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Health Governance Capacity: Enhancing Private Sector Investment in Global Health

Darrell M. West, John Villasenor, and Jake Schneider

About the Brookings Private Sector Global Health R&D Project

Global health remains one of the world's most pressing challenges. Particularly in developing economies, a complex set of factors impede development, deployment, and affordability of medications, vaccines, and diagnostic tests. While there is no single solution to this challenge, an important part of the overall solution lies in incentivizing investors and pharmaceutical companies to raise their investment in global health R&D.

The Brookings Private Sector Global Health R&D Project seeks to find ways to address this investment shortfall. The project recognizes the need to complement the research on the social returns to global health R&D by examining the potential financial returns to private sector global health R&D investors, and offers policy solutions that can boost those returns. This publication is the first in a series of reports published by the Private Sector Global Health R&D Project. To contact the report authors, please email HealthRD@brookings.edu.

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Executive Summary

Much of the attention regarding investment in global health focuses on the public sector. National governments and publicly funded multilateral aid organizations are rightly seen as central to medical research and development, the deployment of delivery systems, and the construction of the infrastructure needed for quality treatment. They fund many of the public health activities in the developing countries and often set the broad contours for international collaboration. Due to factors including market failures, governmental assistance is crucial to poverty-related and neglected disease financing.

Yet it is important not to lose sight of non-governmental contributions to health investment. Pharmaceutical companies, charitable foundations, and venture capital firms fund the creation of vaccines, drugs, and health diagnostics that have an important impact in the developing world. They are a vital part of the global health ecosystem and are responsible for a significant amount of the medical progress that has been made. More broadly, private sector financing is an important mechanism for directing capital to where it can provide the greatest anticipated return. In the context of global health, given the proper environment, this can be a key source of investments in new medications, diagnostic tools, and healthcare innovations, all of which can provide both enhanced financial and social outcomes.

In this report, we examine the quality of healthcare governance in a set of low- and middle-income countries. In particular, we look at management capacity, regulatory processes, health infrastructure, and policy conditions in sub-Saharan Africa and Asia. We argue that good governance is a foundational condition for global health investment and that it conditions the overall environment in which both public and private sector health investment takes place. This report is the first in a series of planned publications under the Brookings Private Sector Global Health R&D Project, which was launched in fall 2016. Subsequent reports will examine funding levels, rate of return on investment, and the financial benefits of global health R&D.

To explore governance, we compile data on 25 aspects of health governance in 18 different countries. As we explain later in this report, we chose these indicators based on the research literature that outlines the measures associated with investment decisions. In particular, we focus on measures that reflect key aspects related to health management, policies, regulations, infrastructure and financing, and health systems. The countries assessed are Bangladesh, China, Democratic Republic of Congo, Ethiopia, Ghana, India, Indonesia,

Kenya, Liberia, Mozambique, Nigeria, Pakistan, Philippines, Sierra Leone, South Africa, Tanzania, Uganda, and Vietnam. These places were chosen based on geographic diversity, opportunities to improve health outcomes, and having a large population.

Among the important findings of our analysis are the following:

1. Factors which can help low- and middle-income countries attract greater private investment in healthcare R&D are improving transparency, strengthening management capacity, lowering tariffs on incoming medical products to the extent that is fiscally possible, expediting regulatory reviews of new drugs, building effective health infrastructure, and increasing appropriately-targeted and efficient public spending on healthcare.
2. Of the countries in the study, Vietnam, South Africa, China, and Ghana rank the highest on aspects of overall health governance that we believe have the greatest potential to help attract private sector investment in health R&D.
3. Several countries have components of good governance that show promise in creating an attractive investment environment. For example, South Africa and Uganda have a notably effective approach to health regulations, while South Africa and China have invested significantly in health infrastructure and Vietnam has worked hard to build its health system.
4. Ghana and Liberia do well on health leadership and management capacity, while Tanzania does well on several of its health policies.
5. Nigeria, Pakistan, the Democratic Republic of Congo, and Bangladesh perform less well on key health governance metrics.

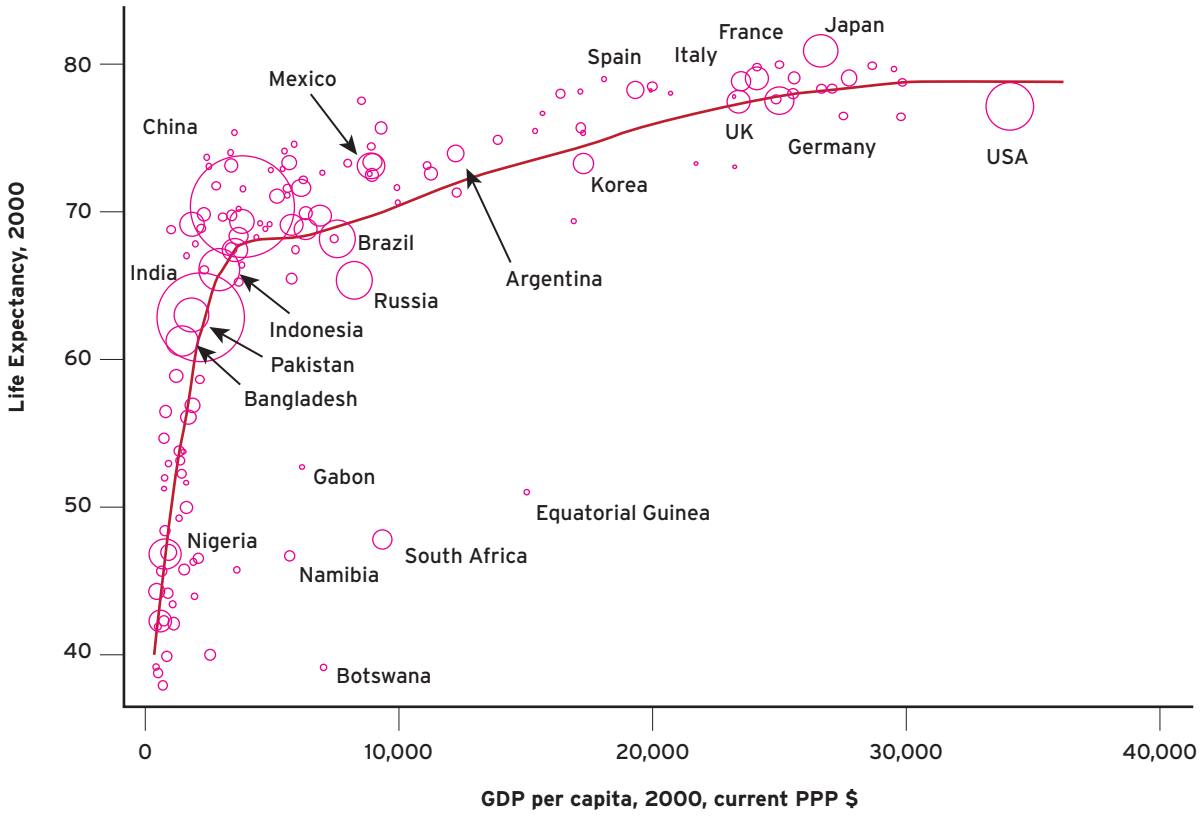
More broadly, countries require enabling policy, regulatory, and administrative mechanisms in order to encourage positive health outcomes in general and global health R&D investments in particular. If there is a strengthened capacity to make effective use of resources, governments, businesses, and non-governmental organizations will be better able to absorb new investments relevant to global health goals. Private investors will be more likely to make global health R&D investments if it is clear that the resulting vaccines, drugs, and diagnostics will pass regulatory, policy, and legal muster, and produce positive health outcomes.

The Importance of Global Health

There is an increasing amount of evidence that better health improves economic outcomes. Health correlates positively with happiness, productivity, and an improved sense of personal well-being.[1] It is also well established that vaccines have saved millions of lives.[2] A dramatic example of this took place in the 1950s when the March of Dimes invested $26 million in a polio vaccine and the resulting vaccine saved 160,000 lives and likely prevented another 1.1 million cases of paralytic polio.[3] There are also as-yet-unrealized opportunities to expand the life-saving impact of vaccines. For example, a study by the World Health Organization Global Vaccine Action Plan found that a measles vaccine would save 10.6 million lives over the next 10 years, a hepatitis B vaccine would save up to 6 million people, a haemophilus influenza type b vaccine would save up to 1.7 million lives, a pneumococcus vaccine would save up to 1.8 million lives, a rotvirus vaccine would save 900,000 lives, and a human papillomavirus vaccine would save 500,000 lives if there were widespread coverage.[4]

As noted above, multiple studies confirm the positive correlation between improved health and economic well-being. For example, the World Health Organization's Commission on Social Determinants of Health demonstrates that higher incomes in developing countries correspond with lower childhood mortality rates.[5] According to the World Health Organization,

FIGURE 1 | **Preston Curve (as updated by Angus Deaton in 2003)**



Recreated from Source: Deaton, Angus. 2003. "Health, Inequality, and Economic Development." Journal of Economic Literature, 41(1): 113–158.
Note: As noted in the Deaton paper, size of circle is proportional to the population size of the country. The regression line is non-parametric based upon population-weight.

"better health enables more people to participate in the economy … [such that] reducing the costs of lost productivity by only 10–20% could add billions of dollars to the economy."[6] Improved health conditions are also beneficial for social cohesion, especially in terms of equity. Societies with better and more equitable health systems are more stable, and function more effectively.

Conversely, poor health imposes large economic costs on the affected society. Diseases such as tuberculosis, malaria, HIV/AIDS, severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), Zika, and Ebola can afflict large numbers of people in a short period of time. Large-scale outbreaks can lead to losses in economic activity as great as $60 billion, according the Coalition for Epidemic Preparedness Innovations.[7]

One prominent representation of the benefits of good health is the Preston curve.[8] Updated by economist Angus Deaton in 2003, the graph shown in Figure 1 demonstrates the strong relationship between health outcomes and economic conditions.[9]

The Need for Global Health R&D Investment

Diseases such as HIV/AIDS, tuberculosis, malaria and neglected tropical diseases (known collectively as HTM), present some of the most significant challenges facing public health systems in the developing world. The World Health Organization (WHO) writes that these illnesses, "cause 32% of the burden of ill health in Africa, and seriously impact health outcomes in every region of the world."[10] In addition to the profound human costs, the economic costs of diseases in general are enormous. In a 2013 *Lancet* report, the authors report that if evidence-based interventions for infections and material and child health conditions are scaled up to very high coverage levels of 90 percent or more, delivery systems are strengthened, and R&D investments are increased, countries could avert "about 10 million [preventable] deaths [by] 2035."[11]

In the vaccine area, researchers examined 94 low and middle-income nations and found that "the return was $16 for every dollar spent on vaccines."

The benefits to investing in global health are quite clear. The 2013 *Lancet* report found that, "reductions in mortality account for about 11% of recent economic growth in low-income and middle-income countries."[12] The gains from combatting these individual diseases also appear to be substantial; for example, "every dollar spent on TB generates up to US $30 through improved health and increased productivity,"[13] and "malaria-free countries have five times greater economic growth than countries with malaria."[14]

Thus, there is a clear social and economic benefit to investing in global health R&D. There are also substantial spillover benefits of these types of investments. For example, one study found that "a 1% increase in public research would eventually produce anything from a 1.05% to a 2.5% increase in private R&D spending."[15] Another study estimated the benefit of a 1% increase in government expenditures on medical research as generating an increase of 0.66% for private spending and 1% in charitable spending.[16] Other studies have estimated the economic multiplier effects of R&D in general and found positive effects. Martin Grueber and Tim Studt, for example, estimate that scientific R&D has a multiplier impact of 2.8 on economic output and 3.4 on employment.[17]

In the vaccine area, researchers examined 94 low and middle-income nations and found that "the return was $16 for every dollar spent on vaccines."[18] And if one includes broader economic consequences, the researchers found that "vaccinations return $44 for every dollar spent."[19]

However, efforts by governments to fight disease across the board represent only a fraction of national budgets in donor countries. Chris Collins, the president of Friends of the Global Fight Against AIDS, Tuberculosis and Malaria, reports that "the American government spends only 0.25 percent of the federal budget on global health aid annually."[20] The amount devoted to global health R&D is a small portion of the overall health budget.

Despite the obvious benefits of quality healthcare, the developing world in general remains under-resourced by the global health community. There are unmet opportunities to advance prevention and treatment of many illnesses. Paul Farmer, Jim Yong Kim, Arthur Kleinman, and Matthew Basilico write:

> Five of the leading causes of death in low-income countries—diarrheal diseases, HIV/AIDS, tuberculosis, neonatal infections, and malaria—are treatable

> infectious illnesses that are not found on the leading list of killers in high-income countries. Tuberculosis, malaria, and cholera continue to claim millions of lives each year because effective therapeutics and preventatives remain unavailable in most of the developing world. Although effective therapy for HIV has existed since 1996, and treatment now costs less than $100 per year in the developing world, AIDS is still the leading infectious killer of young adults in most low-income countries.[21]

Life-saving medications and therapeutics are not reaching many people in need. In addition, for many diseases, there are not adequate tools, and thus there is a heightened need for R&D investments in order to develop new diagnostics and treatments.

The Role of Governance in Health R&D Investment

Many low- and middle-income countries have limited resources with which to improve healthcare. Their governments are strapped financially and not well positioned to invest sufficiently in improving service delivery. That fiscal reality creates a need for foreign engagement and outside investment to address health needs.

But research studies have found that money alone is not enough, and that aid effectiveness is limited by institutional and capacity constraints in recipient countries.[22] A key principle for effective development assistance as outlined in the 2005 Paris Declaration on Aid Effectiveness and 2008 Accra Agenda for Action is recipient country capacity, which depends on a country's ability to design and implement its own development strategies.

Recent studies on investments in global health similarly document that in-country impact may vary depending on countries' abilities to efficiently absorb and manage external resource flows, including those coming from the private sector. For example, a 2015 report on the Global Health Investment Landscaping Project (GHILP) found that lack of coordination and collaboration among parties and a need for an enabling policy environment were key challenges for global health investors.

The 2013 *Lancet* report finds that many low-income and middle-income countries have insufficient resources and training to develop the institutions needed to fully benefit from health investments.

Horton and Lo identify six factors that are necessary to ensure health investments are used to maximum effect: information generation and sharing, deliberation and decision-making, efficient financial allocation, leadership and management, standard-setting, and accountability.[23] The 2013 *Lancet* report finds that many low-income and middle-income countries have insufficient resources and training to develop the institutions needed to fully benefit from health investments. They point to particular needs in human resources, service delivery, information systems, governance, and financing.

The World Health Organization has outlined several steps to improve healthcare: improving coordination and transparency, fostering effective communications, accelerating research and development by modernizing regulatory processes, and developing new standards and research protocols that guide collaborations and information exchanges.[24]

As part of a recent PLOS collection on "Grand Convergence: Aligning Technologies & Realities in Global Health," Lienhardt et al. contend that strengthening research capacity and systems for information management, surveillance, and response in low- and middle-income countries are crucial for reducing the burdens of diseases from tuberculosis, malaria, and neglected tropical diseases.[25] Looking beyond the health system, Engstrom et al. argue for the importance of a multi-sectoral approach to achieving health gains, incorporating multiple constituencies including different ministries, civil society, and the private sector.[26]

Strong governance and institutional quality have long been associated with positive economic growth and health outcomes.

The Link to Private Sector Global Health R&D Investment

Health governance capacity is also a critical factor in attracting private sector investment. For business entities to invest in emerging markets, they must be confident in the institutional and governance infrastructure of the country such that political and economic forces will not undermine their investment. Instability and ineffective institutions are just a few examples of developing world risk. If a country's market is unstable, growth too anemic, or rule of law too weak, it is less likely that the investment will produce positive results. Without adequate governance and institutional quality in both the economic and political spheres, it is difficult to entice pharmaceutical firms and other potential investors to devote new financial resources to initiatives that can improve health outcomes in these countries.

More broadly, strong governance and institutional quality have long been associated with positive economic growth and health outcomes. Acemoglu, Robinson and Johnson document this positive correlation through numerous empirical studies, and Acemoglu and Robinson's *Why Nations Fail* explore the reciprocal relationship between economic and political institutions on development.[27] In addition, Baghdadi-Sabeti and Kohler of the World Health Organization emphasize the need for good governance in healthcare. They state that good governance reduces the risk of corruption in public procurement processes, slows the sale of unsafe pharmaceutical substitutes, and limits the denial of medical resources and services to the people who need them most.[28]

To counteract these problems, the World Health Organization began the Good Governance in Medicines (GGM) program in 2004 in order to improve health capacity worldwide.[29] According to a WHO "Background Paper":

> Governance in health is being increasingly regarded as a salient theme on the development agenda. Leadership and governance in building a health system involve ensuring that strategic policy frameworks exist and are combined with effective oversight, coalition-building, regulation, attention to system design and accountability. The need for greater accountability arises both from increased funding and a growing demand to demonstrate results. Accountability is therefore an intrinsic aspect of governance that concerns the management of relationships between various stakeholders in health, including individuals, households, communities, firms, governments, non-governmental organizations, private firms and other entities that have the responsibility to finance, monitor, deliver and use health services.[30]

Effective policies and regulations are needed in order to promote good governance. As we outline below, there are a number of actions that would improve government's capacity to absorb new resources and address health needs. Assessing governance capacity is important to thinking about ways to increase public and private sector investment in health R&D.

Our Focus on Health Governance

We define health governance capacity as the ability of a nation's institutions to implement health policies, provide medical services, allocate resources efficiently, and help countries respond to global health crises.[31] Health governance capacity can be thought of as the intersection between health and governance. In order to understand this term, we will unpack and define its components, health and governance, individually.

The World Health Organization defines health as a "state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity."[32] The Organization for Economic Co-operation and Development (OECD) adds to this definition by describing health as "determined by many interdependent factors," such as health care, the environment (both physical and social), lifestyle and human biology.[33] The OECD continues that "interrelationships" and "linkages" exist between these various components of health leading to connections between improving the various types of health. Therefore, it is critical to implement a well-balanced health policy that adequately addresses these different components of a health system.

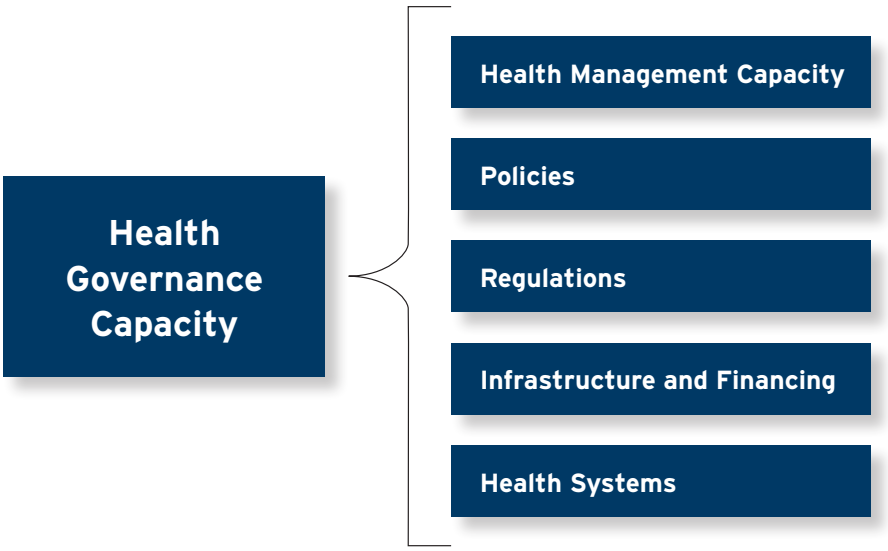
Governance is more difficult to define, with numerous experts offering various definitions. According to scholars Keohane and Nye, governance is "the processes and institutions, both formal and informal that guide and restrain the collective activities of a group."[34] In their 2002 World Development Report, the World Bank defines governance as "rules, enforcement mechanisms, and organizations."[35]

Even the International Monetary Fund (IMF) and the World Bank diverge on the exact definition of governance, although Woods states that they agree that good governance should include "promoting transparency, accountability, efficiency, fairness, participation and ownership."[36] Kaufmann and Kraay weigh in on this definitional challenge stating: "Although the concept of governance is widely discussed among policymakers and scholars, there is as yet no strong consensus around a single definition of governance or institutional quality."[37]

We define health governance capacity as the ability of a nation's institutions to implement health policies, provide medical services, allocate resources efficiently, and help countries respond to global health crises.

In light of the well-established benefits for good governance in relation to health outcomes, we have undertaken an analysis of country capacity in 18 sub-Saharan Africa and Asian nations: Bangladesh, China, Democratic Republic of Congo, Ethiopia, Ghana, India, Indonesia, Kenya, Liberia, Mozambique, Nigeria, Pakistan, Philippines, Sierra Leone, South Africa, Tanzania, Uganda, and Vietnam. We picked these countries based on a combination of factors including geographic diversity, existence of opportunities to improve health outcomes, and (for most of the countries) a large population.

FIGURE 2 | **Health Governance Capacity Dimensions**



Five Dimensions of High-Quality Health Governance

In our research, we examine five health governance capacity "dimensions" relevant for private sector investment using the most recent data that are available.[38] As shown in Figure 2, the dimensions are health management capacity, health policies, health regulations, health infrastructure and financing, and health systems. As noted previously, these are factors that we believe are especially important for investment decisions in a global health context.

For each of these dimensions, we compiled data on five indicators for a total of 25 indicators overall. We identified measures that are relevant for private sector investment decisions and that tap various dimensions of health decision-making, capacity, and outcomes. Each indicator was scored on a scale from 1 (lowest) to 4 (highest). The 25 indicators were then combined using equal weighting to form an overall score on a 100 point scale. We refer to this overall total and to the subscores from which it is derived as the Health Governance Capacity Index (HGCI).

Appendix 1 shows the resulting indicator scores, the subtotals for each dimension, and the overall total for each country in the study. Appendix 2 shows the raw data for each country. In order to index the raw data into scores, we divided the information for each indicator into quartiles.[39] We use these indicators to assess health governance capacity in the 18 countries and rank their readiness or attractiveness for increased private sector investment.

Leadership and Management Capacity

The first dimension of Health Management Capacity describes the ability of each nation to utilize resources towards effective health outcomes. It is well documented that leadership and management capacities correlate with good governance and, for example, that "corruption is a major obstacle to strengthening pharmaceutical systems and increasing access to quality medicines."[40] Therefore, this category measures broad-based governance capacity through indicators such as corruption levels and political stability (as measured by Transparency International's Corruption Perceptions Index and the Worldwide Governance Indicators' Political Stability Index), as well as foreign aid

and foreign investment (both from the World Bank World Development Indicators).[41] The last indicator, external resources (percent of total health expenditure), looks at the extent of budgetary resources utilized explicitly for healthcare.

Policies

As the World Health Organization has written, "National health policies, strategies, and plans play an essential role in defining a country's vision, priorities, budgetary decisions and course of action for improving and maintaining the health of its people."[42] Thus, we selected indicators representing national health policies that affect a country's health governance capacity. The first indicator selected was the Worldwide Governance Indicator's Rule of Law statistic. Kaufmann, Kraay and Mastruzzi, the authors of the Worldwide Governance Indicators (WGI), describe this statistic as "capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence."[43] The other outcomes-based indicator was "Immunization Policies" based on inoculation to DTP3.[44] We selected this indicator to measure how well countries were implementing preventative care, and thus a proxy for health governance capacity. Additional indicators were rules-based indicators, and included "Level of Tariffs on Medical Imports of Pharmaceutical Products," "Has Positive Intellectual Property Rights (member to TRIPS Agreement)," and "Free from Patent Restriction from GSK Manufactured Drugs." "Level of Tariffs" was broken up into four categories depending on average tariff rates from most favored nations (MFNs) based upon World Trade Organization (WTO) data. Both the "TRIPS Agreement" indicator and "Free from Patent Restriction" indicators both measure patent rights in our sub-set of countries. The WTO has decided to extend the transition period to patent exclusivity for least developed countries (LDCs) until July 1, 2021, allowing low-cost generic medications to enter the market, improving health governance capacity.[45] This same logic was used when selecting "Free from patent restriction from GSK Manufactured Drugs." GlaxoSmithKline (GSK) has announced that they will not enforce patent restrictions on their medications for low-income countries (LICs) and will allow generics to produce their medications in exchange for a royalty fee for lower middle-income countries (LMICs).[46]

It is well documented that leadership and management capacities correlate with good governance and that corruption is a major obstacle to increasing access to quality medicines.

Regulations

The third dimension is "Regulations," and is constructed using outcomes-based governance indicators, such as "Regulatory Quality" from the WGI and an indicator compiled from the World Bank Doing Business Report that we termed "Business Climate." This indicator was computed as the simple arithmetic mean of the DTF scores of Starting a Business, Getting Credit, Trading Across Borders and Enforcing Contracts. "Health expenditure, total (% of GDP)," "State parties to the International Health Regulations," and "Has pharmaceutical drug regulatory body" are the other indicators used for computing scores in the "Regulation" category.

Infrastructure and Financing

A country's infrastructure and financing capacity are important components for a nation to be able to provide basic health services and obtain positive health outcomes. According to the WHO, "the purpose of health financing is to make funding available, as well as to set the right financial incentives to providers, to ensure that all individuals have access to effective public health and personal health care."[47] Without the proper infrastructure to monitor and implement

health solutions, the effectiveness of health financing is greatly diminished. Therefore, this dimension measures infrastructure from both a technological and physical-capacity perspective.

The first indicator, "Overall Level of Statistical Capacity," is used as a proxy for the best practices recommendation of the inclusion of a health information system. It is an aggregate measure of a country's statistical capabilities based on methodology, data sources, and periodicity (from the World Bank World Development Indicators).[48] The second indicator is "Access to Electricity (% of population)" and is a proxy for the physical-capacity aspect of infrastructure. The third through fifth indicators focus on health financing (as opposed to infrastructure). The third indicator is "Out-Of-Pocket Expenditure (OOPS) (% of private health expenditure)," used as a measurement for the risk to the population of "catastrophic and impoverishing spending."[49] The fourth indicator is "Private health expenditure (% of total health expenditure)" and measures the "relative weight of private entities in total expenditure on health," where private entities are "pooled resources with no government control, such as voluntary health insurance, and the direct payments for health by corporations and households."[50] The fifth indicator is "Private Insurance (% of private health expenditure)," which further contributes to the understanding of a country's health financing in combination with the other two indicators by adding evidence to the risk faced by the population of catastrophic health spending.

Health Systems

The final dimension of the HGCI is Health Systems. The WHO defines health systems as:

> Comprising all the organizations, institutions and resources that are devoted to producing health actions. A health action is defined as any effort, whether in personal health care, public health services or through intersectoral initiatives, whose primary purpose is to improve health.[51]

Therefore, we selected indicators that tap health actions that improve health outcomes. The first two indicators are complementary, and include "Nurses and midwives (per 1,000 population)," and "Physicians (per 1,000 population)." These two indicators comprise the oldest data within the HGCI, dating back to 2010; where data were not available for 2010, population growth rates were used to calculate an estimate for 2010 statistics. As opposed to the first two, the next two indicators are outputs and include "Infant mortality rate (per 1,000 live births)" and "Life Expectancy at birth." Both of these indicators measure a health system's efficacy and outcomes. The final indicator is a process indicator and measures the "Population at risk of malaria (% of total population)." This measures the ability of a country's health system to protect against the spread of the disease through solutions that include improving education, the distribution of bed nets, and strong health preparedness.

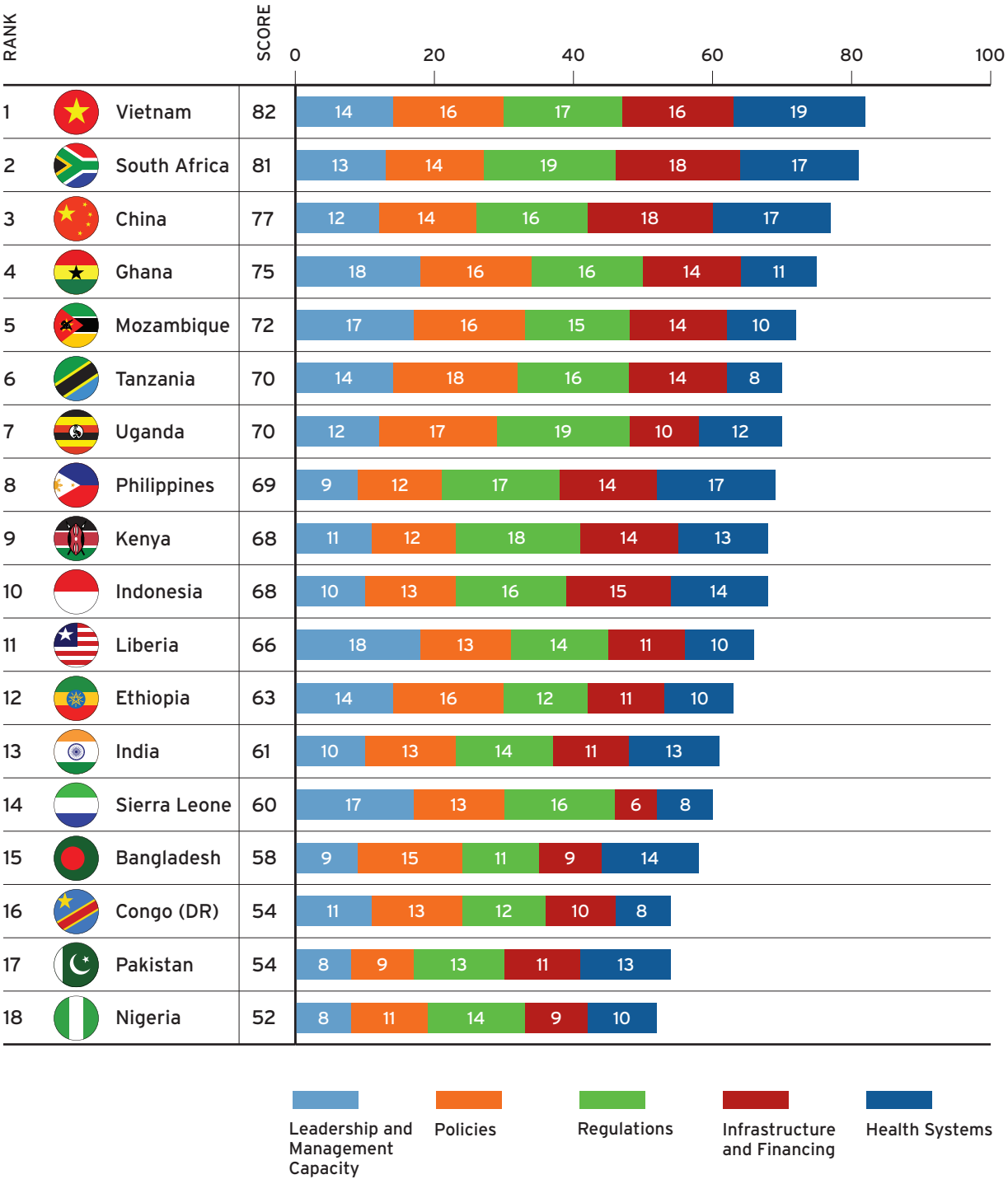
Health Governance Capacity Index

The Health Governance Capacity Index is obtained through an additive combination of the five dimensions described above. The overall scores as well as the results on the five dimensions are shown in Figure 3.

As this figure shows, the strongest performing countries overall were Vietnam, South Africa, China and Ghana. These countries were especially strong on the dimensions of Regulations, Infrastructure and Financing, and Health Systems. Vietnam's score of 19 out of 20 on Health Systems (tied for the highest single performance in any category with South Africa's and Uganda's Regulations scores) helped to propel it to first place.

Ghana meanwhile performed the strongest on Leadership and Management Capacity. Based on the data, the country is doing an excellent job of harnessing its aid and foreign investment inflows while maintaining strong institutional quality, as measured by the Political Stability Index, Rule of Law, and Regulatory Quality.[52]

FIGURE 3 Health Governance Capacity Index (HGCI) Rankings



Several countries have made progress on various aspects of building their health networks. For example, Liberia has constructed emergency operating centers that offer care and information on epidemics. Kenya is using mobile phones to track maternity deaths. Tanzania has expanded its referral systems for sick children. Indonesia has improved its infection control tracking in hospitals.[53]

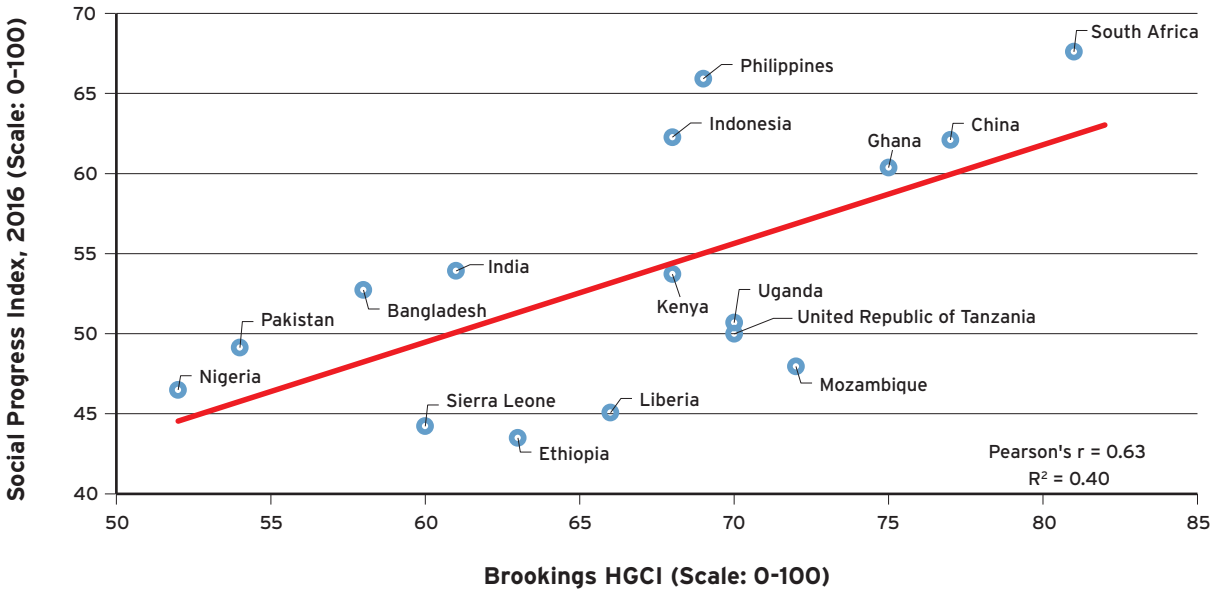
The lowest performing countries in our analysis were Bangladesh, the Democratic Republic of the Congo, Pakistan, and Nigeria. A defining challenge for these countries is a weak performance on Leadership and Management Capacity as well as Health Systems. For example, both Pakistan and Nigeria scored an 8 out of 20 on Leadership and Management Capacity, while the Democratic Republic of the Congo scored an 8 out of 20 on Health Systems. Of the countries in the bottom quartile, Bangladesh had the highest Policies score (15) as well as the highest Health Systems score (14), but it performed less well on other dimensions.

One noteworthy result is the leadership and management scores form Liberia (18) and Sierra Leone (17). These scores were largely driven by strong performances on aid, foreign investment, and external resources as a percent of total health expenditures. Because of the recent Ebola crisis, both countries saw an inflow of external resources and this helped them upgrade their management capacity and fight this epidemic.

The Association Between Health Governance and Social Progress

Figure 4 charts the performance of countries on our health governance metrics and the social progress index developed by the Social Progress Imperative, a Washington, D.C.-based group. There is a strong association between our Health Governance Capacity Index and the Social Progress Index.[54]

Figure 4 | **Association Between HGCI and Social Progress Index**



Source: Social Progress Imperative, Authors' HGCI data
Note: The Democratic Republic of the Congo and Vietnam were omitted due to lack of data.

Key Factors for Boosting Health R&D Investment Through Improved Governance

As noted earlier, we believe that good governance is an important factor conditioning the climate for private sector investment. In addition, we believe that having technical, organizational, and institutional capacity within recipient nations is an important indication of health-investment effectiveness. We think that there are substantial untapped opportunities for increased investment due to unexplored partnerships, policy opportunities, and imperfect information about the drivers of risks and/or returns around translational costs, institutional capacity, and market demand. In future work, we will extend this analysis to investment patterns, rate of return, and the financial benefits of investing in health R&D.

In presenting the results in this report, we hope to reduce the information gap for decision-makers and investors contemplating global health R&D investments. Investors need a sense of governance capacity and health performance in order to gauge the ability of developing countries to absorb new investments and generate positive returns for businesses and residents.[55]

Recommendation 1: Improve transparency and strengthen management capacity

Increasing transparency, reducing corruption, and strengthening management are key factors in the climate for private sector investment. When, in the context of health, governments are not sufficiently open about their data, service delivery, or outcomes, it is difficult to estimate the economic costs and benefits of various initiatives. Having greater transparency in data and operations would advance progress in many countries.[56]

Improved integrity in governance and health systems will not only improve political stability and corruption metrics, but will improve the climate for foreign investment and aid dollars. Both multinational businesses that engage in foreign direct investment in emerging nations and multinational organizations (such as the World Bank and International Monetary Fund), whom make up 90 percent of Official Development Assistance, would prefer to invest in countries with less corruption, better business practices, and an overall strong governance capacity. Furthermore, strengthening institutions would benefit the overall economy of the country.

In presenting the results in this report, we hope to reduce the information gap for decision-makers and investors contemplating global health R&D investments.

Recommendation 2: Lower tariffs on medical products and expedite regulatory reviews of new drugs

Improving policies and regulations would improve the climate for private sector investment. More specifically, countries can do a better job attracting new medical products by lowering their tariff rates on pharmaceuticals and expediting regulatory reviews of new drugs.

Currently, countries included in the study vary considerably in their medical products tariff policies. As shown in Table 1, places such as Pakistan (11.8 percent) and the Democratic Republic of Congo (10.3 percent) have high tariffs, compared to Ghana, Mozambique, and Nigeria, which have none. The former create disincentives in terms of bringing medical products into their countries.

Table 1 **Tariff Rate on Medical Imports of Pharmaceutical Products from Most Favored Nations (in percent)**

Africa		Asia	
Country	**Tariff Rate**	**Country**	**Tariff Rate**
Congo (DR)	10.3	Pakistan	11.8
Sierra Leone	5.2	India	9.7
Ethiopia	5.0	China	4.7
Liberia	2.5	Bangladesh	3.8
Kenya	0.8	Indonesia	3.7
Tanzania	0.8	Philippines	3.2
Uganda	0.8	Vietnam	1.7
South Africa	0.3		
Ghana	0.0		
Mozambique	0.0		
Nigeria	0.0		

Note: Data are from 2015, with the exception of Sierra Leone (2012), Liberia (2013), Mozambique (2014), Pakistan (2014), and Bangladesh (2013). This information is from the World Trade Organization, with the exception of Ethiopia, which is from www.export.gov. Ethiopia's value reflects "health" generally and not only pharmaceuticals.

At the same time, the drug pipeline for many illnesses is limited, in significant part due to the costs involved. While estimates of those costs vary widely, there is no doubt that they are very high in light of the complexities of scientific research, the long lead times on drug development, and the extensive clinical trials required to demonstrate effectiveness contribute to high costs.[57]

A study by the Coalition for Epidemic Preparedness Innovations found that most of the possible vaccines under development were in the preclinical stage (except for the Ebola vaccine, which was in Phase II of testing). That demonstrates the need to address barriers to drug development in the United States, Europe, China, and India, such as unpredictable regulatory pathways, insufficient incentives, rate of return, clinical trial design problems, and liability challenges.[58] Research by Scannell, Blanckley, Boldon, and Warrington has found that drug development has dropped consistently over the past 60 years.[59] As noted by the World Bank, "adequate and sustained financing is needed to strengthen manufacturers' capacity, and support research and development of vaccines, adjuvants and development of new technologies."[60]

Recommendation 3: Invest in healthcare infrastructure

Having adequate infrastructure is key to attracting private sector investment. This includes medical facilities, diagnostic systems, and medical service delivery systems. Each of these developments build confidence in private investors and create a climate where investors feel that their financing will yield benefits.

Anything that improves economic growth will aid the development of management capacity and electrification. Private investors want some assurance that additional money would help people and reach actual beneficiaries. Having good healthcare infrastructure helps to provide confidence to the outside world.

Recommendation 4: Increase spending on healthcare, while also ensuring that spending is efficient and targeted to ensure impact

Health systems depend, among other things, on adequate financing. The populations in the countries in this study would benefit if their governments and (and non-government organizations that work with these countries) increased health system investment. That said, it is also critical that increases in government spending be done with an eye towards efficiency, transparency, impact, and in a manner that complements and spurs related private sector activity. A record of improved efficiency and market awareness in government spending is an important factor in attracting increased private sector investment.

Conclusion

Countries require enabling policy, regulatory, and administrative mechanisms in order to encourage global health R&D investments. Without adequate capacity to make effective use of external resources, governments, businesses, and non-governmental organizations will be less well positioned to absorb new investments. Private investors, who are particularly attuned to factors impacting near- and mid-term investment outcomes, will be more likely to make R&D investments if it is clear that medical products applicable in recipient countries will encounter regulatory, policy, and legal environments that will enable deployment and produce the most positive health outcomes.

When properly targeted investments are made in global health more generally, the benefits are substantial. One analysis looked at the gains of recent years and concluded "the impact of these investments has been startling. Since 1990, the number of annual child deaths has been cut by more than one half. More than 18.2 million people are now receiving life-saving AIDS treatment. The malaria death rate among children under age 5 is down 69 percent since 2000. Efforts to diagnose and treat tuberculosis (TB), a disease that has plagued humanity for centuries, have saved millions of lives in the same period."[61] By boosting private investment in global health in general and R&D in particular, the world can achieve even more impressive future gains in personal well-being and economic growth.

When properly targeted investments are made in global health more generally, the benefits are substantial.

Appendix 1: Health Governance Capacity Index (HGCI) Indexed Values (1 of 2)

Health Governance Indicators	Congo, Democratic Republic of	Ethiopia	Ghana	
Leadership and Management Capacity				
Political Stability Index (percentile rank, scale 0-100)	1	1	4	
Transparency International Corruption Index Score (scale 0-100)	1	3	4	
Net Official Development Assistance (ODA) Received (% of GNI)	4	3	3	
Foreign Direct Investment, Net Inflows (% of GDP)	1	3	4	
External Resources (% of total health expenditure)	4	4	3	
Sub-Total	**11**	**14**	**18**	
Policies				
Rule of Law (percentile rank, scale 0-100)	1	2	4	
Immunization Policies: % of the Population with DTP3 Vaccine	3	4	3	
Level of Tariffs on Medical Imports of Pharmaceutical Products	1	2	4	
Has Positive Intellectual Property Rights (Member to TRIPS Agreement)	4	4	2	
Free from Patent Restriction from GSK Manufactured Drugs	4	4	3	
Sub-Total	**13**	**16**	**16**	
Regulations				
Regulatory Quality (percentile rank, scale 0-100)	1	1	4	
Business Climate (scale 0-100)	1	1	3	
Health Expenditure, Total (% of GDP)	2	2	1	
State Parties to the International Health Regulations	4	4	4	
Has Pharmaceutical Drug Regulatory Body	4	4	4	
Sub-Total	**12**	**12**	**16**	
Infrastructure and Financing				
Overall Level of Statistical Capacity (scale 0-100)	1	2	2	
Access to Electricity (% of population)	1	2	3	
Out-Of-Pocket Expenditure (OOPS) (% of private health expenditure)	3	2	3	
Private Health Expenditure (% of total health expenditure)	2	4	4	
Private Insurance (% of private health expenditure)	3	1	2	
Sub-Total	**10**	**11**	**14**	
Health Systems				
Nurses and Midwives (per 1,000 population)	2	1	3	
Physicians (per 1,000 population)	2	1	2	
Infant Mortality Rate (per 1,000 live births)	1	2	3	
Life Expectancy at Birth	1	3	2	
Population at Risk of Malaria (% of total population)	2	3	1	
Sub-Total	**8**	**10**	**11**	
Total Score	**54**	**63**	**75**	

Note: Each indicator is scored on a scale from 1 (lowest) to 4 (highest)

	AFRICA (11)							
	Kenya	**Liberia**	**Mozambique**	**Nigeria**	**Sierra Leone**	**South Africa**	**Tanzania, United Republic of**	**Uganda**
	2	3	3	1	4	4	3	2
	1	3	2	2	2	4	2	1
	3	4	4	2	4	2	3	3
	2	4	4	1	4	1	3	3
	3	4	4	2	3	2	3	3
	11	**18**	**17**	**8**	**17**	**13**	**14**	**12**
	2	1	2	1	1	4	3	3
	2	1	2	1	2	3	4	3
	3	3	4	4	2	3	3	3
	2	4	4	2	4	2	4	4
	3	4	4	3	4	2	4	4
	12	**13**	**16**	**11**	**13**	**14**	**18**	**17**
	3	1	2	2	2	4	3	3
	4	1	2	2	2	3	2	4
	3	4	3	2	4	4	3	4
	4	4	4	4	4	4	4	4
	4	4	4	4	4	4	4	4
	18	**14**	**15**	**14**	**16**	**19**	**16**	**19**
	1	1	2	2	1	4	3	2
	2	1	2	2	1	3	1	2
	3	4	4	1	2	4	4	3
	4	2	4	1	1	3	3	1
	4	3	2	3	1	4	3	2
	14	**11**	**14**	**9**	**6**	**18**	**14**	**10**
	2	2	2	4	1	4	1	3
	3	1	2	3	1	3	1	2
	3	4	3	1	4	4	2	3
	2	2	1	1	1	2	2	2
	3	1	2	1	1	4	2	2
	13	**10**	**10**	**10**	**8**	**17**	**8**	**12**
	68	**66**	**72**	**52**	**60**	**81**	**70**	**70**

Appendix 1: Health Governance Capacity Index (HGCI) Indexed Values (2 of 2)

Health Governance Indicators
Leadership and Management Capacity
Political Stability Index (percentile rank, scale 0-100)
Transparency International Corruption Index Score (scale 0-100)
Net Official Development Assistance (ODA) Received (% of GNI)
Foreign Direct Investment, Net Inflows (% of GDP)
External Resources (% of total health expenditure)
Sub-Total
Policies
Rule of Law (percentile rank, scale 0-100)
Immunization Policies: % of the Population with DTP3 Vaccine
Level of Tariffs on Medical Imports of Pharmaceutical Products
Has Positive Intellectual Property Rights (Member to TRIPS Agreement)
Free from Patent Restriction from GSK Manufactured Drugs
Sub-Total
Regulations
Regulatory Quality (percentile rank, scale 0-100)
Business Climate (scale 0-100)
Health Expenditure, Total (% of GDP)
State Parties to the International Health Regulations
Has Pharmaceutical Drug Regulatory Body
Sub-Total
Infrastructure and Financing
Overall Level of Statistical Capacity (scale 0-100)
Access to Electricity (% of population)
Out-Of-Pocket Expenditure (OOPS) (% of private health expenditure)
Private Health Expenditure (% of total health expenditure)
Private Insurance (% of private health expenditure)
Sub-Total
Health Systems
Nurses and Midwives (per 1,000 population)
Physicians (per 1,000 population)
Infant Mortality Rate (per 1,000 live births)
Life Expectancy at Birth
Population at Risk of Malaria (% of total population)
Sub-Total
Total Score

Note: Each indicator is scored on a scale from 1 (lowest) to 4 (highest)

	ASIA (7)						
	Bangladesh	**China**	**India**	**Indonesia**	**Pakistan**	**Philippines**	**Vietnam**
	2	3	2	3	1	2	4
	1	4	4	3	2	3	3
	2	1	1	1	2	1	2
	2	3	2	2	1	2	3
	2	1	1	1	2	1	2
	9	**12**	**10**	**10**	**8**	**9**	**14**
	2	3	4	3	2	3	4
	3	4	2	2	1	1	4
	3	3	2	3	1	3	3
	4	2	2	2	2	2	2
	3	2	3	3	3	3	3
	15	**14**	**13**	**13**	**9**	**12**	**16**
	1	3	3	4	2	4	2
	1	4	3	3	2	3	4
	1	3	2	1	1	2	3
	4	2	2	4	4	4	4
	4	4	4	4	4	4	4
	11	**16**	**14**	**16**	**13**	**17**	**17**
	3	4	3	4	3	3	4
	3	4	3	4	4	3	4
	1	3	1	2	1	2	2
	1	3	2	3	2	2	3
	1	4	2	2	1	4	3
	9	**18**	**11**	**15**	**11**	**14**	**16**
	1	3	4	3	2	4	3
	3	4	3	2	4	4	4
	2	2	1	2	1	3	4
	4	4	3	4	3	3	4
	4	4	2	3	3	3	4
	14	**17**	**13**	**14**	**13**	**17**	**19**
	58	**77**	**61**	**68**	**54**	**69**	**82**

Appendix 2: Health Governance Capacity Index (HGCI) Raw Values (1 of 2)

Health Governance Indicators	Congo, Democratic Republic of	Ethiopia	Ghana	Kenya
Leadership and Management Capacity				
Political Stability Index (percentile rank, scale 0-100)	4	8	50	9
Transparency International Corruption Index Score (scale 0-100)	21	34	43	26
Net Official Development Assistance (ODA) Received (% of GNI)	8	6	3	4
Foreign Direct Investment, Net Inflows (% of GDP)	-1	4	8	2
External Resources (% of total health expenditure)ꝉ°	38	42	15	28
Policies				
Rule of Law (percentile rank, scale 0-100)	3	38	61	37
Immunization Policies: % of the Population with DTP3 Vaccine	94	96	89	78
Level of Tariffs on Medical Imports of Pharmaceutical Products[1]°	H	M¬	L	LM
Has Positive Intellectual Property Rights (Member to TRIPS Agreement)[2]	LDC	LDC	Y	Y
Free from Patent Restriction from GSK Manufactured Drugs[3]	LIC	LIC	LMIC	LMIC
Regulations				
Regulatory Quality (percentile rank, scale 0-100)	6	14	53	43
Business Climate (scale 0-100)º	38	43	64	69
Health Expenditure, Total (% of GDP)	4	5	4	6
State Parties to the International Health Regulations†	Y	Y	Y	Y
Has Pharmaceutical Drug Regulatory Body	Y	Y	Y	Y
Infrastructure and Financing				
Overall Level of Statistical Capacity (scale 0-100)	51	70	69	56
Access to Electricity (% of population)	16	27	64	23
Out-Of-Pocket Expenditure (OOPS) (% of private health expenditure)	61	78	67	67
Private Health Expenditure (% of total health expenditure)	63	41	40	39
Private Insurance (% of private health expenditure)ꞵ°	5	1	2	22
Health Systems				
Nurses and Midwives (per 1,000 population)‡	0.6‡	0.2	0.9	0.8
Physicians (per 1,000 population)‡	0.1‡	0.0‡	0.1	0.2
Infant Mortality Rate (per 1,000 live births)	234	133	39	55
Life Expectancy at Birth	52	65	63	61
Population at Risk of Malaria (% of total population)º+	91	34	100	57

º Calculated by The Brookings Institution.
[1] L = Tariffs at 0%; LM = Tariffs greater than 0% and less than 5%; M = Tariffs greater than or equal to 5% and less than 10%; H = Tariffs greater than or equal to 10%
[2] Least developed countries (LDCs) have been given an extended transition period towards the adoption of the TRIPS Agreement until 1 July 2021. (UN classication)
[3] Low-income countries (LICs) will be exempt from GSK patents allowing generics to enter the market at lower prices. GSK will allow generic companies to manufacture patented medications in lower middle-income countries (LMICs) with a royalty fee, still allowing the medication to be sold at lower than monopolistic prices. (World Bank classification)
* Data selected is the most recent as of 1 February 2017. Older data was selected when applicable based on completeness and internal consistency.
** Source is as listed for all observations, except where specified as otherwise.
ꝉ Value reported as less than 1%; estimated at 0%.
† Indicates that a State Party has submitted, to the Director-General of the WHO, documentation related to the International Health Regulations (2005), which has been circulated by the Director-General to all Member States of WHO as well as to other States eligible to become Parties to the Regulations pursuant to Article 64 thereof.
ꞵ Value estimated using a "hot deck imputation" based upon Ghanan and Ethiopian private health expenditure values.
° Value estimated using "cold deck imputation" from a previous year.
‡ Data estimated to 2010 values using population growth rates.
+ Statistic capped at 100%.
¬ Value estimated as exports on "Health" from export.gov.

AFRICA (11)									
	Liberia	Mozambique	Nigeria	Sierra Leone	South Africa	Tanzania, United Republic of	Uganda	Year of Data*	Source**
	21	26	6	43	39	30	20	2015	WGI
	37	27	28	30	45	32	25	2016	CPI
	44	13	0	19	0	6	6	2014	WB
	35	26	1	12	1	4	4	2015	WB
	49	49	7	17	2	36	36˚	2014	WHO
	19	20	13	18	59	39	43	2015	WGI
	65	80	74	86	93	98	89	2015	WHO
	LM˚	L˚	L	M˚	LM	LM	LM	2015	WTO
	LDC	LDC	Y	LDC	Y	LDC	LDC	2017	WTO
	LIC	LIC	LMIC	LIC	N	LIC	LIC	2016	GSK
	20	34	22	20	64	41	46	2015	WGI
	47	50	53	52	63	57	64	2017	WB
	10	7	4	11	9	6	7	2014	WB
	Y	Y	Y	Y	Y	Y	Y	2013	WHO
	Y	Y	Y	Y	Y	Y	Y	2017	BI
	58	71	68	63	82	73	69	2016	WB
	10	20	56	14	85	15	18	2012	WB
	45	22	96	73	13	43	55	2014	WHO
	69	44	75	83	52	54	75	2014	WHO
	5	2ᵏ	3	0	83	7	3	2014	WHO
	0.3	0.4	1.6	0.2	4.8	0.2	1.3	2010	WB
	0.0‡	0.0	0.4‡	0.0	0.7‡	0.0‡	0.1‡	2010	WHO
	8	61	491	20	36	72	61	2014	WHO
	62	54	55	46	60	63	59	2013	WHO
	100⁺	98	100⁺	100⁺	7	84	98	2014	WHO

Legend to Source:

WGI = Worldwide Governance Indicators
CPI = Transparency International's Corruptions Perceptions Index
WB = World Bank
WHO = World Health Organization
WTO = World Trade Organization
GSK = GlaxoSmithKline
BI = Brookings Institution

Appendix 2: Health Governance Capacity Index (HGCI) Raw Values (2 of 2)

Health Governance Indicators	Bangladesh	China
Leadership and Management Capacity		
Political Stability Index (percentile rank, scale 0-100)	11	27
Transparency International Corruption Index Score (scale 0-100)	26	40
Net Official Development Assistance (ODA) Received (% of GNI)	1	0
Foreign Direct Investment, Net Inflows (% of GDP)	2	2
External Resources (% of total health expenditure)ŀ°	12	0ŀ
Policies		
Rule of Law (percentile rank, scale 0-100)	27	44
Immunization Policies: % of the Population with DTP3 Vaccine	93	99
Level of Tariffs on Medical Imports of Pharmaceutical Products[1]°	LM°	LM
Has Positive Intellectual Property Rights (Member to TRIPS Agreement)[2]	LDC	Y
Free from Patent Restriction from GSK Manufactured Drugs[3]	LMIC	N
Regulations		
Regulatory Quality (percentile rank, scale 0-100)	17	44
Business Climate (scale 0-100)º	41	72
Health Expenditure, Total (% of GDP)	3	6
State Parties to the International Health Regulations†	Y	Y†
Has Pharmaceutical Drug Regulatory Body	Y	Y
Infrastructure and Financing		
Overall Level of Statistical Capacity (scale 0-100)	74	83
Access to Electricity (% of population)	60	100
Out-Of-Pocket Expenditure (OOPS) (% of private health expenditure)	93	72
Private Health Expenditure (% of total health expenditure)	72	44
Private Insurance (% of private health expenditure)ŀ°	0	10
Health Systems		
Nurses and Midwives (per 1,000 population)‡	0.3	1.5
Physicians (per 1,000 population)‡	0.4‡	1.5
Infant Mortality Rate (per 1,000 live births)	102	166
Life Expectancy at Birth	71	75
Population at Risk of Malaria (% of total population)º+	7	21

º Calculated by The Brookings Institution.
[1] L = Tariffs at 0%; LM = Tariffs greater than 0% and less than 5%; M = Tariffs greater than or equal to 5% and less than 10%; H = Tariffs greater than or equal to 10%
[2] Least developed countries (LDCs) have been given an extended transition period towards the adoption of the TRIPS Agreement until 1 July 2021. (UN classication)
[3] Low-income countries (LICs) will be exempt from GSK patents allowing generics to enter the market at lower prices. GSK will allow generic companies to manufacture patented medications in lower middle-income countries (LMICs) with a royalty fee, still allowing the medication to be sold at lower than monopolistic prices. (World Bank classification)
* Data selected is the most recent as of 1 February 2017. Older data was selected when applicable based on completeness and internal consistency.
** Source is as listed for all observations, except where specified as otherwise.
ŀ Value reported as less than 1%; estimated at 0%.
† Indicates that a State Party has submitted, to the Director-General of the WHO, documentation related to the International Health Regulations (2005), which has been circulated by the Director-General to all Member States of WHO as well as to other States eligible to become Parties to the Regulations pursuant to Article 64 thereof.
ŀ Value estimated using a "hot deck imputation" based upon Ghanan and Ethiopian private health expenditure values.
° Value estimated using "cold deck imputation" from a previous year.
‡ Data estimated to 2010 values using population growth rates.
+ Statistic capped at 100%.
¬ Value estimated as exports on "Health" from export.gov.

	ASIA (7)						
	India	**Indonesia**	**Pakistan**	**Philippines**	**Vietnam**	**Year of Data***	**Source****
	17	25	1	21	49	2015	WGI
	40	37	32	35	33	2016	CPI
	0	0	1	0	2	2014	WB
	2	2	0	2	6	2015	WB
	1	1	8	1	3	2014	WHO
	56	40	24	42	46	2015	WGI
	87	84	75	60	97	2015	WHO
	M	LM	H°	LM	LM	2015	WTO
	Y	Y	Y	Y	Y	2017	WTO
	LMIC	LMIC	LMIC	LMIC	LMIC	2016	GSK
	40	47	29	53	34	2015	WGI
	58	60	53	57	70	2017	WB
	5	3	3	5	7	2014	WB
	Y†	Y	Y	Y	Y	2013	WHO
	Y	Y	Y	Y	Y	2017	BI
	81	87	76	82	82	2016	WB
	79	96	94	88	99	2012	WB
	89	75	87	82	80	2014	WHO
	70	62	65	66	46	2014	WHO
	3	3	1	13	3°	2014	WHO
	1.6	1.1	0.6	6.6‡	1.0	2010	WB
	0.7	0.1	0.8	1.3‡	1.1	2010	WHO
	986	128	360	53	28	2014	WHO
	66	71	66	69	76	2013	WHO
	88	56	58	45	28	2014	WHO

Legend to Source:

WGI = Worldwide Governance Indicators
CPI = Transparency International's Corruptions Perceptions Index
WB = World Bank
WHO = World Health Organization
WTO = World Trade Organization
GSK = GlaxoSmithKline
BI = Brookings Institution

Endnotes

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39. *In cases where a value had more than one observation that was a cutoff point between two quartiles, we included the observation in the lower of the two quartiles.*

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