics and Evaluation). 2010. *2010 Global Burden of Diseases, Injuries, and Risk Factors Study*. Seattle, WA: University of Washington.

IOM (Institute of Medicine). 2014. *Investing in global health systems: Sustaining gains, transforming lives.* Washington, DC: The National Academies Press.

Missoni, E., and G. Solimano. 2010. *Towards Universal Health Coverage: The Chilean experience—World Health Report*. *Background Paper, 4*. Geneva: World Health Organization.

PAHO (Pan American Health Organization). 2007. *Public health capacity in Latin America and the Caribbean: Assessment and strengthening.* Washington, DC: PAHO.

PAHO. 2008. Working paper on the essential public health functions as a strategy for improving overall health systems performance: Trends and challenges since the public health in the Americas Initiative, 2000–2007. Washington, DC: PAHO.

Townsend, I. 2014. "UK first G7 country to reach 0.7% of national income as aid." Development Initiatives. http://devinit.org/#!/post/uk-first-g7-country-to-reach-0-7-of-national-income-as-aid (accessed October 26, 2015).

WHO (World Health Organization). 2007 *Everybody's business: Strengthening health systems to improve health outcomes: WHO's framework for action.* Geneva: World Health Organization.

WHO. 2010. *The World Health Report 2010—Health Systems: Improving Performance.* Geneva: World Health Organization.

WHO. 2015. Health services development: The WHO Health Systems Framework. http://www.wpro.who.int/health_services/health_systems_framework/en (accessed October 26, 2015).

World Bank. 1993. *World Development Report 1993: Investing in Health.* New York: Oxford University Press.

World Bank Group, USAID and WHO. 2015. The Roadmap for Health Measurement and Accountability. http://ma4health.hsaccess.org/docs/support-documents/the-roadmap-for-health-measurement-and-accountability.pdf?sfvrsn=0 (accessed January14, 2016).

World Bank Group, USAID (U.S. Agency for International Development), and WHO (World Health Organization). 2015. Health Measurement and Accountability Post 2015: Five-Point Call to Action. http://ma4health.hsaccess.org/docs/support-documents/5-point-call-to-action.pdf?sfvrsn=0 (accessed January14, 2016).

Appendix A

A Review of Public–Private Partnership Activities in Health System Strengthening

By Jill Jensen, Dr.P.H. student
Columbia University Mailman School of Public Health
June 20, 2015

INTRODUCTION

Global health programs and partnerships have historically focused on narrow, quantifiable aspects of global health challenges, especially communicable diseases on which they can make a measureable impact. Particularly in the context of the 2008 to 2009 global financial crisis, donors focused their investment on "high-impact interventions"—mostly vertical programs that could demonstrate "value for money" through decreases in disease-specific morbidity and mortality (Glassman et al., 2013). While metrics over the past decade show important reductions in the top causes of mortality (CDC, 2011), low- and middle-income countries (LMICs) continue to require support for crumbling health systems that fail to sustain program achievements and meet the demand for additional health care priorities. In the long term, vertical programs are only as effective as the health system in which they reside (Bloland et al., 2012).

Lessons learned from unsustained success in disease eradication, as well as failed responses to acute health crises, demonstrate the need for an enhanced approach to global health programming. Authors of the Lancet's Global Convergence Series suggest a "diagonal" approach to health programming, which could support decreases in mortality in LMICs to the level of high-income countries (HICs) by 2035. In a diagonal approach, health system strengthening (HSS) activities—those that support key health system functions (Bloland et al., 2012)—are prioritized along with vertical, disease-focused initiatives to create a system that can support the care for each person across his or her lifecycle.

> Structural investments in the health system should accompany all spending—global or domestic—on discrete interventions…. [These investments] would coalesce into a basic multifunctional health service delivery platform that can provide lifelong care for people with chronic diseases and can establish a base to treat a range of health concerns. (Jamison et al., 2013)

A diagonal approach supports the equitable distribution of resources between disease-oriented programming and support for health system functions that are critical to sustaining any activity working toward improved health for all.

PUBLIC–PRIVATE PARTNERSHIPS

Partnership with the private sector is not a new idea—a 1993 World Health Assembly Resolution urged the World Health Organization (WHO) "to mobilize and encourage the support of all partners in health development, including nongovernmental organizations and institutions in the private sector" (Buse and Waxman, 2001). WHO describes public–private partnerships (PPPs) for health as "public sector programmes with private sector participation" (WHO, 2015c), a vague definition that allows for many shapes and sizes of PPPs. A government partner sits at one end of the table, setting the priorities and rules under which private organizations operate (WHO, 2015c). On the other end are private for-profit entities, nongovernmental organizations (NGOs), and/or large multistakeholder initiatives such as Roll Back Malaria, the Global Polio Eradication Initiative, the Global Alliance for Vaccines and Immunization (GAVI), and the Global Fund for HIV/AIDS, Tuberculosis and Malaria (Dare, 2003). PPPs are actively involved in vertical programming, but only a few make HSS their primary focus. In fact, only 1 out of 90 international health-related PPPs in 2007 "focused on improving health systems beyond specific diseases" (Barr, 2007). Today, private-sector participation in HSS is slowly gaining momentum, as more and more PPPs are endeavoring HSS-related activities in accordance with the current emphasis on diagonal approaches to global health programing.

Innovative strategies for HSS are required to strengthen the platform on which vertical health programs are based. But how effective are PPPs for HSS? The Global Convergence Series recognizes a gap in the knowledge base regarding the "advantages and disadvantages of various mixes of public and private provision," and whether PPPs "can improve efficiency, access, and quality in health care delivery" (Jamison et al., 2013). Literature in this area is scattered—some articles detail the experience of private-sector providers filling gaps in public health care delivery. Other articles detail multistakeholder initiatives attempting to bolster the health workforce or access to and availability of medical products. There is limited evidence of PPPs addressing the health system as a whole; the author of this review found only two articles in which PPPs attempted system-wide activities. The author did not find any review articles that collated the experience of PPPs to better understand the advantages and disadvantages of various "mixes"—a gap that this review paper aims to fill.

WORKSHOP ON THE LONG-TERM PICTURE FOR HEALTH SYSTEMS: THE ROLE OF PUBLIC–PRIVATE PARTNERSHIPS IN HEALTH SYSTEMS STRENGTHENING

The National Academies of Sciences, Engineering, and Medicine established the Forum on Public–Private Partnerships for Global Health and Safety (PPP Forum) to identify opportunities that strengthen the role of PPPs in meeting the health and safety needs of individuals and communities around the globe, particularly those in LMICs. The PPP Forum sponsored a 2-day workshop on June 25 and 26, 2015, in New York City, to discuss PPPs as they relate to HSS. The workshop objectives were to examine a range of innovations, incentives, roles, and opportunities for all relevant sectors and stakeholders in HSS through partnerships; explore lessons learned from previous and ongoing efforts

with the goal of illuminating how to improve performance and outcomes going forward; and discuss measuring the value and outcomes of investments and documenting success in partnerships focused on HSS. For the purposes of this workshop, the term "health system" comprises all actors, organizations, and resources working toward improved health for all. It is inclusive of personal health care delivery services, public or population health services, health research systems, and policies and programs within other sectors that address broader determinants of health. Additionally, a health system with robust public health services includes mechanisms for monitoring health status to identify and solve community health problems; diagnosing and investigating health problems and health hazards in the community; health promotion; community participation in health; developing policies and plans that support individual and community health efforts; enforcing laws and regulations that protect health and ensure safety; promotion of equitable access; human resources development and training in public health; quality assurance; public health research; and reduction of the impact of emergencies and disasters on health. Further, recognizing that the health of individuals and communities is influenced by factors that are often outside the purview of the traditional health sector—such as the social, economic, and built environments—for this workshop the health system has been operationalized to include policies and programs within other sectors that address these determinants. Such sectors include finance, education, transportation, and information communication technologies, among others.

This literature review was prepared to inform the workshop audience of lessons learned during previous iterations of PPPs involved in HSS, in order to inspire PPP Forum members and the public audience to share experiences that might fill gaps in the literature, and discuss alternative models of PPPs that address obstacles experienced in the past. This review is structured around four major themes that emerged from the literature—service delivery, health workforce, medical technology, and laboratory systems—demonstrating the tendency of PPPs to focus on components of the health system instead of the health system as a whole. As previously mentioned, the author came across only two attempts at system-wide strengthening; these are discussed in detail to demonstrate the opportunities and challenges of PPP participation in health system-wide programming.

METHODS

The key research question for this review is the following: How have PPPs supported health system strengthening? The author of this review defined HSS as any activity aimed at improving the function of the health system, either by targeting a particular component or the health system as a whole (Bloland et al., 2012; WHO, 2007). Using the WHO definition of "Building Blocks," these components include leadership and governance, financing, workforce, medical products and technology, information systems, and service delivery (Savigny and Adam, 2009); each are critical to all donor-supported and government health programs. In an effort to learn from past PPPs with the health system as the primary focus, the author initiated the review by conducting searches for peer-reviewed literature on EBSCO, PubMed, and Google Scholar using a combination of the following key terms: health system, health system strengthening, private sector, public–private partnership. The author examined the reference section of

each article to find other relevant literature. Only peer-reviewed articles from 2000 to the present were included. To isolate key articles for the review, the author excluded articles that dealt with HSS outside the context of LMICs. The author also excluded articles that did not elaborate on a partnership between public-sector and private-sector entities. Public-sector entities could include national and local health authorities, while private-sector entities could include community-based organizations, for-profit corporations, and multilateral organizations.

REVIEW OF THE LITERATURE

Service Delivery

"[I]ncluding effective, safe, and quality personal and non-personal health interventions that are provided to those in need, when and where needed (including infrastructure), with a minimal waste of resources." - Savigny and Adam, 2009

According to the author, Berthollet Bwira Kaboru, a public–private mix (PPM) approach to health care delivery involves an integrated system of public health care providers and for-profit, not-for-profit, and/or informal providers (Kaboru, 2012). In Pakistan, 206 public–private service organizations and 600 nongovernmental organizations (NGOs) are providing health care services and conducting health-related research and advocacy (Ejaz et al., 2011). The Chief Minister's Initiative on Primary Health Care encourages the PPM approach in Pakistan, through which 69 district governments—starting with the Rahim Yar Khan district—have signed memorandums of understanding (MOUs) with the Punjab Rural Support Programme (PRSP) to run basic health units in rural areas (Ravindran, 2010). Similarly, district health offices in Malawi have signed service level agreements (SLAs) with Malawi's leading faith-based provider, the Christian Health Association of Malawi (CHAM), to operate rural health facilities; CHAM now operates 35 percent of all health facilities in the country (Chirwa et al., 2013). In Vietnam, private health care providers deliver 60 percent to 75 percent of ambulatory care and up to 4 percent of inpatient services. In all three countries, PPM is largely considered a "promising alternative" to the "inadequate"—and sometimes "inept"—public health system, which fails in particular to provide health care services for the rural poor (Chirwa et al., 2013; Duc et al., 2012; Ejaz et al., 2011).

A PPM approach to health care delivery leverages the inherent advantages of private-sector organizations. According to Ejaz et al. (2011), NGOs are particularly skilled in human resources management; they are able to hire and supervise staff more quickly and effectively than the Ministry of Health and local health authorities. NGOs are also able to promptly acquire specialized equipment and be more creative with health promotion activities. Furthermore, NGOs are perceived to foster better relationships with beneficiary communities. Chirwa et al. (2013) also emphasizes the advantages of incorporating private-sector providers into the health system, which includes increased technical efficiency and the ability to bypass "overly bureaucratic government procedures and overcome absorptive capacity constraints in the scale up of services." Considering the impact on public health care facilities, both government and nongovernment participants in the study by Duc et al. (2012) were encouraged by the potential to reduce

overcrowding in public health care facilities, thereby reducing government costs and giving clients more choices for services. The three examples demonstrate how a more effective integration of private-sector providers into the health system could relieve the burden on public health facilities while improving personnel management, use of technology, creativity in services, and community relationships.

A sustainable plan, however, for integrating private-sector providers in the public health system remains a challenge. Though the availability of CHAM providers in Malawi led to improved utilization of health care services in rural areas, costs escalated without reciprocal increases in reimbursement from the public sector. For example, Mulanje Mission Hospital experienced an increase of 23 percent in the utilization of maternal health services between 2006 and 2011, which resulted in a 56 percent increase in costs for these services. According to CHAM facility-level managers, quality of care decreased as hospitals struggled to balance insufficient resources with the rise in utilization. Overutilization also caused CHAM facilities to frequently run out of drugs. If the Central Medical Stores could not keep up with the demand, CHAM facilities resorted to purchasing more expensive drugs from private drug suppliers, leading to greater cost escalation. To make up for rising costs, some CHAM facilities unilaterally revised their service price lists; this list stated the price at which district health offices would reimburse CHAM facilities for services. Although district health offices did not approved these revisions, they simply could not afford to reimburse CHAM facilities regardless of the revisions, which lead to resentment, mistrust, and eventually the cancellation of many SLAs (Chirwa et al., 2013).

Inconsistent (or nonexistent) reimbursement, drug stockouts, and decreasing quality of health care services characterize PPMs in Malawi, Pakistan, and Vietnam (Chirwa et al., 2013; Duc et al., 2012; Ravindran, 2010). Other challenges with PPMs include ineffective referrals between private-sector health facilities and government-operated hospitals (Duc et al., 2012; Ravindran, 2010,); insufficient integration of national health promotion programs with private facilities (Ravindran, 2010); mistrust due to the rapid introduction of private-sector providers without the consult of local government stakeholders (Chirwa et al., 2013; Ravindran, 2010); and a lack of human and financial resources at the district government level resulting in weak capacity for regulation, monitoring, and quality assurance at private facilities (Duc et al., 2012).

Is reliance on private-sector health care providers for service delivery a stopgap or a permanent solution to the inadequacies of the public health system? The government's reliance on the private sector, noted a donor agency representative, is an acknowledgement "that the government does not trust its own system," and would not lead to an overall strengthening of the health system "unless the thinking changes at the strategic level and there is a clear policy push in that direction" (Ejaz et al., 2011). Private-sector providers remain an integral part of health systems, although there needs to be continued strengthening of public health care services to decrease reliance on the private sector and provide beneficiaries with comparable choices for quality health care services.

Health Workforce

"responsive, fair, and efficient given available resources and circumstances, and available in sufficient numbers" - Savigny and Adam, 2009

The Emergency Hiring Program in Kenya is an example of how the business savvy of the private sector can strengthen a key component of the health system—the health workforce. In 2008, Kenya had less than two physicians (1.79) and less than four nursing and midwifery personnel (3.81) per 10,000 people (WHO, 2015a). Hospitals were overwhelmed with HIV/AIDS patients—384 people died in 2000 due to HIV/AIDS (WHO, 2015b). Kenya's Emergency Hiring Program sought to address the health workforce shortage and the HIV/AIDS burden, which was exacerbated by the lack of knowledge about HIV/AIDS care. The Kenyan Ministry of Health, Capacity Project (a global initiative of the U.S. Agency for International Development [USAID]), and Management Sciences for Health founded a PPP to support the Emergency Hiring Program. Stakeholders from the Ministry of Health, Directorate of Personnel Management, Ministry of Education, and Ministry of Finance informed the program design. The group selected Deloitte & Touche, Kenya, to carry out the following core business functions: staff attraction, screening and selection, recruitment, training, deployment, payroll and benefits, management, and retention. Private academic and charitable institutions, including the African Medical and Research Foundation, Kenya Medical Training College, and Kenya Institute of Administration, supported health workforce training and exposure to best practices for HIV/AIDS care. The recruitment and training process took around 6 months; those who completed the process were given 3-year contracts, after which they were absorbed by the Ministry of Health. At the time the article was published in 2008, 830 health care workers were hired, trained, and deployed under the program to 219 public health facilities (Adano, 2008). It is not certain how effective the new health care workers were overall, or to what extent the Emergency Hiring Program impacted HIV/AIDS-related deaths. The author also provides no comment on partnership dynamics. WHO statistics, however, demonstrate country-wide reductions in HIV/AIDS deaths—from 384 deaths in 2000 to 127 in 2012 (WHO, 2015b). Kenya also experienced increase in the health workforce between the publishing of the article (2008) and 2012—from 1.79 to 1.89 doctors per 10,000 people, and from 3.81 to 8.22 nurses and midwives per 10,000 people (WHO, 2015a). This area of PPP activities would benefit from a discussion of indicators and measurement tools to assess the impact of health workforce recruitment and training programs.

Medical Technologies

"including medical products, vaccines, and other technologies assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost effective use" - Savigny and Adam, 2009

Incentivizing pharmaceutical and vaccine development for diseases that primarily impact LMICs has always been a challenge. "[D]eveloping and producing vaccines is a costly business, and the incentives to invest in vaccines appropriate to the disease profiles of the developing world are not sufficient. It is what economists call a 'market failure'" (Adlide et al., 2009). PPPs endeavor to fill the gap in development and access to pharmaceuticals by leveraging the strengths and resources of public-sector institutions, academia, the pharmaceutical industry, the biotech sector, contract research organizations, and NGOs to meet the need in LMICs (Croft, 2005). As a PPP, GAVI consolidates demand in LMICs to incentivize pharmaceutical production, and then speeds the availability and use of drugs through partnerships with industry, multilateral agencies, and beneficiary governments. Individuals who are integrated in GAVI's governance structure are key to the PPP's success, contributing technical skills in their respective areas to solve issues related to drug development and access (Adlide et al., 2009).

Many PPPs focus just on the product development side, bringing together the strengths of the public and private sectors to develop new drugs for neglected diseases. According to the author Simon L. Croft, disease expertise is typically housed within academia and the public sector; these experts provide "the technology and ideas from the genome to the structural biology that enables rational drug design" (Croft, 2005). Industry employs its skills in pharmacology, assay development, toxicology, scale-up chemistry, and formulation to translate these ideas and knowledge into the development of safe and effective pharmaceuticals. Examples of product development (PD) PPPs include Merck's partnership for onchocerciasis, Pfizer's partnership with the International Trachoma Initiative, and the GSK/Merck partnership with the WHO for lymphatic filariasis (Mackey and Liang, 2012).

WHO's Special Programme for Research and Training in Tropical Diseases (TDR), a collaboration founded in 1974 by WHO, World Bank, and the United Nations Development Programme, provides funding for disease research and pharmaceutical development using international, governmental, and philanthropic contributions (Croft, 2005; Mackey and Liang, 2012). TDR has funded several PD PPPs, including the Global Forum for Health Research, the Multilateral Initiative for Malaria, the Medicines for Malaria Venture, the Strategic Initiative for Developing Capacity in Ethical Review, Drugs for Neglected Diseases Initiative, the Forum for African Medical Editors, and the Foundation for Innovative New Diagnostics (Zicker, 2007). TDR also assists in procuring raw materials, conducts quality control, and exposes PD PPPs to the tools and networks they need to advance drug discovery and development.

One example of a TDR-supported PD PPP is the Medicines for Malaria Venture (MMV). Established in 1999, MMV has recently accelerated the development of novel synthetic peroxides, a component of the antimalarial drug, artemisinin. Development went from basic chemistry to clinical trials in just 4 years, involving scientists from the United States, Europe, and Australia (MMV, 2002; Vennerstrom et al., 2004). According to Croft, keys to success within this PD PPP include clear objectives, regular interaction among and between researchers, the MMV, and industry, and feelings of loyalty, commitment, and enjoyment in the work environment (Croft, 2005).

PPPs that support drug development and access benefit from the unique skills each partner brings to the process; however, they continue to struggle with establishing a sustainable and effective partnership structure. In a review by Kent Buse and Sonja

Tanaka, GAVI and MMV were not without problems. At the time the review was written (2011), GAVI experienced a multitude of issues, including the following:

- "Need to identify and promote added value of partnership, accounting for evolving landscape"
- "Board members are unable to adequately represent their respective constituencies"
- "Poor transparency of governance and decision-making processes"
- "Weak strategic planning and/or lack of an overarching partnership strategy"
- "Weak partnership performance evaluation framework and accountability mechanisms"
- "Policies and funding allocations not based on strategic priorities"
- "Inadequate identification and support of cost-effective interventions"
- "Inadequate investment of effort in data collection and analysis to drive consensus on opportunities"
- "Mechanisms to promote country ownership are weak"
- "Inadequate support to building country capacity"
- "Country activities are not sufficiently tailored to country performance, capacity, and needs"
- "Inadequate support to strengthening information systems and monitoring capacity in country"

MMV experienced mostly different challenges, according to Buse and Tanaka:

- "Lack of sufficient governance mechanism to ensure inclusive and joint decision making"
- "Stakeholders and partnership priorities are not adequately represented by Board composition"
- "Secretariat structure/staffing does not support partnership effectiveness"

Both MMV and GAVI had two similar issues in common: "[p]oorly defined roles and responsibilities of partners"; and "[p]oor mechanisms to ensure long-term financial sustainability of programmes" (Buse and Tanaka, 2011). In fact, these issues are similarly experienced by PPPs involved in strengthening other components of the health system, leading one to believe that weak financial sustainability and inadequate definition of roles and responsibilities to be among the greatest challenges facing PPPs for HSS. Future discussions should examine the practical challenges and potential solutions to establishing long-term, flexible funding mechanisms, as well as defining and enforcing partnership roles and responsibilities.

Laboratory Systems

The role of national laboratory systems in health care service delivery and overall public health cannot be underestimated. Laboratory strengthening is a critical component of HSS; in fact, it is one of six key public health functions "that would contribute the most towards health systems strengthening efforts as a whole and have the greatest

impact on improving the public's health" (Bloland et al., 2012). Laboratories are essential for surveillance, outbreak control, and clinical decision making (Bloland et al., 2012); more than 70 percent of clinical decision making is based on (or confirmed by) medical laboratory test results (Alemnji et al., 2014). And yet, like the broader health system in which it resides, national laboratory systems suffer from a dearth of professional staff, outdated equipment and poor equipment maintenance, weak supply chain management for consumables, insufficient quality control, and poor infrastructure—namely, inconsistent electricity and water, as well as crumbling physical infrastructure (Alemnji et al., 2014; Bloland et al., 2012; Nkengasong et al., 2010; Sturchio and Cohen, 2012).

The authors Nkengasong et al. (2010) outline the ideal comprehensive national laboratory strategic plan—essentially a systems strengthening plan—with similar goals as HSS: "(1) a framework for training, retaining, and career development of laboratory workers; (2) infrastructure development; (3) supply-chain management of laboratory supplies and maintenance of laboratory equipment; (4) specimen referral systems in an integrated, tiered [national laboratory system] network; (5) standards for quality management systems and accrediting laboratories and facilities; (6) laboratory information system; (7) biosafety and waste management; and (8) a governance structure that will clearly address regulatory issues and define reporting structures, authority, and the relationship between private diagnostic and public health laboratories" (Nkengasong et al., 2010). Were Bloland et al. invited to add to this plan, they would underscore the need for improved quality control, standardization, and accreditation; they would also add the following to the list: (9) stronger linkages among laboratories at the international, national, and subnational levels, and (10) integration among disease-specific laboratory networks.

Nkengasong et al. suggest PPPs play an important role in supporting the implementation of strategic plans for strengthening national laboratory systems. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and Becton, Dickinson and Company (BD) lead one such PPP—funded to the tune of $18 million between 2007 and 2012. With the goal of strengthening national laboratory systems in eight African countries severely impacted by HIV/AIDS and tuberculosis (TB), the PPP focuses on training laboratory workers, improving the range and quality of services, developing tools and guidelines for quality control and quality assurance, strengthening TB reference laboratories to serve as training facilities, and improving access to diagnostics for TB. By 2012, PEPFAR and BD, in partnership with the Centers for Disease Control and Prevention (CDC), ministries of health, national reference laboratories, and local implementing partners, had launched the initiative in Ethiopia, Mozambique, South Africa, and Uganda. The PPP adjusted training curricula according to the need of each country, addressing topic areas such as referral procedures for clinical specimens, record keeping, quality assessment, project management, and TB-specific services (including TB identification and drug susceptibility testing). According to a published article by Gary M. Cohen and Jeffrey L. Sturcio, executive vice president of BD and executive director of Rabin Martin, respectively, the PPP has already demonstrated improvements in the diagnosis of multidrug-resistant TB, patient management, and treatment outcomes. In Uganda specifically, the PPP trained 120 laboratory workers and improved quality management services in laboratories that serve almost 100,000 people on antiretroviral therapy (Sturchio and Cohen, 2012).

While the PEPFAR and BD–led PPP places a heavy emphasis on HIV- and TB-related laboratory services, Sturchio and Cohen imply that strengthening these services will benefit the overall laboratory system and broader patient population. The authors Wafaa M. El-Sadr and Elaine J. Abrams suggest efforts to strengthen HIV laboratory services could have system-wide effects if governments and donors support broader access to these services. The influx of international resources invested in the HIV/AIDS epidemic benefits laboratory systems through newly renovated and equipped laboratories, technologies for CD4 cell count enumeration, and expanded availability of routine laboratory assays. Additionally, extensive training in HIV-related services provides access to new information and professional growth opportunities for laboratory and health care workers, which may contribute to the retention of these workers in the future. It is critical, however, that donors, governments, and other partners enable the broader patient population to access newly established resources through national policies and funding support. HIV-related services are generally free to those with HIV; thus, patients without HIV infection should also have access to these services at no or limited cost. El-Sadr and Abrams caution, "Unless similar support is made available for commodities and services for general health, infrastructure enhancements established through the scale-up of HIV services will probably primarily benefit only those with HIV disease" (El-Sadr and Abrams, 2007). An external evaluation of the PEPFAR and BD–led PPP is not yet available in peer-reviewed literature, but could reveal the impact of the PPP on the broader laboratory system and patient population.

"Whole" Health System Strengthening

Where most PPPs focus on a single component of the health system, occasionally a brave PPP will take on the health system as a whole. GAVI and Pink Ribbon Red Ribbon (PRRR) are two such international PPPs that attempted "whole" HSS through initiatives that ran parallel with their regular activities. The article by Doyin Oluwolea and John Kraemerb is mostly an optimistic account of PRRR activities, while the article on GAVI is a critical perspective that describes aspects of the partnership that did not function well.

Pink Ribbon Red Ribbon

PRRR is a PPP designed to support cancer control—in particular, cervical cancer—in Africa and Latin America; however, Oluwolea and Kraemerb use the term "diagonal approach" to describe the partnership's strategy of bringing together partners from across the health system and benefitting from existing vertical programs, such as those established for HIV/AIDS control, to strengthen the broader issue of chronic disease management. "In countries with strong, decentralized HIV service delivery systems, it is sensible and feasible to integrate HIV and cervical cancer services, a process that can be greatly facilitated by the experience these countries have gathered in the area of chronic disease management." (Oluwole and Kraemer, 2013). Four organizing members of the partnership include the George W. Bush Institute, PEPFAR, Susan G. Komen for the Cure, and the Joint United Nations Programme on HIV/AIDS (UNAIDS). Other members include BD, The Bill & Melinda Gates Foundation, the Bristol-Myers

Squibb Foundation, the Caris Foundation, GlaxoSmithKline (GSK), IBM, Merck, QIAGEN, and others. PRRR's secretariat sits at the George W. Bush Institute and addresses gaps by working with existing partners. The PRRR Steering Committee, which acts like a board of directors, addresses high-level issues with the support of ad hoc working groups. In each country, the Ministry of Health leads a technical working group to develop the national strategy and plan for cancer control. Country-specific teams, which include a mix of public and private actors from PRRR member organizations, implement the national plan and coordinate activities.

The PRRR partnership has yet to conduct a formal evaluation of its impact on chronic disease management and the broader health system; however, future models of PPPs can learn from aspects of the partnership that operated well. Because cancer control requires a functioning continuum of care, the involvement of partners who represented multiple components of the health system—from pharmaceutical and vaccine developers, to health educators, to public and private health care providers—allowed PRRR to "capitalize on the particular efficiency and expertise of different organizations while avoiding duplication of effort among them." For example, Merck and GSK were able to offer vaccines for free or at discounted prices. Other private organizations were able to procure commodities rapidly and as needed. UNAIDS leant PRRR the credibility it had with government and civil society organizations, thereby enhancing PRRR's community buy-in. To ensure all parties remained accountable, PRRR required pledges to be made publicly; every quarter, the country-level secretariat determined if commitments were on track and reported their status to all PRRR members.

Flexibility, adaptability, communication, and coordination are the main takeaways from the article by Oluwolea and Kraemerb. While the authors write little about the aspects of the partnership that did *not* work well, they do suggest an opportunistic approach to HSS. The speed at which private organizations can accomplish goals is generally an advantage, but the lengthy vetting processes of their government partners can frustrate these organizations. Therefore, the authors suggest a flexible, opportunistic approach that allows for support to be mobilized when high-priority needs are identified. And with all partnerships, the authors encourage well-planned coordination mechanisms and frequent communication.

GAVI

Even well-established PPPs have yet to master the art and science of maintaining partnerships and contributing to stronger health systems. According to the author Joseph F. Naimoli, the experience of GAVI in HSS "provides further evidence that the business of partnering can be complicated, messy, and rife with pitfalls, and the learning curve steep" (Naimoli, 2009). GAVI's foray into HSS was motivated by criticism that the PPP was too vaccination-focused, and that it needed to find innovative strategies to support countries who that were falling behind on immunization coverage targets. Thus, the goal of GAVI's HSS initiative was to improve immunization coverage and maternal and child health outcomes through a whole-system approach. The partnership did acknowledge the risks associated with undertaking HSS: not achieving value for money, inappropriate use of funds, unsustainability, and limited absorptive capacity on the side of national governments. Still, GAVI decided to pursue HSS in parallel with its regular vaccine-

related activities. The role of GAVI's secretariat grew to include agenda-setting, technical and procedural decision making, and conflict resolution. A Task Team (TT) chaired by WHO, UNICEF, and the World Bank, launched, steered, and advised the rollout of HSS. Governance structures at the country level varied with each iteration, but included government stakeholders, civil society representatives, and NGOs.

In a thorough study on GAVI operations at the global and country levels, Naimoli found countless deficiencies in design appropriateness, governance, management, monitoring and evaluation, and capacity building. In designing GAVI's overall strategy for PPP, partners struggled to reach consensus given their different definitions of the health system, experience in HSS, and overall values. Collaboration within the TT also faltered due to unclear member roles/responsibilities and mutual accountabilities; irregular leadership and unclear lines authority; shifting mandates; unequal member influence; and inadequate processes for conflict resolution and joint decision making. GAVI's crisis management style was a burden on GAVI partners and participating governments, who were not able to accomplish tasks with a high level of quality, or involve the right mix of stakeholders, given short deadlines and last-minute guidance. In accordance with monitoring and evaluation plans, many governments were not able to provide baseline data or support route data collection as required. Furthermore, partners questioned the appropriateness of indicators and targets, and whether or not they were in line with national health sector priorities. Finally, capacity building was seen as inadequate, with not enough partners represented in at the global or the country level, and thus in the design or implementation of the HSS initiative.

"To its credit," states Naimoli (2009), "GAVI has taken a bold step in trying to carry through on the longstanding challenge in global health to bridge the divide between vertical and horizontal modes of delivering priority health services." Indeed, future models of PPPs can learn from GAVI's experience in order to form innovative strategies for HSS and diagonal approaches to global health programming. In the meantime, GAVI's HSS initiative is characterized by confusion, disagreement, a lack of trust, and a lack of incentives to keep partners engaged. Additional operational research is necessary to understand the best ways for moving forward given the challenges of multistakeholder partnerships for HSS.

DISCUSSION

This review serves as a background paper for the Academies workshop on the Long-Term Picture for Health Systems: The Role of Public–Private Partnerships in Health Systems Strengthening. Based on the literature contained in this review, future iterations of PPPs involved in HSS could take the following actions to address key challenges experienced in the past:

1. Consult with national, district, and community stakeholders, in particular local health authorities, to identify health priorities and needs at each level.
2. Integrate key stakeholders in the partnership at the global and the country level who have technical skills in all the processes involved for HSS; for example, drug development, procurement, distribution, infrastructure, health

workforce management, health care provision, monitoring and evaluation, health education, community buy-in, etc.

3. Explore shared values and establish an agreed-upon definition of the health system, on which partners can establish programmatic goals and objectives.
4. Precisely define and communicate the roles and responsibilities of each partner, including mutual accountabilities and lines of authority.
5. Consult regularly with all national, district, and community-level stakeholders to ensure program activities are in line with actual needs, and any unintended adverse consequences are addressed.
6. Define strategies for conflict resolution and joint decision making; communicate with partners regularly to keep everyone engaged.
7. Establish a timeline that is practical and manageable, and communicate this to all partners and relevant stakeholders.
8. Keep partners accountable by publicizing commitments and tracking progress regularly and transparently.
9. Establish a plan to ensure long-term financial sustainability, taking into account the costs associated with health care delivery in remote and rural areas, as well as rising costs associated with rising demand for services.
10. Collaborate with industry partners to ensure sustainability and affordability of drug supply.
11. Recruit, train, and maintain an adequate workforce to support the rise in demand for health care and supportive services.
12. Establish a plan for referral and health information systems to connect privately operated health facilities and government facilities.
13. Ensure adequate integration of national health programs and policies at privately operated health facilities, taking into account any additional resources or support necessary.
14. Support government health authorities to conduct regulation, monitoring, and quality assurance.
15. Support government stakeholders involved in baseline and routine data collection to ensure program monitoring and evaluation.
16. Ensure broader patient populations can benefit from laboratory resources established by disease-specific programs through national policies and funding support.

Noticibly absent from the literature is a critical examination of the incentives that motivate private-sector entities to join PPPs, especially PPPs that that seek to strengthen health systems (where the immediate benefit is harder to measure). Much skepticism exists in the public sector regarding industry incentives for participating in PPPs (Barr, 2007; Reich, 2000). The authors Buse and Tanaka acknowledged the importance of incentives by contending that values and interests must be understood in order to appeal to and maintain partners. Potential incentives for the private sector to participate in PPPs include networking opportunities, access to knowledge, exposure to best practices, and entrance into new markets. Buse and Tanaka, both from UNAIDS, suggest appealing to the private sector's profit-oriented values and need for a "return on investment" (Buse and Tanaka, 2011). A question, however, remains: Why would private-sector entities

participate in HSS activities where the return on investment is not immediate (and often difficult to measure)? Private-sector perspectives may address the skepticim of the global health and development communities and illuminate strategies to maintain successful PPPs.

Understanding public- and private-sector incentives is one step to understanding program sustainability; incentives are necessary to ensure partnerships last as long as it takes for health system goals to be met. Sustainability of health system achievements is also critical, but how do PPPs measure their impact on health systems? Unsurprisingly, literature on PPPs barely addresses sustainability of partnerships and achievements in HSS. Only two articles make general remarks on sustainability, suggesting PPPs establish flexible partnerships, long-term financing, and risk-management mechanisms to stand the test of time (Buse and Tanaka, 2011; Reich, 2000). Discussions at the workshop will be a useful first step in filling the literature gap on sustainability in PPPs for HSS.

CONCLUSION

Diagonal approaches to global health programming will allow a convergence to happen within the next two decades; thus, PPPs that continue to address disease priorities AND strengthen health systems will help LMICs reduce mortality to the level of HICs by 2035. As public and private organizations become more active in pursuing HSS strategies, the workshop serves as an opportunity to examine new models of partnerships that account for sustainability, incentives, measuring performance, and addressing the key challenges experienced in the past. This literature review encourages PPP Forum members and the public audience to share experiences that fill gaps in the literature, and to discuss alternative models for PPPs that meet the challenges of HSS and improve performance and outcomes going forward.

REFERENCES

Adano, U. 2008. The health worker recruitment and deployment process in Kenya: An emergency hiring program. *Human Resources for Health* 6:19.

Adlide, G., A. Rowe, and J. Lob-Levyt. 2009. Public–private partnership to promote health: The GAVI alliance experience in Andrew Clapham and Mary Robinson (eds), *Realizing the right to health*. Zurich: Rüffer & Rub.

Alemnji, G. A., C. Zeh, K. Yao, and P. N. Fonjungo. 2014. Strengthening national health laboratories in sub-Saharan Africa: A decade of remarkable progress. *Tropical Medicine & International Health* 19(4):450-458.

Barr, D. A. 2007. A research protocol to evaluate the effectiveness of public-private partnerships as a means to improve health and welfare systems worldwide. *American Journal of Public Health* 97:19-25.

Bloland, P., P. Simone, B. Burkholder, L. Slutsker, and K. M. D. Cock. 2012. The role of public health institutions in global health system strengthening efforts: The U.S. CDC's perspective. *PLoS Medicine* 9(4).

Buse, K., and S. Tanaka. 2011. Global public–private health partnerships: Lessons learned from ten years of experience and evaluation. *International Dental Journal* 61(Suppl 2):2-10.

Buse, K., and A. Waxman. 2001. Public–private health partnerships: A strategy for WHO. *Bulletin of the World Health Organanization* 79:748-754.

CDC (Centers for Disease Prevention and Control). 2011. Morbidity and Mortality Weekly Report: Ten great public health achievements—Worldwide, 2001–2010. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6024a4.htm (accessed January 15, 2016).

Chirwa, M. L., I. Kazanga, G. Faedo, and S. Thomas. 2013. Promoting universal financial protection: Contracting faith-based health facilities to expand access—Lessons learned from Malawi. *Health Research Policy and Systems* 11:27.

Croft, S. L. 2005. Public–private partnership: From there to here. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 99(Suppl 1):S9-14.

Dare, L. 2003. WHO and the challenges of the next decade. *Lancet* 361(9532):170-171.

Duc, H. A., L. L. Sabin, L. Q. Cuong, D. D. Thien, and R. F. Iii. 2012. Potential collaboration with the private sector for the provision of ambulatory care in the Mekong Region, Vietnam. *Global Health Action* 5:10126.

Ejaz, I., B. T. Shaikh, and N. Rizvi. 2011. NGOs and government partnership for health systems strengthening: A qualitative study presenting viewpoints of government, NGOs, and donors in Pakistan. *BMC Health Services Research* 11:122.

El-Sadr, W. M., and E. J. Abrams. 2007. Scale-up of HIV care and treatment: Can it transform healthcare services in resource-limited settings? *AIDS* 21 (Suppl 5):S65-7.

Glassman, A., V. Fan, and M. Over. 2013. *More health for the money: Putting incentives to work for the Global Fund and its partners.* Working Group on Value for Money in Global Health. Washington, DC: Center for Global Development.

Jamison, D. T., L. H. Summers, G. Alleyne, K. J. Arrow, S. Berkley, A. Binagwaho, F. Bustreo, D. Evans, R. G. A. Feachem, J. Frenk, G. Ghosh, S. J. Goldie, Y. Guo, S. Gupta, R. Horton, M. E. Kruk, A. Mahmoud, L. K. Mohohlo, M. Ncube, A. Pablos-Mendez, K. S. Reddy, H. Saxenian, A. Soucat, K. H. Ulltveit-Moe, and G. Yamey. 2013. Global Health 2035: A world coverging within a generation. *Lancet* 382:1898-1955.

Kaboru, B. B. 2012. Uncovering the potential of private providers' involvement in health to strengthen comprehensive health systems: A discussion paper. *Perspectives in Public Health* 132(5):245-252.

Mackey, T. and B. Liang. 2012. Threats from emerging and re-emerging neglected tropical diseases (NTDs). *Infection Ecology and Epidemiology* 2:18667.

MMVnews. 2002. *Peroxide potential for malaria.* Geneva: Medicines for Malaria Venture.

Naimoli, J. F. 2009. Global Health partnerships in practice: Taking stock of the GAVI Alliance's new investment in health systems strengthening. *International Journal of Health Planning and Management* 24(1):3-25.

Nkengasong, J. N., P. Nsubuga, O. Nwanyanwu, G. M. Gershy-Damet, G. Roscigno, M. Bulterys, B. Schoub, K. M. Decock, and D. Birx. 2010. Laboratory systems and services are critical in global health: Time to end the neglect? *American Journal of Clinical Pathology* 134:368-73.

Oluwole, D., and J. Kraemer. 2013. Innovative public–private partnership: a diagonal approach to combating women's cancers in Africa. *Bulletin of the World Health Organization* 91: 691-696.

Ravindran, T. K. S. 2010. Privatisation in reproductive health services in Pakistan: Three case studies. *Reproductive Health Matters* 18(36):13-24.

Reich, M. R. 2000. Public–private partnerships for public health. *Nature Medicine* 6:617-620.

Savigny, D. D., and T. Adam. 2009. *Systems thinking for health systems strengthening*. Geneva: World Health Organization.

Sturchio, J. L., and G. M. Cohen. 2012. How PEPFAR's public–private partnerships achieved ambitious goals, from improving labs to strengthening supply chains. *Health Affairs* 31(7):1450-1458.

Vennerstrom, J. L., S. Arbe-Barnes, R. Brun, S. A. Charman, F. C. K. Chiu, J. Chollet, Y. Dong, A. Dorn, D. Hunziker, H. Matile, K. Mcintosh, M. Padmanilayam, J. S. Tomas, C. Scheurer, B. Scorneaux, Y. Tang, H. Urwyler, S. Wittlin, and W. N. Charman. 2004. Identification of an antimalarial synthetic trioxolane drug development candidate. *Nature* 430(7002):900-904.

WHO (World Health Organization) 2007. *Everybody's business: Strengthening health systems to improve health outcomes.* Geneva: World Health Organization.

WHO. 2015a. Global health observatory data repository. http://apps.who.int/gho/data/?theme=home (accessed June 8, 2015).

WHO. 2015b. Kenya: WHO statistical profile. http://www.who.int/gho/countries/ken.pdf (accessed June 8, 2015).

WHO. 2015c. Trade, foreign policy, diplomacy and health: Public–private partnerships for health. http://www.who.int/trade/glossary/story077/en/ (accessed June 8, 2015).

Zicker, F. 2007. Impact of research on neglected diseases: The role of the Special Programme for Research and Training in Tropical Diseases (TDR). *Salud Pública de México* 49:301-305.

Appendix B

Workshop Agenda

The Long-Term Picture for Health Systems:
The Role of Public–Private Partnerships in Health Systems Strengthening
June 25–26, 2015

New York Academy of Medicine
1216 Fifth Ave, Room 20
New York, NY 10029

The National Academies of Sciences, Engineering, and Medicine Forum on Public–Private Partnerships for Global Health and Safety has been established to illuminate opportunities that strengthen the role of public–private partnerships (PPPs) in meeting the health and safety needs of individuals, communities, and populations around the globe.

Workshop objectives:

- To examine a range of innovations, incentives, roles, and opportunities for all relevant sectors and stakeholders in strengthening health systems through partnerships.
- To explore lessons learned from previous and ongoing efforts with the goal of illuminating how to improve performance and outcomes going forward.
- To discuss measuring the value and outcomes of investments and documenting success in partnerships focused on health systems strengthening.

Context: Over the past several decades, significant investments in global health have been made by the public and private sectors, leading to meaningful changes for many of the world's poor. Many of these investments and resulting progress have been concentrated in vertical health programs, such as child and maternal health, malaria, and HIV, where donors may have a strategic interest and feel they can more easily maintain and monitor their investments and impacts. Frequently, when partnerships between donors and other stakeholders form, they are around these vertical disease or condition-specific programs, as stakeholders can coalesce on a specific topical area of expertise and interest. However, to sustain these successes and continue progress, there is a growing recognition of the need to strengthen health systems more broadly and to build functional administrative and technical infrastructure that can support health services for all, improve the health of populations, increase the purchasing and earning power of consumers and workers, and advance global security.

For the purposes of this workshop, the health system comprises all actors, organizations, and resources working toward improved health. It is inclusive of personal health care delivery services, public or population health services, health research systems, and policies and programs within other sectors that address broader determinants of health. The World Health Organization has identified six building blocks

of the health system—leadership and governance, financing, workforce, medical products and technology, information systems, and service delivery. Additionally, a health system with robust public health services includes mechanisms for monitoring health status to identify and solve community health problems; diagnosing and investigating health problems and health hazards in the community; health promotion; community participation in health; developing policies and plans that support individual and community health efforts; enforcing laws and regulations that protect health and ensure safety; promotion of equitable access; human resources development and training in public health; quality assurance; public health research; and reduction of the impact of emergencies and disasters on health. Further, recognizing that the health of individuals and communities is influenced by factors that are often outside the purview of the tradition health sector—such as the social, economic, and built environments—for this workshop the health system has been operationalized to include policies and programs within other sectors that address these determinants. Such sectors include finance, education, transportation, and information communication technologies, among others.

To strengthen health systems across these domains, different actors from the public and private sectors have unique resources that they can bring to bear, for example, information and technical systems development, human resources management, financing mechanisms, and product development and delivery capacity. Partnerships are an opportunity for stakeholders to come together around a common set of objectives, with the ultimate goal of health systems strengthening, and identify not only how to work together but also where each stakeholder can contribute the most effectively. Within the current context of the post-2015 development agenda, a discussion on the role of partnerships in building sustainable and resilient health systems is particularly timely.

DAY 1
June 25, 2015

8:30 a.m. **Registration**

9:00 a.m. **Welcome**
Jo Ivey Boufford, *New York Academy of Medicine; Co-Chair of the Forum on Public–Private Partnerships for Global Health and Safety*

9:10 a.m. **Opening Remarks from Workshop Co-Chair**
Simon Bland, United Nations Programme on HIV/AIDS

9:30 a.m. **Envisioning the Health Ecosystem: Applying Lessons from Public–Private Partnerships in the Information and Communications Technology Industry**
Reza Jafari, *e-Development International*

10:05 a.m. **Health Systems Strengthening and the Role of Public–Private Partnerships**
Rifat Atun, *Harvard T.H. Chan School of Public Health*

10:40 a.m. **BREAK**

I. Incentives for Public–Private Partnerships for Health Systems Strengthening

All sectors and stakeholders benefit when individuals and communities have access to affordable and quality care, markets exist for new technologies and promising interventions for health improvements to be implemented effectively, the labor force is healthy and productive, and public health systems are in place to detect and respond to emerging threats. A strong health system underpins these conditions and their sustainability. With this growing recognition, both public and private stakeholders are investing in strengthening health systems through varying mixes of public and private engagement and partnerships. This panel and facilitated discussion will illuminate incentives for investing in health systems, explore the value approaching such investments through public–private partnerships, and explore mechanisms for incentivizing and regulating investments and partnerships.

11:00 a.m.–12:15 p.m.
Moderator: Trevor Gunn, *Medtronic*
Speakers:

- Gary Cohen, *BD*
- Jeanette Vega, *National Health Foundation (FONASA), Chile*
- Simon Bland, *UNAIDS*

12:15 p.m. **LUNCH**

1:15 p.m. **Innovations in Partnerships for Health Systems: Driving New Solutions with Cross-Sector Partners**
Steve Davis, *PATH*

II. Lessons Learned from Partnerships, Part 1

Representing a range of experiences in partnerships focused on components of the health system, panelists in this session will present their initiatives within the context of health systems strengthening, and illuminate challenges and barriers they have encountered, as well as opportunities from improving the functioning of partnerships, health systems, and health outcomes going forward. Specifically, panelists will share challenges and barriers for: (1) engaging different stakeholders as partners, including corporate-sector partners, government ministries across sectors and level of authority (national, regional, and municipal), and communities and civil society, among others; (2) coordinating roles and aligning expectations among partners; and (3) sustaining and improving outcomes and impacts. Panelists and members of the forum will engage in a discussion on creative solutions for overcoming identified barriers and challenges.

1:45 p.m.–3:00 p.m.
Moderator: Bruce Compton, *Catholic Health Association of the United States*
Speakers:

- Christophe Longuet, *Fondation Mérieux (by video-conference)*
- Andrew Jones, *Tropical Health and Education Trust (THET)*
- Clarion Johnson, *ExxonMobil*

3:00 p.m. **BREAK**

III. Lessons Learned from Partnerships, Part 2

The health of individuals and communities is influenced by a range of social, economic, and behavioral determinants, as well as the physical environment. Addressing these determinants requires strengthening and integrating systems beyond health care delivery. In this session, panelists will present initiatives that are addressing determinants of health and the role of partnerships in meeting their objectives. Panelists will illuminate challenges and barriers they have encountered as well as opportunities when engaging in partnerships, specifically for: (1) engaging different stakeholders as partners, including corporate sector partners, government ministries across sectors and level of authority (national, regional, and municipal), and communities and civil society, among others; (2) coordinating roles and aligning expectations among partners; and (3) sustaining and improving outcomes and impacts. Panelists and members of the forum will engage in a discussion on creative solutions for overcoming identified barriers and challenges.

3:30 p.m.–4:45 p.m.
Moderator: Jo Ivey Boufford
Speakers:
- Mushtaque Chowdhury, *BRAC*
- Jeff Sturchio, *Rabin Martin*

4:45 p.m. **Wrap-Up of Day 1**

5:00 p.m. **Reception**

DAY 2
June 26, 2015

8:30 a.m. **Registration**

8:40 a.m. **Introduction to Day 2 of the Workshop**

8:45 a.m. **Public–Private Partnerships for Health Systems Strengthening: Experience of Narayana Health in India**
Devi Shetty, *Narayana Health (by video-conference)*

IV. Measuring Performance and Progress in Public–Private Partnerships for Health Systems Strengthening

The objective of this facilitated panel discussion is to explore from multiple perspectives how both successes and failures in partnerships for health systems strengthening is being defined and measured, with the goal of illuminating opportunities for developing a shared vision. Panelists will identify and discuss stages within partnerships where measurement is needed and might vary. The panel will specifically address these issues within the context of partnerships focused on health systems strengthening and where there are parallels and differences with measuring vertically or disease-focused partnerships.

9:15 a.m.–10:45 a.m.
Moderator: Robert Bollinger, *Johns Hopkins Bloomberg School of Public Health*
Speakers:

- Margaret Kruk, *Harvard T.H. Chan School of Public Health*
- Sally Stansfield, *Deloitte*
- Aye Aye Thwin, *U.S. Agency for International Development*
- Katherine Taylor, *University of Notre Dame*
- Justin Koester, *Medtronic*

10:45 a.m. **BREAK**

V. Sustaining and Increasing Long-Term Investments in Health Systems

This facilitated panel discussion will explore opportunities and mechanisms for sustaining and increasing long-term investments in health systems, including sustaining impacts on health, mechanisms for sustainable financing, and sustainability or evolution in partnership models.

11:00 a.m.–12:15 p.m.
Moderator: Jo Boufford
Speakers:

- Olusoji Adeyi, *World Bank*
- Jeff Sturchio, *Rabin Martin*
- Mushtaque Chowdhury, *BRAC*
- Rajesh Anandan, *U.S. Fund for UNICEF*

VI. Next Steps for Making Progress and Opportunities Moving Forward

Based on the workshop presentations and discussions, as well as individual and organizational experiences, in this facilitated dialogue, workshop session moderators, forum members, and participants will reflect on key messages related to lessons learned from partnership efforts to strengthen health systems and opportunities for improving efforts going forward.

12:15 p.m.–1:30 p.m.
Facilitator: Simon Bland, *UNAIDS*

- Bruce Compton, *Catholic Health Association of the United States*
- Jo Ivey Boufford, *New York Academy of Medicine*
- Robert Bollinger, *Johns Hopkins Bloomberg School of Public Health*
- Clarion Johnson, *ExxonMobil*

1:30 p.m. **Adjourn Workshop**

Appendix C

Speaker Biographical Sketches

Olusoji Adeyi, M.D., M.B.A., Dr.P.H., is the director of the Health, Nutrition and Population Global Practice at the World Bank Group. He has served as the World Bank's sector manager for Health, Nutrition and Population in Eastern and Southern Africa, with responsibilities for the institution's support for policies, strategies, and programs in the sub-region. Dr. Adeyi was founding director of the Affordable Medicines Facility-malaria (AMFm) at the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Formerly coordinator of public health programs at the World Bank, Dr. Adeyi led a number of initiatives on global public health policies and strategies, as well as analyses of the integration of health systems and health interventions. Dr. Adeyi has extensive experience in policies, strategies, and programs for health systems, service delivery, and disease control at the global, regional, and country levels in Africa, Eastern Europe, and Central Asia. He has also had responsibilities with the Federal Ministry of Health in Nigeria, the World Health Organization, UNAIDS, and the Harvard T.H. Chan School of Public Health. He has authored research papers and books on service delivery, quality of care, maternal health, health financing, HIV/AIDS, tuberculosis, malaria, and chronic non-communicable diseases.

Rajesh Anandan, M.Eng., is senior vice president, Strategic Partnerships and UNICEF Ventures. Since joining the U.S. Fund for UNICEF in April 2009, he has led the development of cross-sector initiatives with corporations, foundations, and academia generating more than $400 million annually in funding and in-kind resources. In 2011, he launched UNICEF Ventures, which aims to incubate new business ventures and develop new collaborative models to accelerate innovation. In 2012, Mr. Anandan was appointed to co-lead the U.S. Fund's Strategic Planning process and lead organization-wide cause-related campaigns and platforms. Previously, he set up and ran the Private Sector division at the Global Fund to Fight AIDS, Tuberculosis and Malaria in Geneva, where he was responsible for large-scale co-investments, access and pricing initiatives, and cause-related marketing ventures such as (PRODUCT)RED. Mr. Anandan has also held a broad range of roles in the private sector, including product development and marketing at the Microsoft Corporation, corporate strategy and private equity consulting at Bain & Company, and general management and business development in technology-related start-ups. He is the founder of UTLRA, a network of technology and business service ventures employing individuals with heightened abilities, üba, a digital advocacy platform merging fashion and art to promote human security, and is the co-founder of WeCare, a grassroots organization supporting children affected by conflict in his home country Sri Lanka. He is a mentor at the Unreasonable Institute and serves as an advisor to a number of social enterprises focused on creating employment in marginalized communities. Mr. Anandan received B.Sc. and M.Eng. degrees in Computer Science and Electrical Engineering from MIT, with concentrations in Artificial Intelligence, Systems Dynamics, and Economics.

Rifat Atun, MBBS, M.B.A., is professor of global health systems at the Harvard T.H. Chan School of Public Health, Harvard University, and director of the Global Health Systems Cluster. In 2006–2013, he was professor of International Health Management at Imperial College

London, where he led the Health Management Group and remains a visiting professor at the Faculty of Medicine. In 2008–2012, Professor Atun served as a member of the Executive Management Team of the Global Fund to Fight AIDS, Tuberculosis and Malaria in Switzerland as the director of the Strategy, Performance, and Evaluation Cluster. Dr. Atun's research focuses on global health systems, global health financing, and innovation in health systems. He has published around 200 articles in peer-reviewed journals, including in *Lancet*, *PLoS Medicine*, *BMJ*, *Lancet Infectious Diseases*, *Journal of Infectious Diseases*, and the *Bulletin of the World Health Organization*. Dr. Atun has worked at the UK Department for International Development Health Systems Resource Centre as regional manager for Europe and Central Asia and has acted as a consultant for the World Bank, the World Health Organization, and other international agencies globally to design, implement, and evaluate health system reforms. Dr. Atun studied medicine at the University of London as a Commonwealth Scholar and subsequently completed his postgraduate medical studies and master's in business administration degree at the 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).

Simon Bland, M.S., C.B.E., joined United Nations Programme on HIV/AIDS (UNAIDS) in August 2013 as its director in New York. Prior to joining UNAIDS, he was a senior civil servant in the United Kingdom's Department for International Development (DFID) and, most recently, headed its Global Funds Department. In this role, he was responsible for the United Kingdom's policies, programs, financial management, and shareholder relations with Global Funds and Innovative Finance in health and education. He represented the United Kingdom on the Boards of the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the Gavi Alliance, UNITAID, and the Global Partnership for Education. From September 2011 to June 2013, Mr. Bland was chair of the Board of the Global Fund and oversaw a substantial transformation culminating with the introduction of its new funding model and strengthened partnership approach. Mr. Bland's early background was in marine sciences and natural resources management, later branching out into development economics and management. He has spent most of the last 30 years working in developing countries in Africa, Asia, and the Pacific. He has led DFID country programs in Kenya, Russia, Somalia, and Ukraine, before moving to Geneva to work on global health, education, and humanitarian affairs. Mr. Bland was made a commander of the British Empire in the Queen's Birthday Honours list in 2013 for service to global health.

Robert C. Bollinger, M.D., M.P.H., is a professor of infectious diseases in the Department of Medicine of the Johns Hopkins University (JHU) School of Medicine, with joint appointments in the Department of International Health of the Johns Hopkins Bloomberg School of Public Health and the JHU School of Nursing. He has more than 30 years of experience in international public health, clinical research, and education in a broad range of global health priorities including HIV/AIDS, malaria, tuberculosis, leprosy, and emerging infections. Dr. Bollinger is engaged in collaborative research projects in India, Uganda, Columbia, and the United States. Dr. Bollinger is director of the Johns Hopkins Center for Clinical Global Health Education (CCGHE), which develops and provides clinical education to health care providers in resource-limited communities around the world. Under Dr. Bollinger's leadership, the CCGHE has developed educational and research programs in more than 20 countries, becoming a leader in the development and use of distance learning and mobile health (mHealth) technology in resource-

limited settings. Dr. Bollinger's research interests include identification of the biological and behavioral risk factors for HIV transmission, characterization of the clinical progression and treatment of HIV and related infections, and projects focused on optimizing strategies to improve health care capacity and care delivery in resource-limited settings. He has recently been appointed Hopkins Director of a new public–private partnership among corporate stakeholders, JHU and IMEC, a Belgium-based global leader in silicon chip technology, to design and evaluate next generation point-of-care "lab on a chip" diagnostic technologies. Dr. Bollinger has published more than 140 peer-reviewed research publications and 15 book chapters. Dr. Bollinger is also an active clinician/educator, who provides and supervises HIV and infectious diseases clinical care, in the outpatient and in-patient settings at Johns Hopkins Hospital. Dr. Bollinger has contributed to many public health training programs, expert committees, and consultations in more than 18 countries, as well as serving on the U.S. Presidential Advisory Council for HIV/AIDS (PACHA). His commitment to health education and research has been recognized by the Johns Hopkins Department of Medicine David M. Levine Excellence in Mentoring Award. Dr. Bollinger is Board Certified in Internal Medicine and Infectious Diseases from the American Board of Internal Medicine, having received internal medicine training at the University of Maryland Medical Systems and a Postdoctoral Fellowship in Infectious Diseases from JHU School of Medicine. Dr. Bollinger has been on the faculty at JHU School of Medicine and Public Health since 1992.

Katherine Bond, Sc.D., is the Vice President of International Regulatory Affairs at U.S. Pharmacopeia. She was previously director of Strategy, Partnerships, and Analytics in the Office of International Programs (OIP) at the U.S. Food and Drug Administration (FDA). Dr. Bond has more than 20 years' global health experience in Asia and Africa, covering public health research; training; intervention design, implementation, and evaluation; strategy and policy formulation and donor support. From 2002 to 2009, Dr. Bond held positions as associate director for The Rockefeller Foundation in Southeast Asia and East Africa, where she cultivated dynamic regional and global networks covering areas of emerging infectious diseases; pandemic preparedness and response; global health diplomacy; HIV/AIDS; health systems strengthening; urban health; migrant health; and gender. From 2000 to 2002, as deputy director of Mekong Regional Office for the Program for Appropriate Technology in Health (PATH), she provided technical and management leadership to regional and country programs addressing public health priorities in the Mekong Region. She co-chaired an organization-wide team to develop institutional strategies and principles of impact assessment and led region-wide capacity-building efforts in adolescent reproductive health and HIV/AIDS. She also served as a technical advisor to the World Health Organization Division of Child and Adolescent Health. Dr. Bond has also served as a consultant to the U.S. Agency for International Development (USAID), the Ford Foundation, the Academy for Educational Development (AED), and the International Center for Research on Women (ICRW). Dr. Bond received her Doctor of Science from Johns Hopkins University School of Hygiene and Public Health and her B.A. in Sociology and Anthropology from Swarthmore College.

Jo Ivey Boufford, M.D., is president of The New York Academy of Medicine. Dr. Boufford is professor of public service, health policy and management at the Robert F. Wagner Graduate School of Public Service and clinical professor of pediatrics at New York University School of Medicine. She served as dean of the Robert F. Wagner Graduate School of Public Service at

New York University from June 1997 to November 2002. Prior to that, she served as principal deputy assistant secretary for health in the U.S. Department of Health and Human Services (HHS) from November 1993 to January 1997, and as acting assistant secretary from January 1997 to May 1997. While at HHS, she served as the U.S. representative on the Executive Board of the World Health Organization (WHO) from 1994 to 1997. From May 1991 to September 1993, Dr. Boufford served as director of the King's Fund College, London, England. The King's Fund is a royal charity dedicated to the support of health and social services in London and the United Kingdom. She served as president of the New York City Health and Hospitals Corporation (HHC), the largest municipal system in the United States, from December 1985 until October 1989. Dr. Boufford was awarded a Robert Wood Johnson Health Policy Fellowship at the Institute of Medicine in Washington, DC, from 1979 to 1980. She served as a member of the National Council on Graduate Medical Education and the National Advisory Council for the Agency for Healthcare Research and Quality from 1997 to 2002. She currently serves on the boards of the United Hospital Fund, the Primary Care Development Corporation, and Public Health Solutions (formerly MHRA). She was president of the National Association of Schools of Public Affairs and Administration in 2002–2003. She was elected to membership in the National Academy of Medicine in 1992 and is a member of its Executive Council, Board on Global Health and Board on African Science Academy Development. She was elected to serve a second 4-year term as the foreign secretary of the National Academy of Medicine beginning July 1, 2010. She received Honorary Doctorate of Science degree from the State University of New York, Brooklyn, May 1992; New York Medical College, May 2007; Pace University, May 2011; and Toledo University, June 2012. She was elected a Fellow of the National Academy of Public Administration in 2005. She has been a Fellow of The New York Academy of Medicine since 1988 and a Trustee since 2004. Dr. Boufford attended Wellesley College for 2 years and received her B.A. in Psychology magna cum laude from the University of Michigan and her M.D., with distinction, from the University of Michigan Medical School. She is Board Certified in Pediatrics.

Mushtaque Chowdhury, Ph.D., is the vice chair of BRAC, the world's largest non-governmental organization. Previously, he was its deputy executive director, founding director of the Research and Evaluation Division, and founding dean of the James P. Grant School of Public Health. Dr. Chowdhury is also a professor of population and family health at the Mailman School of Public Health of Columbia University in New York. During 2009–2012, he worked as the senior adviser to the Rockefeller Foundation, based in Bangkok, Thailand. He also served as a MacArthur Fellow at Harvard University. Dr. Chowdhury holds a Ph.D. from the London School of Hygiene and Tropical Medicine, an M.Sc. from the London School of Economics, and a B.A. (honors) from the University of Dhaka.

Dr. Chowdhury was a coordinator of the United Nations Millennium Task Force on Child Health and Maternal Health, set up by the former Secretary General Kofi Annan. He is a co-recipient of the "Innovator of the Year 2006" award from the Marriott Business School of Brigham Young University in United States, and in 2008, he received the PESON Oration Medal from the Perinatal Society of Nepal. He has a wide interest in development, particularly in the areas of education, public health, poverty eradication, and the environment. Dr. Chowdhury has published more than 150 articles in peer-reviewed international journals, including the *International Journal on Education*, *Lancet*, *Social Science & Medicine*, *Scientific American*, and the *New England Journal of Medicine*. One of his recent books is *From One to Many:*

Scaling Up Health Programs in Low Income Countries (co-edited with Richard Cash et al.), published in 2011. He coordinated the recently launched *Lancet Series on Bangladesh* (http://www.thelancet.com/series/bangladesh). *Lancet* also published a "profile" celebrating his contributions to global health.

Dr. Chowdhury is a founder of the Bangladesh Education Watch and the Bangladesh Health Watch, two civil society watch-dogs on education and health, respectively. He is on the board and committees of several organizations and initiatives, including the Board of Trustees of BRAC University in Bangladesh and the International Advisory Board of the Centre for Sustainable International Development at the University of Aberdeen in the United Kindgom.

Gary M. Cohen is Executive Vice President and President, Global Health and Development at BD (Becton, Dickinson & Co), a global medical technology company operating in 150 countries with over 45,000 employees. He joined BD in 1983 and has served as an executive officer since 1996. Mr. Cohen is also acting CEO of GBCHealth and a board director of the Perrigo Company, CDC Foundation and US Fund for UNICEF, and board chair/founder of *Together for Girls*, a partnership of five UN agencies, the governments of the United States and Canada and other partners to end violence against children, particularly sexual violence against girls. He is a vice chair of the MDG Health Alliance and recently served on the UN Commission on Life Saving Commodities for Women and Children. He is also a member of the UN Secretary General's Network of Engaged Men Leaders. Mr. Cohen and BD extensively engage in cross-sector collaboration to address unmet health needs globally, including among high disease burden, low resource populations, utilizing various methods such as social investing, CSR and shared value creation. He serves as a speaker and advocate on advancing health and human rights in forums including the United Nations, World Economic Forum and Clinton Global Initiative. He has been honored by Medical Education for South African Blacks, B'nai B'rith International, the U.S. Fund for UNICEF, the Nyumbani Home for orphaned HIV-positive children, the American Jewish Committee and the Dikembe Mutombo Foundation. Mr. Cohen holds a B.A. and an M.B.A. from Rutgers University and previously served on the university's board of trustees.

Bruce Compton, B.A., is senior director of international outreach for the Catholic Health Association of the United States (CHA). He is based in the association's St. Louis office. Mr. Compton is responsible for assisting and supporting CHA-member organizations in their outreach activities in the developing world. His duties include facilitating collaboration among CHA-member organizations and others, seeking to enhance the impact of international ministries. Additionally, he is responsible for education regarding international outreach issues and encouraging CHA members' participation in various activities of international ministry. Compton lived in Haiti from 2000 to 2002, and he continued to work in support of health missions in the developing world after he returned to the Unites States. He did so in his capacity as founding president and chief executive of the Springfield, Illinois–based Hospital Sisters Mission Outreach.

Steve Davis, M.A., J.D., is president and CEO of Program for Appropriate Technology in Health (PATH). As president, he combines his extensive experience as a technology business leader, global health advocate, and social innovator to accelerate great ideas and bring lifesaving solutions to scale. He oversees PATH's work of driving transformative global health innovation

to save and improve lives, reaching 219 million people in 2013. Mr. Davis's long-standing commitment to human rights and global development grew from his early work on refugee programs and policies, and from his later focus on Chinese politics and law. He has employed that same passion as a leader and strategist for a range of private and nonprofit companies and international organizations, including as CEO of Internet pioneer and global digital media firm Corbis, director of social innovation for McKinsey & Company, and interim CEO of the Infectious Disease Research Institute. Earlier in his career, he practiced law at the international law firm of K&L Gates, with a focus on intellectual property.

Mr. Davis is a member of the Council on Foreign Relations and holds a faculty appointment as a lecturer at the Stanford Graduate School of Business. He currently serves on the boards of InterAction and Global Partnerships and sits on several advisory groups, including the World Economic Forum's Global Agenda Council on Social Innovation, the Clinton Global Initiative's Global Health Advisory Board, the Council on Foreign Relation's Task Force on Non-Infectious Diseases, and Wellcome Trust's Sustaining Health Dialogue. He previously has served on numerous corporate and nonprofit boards.

Trevor Gunn, Ph.D., is vice president, international relations, for Minneapolis-based Medtronic, the world's largest independent medical technology company. Dr. Gunn was formerly the long-time director of the U.S. Department of Commerce's Business Information Service for the Newly Independent States (BISNIS), the clearinghouse for U.S. government information for doing business in the former Soviet Union. He has served the past 20 years as adjunct professor at CERES/School of Foreign Service, Georgetown University. He received his B.A. from the University of San Francisco and his Ph.D. in International Relations from the London School of Economics in 1992. He has worked with the Chamber of Commerce of Southern Sweden, Dover Elevator Corporation (now ThyssenKrupp of Germany), International Executive Service Corps, and on the staff of the former San Francisco Mayor and two U.S. Senators from California. He sits on the U.S. Department of State's Advisory Committee on International Economic Policy; is an official Trade Advisor to the Office of the U.S. Trade Representative (USTR) in the "Industry Trade Advisory" system of the U.S. government (vice chair for health). Further, he is a member the Board of Directors for the U.S.–Russia Business Council, the Washington Export Council (Washington, DC), and the Board of Advisers of the Washington International Business Council; chair of the Brazil–U.S. Business Council's Trade and Regulatory Working Group; co-chair of the U.S.–Korea Business Council's Health Working Group, the Board of Directors of the Executive Council on Diplomacy, and the Board of the Center for Citizens Initiatives (San Francisco); and on the Board of Advisors of the University of Wisconsin–Madison's CIBER (International Business) program. Equally, he is a member of the National Academy of Sciences, Engineering, and Medicines' Forum on Public–Private Partnerships for Global Health and is a member of the U.S. Department of Commerce's District Export Council (Virginia).

A. Reza Jafari, M.B.A, EdS, ABD (Ph.D.), is chairman and CEO of e-Development International, an executive advisory and investment group that promotes, facilitates, and participates in Information and Communications Technology (ICT) initiatives via social entrepreneurship in health care and education in the global markets. Dr. Jafari has spent 35 years in the global information technology (IT) services, telecommunications, media and entertainment, and education industries. He now manages a portfolio of business relationships

and interests that include advising established and start-up companies and organizations in Mobile Broadband, eHealth and mHealth, IoT, big data and cloud services. He currently serves as the chairman of the Board of ITU TELECOM (a United Nations agency) and a commissioner of the Broadband Commission for Sustainable Development. He has served as the chairman of the Board of the India, China, and America Institute; a board member of GSMA, Ltd.; and commissioner of economic development for the state of Maryland. He also served as the chairman and managing director of NeuStar International, and group president of Global Telecom, Media, and Entertainment Industry group and other senior executive positions at Electronic Data Systems (now Hewlett Packard).

Clarion Johnson, M.D., served as global medical director of ExxonMobil Corporation until his retirement in 2013. Currently, Dr. Johnson is the chair of The Joint Commission's International and Resource Boards and a member of the Yale School of Public Health Leadership Council. He serves on several boards including the Milbank Memorial Fund Board and its Executive Committee; the Catholic Medical Mission Board; the Quality Assurance Committee of The Bon Secours Hospital System; the Board on Global Health of the Institute of Medicine; and co-chairs its Forum on Public–Private Partnerships for Global Health and Safety. Dr. Johnson also has a U.S. Health and Human Services secretary appointment to the National Institute of Occupational Safety and Health Advisory Board and was a member of the Virginia Governor's Task Force on Health Reform and co-chair of the Insurance Reform Task Force. He is the past chair of the Virginia Health Care Foundation and the Board of City Lights Charter School in Washington, DC. He served as advisor and lecturer in the Harvard Medical School's Department of Continuing Education "Global Clinic Course" 2005–2008. In 2013, he received the President's Award from the Oil and International Petroleum Industry Environment Conservation Association (IPIECA) and Oil and Gas Producers for contributions to health. In 2012, he was the recipient of the Society of Petroleum Engineers Award for Health, Safety, Security, Environment, and Social Responsibility. In 2011, he received a medal from the French Army's Institute De Recherche Biomedical for Project Tetrapole, a public–private partnership in malaria research. Dr. Johnson is a graduate of Sarah Lawrence College and member of its Board of Trustees and the Yale School of Medicine. While on active duty in the U.S. Army, he also trained as a microwave researcher at Walter Reed Army Institute of Research. He is Board Certified in Internal Medicine, Cardiology, and Occupational Medicine.

Andrew Jones has worked extensively in the nonprofit sector in the fields of health care and international development after a number of years working as a hospital manager in the UK National Health Service. As head of partnerships at the Tropical Health and Education Trust (THET), Mr. Jones is responsible for fostering the development of partnerships between the UK health sector and institutions in Africa, Asia, and the Middle East to train and develop health workers, mainly through the Health Partnership Scheme, a $55 million UK government–funded program.

Justin Koester is a senior international relations specialist for Minneapolis-based Medtronic, Inc., the world's largest independent medical technology company. He has spent the previous 5 years focusing on increasing market access for Medtronic's innovative medical technologies in emerging markets. Engaging policy makers on market-access barriers and seeking new business opportunities for Medtronic via public–private partnerships and diplomatic engagement. Mr.

Koester also currently serves as co-chair of the Non-Communicable Disease (NCD) Roundtable, an independent advocacy organization seeking increased attention and health care policy that strengthens the prevention, diagnosis, treatment, and control of NCDs.

Mr. Koester has experience in advocacy and support for new and enhanced health care policies in more than 150 countries related to medical device reimbursement and funding, health technology assessment, regulatory approvals and post-market surveillance, procurement, and pricing in regard to medical technology therapies. Previously, he worked for Medtronic as the Latin America clinical research associate, managing more than 22 clinical trials for medical devices. Before Medtronic, he worked for the U.S. Trade and Development Agency on trade evaluations and development impact.

He received a B.A. in Latin American and Hemispheric Studies and International Relations and a B.A. in Economics from George Washington University in 2008.

Margaret E. Kruk, M.D., M.P.H., is an associate professor of global health in the Harvard T.H. Chan School of Public Health's Department of Global Health and Population. Her research generates evidence for improved health system quality and accountability in low- and middle-income countries. Her work focuses on the intersection of health care delivery and population expectations for health services, with the aim of making health systems more responsive to users. In collaboration with academic colleagues and governments in low-income countries, she studies health care utilization and quality, maternal health, and population preferences for health service delivery. Dr. Kruk is also interested in the development of novel evaluation methods for assessing the effectiveness of complex interventions and health system reforms. She has worked in Ethiopia, Ghana, Kenya, Liberia, Mozambique, Tanzania, Uganda, and Zambia.

Dr. Kruk served as commissioner on *Lancet*'s Global Health 2035 Commission on Investing in Health and currently serves on the Institute of Medicine Committee on Health Systems Strengthening. She is an editor of the Essential Surgery volume of the *Disease Control Priorities Project, Third Edition*. Prior to joining Harvard, Dr. Kruk was associate professor of health management and policy and director of the Better Health Systems Initiative at the Columbia University Mailman School of Public Health. She was previously policy advisor for health at the United Nations Millennium Project, an advisory body to the UN Secretary General on implementing the Millennium Development Goals. She holds an M.D. from McMaster University and an M.P.H. from Harvard University.

Christophe Longuet, M.D., has been medical director at Fondation Mérieux since March 2007. His responsibilities at the foundation include training and knowledge-sharing activities for health professionals and projects aiming to strengthen health systems and access of the populations to better services. He is a medical doctor, specializing in tropical diseases and HIV/AIDS. He worked for 12 years at Bichat Claude Bernard Hospital, Paris, where he participated in clinical research in HIV/AIDS and malaria treatment and in medical care of people. He still keeps a clinical practice on a part-time basis in the infectious diseases department of Croix Rousse Hospital, Lyon.

Dr. Longuet has 9 years of experience in the pharmaceutical industry (Merck Sharp & Dohme [MSD]), where he had the responsibility to introduce antiretrovirals in Africa within international partnerships with the World Health Organization and UNAIDS. At MSD, he has also been in charge of the humanitarian donation of mectizan for the control of onchocerciasis. Prior to this, he was district medical officer in the Commonwealth of Dominica for the French

Cooperation and then practiced internal medicine in Pointe à Pitre University Hospital, Guadeloupe. Dr. Longuet also holds a master's degree in International Public Health from the Catholic University of Louvain, Belgium, and a postgraduate degree in Health Economics from Paris IX-Dauphine University.

Myat Htoo Razak, MBBS, M.P.H., Ph.D., has 25 years of experience in clinical services, health policy, epidemiology, HIV/AIDS research and intervention, health systems strengthening, and research capacity building. He is the program director of the Fogarty Global Health Program for Fellows and Scholars, Fulbright-Fogarty Global Health Program, and Fogarty International Trauma and Injury Research Training Program of the Fogarty International Center (FIC) at the National Institutes of Health (NIH). All programs focus on strengthening research capacity and networks for health professionals globally. In addition, Dr. Razak is the FIC/NIH team leader of the Medical Education Partnership Initiative, a $130 million program funded by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and NIH that aims to improve quantity, quality, and retention of health professionals in Africa.

Before joining NIH in 2009, Dr. Razak held technical leadership positions in the United States, Asia, and Africa, with agencies such as the Centers for Disease Control and Prevention (CDC), the World Health Organization, UNAIDS, Family Health International, and Johns Hopkins University. Dr. Razak received his medical degree from the Institute of Medicine in Rangoon, Burma, and an M.P.H. in Health Services Organization and a Ph.D. in Epidemiology from University of California, Los Angeles. Previously, he served as an epidemic intelligence service officer of CDC. Dr. Razak is a member of the Health Systems Strengthening Steering Committee and the Human Resources for Health Working Group of PEPFAR.

Devi Prasad Shetty, MBBS, is chairman and director of Narayana Health. He began his career with the Guys Hospital in London working for the National Health Service, United Kingdom, with whom he was associated till 1989. Subsequently, on his return to India, he started working at the BM Birla Heart Research Centre in Kolkata, where he was involved in the treatment of Mother Teresa. Thereafter, he moved to Bengaluru to commission the Manipal Heart Foundation. He founded a chain of super-specialty hospitals that includes the Rabindranath Tagore International Institute of Cardiac Sciences in Kolkata and Narayana Health City in Bengaluru. Currently, the Narayana Health Group of Hospitals manages 23 hospitals across 14 cities.

Dr. Shetty and his team pioneered the concept of a "Health City," a 2,000- to 5,000-bed conglomeration of multiple super-specialty hospitals within a single campus. The economies of scale achieved through this health city enable the group to provide affordable health care to thousands. Dr. Shetty was also involved in coining the term "micro-health insurance." He spearheaded the launch of a health insurance initiative for the farmers of Karnataka in association with the state government.

In addition to his administrative and medical commitments with the Narayana Health Group, Dr. Shetty served on the Board of Governors of the Medical Council of India, an apex body regulating medical education in India. His activities are profiled in several international publications including *The Wall Street Journal*, which referred to him as the "Henry Ford of cardiac surgery" in a cover page article of *Forbes*, *Fortune*, and *Business Week*. Harvard Business School and Wharton Business School created a case study while reviewing Narayana Health's unique business model.

Dr. Shetty performed the first open-heart surgery in the world to close a hole in the heart using a microchip camera. He also conducted the first surgery in India using blood vessels of the stomach to bypass blocked arteries of the heart, along with the first dynamic cardiomyoplasty operation in Asia. He was also the first to use the artificial heart in India. He has performed more than 13,000 operations (5,000 on children).

Sally Stansfield, M.D., is a globally recognized leader in public health and development. She brings more than 30 years of expertise in health systems strengthening, with a focus on health information, communication, and technology; data maximization; metrics for evaluation; systems strengthening; and information technology governance. Working with international health organizations, she established and led a global health partnership to strengthen country health information systems in more than 85 countries, mobilizing more than $1 billion in critical new funding. She has extensive experience working with global health partners and has served as a trusted advisor at the highest levels for many of the world's leading public health institutions.

Jeffrey L. Sturchio, Ph.D., is president and CEO at Rabin Martin, a global health strategy consulting firm, and former president and CEO of the Global Health Council. Before joining the Council in 2009, Dr. Sturchio was vice president of Corporate Responsibility at Merck & Co., Inc., president of The Merck Company Foundation, and chairman of the U.S. Corporate Council on Africa (CCA), whose 160 member companies represent some 85 percent of total U.S. private sector investment in Africa. While at Merck & Co., Inc., for more than a decade, he was a leader of the company's global HIV/AIDS policy and was centrally involved in the United Nations/ Industry Accelerating Access Initiative established in 2000 to help improve HIV/AIDS care and treatment in the developing world. He was a member of the board of the African Comprehensive HIV/AIDS Partnerships in Botswana (2005–2009) and a member of the private-sector delegation to the Board of the Global Fund to Fight AIDS, Tuberculosis and Malaria (2002–2008). He is chairman of the BroadReach Institute for Training and Education and a member of the boards of the Corporate Council on Africa, Friends of the Global Fight Against AIDS, TB and Malaria, and the Museum of AIDS in Africa. Dr. Sturchio is also currently a visiting scholar at the Institute for Applied Economics, Global Health, and the Study of Business Enterprise at The Johns Hopkins University; Senior Associate at the Center for Strategic and International Affairs; a principal of the Modernizing Foreign Assistance Network; a Fellow of the American Association for the Advancement of Science; a member of the Council on Foreign Relations and the Arthur W. Page Society; and an advisor to amfAR, the Clinton Global Initiative, and the NCD Alliance, among others. He received an AB in History from Princeton University and a Ph.D. in the History and Sociology of Science from the University of Pennsylvania. His publications include Noncommunicable diseases in the developing world: Addressing global gaps in policy and research (edited with L. Galambos, Johns Hopkins University Press, 2013).

Katherine Taylor, M.Sc., Ph.D., is a research professor in the Biological Sciences Department at the University of Notre Dame. She also holds the titles of director of operations and director of global health training with the university's Eck Institute for Global Health. In her current position, she serves as the university liaison for a number of international global health partnerships. She is also actively involved in training and global health education as the director of the Master of Science in Global Health Program. Dr. Taylor earned a B.Sc. from Purdue University, an M.Sc. from University of Notre Dame, and a Ph.D. from the Vrije University,

Brussels. Her research experience includes 14 years in Kenya, initially employed by the Centers for Disease Control and Prevention on malaria research projects, in collaboration with the U.S. Army and the Kenya Medical Research Institute. The last 10 years in Kenya, she worked on the immunology of African trypanosomes in livestock at the International Livestock Research Institute and served as the project leader for the Immunology and Vaccine Development. Dr. Taylor left Kenya in 2001 to join the National Institute of Allergy and Infectious Diseases, Division of Microbiology and Infectious Diseases as a program officer. There, she developed and led a new Drug Development Section within the Office of Biodefense that funded a portfolio of contracts for the development of new drugs against high-priority biothreats. Dr. Taylor is currently the president of the American Society for Tropical Medicine and Hygiene, Committee for Global Health and also serves on the Program Committee of the Society.

Aye Aye Thwin, M.D., Ph.D., is a physician with a doctorate in public health economics. She has more than 25 years of international experience in health systems and financing reform. From 1991 to 1995, Dr. Thwin served in Bangladesh with the German Agency for Technical Cooperation (GIZ) as an advisor to the National Institute of Population Research and Training, Ministry of Health and Family Welfare. In 1995, she was on the faculty at the Johns Hopkins Bloomberg School of Public Health, and seconded as senior technical advisor to the International Centre for Diarrhea Disease Research, Bangladesh. For the next 4 years, she led Johns Hopkins University's research program in Bangladesh on health financing, analysis of health and population policy, and urban poverty. She also served as an advisor to the Ministry on specific structural and organizational reforms. In 1999, she joined the World Health Organization as health financing and sector management advisor to the Ministry of Health, Cambodia, serving as team leader for health systems strengthening, policy and budgetary reforms, and donor coordination. She joined USAID in 2003, served for 1 year at the Bureau of Global Health in Washington, DC, and was later assigned to the Philippines as the chief of the Office of Health from 2004 to 2009. In 2009, she moved to USAID's Regional Mission for Asia as the director of the Office of Public Health. In August 2014, Dr. Thwin was assigned as senior health advisor at USAID headquarters responsible for a range of strategic initiatives on health systems strengthening and financing. Dr. Thwin has a medical degree from the Institute of Medicine, Burma, a Masters in Public Health from Mahidol University, Thailand, and a Doctor of Science degree from the Johns Hopkins Bloomberg School of Public Health.

Jeanette Vega Morales, M.D., Ph.D., is the director of the national Chilean Public Health Insurance Agency (FONASA) since March 2014. Dr. Vega has more than 20 years of experience in international health. Her areas of expertise include social determinants of health, health equity, and health systems. Prior to being appointed as director of FONASA by President Michelle Bachelet, Dr. Vega served as managing director of health at the Rockefeller Foundation. She was vice minister of health in Chile, between 2008 and 2010, leading the country's 13-step agenda for equity in health. Before that, she served as a director at the World Health Organization in Geneva, where she led the equity in health agenda, looking at the social determinants of health and health systems. Dr. Vega started her career as a medical doctor in Chile specializing in family medicine. She has a master's degree in Public health from the Universidad de Chile and a Ph.D. in Public Health from the University of Illinois at Chicago.