

Disparities on the Path to Universal Health Coverage

Findings from
Financing Global Health

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Contents

- 4 About IHME
- 5 Call for collaborators
- 6 Authors
- 7 About the cover
- 7 Acknowledgments
- 8 Glossary of terms
- 11 Report highlights**
- 13 Introduction**
- 15 Findings**
 - 17 The uneven growth of health spending, 1995-2014
 - 21 Higher development, higher health spending
 - 22 The relationship of health spending sources and development
 - 36 Variations in the types of health care purchased
 - 39 Health financing, past and present
 - 40 What past trends and relationships say about future health spending
- 49 Conclusion**
- 51 Methodological appendix
- 55 References

About IHME

The Institute for Health Metrics and Evaluation (IHME) is a population health research center that is part of UW Medicine at the University of Washington. IHME provides rigorous and comparable measurement of health problems and evaluates the strategies used to address them. IHME makes this information freely available so that researchers, policymakers, and other health stakeholders have the necessary evidence to make informed decisions. For more information about IHME and its work, please visit www.healthdata.org.

Call for collaborators

In addition to conducting the FGH study, IHME coordinates the Global Burden of Diseases, Injuries, and Risk Factors (GBD) Study, a comprehensive effort to measure epidemiological levels and trends worldwide. (More information on GBD is available at <http://www.healthdata.org/gbd>.) The GBD study relies on a worldwide network of over 2,000 collaborators in over 120 countries. Current collaborator areas of expertise include epidemiology, public health, demography, statistics, and other related fields.

During the coming GBD analyses, IHME plans to expand the scope of GBD to encompass quantification of health resource flows, health system attributes, and the performance of health systems. To that end, IHME is seeking GBD collaborators who are experts in health financing and health systems. GBD collaborators – many of whom have co-authored GBD publications – provide timely feedback related to the interpretation of GBD results, data sources, and methodological approaches pertaining to their areas of expertise. We invite researchers and analysts with expertise in health financing to join the GBD collaborator network. Potential collaborators may apply at <http://www.healthdata.org/gbd/call-for-collaborators>.

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About the cover

The cover of *Disparities on the Path to Universal Health Coverage* may look familiar to some observers of global health trends. While the image is generated using the data underpinning this report, its “bubble chart” form is strongly associated with Dr. Hans Rosling. Dr. Rosling, who passed away on February 7, while this report was being produced, was a champion of evidence-based thinking and a powerful scientific communicator. He encouraged scientists to think beyond scientific journal publications and obscure jargon, and instead to explore ways to visualize and more broadly communicate data and statistics. His work with Gapminder and his engaging in-person presentations have inspired IHME in the way we approach the visuals in this report and in our freely accessible visualizations (www.healthdata.org/results/data-visualizations). Dr. Rosling will be sorely missed, but his legacy of telling powerful stories by simplifying complex data will live on at IHME and around the world.

Glossary of terms

Development assistance for health (DAH)

Financial and in-kind resources that are transferred from development agencies (such as UNICEF or the United Kingdom's Department for International Development) to low- and middle-income countries with the primary purpose of maintaining or improving health. DAH is mutually exclusive from out-of-pocket, prepaid private, and government health spending.

Source of DAH

The original provider of funds used for DAH. The majority of DAH is originally provided by high-income country governments and philanthropic organizations.

Channel of DAH

An institution that directs DAH funds from the source to governments and organizations in low- and middle-income countries. Examples of DAH channels include bilateral aid agencies (such as the United States Agency for International Development), United Nations agencies (such as the World Health Organization and UNICEF), public-private partnership organizations (such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and Gavi, the Vaccine Alliance), and development banks (such as the World Bank and the Inter-American Development Bank).

Focus area of DAH

A broad set of health and health-related issues toward which DAH is targeted. Examples include HIV/AIDS, newborn and child health, malaria, and health system strengthening. The exact ways in which DAH funds are used within focus areas vary considerably. They could be directed toward treatment of disease, prevention of disease, or improvement in the ability of health systems to conduct disease surveillance.

Out-of-pocket health spending

Payments made by individuals at or after the time of health care delivery. Out-of-pocket spending is mutually exclusive from government, prepaid private, and DAH spending. This includes spending at the point of care that is not reimbursed, such as health insurance copayments or payments devoted to deductibles.

Medical impoverishment

Households experience medical impoverishment when they fall below their country's poverty line due to health spending. As the share of total health spending that comes from out-of-pocket sources rises, the rate of medical impoverishment also tends to rise.

Government health spending

Spending for health care that is derived from domestic government sources. Government health spending is mutually exclusive from out-of-pocket, prepaid private, and DAH spending. Government spending includes spending on public health system infrastructure and government-provided social health insurance.

Prepaid private health spending

Health spending sourced from non-public programs that are funded prior to obtaining health care. This includes private health insurance and services provided for free by non-governmental agencies. Prepaid health spending is mutually exclusive from out-of-pocket, government, and DAH spending.

Total health spending

The sum of government health spending, prepaid private health spending, out-of-pocket health spending, and DAH. This represents all direct spending for health maintenance, restoration, or enhancement. It does not include indirect health spending, such as lost wages due to illness or transportation costs; spending on informal care, such as care provided by a family member; spending on traditional healers; and illegal, “black market,” or under-the-table transactions such as bribes.

Health spending per person

Total health spending divided by population size. Dividing health spending by a country’s population is a way of accounting for population size so that the spending of small and big countries may be compared accurately.

GDP per person

Gross domestic product (GDP) is the monetary value of all final goods and services produced in a country within a given period of time. Dividing GDP by a country’s population is a way of accounting for population size so that the GDPs of small and big countries may be compared accurately.

World Bank income group

The World Bank classifies countries using gross national income (GNI) per person. (A country’s GNI is similar to its GDP plus any payments or investment income that flows to its residents from abroad.) This report uses the 2017 World Bank income groups, which are high-income (GNI per person greater than \$12,475), upper-middle-income (\$4,036 to \$12,476), lower-middle-income (\$1,026 to \$4,035), and low-income (\$1,025 or less).

Report highlights

- There are large disparities in the financial resources available for health in countries across the globe. As of 2014, health spending per person in high-income countries was \$5,221, while in low-income countries it was \$120. Even the ranges within income groups are large. For instance, while the 2014 health spending per person in lower-middle-income countries averaged \$268, spending in that group ranged from a low of \$92 (Bangladesh) to a high of \$791 (Tunisia).
- On average, health spending rises steadily, but exponentially, as economic development increases. This results in small absolute increases at the lower end of the development spectrum and very large absolute increases at the higher end.
- Global health spending per person increased from \$689 to \$1,279 between 1995 and 2014. In high-income countries, total health spending per person increased from \$2,976 to \$5,221 during that time, while it increased in upper-middle-income countries from \$309 to \$914, in lower-middle-income countries from \$105 to \$267, and in low-income countries from \$51 to \$120.
- On average, as countries increase in development, they spend more per person on health while reducing their reliance on DAH, gradually increasing their reliance on government health spending and eventually reducing their reliance on out-of-pocket spending. Highly developed countries rely heavily on government spending to finance health care.
- Following a decade of impressive worldwide expansion, the growth of development assistance for health (DAH) has stagnated. From 2000 to 2010, DAH grew by 11.4% annually. Since 2010, DAH has grown by 1.8% annually, and reached \$37.6 billion in 2016.
- Since 2010, DAH for HIV/AIDS, which has been the largest DAH focus area, has contracted by \$100 million per year.
- DAH made up only 0.6% of global health spending in 2014, but accounted for 35.7% of health spending in low-income countries.
- Projections of health spending until 2040 indicate that global health spending will continue to rise, but that disparities will endure. Global health spending per person is projected to rise by 3.2% annually, to \$2,872, in 2040. High-income countries are projected to spend \$9,215 per person on health in 2040, 47.2 times the level in low-income countries (\$195).
- Potential spending analyses suggest that the methods by which low- and middle-income countries can increase their government spending on health must be tailored to each country's circumstances.

- There may be potential for governments to spend more on health over the next 25 years. According to projections in this report, if they committed to spending as much on health as their highest-spending peers, low-, lower-middle-, and upper-middle-income countries could spend 64.3%, 80.7%, and 19.9% more, respectively, by 2040.
- Each of these trends contains important nuances and variations. Identifying and measuring those differences in health financing trends across countries will be critical to meeting the UN Sustainable Development Goals and progressing toward universal health coverage.

Introduction

Disparities on the Path to Universal Health Coverage presents a retrospective and prospective look at global trends in health financing, with a focus on understanding trends related to economic development and development assistance for health. This report is based on the Financing Global Health (FGH) 2016 study, a yearly effort conducted by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington in Seattle. The study constructs and analyzes the most comprehensive country- and global-level database of health spending in the world. Constructing the database requires collecting health financing data from different sources, adjusting those data to make them mutually compatible across geography and time, tracking flows of health funds around the world, breaking down aggregated financing data into policy-relevant categories, and many other tasks. The FGH 2016 study estimates spending on health in 184 countries from 1995 to 2014 and development assistance for health, by source, channel, and focus area, from 1990 to 2016. It also uses past trends and relationships to estimate future spending on health in those 184 countries through 2040. The study's results are publicly available, as the authors hope that the findings will help policymakers and stakeholders around the world improve health care financing and, ultimately, people's health.

The FGH study improves on other studies of its kind by breaking down all spending by source, funding agent, and type of care, thereby providing more granular information about that spending and its ultimate aims. It measures the complex trends in global health financing and the ways in which countries deviate from those trends. It shows how much money governments contribute to their own health budgets versus how much is funded by development assistance. The study also covers more years and more countries than other studies, which makes it particularly useful in determining long-term and widespread trends. Finally, it offers funding projections that take into account expected and potential funding scenarios, thereby showing not just what is *probable* in health financing, but what *may be possible*.

Data used in this report came from the IHME Financing Global Health database, which was constructed using data from project records, country estimates, budgets, annual reports, and many other sources, including the International Monetary Fund database on government spending, the World Health Organization's Health Expenditure Database, and National Health Accounts. Using rigorously vetted methods and relevant data, IHME filled in gaps in time, place, and indicator to provide much-needed information on health spending for decision-making.

All monetary figures in this report have been converted to, and are expressed in, 2015 US dollars, making them comparable across time and geographic area.

It is important to note that the health spending outlined in this report is spending in the formal health sector, including that on doctor visits, surgeries, vaccines, hospital administrations, eyeglasses, over-the-counter medications, and so on. By looking at "formal" health spending, the FGH study does not track

resources devoted to informal care, such as care received from a family member or traditional healer. Nor does it track indirect health care spending, such as wages lost due to illness, time and money spent traveling to seek health care, or illegal, “black market,” or under-the-table health care transactions, such as bribes. The FGH estimates are also truly global – they account for spending in all countries, rich and poor, less developed and more developed.

Increased health spending does not always guarantee gains in health outcomes. Both the effectiveness of health interventions and the efficiency with which health care is delivered determine whether or not increased health spending results in population health improvements. Both more funding and more effective use of funding, working in concert, will be needed to meet the challenges of the United Nations Sustainable Development Goals era and the 21st century generally.

Information on the data sources and types of statistical analyses used in the FGH study is available in the methodological appendix. Additional methodological and technical information on the FGH study is available in the two recent FGH journal articles published in *The Lancet*.

All results and reports associated with the FGH 2016 study are available on the IHME website at www.healthdata.org/fgh2016. That includes *Financing Global Health 2016: Development Assistance, Public and Private Health Spending for the Pursuit of Universal Health Coverage*, a companion report that contains greater technical detail than this report, particularly in relation to DAH. The IHME website also hosts a visualization tool (<http://vizhub.healthdata.org/fgh>) that allows users to explore the FGH 2016 data on their own. These materials are freely accessible to the public.

Findings

Health spending increased between 1995 and 2014, although countries' specific health spending characteristics varied with level of development. Those variations are uneven, not uniform. This report focuses on three key ways in which spending varied along the development spectrum: the amount of spending, the source of spending, and the types of goods and services purchased with that spending.

AMOUNT OF SPENDING

Total health spending tends to increase with development. Accordingly, as countries' levels of development rose between 1995 and 2014, their total health spending tended to increase as well. These trends were highly uneven, however. While spending went up everywhere, it did so far more in richer, more-developed countries, so the gap between health spending in the poorest and richest countries remains very wide.

SOURCE OF SPENDING

In general, highly-developed countries spent more on health than less-developed ones. But the story does not end there. Countries at different levels of development tended to source the funds they spent on health from different places (out-of-pocket spending versus government spending, for example). There are four main ways to finance health care: out-of-pocket spending, government spending (e.g., from single-payer, government-run health care systems), prepaid private spending (i.e., health care funded by private health insurance or local non-governmental organizations), and DAH. These four categories cover all health care spending, but they do not overlap, so no health funds are “double counted” between two or more categories.

Overall, less-developed countries depended on a mix of out-of-pocket spending, government spending, and DAH, while more-developed countries' spending was dominated by government funds. That said, individual countries varied considerably in their source-of-funding mixes. The most important factor in increasing health care access and utilization may not be government funding, but is most likely the availability of prepaid spending options – public or private – that reduces the centrality of out-of-pocket funds in obtaining health care.

TYPE OF CARE

Health funds can buy many things, from immunizations and medical goods to advanced surgeries and long-term nursing care. The proportions of the types of care purchased remain fairly constant among countries along the development spectrum. This is somewhat counterintuitive, since the things countries buy with their health care funds must depend on their disease profiles, which are tied to their levels of development. It is important to remember, though, that similar proportions of care types purchased at low and high levels of development mask what are actually very different amounts of health spending. Highly developed countries spend much more on every type of health care than countries at low levels of development.

From 1990 to 2010, DAH increased quickly, especially in the first decade of the 21st century, but since 2010 DAH growth has stagnated. The proportion of DAH directed to HIV/AIDS, which has been the largest health focus area since 2007 – has declined since 2010. In many low-income countries, DAH is a significant component of health spending. Furthermore, DAH could play an integral role in low- and middle-income countries' progress toward the UN Sustainable Development Goals (SDGs).

Overall, the FGH study supports the idea of a “health financing transition,” leading the FGH researchers to identify three health financing stages that countries, on average, tend to move through as they increase in level of development. In the first stage, at low levels of economic development, overall health spending is low and health financing is dominated by DAH and out-of-pocket spending. In the second stage, as GDP per person increases, DAH subsides and the primary sources of health care financing are out-of-pocket spending and government spending. Finally, in the third stage, in countries at the highest level of economic development, the use of prepaid spending – especially government spending – increases and reliance on out-of-pocket spending declines. In this last stage, countries tend to spend considerably more on health.

The complicated interplay between DAH, government spending, and out-of-pocket spending during the second stage of this transition can result in a precarious phenomenon. As DAH declines, insurance schemes, organized by the governments or privately, need to generate funds to compensate for the DAH reductions. If this does not happen, reductions in DAH can cause an increased reliance on out-of-pocket spending or stall the growth of total health spending (or both). These “missing” health care funds in countries in the middle of the development spectrum can have negative consequences, especially for the poor people living in those countries.

The three stages of the health financing transition are related to the changes in disease burden that occur as countries develop: fewer people die from childhood, maternal, and infectious diseases and, instead, live longer lives while the diseases that affect them shift to non-communicable and chronic diseases. This process has been called the “epidemiological transition.” These two transitions combine both financially and epidemiologically, with changes in what makes a society sick, and how that disease is paid for.

It is important to emphasize that the variation in spending levels and styles among countries also indicates that time and development do not guarantee improvement in the availability of health resources. Making more resources available requires funds. To that end, the FGH 2016 study includes projections of health spending until 2040. Those projections indicate that global health spending will continue to rise, but that the existing disparities in the global health system will endure unless conscious efforts are made to alter them.

Such efforts may be possible: the FGH projections also indicate that, if lower-, lower-middle-, and upper-middle-income countries commit to spending as much on health as their highest-spending peer countries do, those countries would roughly double their health funding resources. Devoting more resources to health, even in the midst of rising development levels, would require political will, conscious decision-making, and sustained effort, but the results would be hugely beneficial to the world's population.

The uneven growth of health spending, 1995-2014

Between 1995 and 2014, global health spending per person grew from \$689 to \$1,279, as shown in Figure 1. This increase in spending tracked with increases in development, as the two are strongly correlated. The lines in Figure 1 illustrate the aggregated effects of all of the health-related spending trends of the past 20 years, including the growing health care spending in highly developed nations, the response to the HIV/AIDS epidemic, the jump in incomes and living standards in East Asia, and others. Panel A shows per-person health spending on an absolute scale, while panel B shows the same data, but using a logarithmic scale. That scale allows for a clearer view of the lines bunched at the bottom of panel A.

Splitting global health spending into the funds spent by countries in different World Bank income groups reveals considerable variation in health spending. Several things stand out in Figure 1. The difference between spending in high- and low-income countries is immense during the entire time series. In 1995, low-income countries spent an average of \$51 per person, while high-income countries spent \$2,976 – almost 60 times as much. In 2014, per-person spending had grown to \$120 in low-income countries and \$5,221 in high-income countries – which actually represents a narrower gap, in relative terms, between the income groups than in 1995 (almost 49 times). The country outliers in each year were, of course, even more disparate in their spending. In 1994, Liberia spent the least, at \$11 per person, while the US spent the most – \$5,330. In 2014, the US remained at the top of the spending list at \$9,237 per person, while Somalia spent the least – only \$33.

The gap in health spending between high-income and middle-income countries, while smaller than the gap between high- and low-income countries, is also huge. In 2014, upper-middle-income countries spent \$914 per person on health and lower-middle-income countries spent \$267 per person. At \$5,221 per person, high-income countries spent over 5 and 19 times as much as their upper-middle- and lower-middle-income counterparts, respectively. The huge gap between spending among high-income countries and the rest of the world is both a reflection of past disparities in development and health and a likely factor in the continuation of those disparities in the present day.

STAGNATION IN DEVELOPMENT ASSISTANCE FOR HEALTH

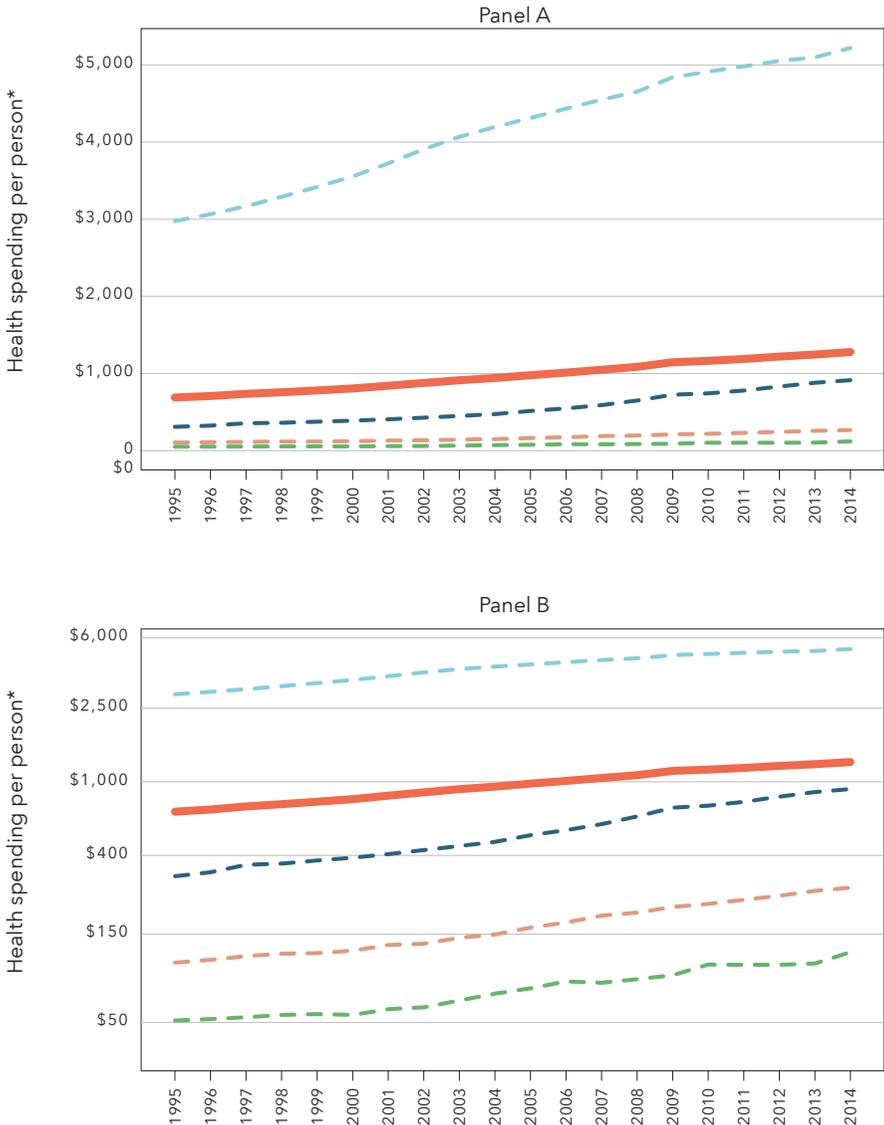
Just as overall health spending per person increased during the past 20 years, so did development assistance for health, or DAH. DAH is financial and in-kind resources that are transferred from development agencies (such as UNICEF or the United Kingdom's Department for International Development) to low- and middle-income countries for the purpose of improving health. While the overall effects of DAH on country health systems are not completely understood, some available research suggests that DAH during the 2000–2014 period may have saved many lives. Millions of people in low- and middle-income countries have received tuberculosis testing, HIV treatment, and antimalarial bed nets.

IHME researchers have tracked DAH since 2009. Part of that effort is devoted to breaking down DAH by its source, channel, focus area, and country recipient. The resulting data and report – this year's version is titled *Financing Global Health 2016: Development Assistance, Public and Private Health Spending for the Pursuit of Uni-*

Figure 1

Global health spending per person by World Bank income group, 1995-2014

● Global ● High-income ● Upper-middle-income ● Lower-middle-income ● Low-income



*Spending is in 2015 purchasing power parity dollars.

Note: Because countries change income groups over time, Figure 1 uses 2017 income groups for each year.

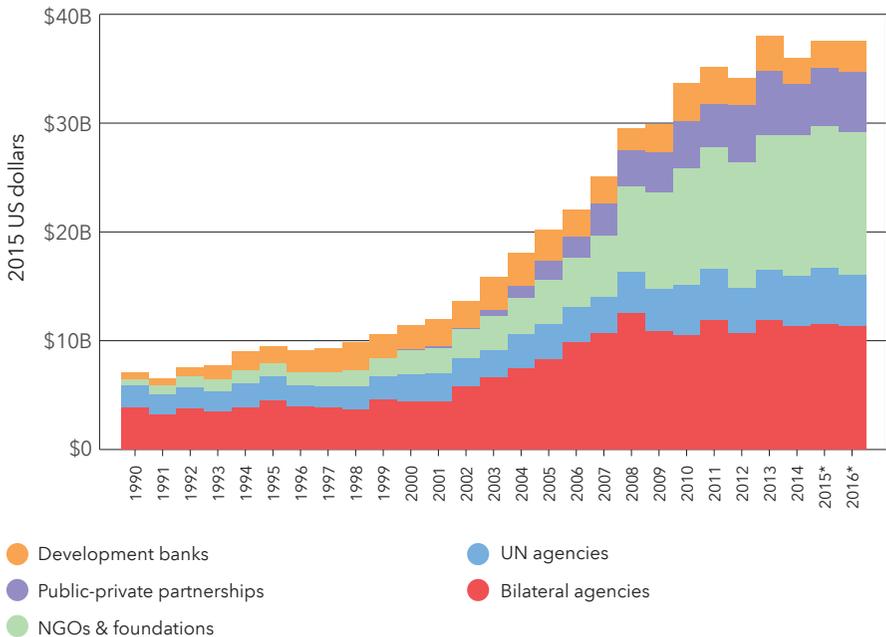
Source: Financing Global Health Database 2016

versal Health Coverage is available for free on the IHME website – is a vital resource for governments and non-governmental organizations (NGOs) around the world.

The increase in DAH between 1990 and 2016[†] is remarkable. In 1990, total DAH amounted to \$11.4 billion; in 2016, that figure had reached \$37.6 billion. The rate of that growth was far from uniform, however, which is made clear in Figure 2. In the 1990s, DAH grew at an annualized rate of 4.9%. Then, in the first decade of the 21st century, DAH increased at an annualized rate of 11.4%. Since 2010, however, overall DAH growth has leveled off to 1.8% per year and funding for HIV/AIDS DAH, in particular, has declined (see Figure 13, below) – a development which could constrain efforts to achieve the United Nations Sustainable Development Goals.

Since DAH eligibility phases out as countries’ incomes rise, DAH only affects overall health spending in low- and middle-income countries, not high-income ones. But what role has DAH played in the overall health spending increases from 1995 to 2014 detailed above? DAH was far from the only factor behind the increases, but it

Figure 2
DAH spending by groups of channels, 1990–2016



*2015 and 2016 are preliminary estimates.

Source: Financing Global Health Database 2016

†Some DAH data available to the FGH researchers span a longer time than those for health spending in general. Thus, the FGH study reports DAH data for the period 1990 through 2016 and other health spending for the period 1995 through 2014.

The Millennium Development Goals and Sustainable Development Goals

Since 2000, the United Nations has established two sets of goals to guide and assess improvements in global health and development. The Millennium Development Goals (MDGs) for 2000 to 2015 included eight goals in areas such as child health, education, and reducing poverty. Success in achieving the goals was mixed. The list of Sustainable Development Goals (SDGs) for 2015 to 2030 is larger and, arguably, more challenging. The SDGs include 17 goals (such as “Ensure healthy lives and promote well-being for all at all ages”) composed of 169 target indicators (such as “By 2030, reduce the maternal mortality ratio [the number of women who die of pregnancy-related issues] to less than 70 per 100,000 live births”). Achieving the SDGs will be a difficult task. It is likely that increased health spending, improved efficiency in health spending, and more effective health interventions will all be needed to do it.

was indeed a substantial one in some countries. Between 1995 and 2014, \$423 billion of DAH was disbursed to low- and middle-income countries. During that same period, low-income countries’ yearly health spending per person increased \$69, from \$51 to \$120. More than half of that increase – 52% – came from DAH.

There is some evidence that DAH increases have had effects in the real world by saving lives and improving health. Two of the clearest examples relate to HIV/AIDS treatment and child health. DAH devoted to HIV/AIDS increased rapidly from 2000 to 2010 (for more information, see <http://www.healthdata.org/research-article/tracking-development-assistance-hiv-aids-international-response-global-epidemic>), with much of that increase devoted to procuring and delivering medications that can change HIV/AIDS from an acute, life-threatening infection to a chronic, manageable one. From 2005 to 2015, that DAH helped reverse the direction of the HIV/AIDS epidemic. At its high point in 2005, 1.8 million people per year died of HIV/AIDS. As of 2015, that number had fallen by 600,000 per year.

The effects of DAH on child health were also substantive. The Lives Saved Scorecard, a proposed tool for evaluating progress in addressing global health challenges (such as those included in the United Nations Millennium Development Goals [MDGs] and Sustainable Development Goals [SDGs]), estimated that between 2000 and 2014 DAH funds were responsible for saving the lives of 14 million children around the world (for more, see: <http://www.healthdata.org/acting-data/lives-saved-scorecard-measuring-impact-investments-child-health>). For 2014 alone, the researchers behind the Lives Saved Scorecard estimated that DAH saved the lives of over 1.5 million children – a remarkable effect, given that DAH in 2014 amounted to just 0.6% of total health spending. That relatively small amount of money has had outsized effects in the low- and middle-income countries of the world.

Higher development, higher health spending

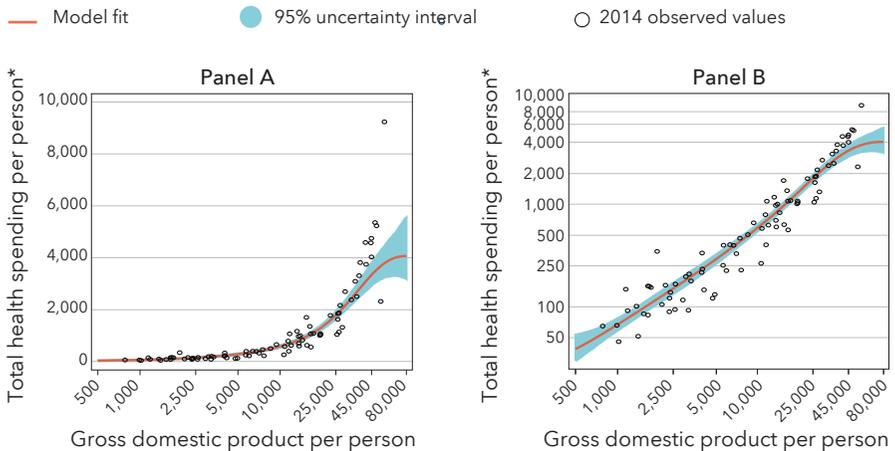
One of the main things that drives variation in health spending is level of development. Between 1995 and 2014, there was a clear correlation between the two, with countries at lower levels of development spending less on health and countries at higher levels spending more. In addition to examining country spending by World Bank income group, the FGH study uses gross domestic product (GDP) per person as a proxy measure for development – the higher a country's GDP per person, the higher its level of development. As GDP per person in a country rises, its people tend to have more money they can devote to health care, while health care providers and governments can devote more resources to health treatments and infrastructure. These conditions build on each other, leading to longer lives, more demand for health care, and increasingly sophisticated (and expensive) treatment options over time.

The lines in Figure 3 illustrate that trend by plotting the global level of development, represented by GDP per person, against total health spending. The relationship of development and spending between 1995 and 2014 was not linear. Figure 3, panel A depicts per-person health spending using an absolute currency scale. Figure 3, panel B depicts the same data points, but does so using a logarithmic scale. (The dots in Figure 3 represent all countries with over 30 million inhabitants in 2014.)

Taken together, the graphs in Figure 3 make clear that health spending rose exponentially in concert with development. Panel A depicts this in the sharp upward bend in the curve starting around \$20,000 GDP per person. By using a logarithmic scale, panel B shows that countries along the entirety of the scale of economic development, from \$500 to \$50,000 GDP per person, increased their health spending at a steady but exponential rate as their levels of development

Figure 3

Health spending (panel A) and health spending with adjusted vertical scale (panel B) by development level, 2014



*Spending is in 2015 purchasing power parity dollars. Source: Financing Global Health Database 2016

increased. Because countries at the low end of development started at low levels of spending – less than \$50 per person in some cases – a doubling in the amount of money they spend per person results in only a \$50 increase. At higher levels of development, in countries that already spend a lot, a doubling of health spending results in increases per person of \$2,000 or more.

Having discerned an average pattern of development and per-person health spending, FGH researchers looked for countries that deviated from what their development peers tend to spend on health. Figure 4 depicts countries' 2014 per-person health spending in relation to what their spending would be expected to be, based solely on their GDP per person. A country with the US's 2014 GDP per person, for instance, would be expected to spend \$3,790 per person on health. Instead, per-person health spending in the US in 2014 was \$9,237 – well over twice the expected amount. India, meanwhile, spent \$253 per person on health, or 22.4% less than the expected amount.

Many countries spent more than the expected amount on health in 2014, including Afghanistan, France, Liberia, and Sudan. In part, this is due to DAH adding to these countries' domestic health spending amounts. Uganda and the US were particular outliers in this regard, spending roughly three times their expected amounts. Many countries also spent less than expected. That group included Argentina, Madagascar, the Philippines, and Romania.

Combining the observed-versus-expected per-person health spending data above with data on health outcomes could point researchers and policymakers toward countries and health systems that are highly efficient with their health spending. Determining policies and health interventions that provide high health returns for relatively low monetary inputs, and replicating those practices, could help drive health care costs down in highly developed countries and augment high-quality medical care in countries with low development levels.

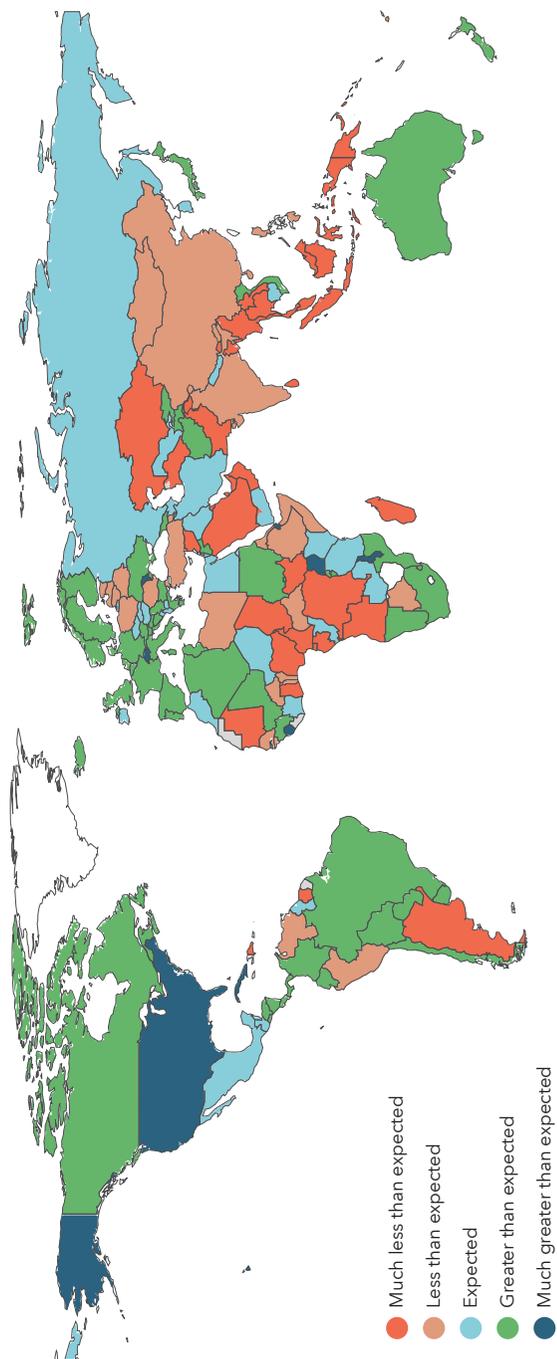
The relationship of health spending sources and development

Just as levels of per-person health spending vary with development, so do the sources from which countries draw funds to finance health. There are four basic sources of health funding: out-of-pocket, government (e.g., from single-payer, government-run health care systems), prepaid private spending (i.e., health insurance funded by private individuals prior to obtaining medical care, eliminating the need to pay for medical care out-of-pocket), and DAH funds.

Globally, in 2014, 59.2% of health spending came from government sources, 17.4% from prepaid private sources, 22.8% from individuals' out-of-pocket spending, and 0.6% from DAH. These proportions varied, however, for countries at different income levels. Out-of-pocket sources predominated in lower-middle-income countries, constituting 58.0% of health spending, and made up large proportions of spending in upper-middle- (33.8%) and low-income (29.1%) countries. By contrast, government funding accounted for the bulk of spending in upper-middle- (57.2%) and high-income (63.4%) countries, and DAH was the largest source of health spending in low-income countries (35.7%).

Figure 4

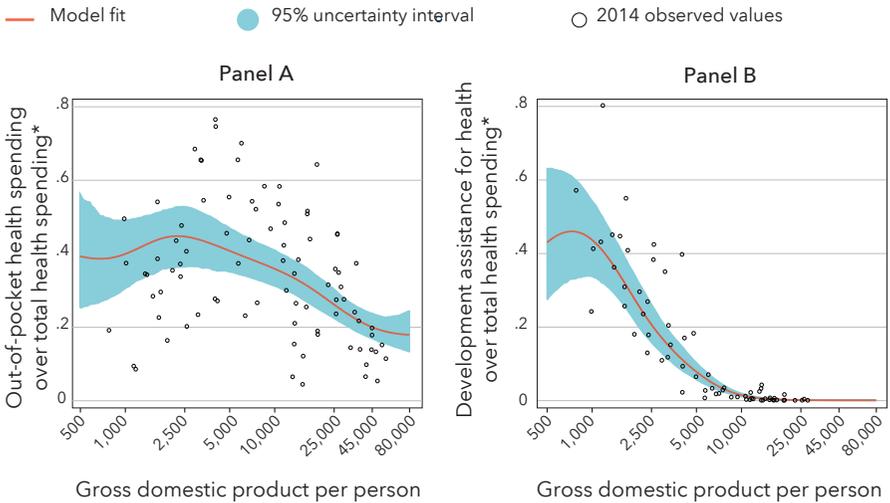
Observed versus expected health spending per person, 2014



Source: Financing Global Health Database 2016

Figure 5

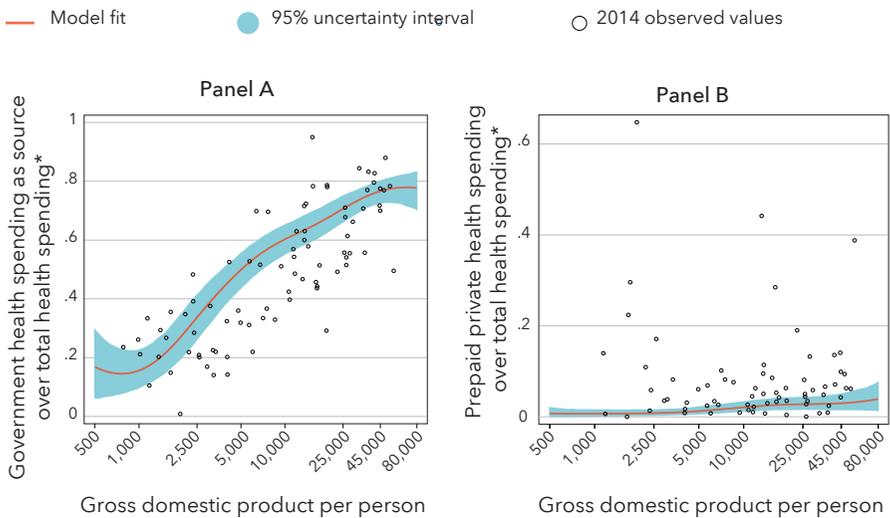
Out-of-pocket health spending (panel A) and DAH spending (panel B) by development level, 2014



*Spending is in 2015 purchasing power parity dollars. Source: Financing Global Health Database 2016

Figure 6

Government (panel A) and prepaid private (panel B) health spending by development level, 1995–2014



*Spending is in 2015 purchasing power parity dollars. Source: Financing Global Health Database 2016

The sources of growth in health spending between 1995 and 2014 also varied by country income level. For high-income countries, 64.5% of the growth in health spending came from government sources. Growth in health spending in low-income countries, by contrast, was driven most of all by DAH, which accounted for 52.1% of the increase between 1995 and 2014.

As in the case of per-person health spending, there are clear relationships between level of development and funding sources for health. As countries develop, their health spending tends to depend less on out-of-pocket and DAH sources, while increasingly depending on government funds.

Figure 5 shows how out-of-pocket and DAH funding related to GDP per person from 1995 to 2014. Figure 5, panel A depicts out-of-pocket spending as a proportion of total health spending; the dots in the graph represent, as in Figure 3 above, countries with populations over 30 million in 2014. Countries with the lowest development levels financed roughly 40% of their health spending with out-of-pocket funds, while the most highly developed countries used out-of-pocket spending for approximately 20% of their spending. The curve in the figure indicates that the proportion of health care purchased with out-of-pocket spending was substantial across the development spectrum, but especially so in the lower ranges of economic development, from \$500 to \$10,000 GDP per person. Only at very high levels of development – around \$25,000 GDP per person – did countries quickly reduce their reliance on out-of-pocket spending. Because out-of-pocket spending is a leading cause of medical impoverishment and a barrier to medical care, reducing its use is a key part of increasing access to health care.

There is great variation in the usage of out-of-pocket spending among different countries. Based on their GDP per person, many countries, such as Afghanistan, Sudan, Venezuela, and Russia, spent more out-of-pocket funds on health than expected. Conversely, countries such as Congo, Algeria, South Africa, and France depended on out-of-pocket spending less than would be expected.

Panel B of Figure 5 depicts the share of DAH in total health spending by development level. Here, the curve in the line indicates that the least-developed countries received slightly less DAH funding than countries at \$801 GDP per person. It turns out that a small number of very poor countries received very little DAH between 1995 and 2014. The reasons for this are not fully known, although some hypotheses are evident: countries with very low development had less-developed infrastructures that made international investment such as DAH more complicated and possibly less efficient. In addition to this, some of these countries have political conflict, violence, and less stability, again making it difficult to provide assistance. In any case, DAH still made up a substantial proportion of health budgets for countries with lower levels of development, then quickly fell from countries' health spending as they approached \$5,000 GDP per person. Behind this condition lies the complicating factor, discussed elsewhere in this report, of developing countries' difficulties in increasing domestic health spending as they increase in development level and, therefore, receive diminished amounts of DAH.

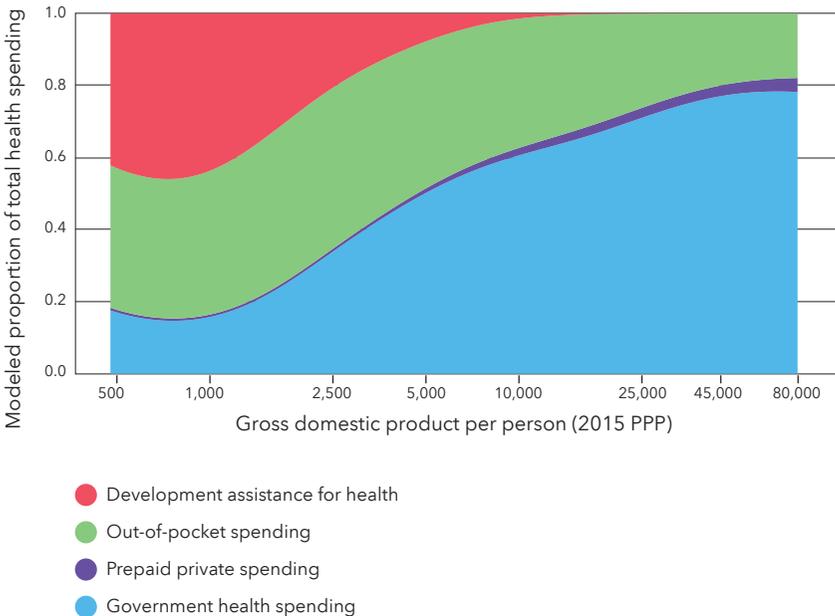
Figure 6 shows, using the same presentation as Figure 5, the role that government spending and prepaid private spending played in countries along the development spectrum. The steady upward slope of government spending as a proportion of total health spending in Figure 6, panel A stands in sharp contrast to the downward slope of out-of-pocket spending in Figure 5. Figure 6 also shows,

in panel B, the relatively small role played by prepaid private spending in health spending around the world. There were a few extreme outliers in this case, however, that depended far more on prepaid private spending than normal. The three highest dots in this graph – the countries that depended most on prepaid private spending – represent, from left to right, Uganda, South Africa, and the US.

The ways in which these sources of health spending fit together at various levels of development are shown in Figure 7. At \$1,000 GDP per person, countries depended most of all on DAH, followed closely by out-of-pocket spending, and then, at a much lower proportion, government spending. As countries developed, however, DAH quickly dropped out of the mix. At \$5,000 GDP per person, DAH was a very small part of total health spending. Out-of-pocket spending remained roughly the same; the decline in DAH was almost entirely offset by an increase in government spending. The use of prepaid private spending was very small. At \$50,000 GDP per person, the proportion of total spending attributable to government spending was even larger. Out-of-pocket spending was smaller, and prepaid private spending grew in relation to its proportion at \$5,000 GDP per person but remained a small part of overall health spending

The mixes of these different funding sources illustrate the tradeoffs at play in how countries organize their health funding systems. Out-of-pocket spending has the lowest infrastructure requirements of any of the four payment types, but

Figure 7
Health spending source by GDP per person, 2014



Source: Financing Global Health Database 2016

researchers have also linked it to less access to prescribed medicines, less access to care, and impoverishment in the face of medical costs. Government and prepaid private sources remove those barriers, but they also require infrastructure to levy and collect taxes, support the legal and regulatory needs of health bureaucracies, and direct payments to health care providers. They require that a critical mass of people have enough surplus money to reliably fund either their own or their fellow citizens' care, and may depend on the exercising of foresight to fund care before it is needed. As countries have developed, they have tended to opt for more government spending and less out-of-pocket spending. This seems to have increased both the number of people with some form of health coverage and the extent to which health services are utilized.

GOVERNMENT SPENDING AS A HEALTH FUNDING SOURCE

Government funds play a huge role in health spending. Moreover, the prominence of government spending tends to grow as countries develop. Globally, most health spending is from governments, although there is enormous variation by country and even within income groups. In 2014, governments funded 59.4% of global health spending, with high-, upper-middle-, lower-middle-, and low-income countries using government funds for 63.4%, 57.2%, 36.1%, and 21.3%, respectively, of their total health spending.

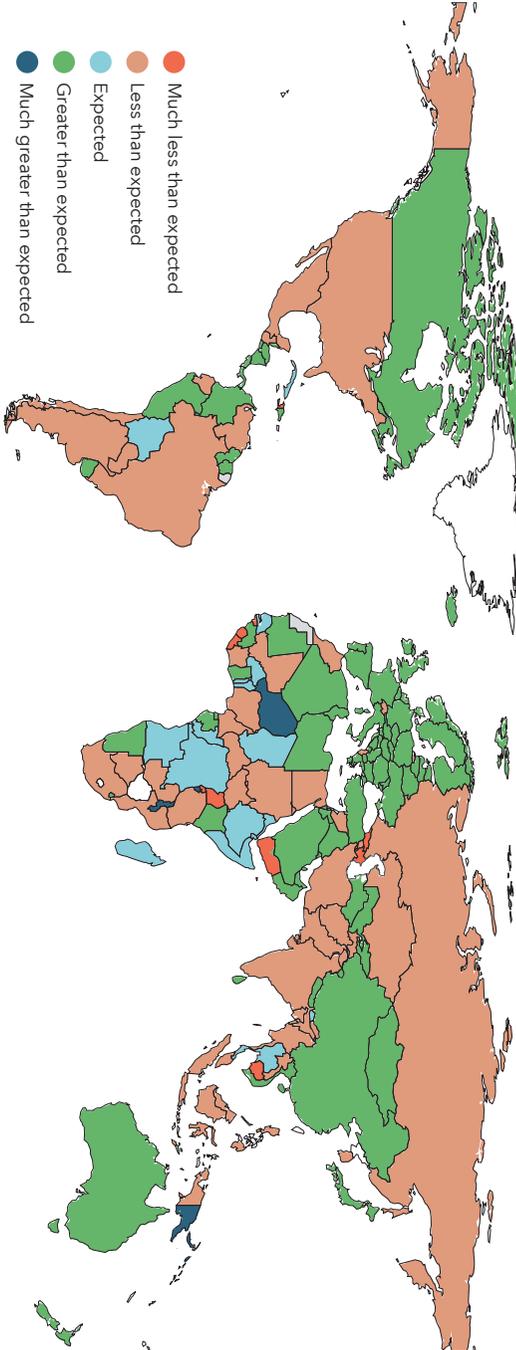
One of the reasons that government spending has been so important is its role in providing access to health care for the poorest people in any given society. Because out-of-pocket spending can be a barrier to accessing care, especially for the poor, and private insurance can be beyond the means of the poor, government spending can, depending on the circumstance, promote equal access to care.

As with other elements of health spending, FGH researchers compared the proportions of each country's health spending derived from government sources with what would be expected, on average, given each country's GDP per person. There were countries at all levels of development that deviated from their expected proportions of government health spending versus total health spending. Figure 8 shows countries' relationship to their expected government health spending levels, based on their GDP per person. Among the countries that use less government spending than expected were the US (a highly developed country), Indonesia (in the middle of the development spectrum), and Uganda (at the low end of development). Countries that used more government spending than expected included countries at the low end of the development spectrum, such as Ethiopia, Mozambique, and Niger, but also those in the middle, such as Bolivia, and those at high levels of development, such as Japan.

Using more or less government spending as a proportion of total health spending does not, however, seem to determine the overall resources spent on health. Figure 9 combines two measures: total health spending and government health spending as a proportion of total health spending. The countries' locations along each axis accord to their level of spending relative to their expected level based on GDP per person. For instance, Iran's total health spending is almost exactly what we would expect for a country of its GDP per person, while South Africa's total health spending is 50% greater than expected based on its GDP per person. Peru's government health spending as a proportion of its total health spending is almost exactly what would be expected given Peru's GDP per

Figure 8

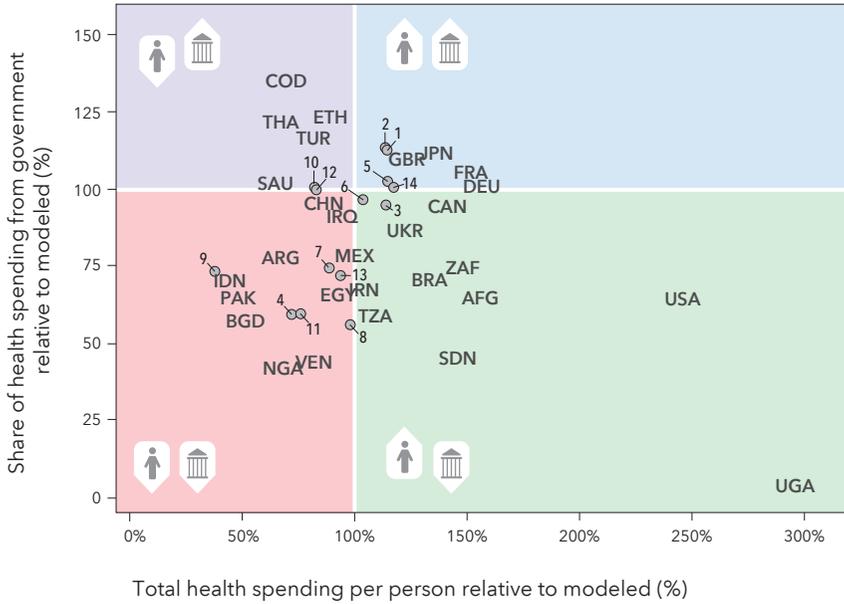
Observed versus expected government health spending, 1995-2014



Source: Financing Global Health Database 2016

Figure 9

The relationship of government health spending and total health spending, 2014



- AFG Afghanistan
- ARG Argentina
- BGD Bangladesh
- BRA Brazil
- CAN Canada
- CHN China
- COD Democratic Republic of the Congo
- 1 COL Colombia
- DEU Germany
- 2 DZA Algeria
- EGY Egypt
- 3 ESP Spain
- ETH Ethiopia
- FRA France
- GBR United Kingdom
- IDN Indonesia
- 4 IND India
- IRN Iran
- IRQ Iraq
- 5 ITA Italy
- JPN Japan
- 6 KEN Kenya
- 7 KOR South Korea
- 8 MAR Morocco
- MEX Mexico
- MMR Myanmar
- NGA Nigeria
- PAK Pakistan
- 10 PER Peru
- 11 PHL Philippines
- 12 POL Poland
- 13 RUS Russia
- SAU Saudi Arabia
- SDN Sudan
- THA Thailand
- TUR Turkey
- TZA Tanzania
- UGA Uganda
- UKR Ukraine
- USA United States
- VEN Venezuela
- 14 VNM Vietnam
- ZAF South Africa

- Health spending per person
- Government financing
- Higher spending than modeled
- Lower spending than modeled

Countries with:

- lower than modeled health spending per person and higher than modeled share of government financing
- higher than modeled health spending per person and higher than modeled share of government financing
- lower than modeled health spending per person and lower than modeled share of government financing
- higher than modeled health spending per person and lower than modeled share of government financing

Note: Graph includes countries with a population over 30 million.

Source: Financing Global Health Database 2016

person, while Argentina's government health spending proportion is only 75% of what would be expected based on its GDP per person.

Combining these two axes into one figure illustrates an important point: there is a relationship between government health spending and total health spending, but it is not determinative. Countries have spent more, or less, than their expected amounts on health while depending on government health spending and while not doing so. Furthermore, while countries tend to utilize government spending more as they increase in development level, there is nothing that guarantees this must be the case. Consider the lower right quadrant of Figure 9. Countries listed in this quadrant spend more on health than their expected amounts, but they depend less than would be expected on government funds to do it. The countries in this quadrant represent a broad range of development levels, from high (US), to middle (Brazil and South Africa), to low (Uganda).

There are notable outliers in the rest of Figure 9 as well. While the top right quadrant of the figure is populated by wealthy, highly developed countries, it also contains countries like Algeria and Colombia that span the middle ranges of development. Countries in the lower left quadrant tend to be less developed, but wealthier countries, such as South Korea and Argentina, are represented there, too.

The FGH 2016 research, and the specific findings regarding government spending above, support the idea that advancing along the development spectrum serves as a catalyst for universal health coverage. It does not, however, support the idea that government health spending is the *only* viable scheme for fostering increased health coverage. While out-of-pocket payments, because they have been shown to be barriers to care, may have to be used judiciously, and DAH funds may be unreliable due to donor country politics and priorities, both prepaid private and government funding systems may, given the specific circumstances, be attractive options for any given country to adopt.

DEVELOPMENT ASSISTANCE FOR HEALTH AS A HEALTH FUNDING SOURCE

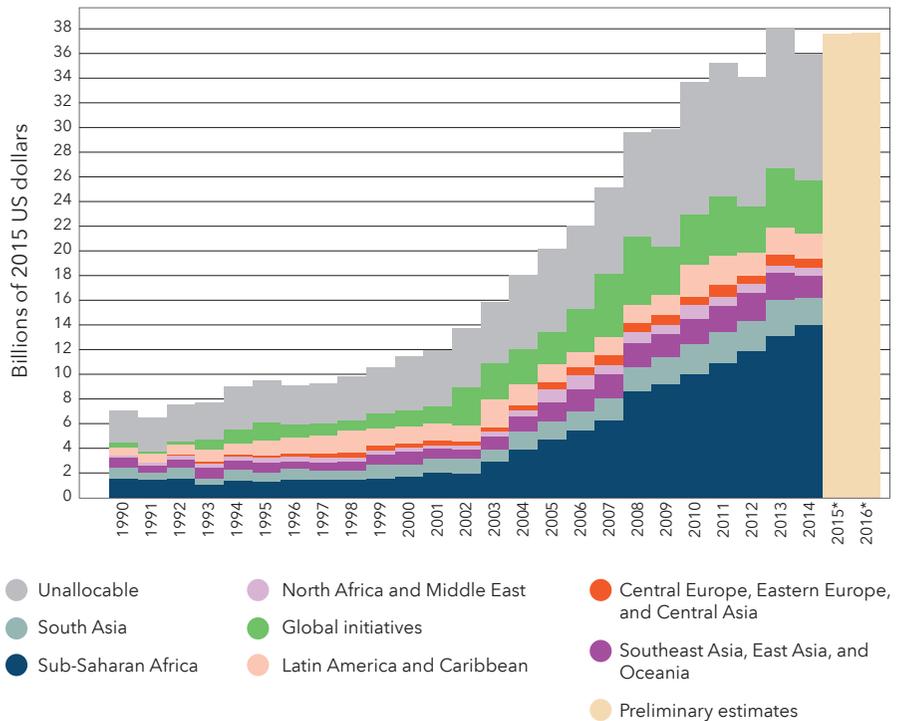
Development assistance for health (DAH) is a small part of health financing overall, but an important part of health financing for some countries. While DAH made up only 0.6% of global health spending in 2014, it constituted 34.2% of 2014 health spending in low-income countries. Because of the importance of DAH to global health, IHME researchers have published detailed reports on worldwide amounts and flows of DAH funding every year since 2009. That report is based on a database constructed by IHME that uses all publicly available DAH information, including project-level records from the Organisation for Economic Co-operation and Development (OECD) and other development agencies, along with audited organizational budget statements and annual reports. The most recent version of that report, *Financing Global Health 2016: Development Assistance, Public and Private Health Spending for the Pursuit of Universal Health Coverage*, which contains more detailed information and figures on DAH and government health spending than this report, was published in spring 2017 in tandem with this report. It is publicly available on the IHME website at www.healthdata.org/fg2016.

After a period of impressive increases, DAH growth has stagnated

Global DAH funding amounted to \$37 billion in 2016. As illustrated in Figure 2, above, in getting to that point, DAH growth underwent annualized increases of 4.6% in the 1990s, then an impressive 11.4% in the first decade of the 21st century, before leveling off to 1.8% per year since 2010. Many people in the international aid and global health communities have argued that this slowdown in DAH will hinder achievement of the Sustainable Development Goals.

Because DAH flows primarily to poorer countries, and because those countries tend to be geographically clustered, DAH funding grew more quickly in some regions than others. As Figure 10 shows, sub-Saharan Africa has seen the largest growth in DAH over the last 20 years. In 1995, DAH to sub-Saharan Africa amounted to \$1.3 billion; by 2014 that had grown to \$14 billion. Between 1995 and 2014, sub-Saharan Africa received 27.1% of global DAH. These figures far outweigh the second-largest recipient of DAH, Latin America and the Caribbean, which received 7.9% of global DAH during that time. This is due in part to the geographic

Figure 10
DAH by recipient region, 1990-2016



*2015 and 2016 are preliminary estimates.

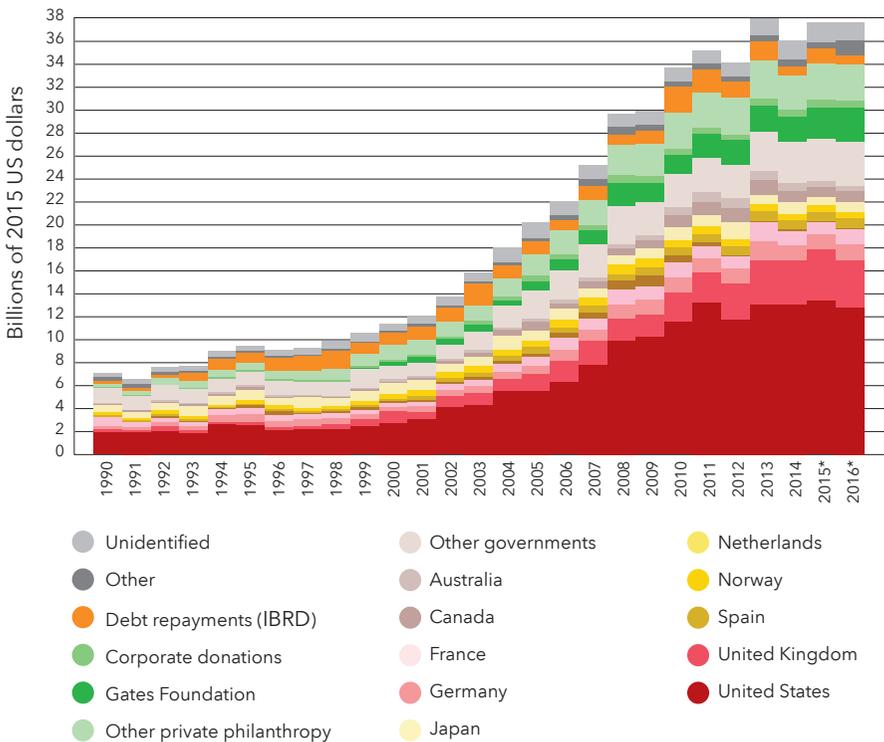
Note: Health assistance for which no recipient regional information is available is designed as “unallocable.”

Source: Financing Global Health Database 2016

clustering of less-developed countries in sub-Saharan Africa, but also to the global community’s response to two epidemics, malaria and HIV/AIDS, that affect sub-Saharan Africa disproportionately.

The bulk of DAH resources have come from governments in wealthy countries, led by the US and the UK. Figure 11 shows not only the predominance of US and UK funds as a source of DAH (the sources for 31.9% and 7.8% of total DAH, respectively), but also illustrates the immense growth in DAH during the early 2000s. Figure 11 also shows the substantial growth in DAH funding from the Bill & Melinda Gates Foundation (Gates Foundation) and other non-governmental organizations around the world (“Other private philanthropy”). Taken together, these sources and the other sources listed in Figure 11 mobilized an immense amount of DAH to address the MDGs.

Figure 11
DAH by funding source, 1990-2016



*2015 and 2016 are preliminary estimates.

Note: Health assistance for which we have no source information is designated as “unidentified.” “Other” captures DAH for which we have source information but which is not identified as originating with any of the sources listed.

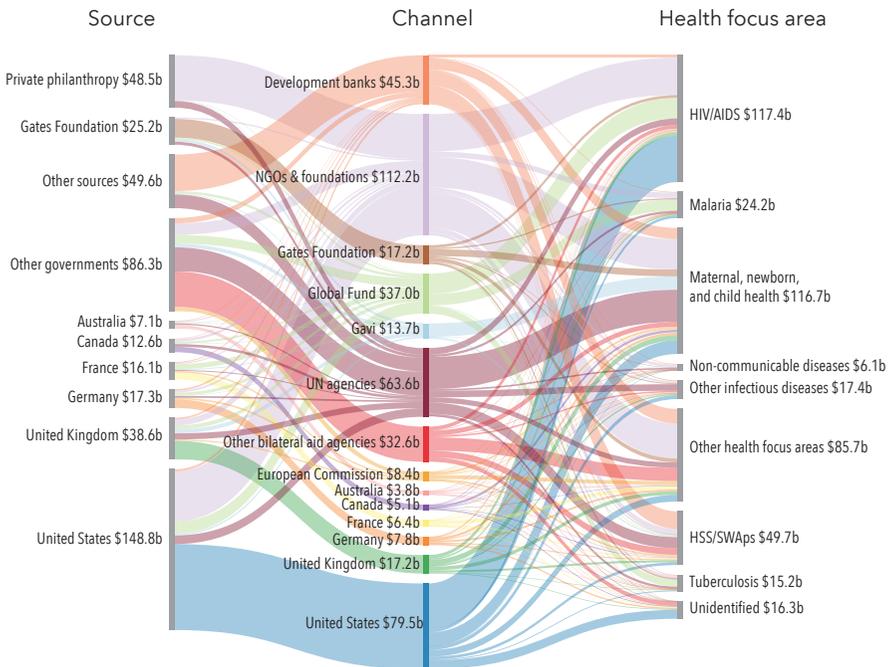
Source: Financing Global Health Database 2016

Over the past 20 years, countries have depended on a variety of channels to direct DAH toward health improvements. Governments have their own bilateral aid agencies (such as the United States Agency for International Development and the UK’s Department for International Development), but they also provide DAH through private aid organizations, multilateral organizations (like the World Health Organization and the World Bank), and public-private partnerships, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (which channeled 10% of DAH in 2016) and Gavi, the Vaccine Alliance (5% of DAH in 2016).

Figure 12 illustrates the flow of DAH from source, through channel of disbursement, to health focus area in 2016. Note the large portion of US funds that were channeled through NGOs and foundations (39%), and US government agencies (43%). A relatively small proportion of US health assistance – 5% – flowed through

Figure 12

DAH funding flows from source to disbursement channel to health focus area, 2000-2016



Note: Figure 12 is an intricate figure that illustrates a convoluted set of processes: how DAH funds moved around the world from source, to channel, and to health focus area, in 2016. It shows, for example, that funds originating in the US were channeled predominantly to two sources: NGOs and US bilateral agencies. Each of those channels, in turn, distributed DAH funds to many different health focus areas (with a majority going to HIV/AIDS). Figure 12 also tracks smaller amounts of DAH funds from the US to the Global Fund, UN agencies, and Gavi. An interactive version of this figure is available at <http://ihmeuw.org/407z>.

Source: Financing Global Health Database 2016

UN agencies. The picture was similar for the UK: government agencies channeled most funds (44%) as well. While these countries' trends are easily visible in Figure 12 due to their size, this trend is actually evident in all of the major country donors listed here: governments tend to channel the largest portion of their aid through their own bilateral agencies – not multilateral ones.

Figure 12 also makes clear just how important the Gates Foundation is to global health. On its own, it served as the source of roughly 5% of DAH – more than France, Canada, or Australia, and equal to Germany's contribution. The Gates Foundation channeled most of its funds directly to DAH recipients, but also contributed funds through Gavi, the Global Fund, the UN agencies, and NGOs.

One of the most notable channels in Figure 12 is the set of UN agencies, which channeled 12% of global DAH in 2016. The largest portion of UN funds was directed through WHO (47%), with UNICEF (26%), the UN Population Fund (15%), the Joint UN Programme on HIV/AIDS (6%), and the Pan-American Health Organization (6%) channeling the rest. The Global Fund channeled 10% of DAH, while development banks were responsible for 7% of DAH, and Gavi funded vaccine programs with 5% of global DAH.

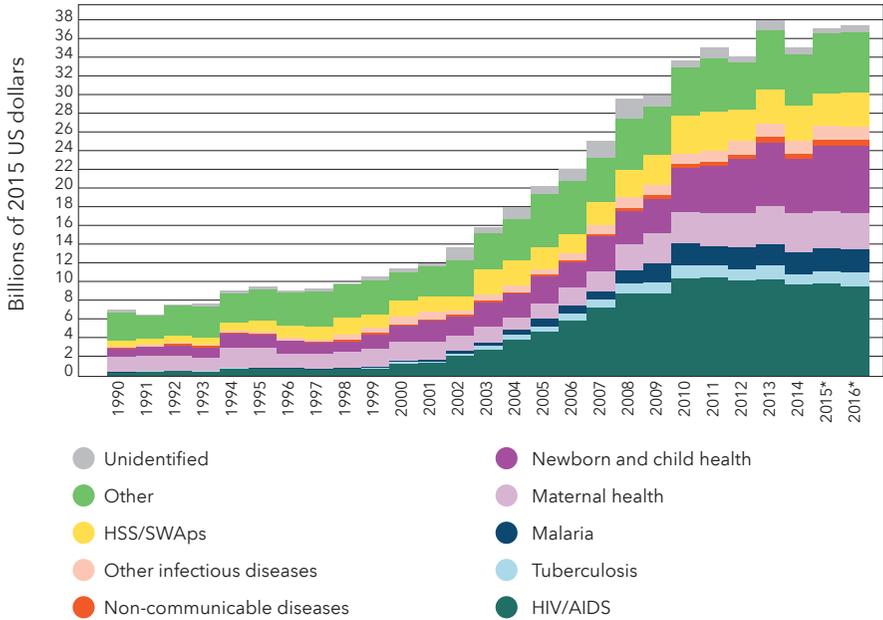
These sources and channels provide funds to and direct funds toward many health focus areas. The primary health focus areas internationally have been HIV/AIDS; tuberculosis; malaria; maternal, newborn, and child health; health system strengthening; other infectious diseases (which include neglected tropical diseases); and non-communicable diseases.

As Figure 12 indicates, most channels directed funds toward a variety of different causes. Although the UK, for example, directed roughly equal amounts of money toward child health, maternal health, and malaria, one health focus area did not stand out among the others. While this was the case for most of the channels listed in Figure 12, there were two outliers to this trend: Gavi and the US. Gavi's focused mandate prompts it to devote 89% of its funds toward vaccines, which the FGH study includes in the child health category, and 11% of its funds toward health system strengthening. The US devoted the majority of its DAH – 62% – to HIV/AIDS. Overall, US aid agencies were responsible for 38% of global HIV/AIDS DAH in 2016.

Figure 13 not only shows the immense growth in DAH since the 1990s, but also details which health focus areas DAH addressed. The chart shows the huge growth in HIV/AIDS DAH, from \$310 million in 1990, to \$1.3 billion in 2000, to a high point, in 2010–2012, of \$10 billion per year. Since then, DAH for HIV/AIDS has actually declined to \$9.5 billion. This is potentially problematic, since the need for HIV/AIDS support – particularly for purchasing medication that keeps AIDS at bay but does not cure HIV – will continue until a cure for HIV/AIDS is found.

During the MDG era and the beginning of the SDG era, from 2000 to 2016, funding for child health and maternal health grew from \$1.6 billion to \$7.2 billion and \$2.1 billion to \$3.9 billion, respectively. DAH used to combat malaria also grew markedly from 2000 to 2016, from \$180 million to \$2.5 billion per year. These health focus areas were targeted by the MDGs from 2000 to 2015. Figure 13 also shows that very little DAH is devoted to non-communicable diseases. The majority of the world's DAH resources are devoted to early childhood health, maternal health, and infectious diseases.

Figure 13
DAH by health focus area, 1990-2016



*2015 and 2016 are preliminary estimates.

HSS = Health system strengthening

Note: Health assistance for which we have no health focus area information is designated as “unidentified.” “Other” captures DAH for which we have project-level information but which is not identified as funding any of the health focus areas tracked.

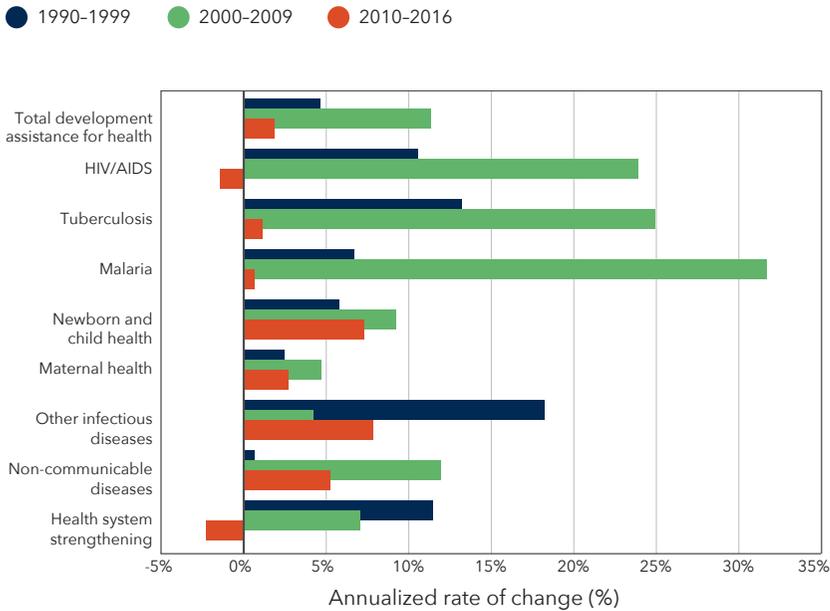
SWApS = Sector-wide approaches

Source: Financing Global Health Database 2016

It can be difficult to tell based on aggregated charts like Figure 13 how the attention paid to specific health focus areas has waxed and waned over the years. For that reason, Figure 14 breaks down the annualized rates of change in DAH by health focus area from 1990 to 2016. For each health focus area, Figure 14 shows the annualized rate of change in DAH for 1990–1999, 2000–2009, and 2010–2016. Since overall DAH grew at an annualized rate of 11.4% between 2000 and 2009, it is no surprise that that decade dominates the increases shown here. DAH for malaria, tuberculosis, and HIV/AIDS grew most quickly during that decade. Figure 14 also shows the flattening in DAH growth observed since 2010 – no health focus area experienced faster growth in 2010–2016 than in the two decades before.

There are many important things to consider when thinking about improving the allocation and use of DAH. For example, it may be that the relative lack of DAH provided to countries at the lowest reaches of development indicates that DAH

Figure 14
Change in DAH funding by health focus area, 1990–2016



Source: Financing Global Health Database 2016

has not always gone where it is most needed. Some observers have reported that countries growing into the middle ranges of income and development have found themselves ineligible for DAH despite substantial remaining population health issues and large numbers of people living in extreme poverty. It could be that this “missing middle” phenomenon, in which countries find themselves no longer eligible for DAH while still in need of health funding assistance, will jeopardize global health improvements unless it is addressed.

More research on the optimal distribution of DAH, both at the lower and middle ranges of development, is needed. So, too, is research into how best to utilize DAH funds when they are available. Along with these efforts, however, it will be important to many to maintain the growth of DAH. All three of these elements will be needed for the world to meet the SDGs.

Variations in the types of health care purchased

Despite the fact that countries at different levels of development have different health needs, infrastructures, and funding resources available, the mix of types of health care that they use is relatively similar, with variations that are, for the most part, subtle. Because the amount of health care purchased increases exponentially with development, however, similar proportions of care purchased in

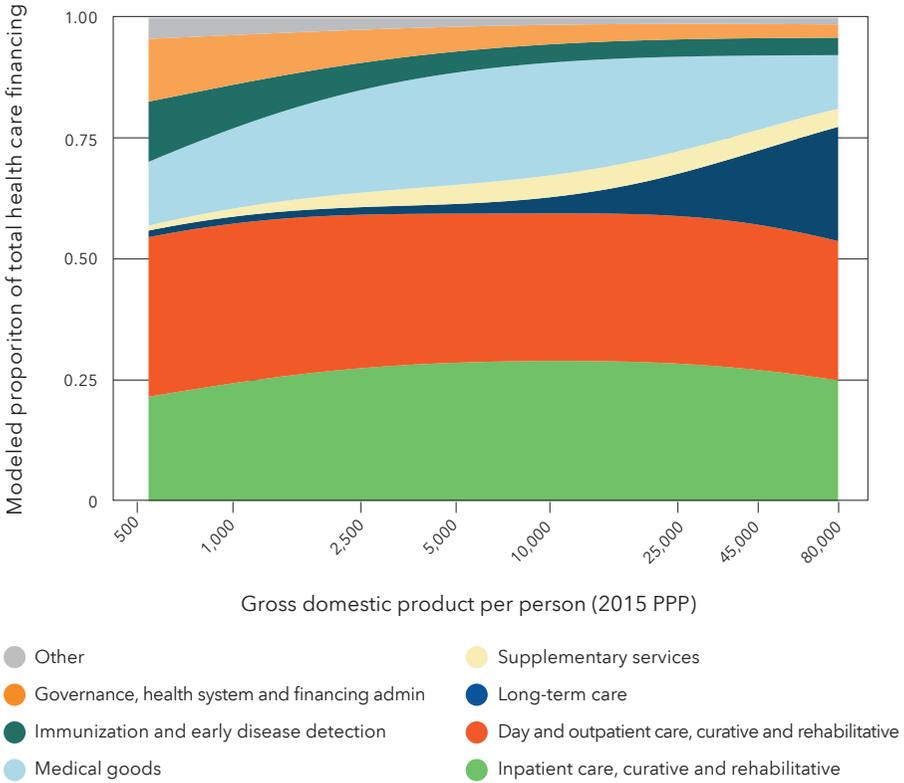
less-developed and more-developed countries disguise large disparities in the absolute amounts of care being purchased. Understanding development level variations in the types of care purchased can therefore help health system administrators determine the ways in which their systems might be strong or deficient, and what their needs might be in the future.

Analyses of type-of-care based on large datasets spanning many years are not commonly completed, so the analysis of spending patterns in type-of-care from 1995 to 2014 marks an important contribution of the FGH 2016 study. FGH study data for this analysis were obtained from National Health Account (NHA) reports, which are reports that include data on type-of-care in a standardized form agreed upon by the OECD, WHO, and Eurostat. With these data, FGH researchers were able to track trends in total and government spending for eight type-of-care categories:

- Inpatient care (including curative and rehabilitative);
- Day and outpatient care (including curative and rehabilitative);
- Long-term care (often referred to as “nursing care,” this type of care is devoted to managing pain, suffering, and health deterioration, with the assumption that patients will remain somewhat dependent on long-term care indefinitely);
- Supplementary services (a category aggregated from laboratory and imaging services, patient transportation, and emergency rescue);
- Medical goods (a highly diverse category that includes items such as pharmaceuticals, corrective lenses, wheelchairs, and bandages);
- Immunization and early disease detection (“early disease detection” is screening and testing to diagnose both communicable and non-communicable diseases);
- Governance, health system, and financing administration (this can be thought of as the infrastructure costs of any health system); and
- Other (everything else).

These types of care interact with each other in intricate ways as countries increase in development. Putting all of those trends together yields a snapshot of type-of-care spending that is potentially more intelligible than trying to consider each of the different types of care in turn. Figure 15 illustrates the proportions of total health spending devoted to different types of care by countries along the economic development spectrum. The proportions spent on different types of care are fairly uniform across development levels. The clear exception is long-term care spending, which crowds out other types of spending at very high levels (approximately \$25,000 and above) of GDP per person. This aspect of Figure 15 sends a mixed message. One the one hand, people in highly developed countries are living longer than ever before. On the other hand, they tend to get sicker as

Figure 15
 Spending on types of care by GDP per person, 1995–2014



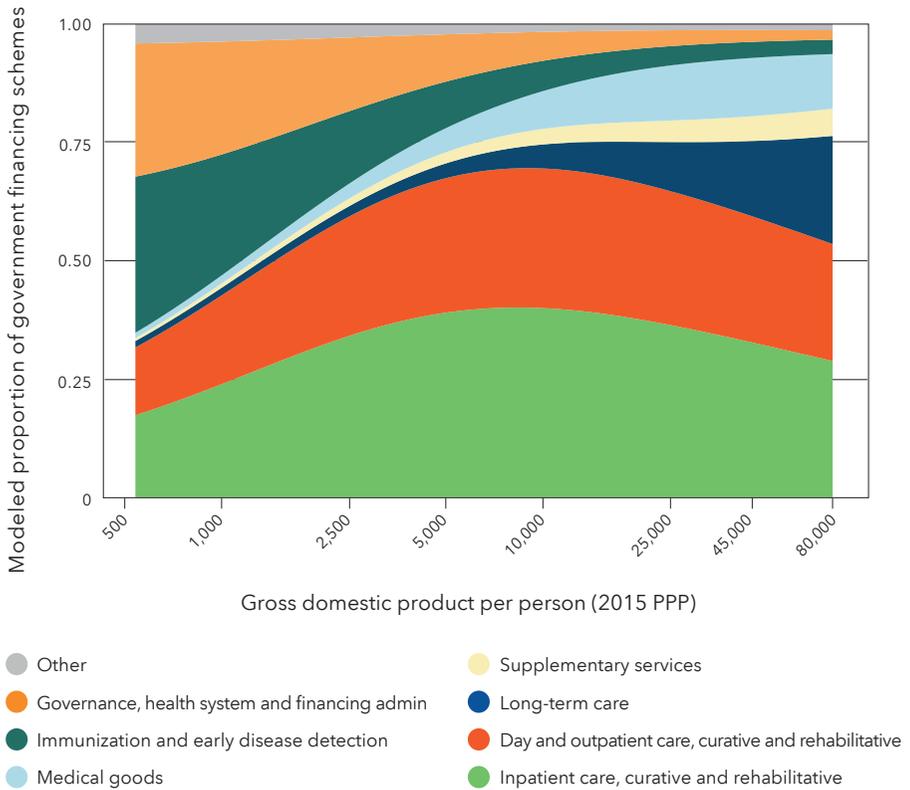
Source: Financing Global Health Database 2016

they get older, and their countries have not, evidently, determined how to control the costs associated with caring for them. This could serve as a warning of sorts for countries moving up the development spectrum.

The proportions of different types of care purchased with government funds vary across the development spectrum. Figure 16 indicates that the governments of less-developed countries spend a greater proportion of their health funds on governance, health system, and financing administration, and immunization and early disease detection than more-developed countries. Country governments in the middle range of economic development spend the greatest proportion on inpatient care, while highly developed country governments devote the largest proportions of spending to long-term care and medical goods. It is important to keep in mind that these are proportions of spending, not raw amounts of spending

Figure 16

Government spending on types of care by GDP per person, 1995-2014



Source: Financing Global Health Database 2016

– governments in more highly developed countries purchase far more care than those at lower development levels.

Considering total spending and government spending by type of care, it is clear that, as countries develop, they spend more on long-term care and less on administrative services. This is probably due, among many factors, to aging populations, more expensive medical treatments, and declining marginal administrative costs. The prominence of expensive forms of care – especially long-term care – at higher development levels speaks to the importance of prepaid financing schemes in those countries. The shift from out-of-pocket sources of health funds to prepaid ones is probably a necessary component of the shifts in type of care observed with increasing development.

Health financing, past and present

The characteristics of the amounts, sources, and types of care purchased with health spending between 1995 and 2014 point toward several distinct challenges in the years ahead, assuming that the international community's goal is to increase the availability and utilization of health care. Narrowing the gap between high-spending and low-spending countries, for example, could lead to health gains in less-developed countries. Based on past trends, achieving such a goal will depend in part on reducing less-developed countries' reliance on out-of-pocket spending, since it can be both a barrier to accessing care and a cause of medical impoverishment. It will also depend on economic growth and rising global incomes. The functioning of governments will also play a role, whether by delivering health care directly, fostering effective health infrastructure, providing regulatory frameworks that encourage prepaid health care financing, or raising and spending funds on health.

What past trends and relationships say about future health spending

Given the health and health funding challenges the world will face in the years ahead, judicious planning will prove important for meeting the health needs of the world's population and benchmarks such as the SDGs. In order to aid planning and foster discussion about the availability and prioritization of resources, the FGH 2016 study includes projections of health spending. FGH researchers estimated national GDP; all-sector government, government, out-of-pocket, and prepaid private health spending; and DAH received for 184 countries through 2040. They also compared countries' spending with that of their development peers in order to project the spending that *may be possible*, rather than just what is likely, if countries were to change their budgetary practices or priorities.

The ranges of these estimates are high, since predicting the future is difficult and funding for health could be impacted by any number of difficult-to-predict political and economic factors. For example, FGH researchers project that total DAH spending in 2040 will be \$33.9 billion, but since that figure will depend on budgeting decisions, donation decisions, disease burdens, and even economic performance, it is possible that DAH spending in 2040 will differ considerably from that projection. Nonetheless, the FGH projections form a baseline for discussion of what is likely if countries adhere during the coming decades to their established spending patterns. (More information on the methodology behind these estimates is available in the methodological appendix at the end of this report and in the FGH 2016 journal articles available at www.healthdata.org/fgh2016.)

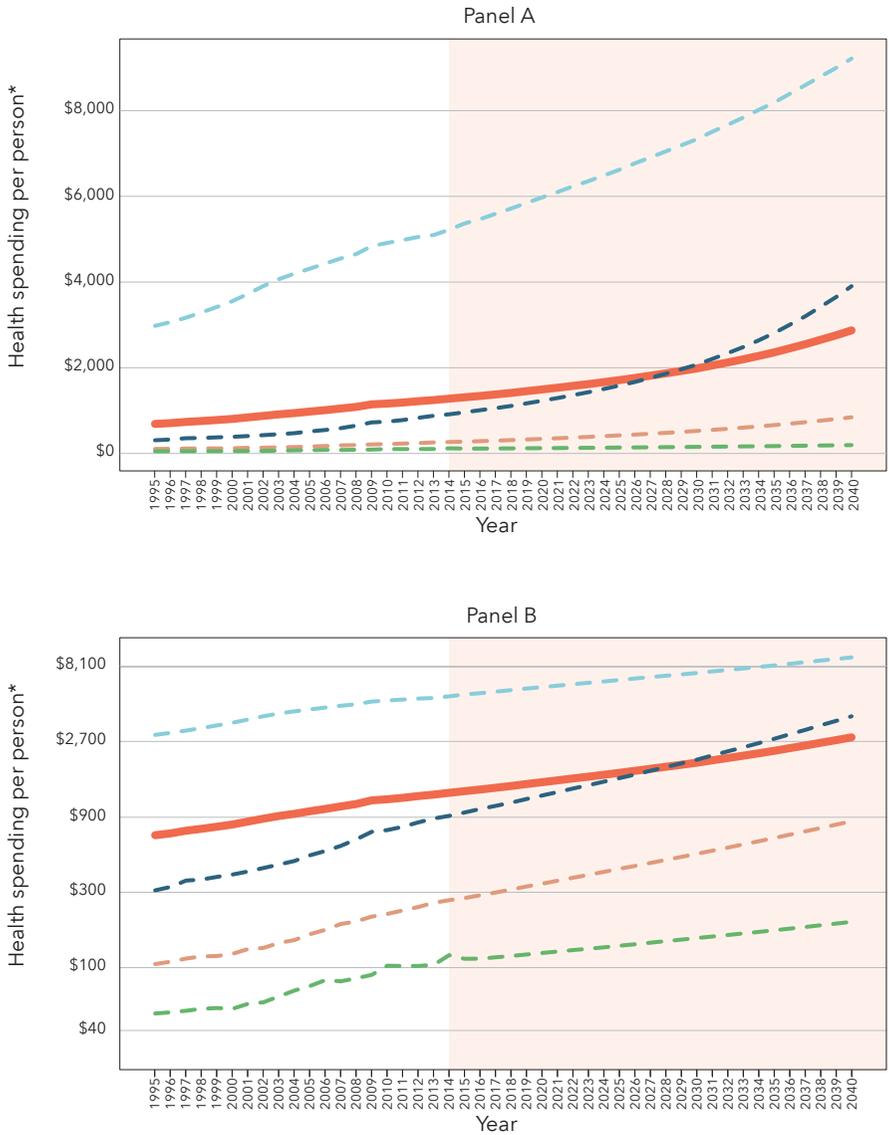
FGH researchers project that global health spending will continue to rise overall by 2040, but that the disparities in health spending evident from 1995 to 2014 will continue as well. Expressed in terms of total health spending per person, global spending will grow from \$1,279 in 2014 to \$2,872 in 2040, which represents an annual growth rate of 2.9%. But in the case of projections – as in every other section of this report – this headline trend contains large variations when broken down.

The health spending gaps among countries in different income groups are projected to change very little between now and 2040. Figure 17 depicts total health spending per person by country income group in 2014 and 2040. Panel A

Figure 17

Projected increases in health spending by World Bank income group, 1995-2040

- Global
- High-income
- Upper-middle-income
- Lower-middle-income
- Low-income
- Projection



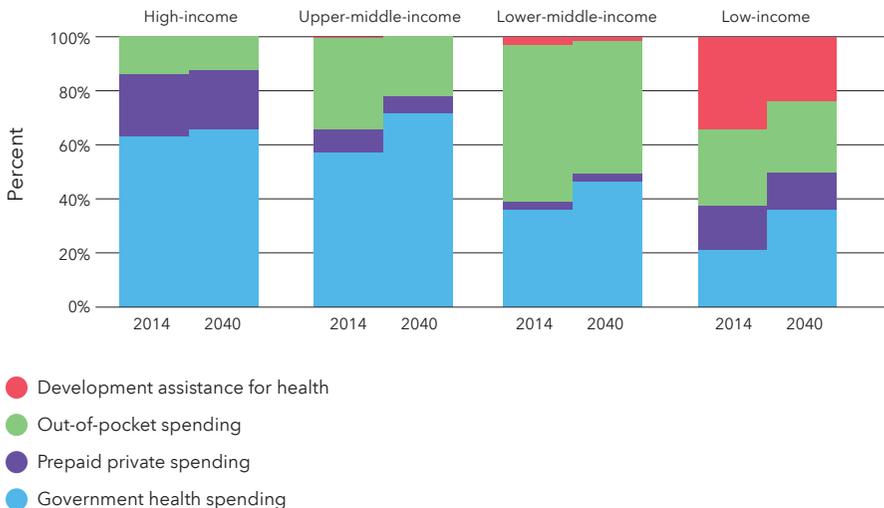
*Spending is in 2015 purchasing power parity dollars.

Source: Financing Global Health Database 2016

shows per-person health spending on an absolute scale, while panel B shows the same data, but using a logarithmic scale. That scale allows for a clearer view of the lines bunched at the bottom of panel A. Per-person health spending in high-income countries is projected to grow from \$5,221 to \$9,215, in upper-middle-income countries from \$914 to \$3,903, in lower-middle-income countries from \$267 to \$844, and in low-income countries from \$120 to \$195. This means that health spending in upper-middle-income countries is projected to grow the fastest among these income groups, at 5.7% annually. Low-income per-person health spending is projected to grow at 1.8%, lower-middle-income spending at 4.5%, and high-income spending at 2.2%. Despite the fact that high-income countries are projected to have relatively slow growth, per-person spending disparities will remain massive after 30 years. Per-person spending in low-income countries will represent just 2.1% of spending in high-income countries, and lower-middle-income per-person spending will amount to only 9.2% of high-income country spending.

Figure 18 breaks down the above 2014–2040 spending increases by funding source, including government spending, prepaid private spending, out-of-pocket spending, and DAH. Note that for every income group, the proportion of total health spending funded by government sources is projected to increase, while the proportions funded by out-of-pocket spending and DAH are projected to decline. This projection takes into account the recent flat growth in DAH and the previously described relationships of government spending and out-of-pocket spending with increasing development. As countries develop over the next 30 years, the FGH researchers expect the established relationship of funding sources and develop-

Figure 18
Proportion of projected increases due to funding source by World Bank income group, 2014–2040



Source: Financing Global Health Database 2016

ment to remain in effect. As development levels increase, the share of total health spending financed by government sources will rise, while the share financed by out-of-pocket spending will fall. DAH, while projected to decline as a percentage of total health spending, will no doubt continue to play an important role in sustaining the health systems of low-income countries.

Figure 18 underlines the importance of government funds in global health – both now and in the future. Globally, FGH researchers project total government spending on health to increase by \$1,126 per person between 2014 and 2040. The largest absolute increase will come in high-income countries, where governments are expected to increase per-person spending on health by \$2,729, to a total of \$6,039, in 2040. That is almost double the 2014 per-person spending. Per-person spending in upper-middle-income countries is forecast to nearly quadruple, reaching \$3,903 per person, by 2040. By 2040, lower-middle-income countries' per-person spending is projected to nearly triple to \$844 and low-income spending to reach \$195 per person, or more than double their 2014 spending.

Despite large growth in spending in some countries, very real global health gaps persist in other countries. Groups within the global health community advocate for more funding to be spent, and more global effort expended, to decrease maternal mortality, eliminate malaria, address the rising toll of non-communicable diseases, work toward universal health care coverage, and so on. The ambitious health goals embedded in the SDGs are based, in part, on the belief that increasing both funding for health and the performance of health systems is a question of priorities, not feasibility.

The researchers behind the FGH 2016 study addressed that debate by estimating not only what countries are likely to spend on health, but what they could potentially spend on health, by 2040. This analysis of spending scenarios compares each of the 184 countries' potential future spending – both overall government spending and government health spending – to that of their peers, defined by income per person. Within each peer group, the spending proportions of the highest-spending countries define the limit of what that group of countries could spend. The FGH researchers examined what would happen to health spending if all the countries in each income group increased their spending to that limit – that is, if all countries in each income group decided to spend as much as the highest-spending members of their groups.

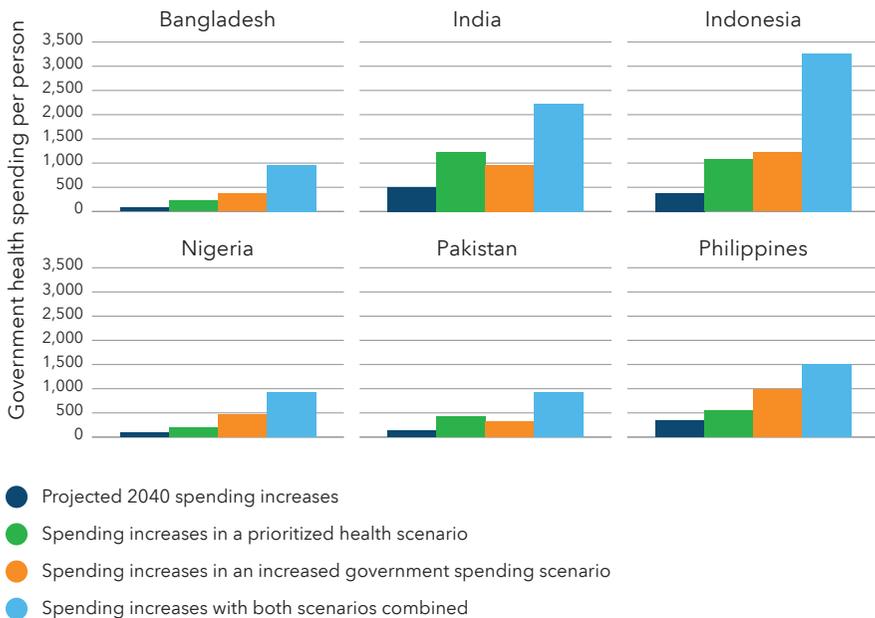
The FGH researchers projected the effect of three potential fiscal policy scenarios on government health spending. The results show that local context matters. They found that the scenario resulting in the highest health spending differed between countries. The three scenarios examined were:

1. A country raises its overall government spending to the highest level observed in its peer income group while keeping constant the proportion of government spending devoted to health;
2. A country raises the proportion of health spending in the government budget to match the highest proportion observed in its peer countries;
3. A country does both: it raises both its overall spending and the proportion of its government budget devoted to health to the highest level observed in its peer income group.

Figure 19 illustrates the results of these fiscal scenarios for six countries. The columns in the figure represent each country’s projected 2040 government health spending per person, plus their hypothetical government health spending per person in the three spending scenarios outlined above. There is no surprise that raising both total government spending and the proportion of government spending devoted to health results in the highest government health spending level. Note, though, that the results for the other two scenarios differ across the countries. Consider, for instance, India and Nigeria, two of the most populous countries in the lower-middle-income per person income group. In India, increasing the proportion of the government budget devoted to health results in the second-highest government health spending figure. In Nigeria, though, increasing overall government spending – without placing a higher priority on health within the government budget – causes the second-greatest increase in government health spending. Figure 19 underlines the fact that the particular fiscal situation of each country must influence how it addresses the need for greater health spending.

The FGH 2016 study, which included analyses like that illustrated in Figure 19 for each of the 184 countries in the study, shows that low-income countries could potentially spend, across all funding sources, a bit more than two times

Figure 19
Potential health funding increases for six countries by 2040, in four scenarios



*Spending is in 2015 purchasing power parity dollars. Source: Financing Global Health Database 2016

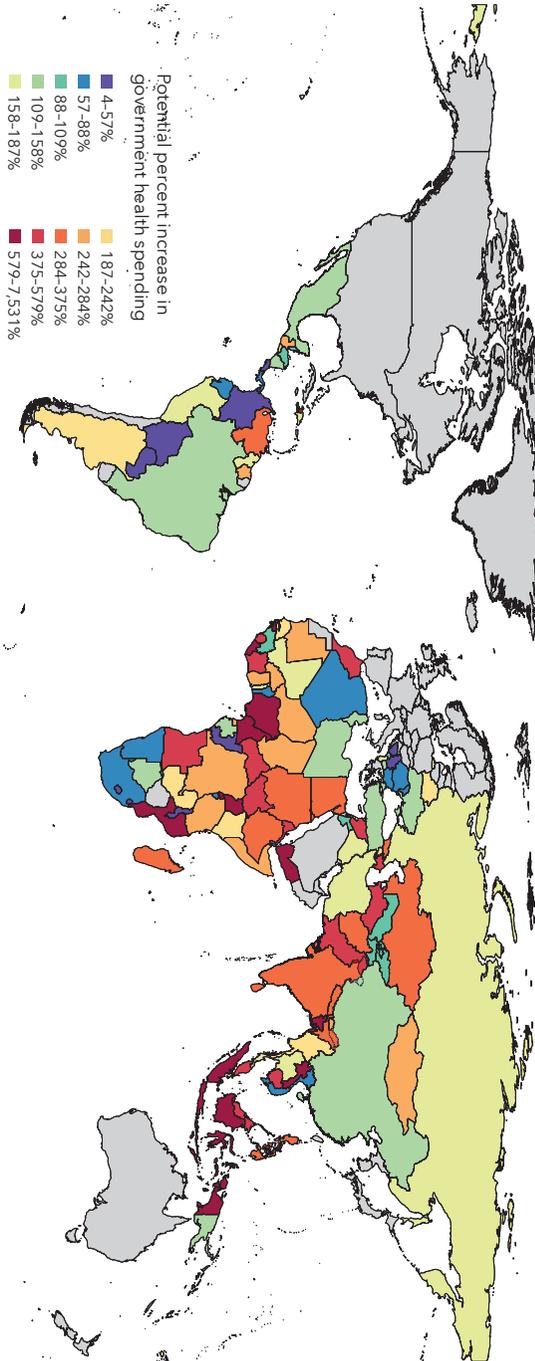
their already-projected amount on health if they spent to the level of their best-performing peers. For lower-middle-income countries, that figure is 1.8 times, and for upper-middle-income countries, 1.2 times. Increasing government health spending in these countries could impact a huge proportion of the world's people. Figure 20 shows the countries of the world, colored according to their projected potential percentage increase in government health spending. The countries with highest potential health spending increases are clustered in Africa, the Middle East, South Asia, and East Asia. Two of the four most populous countries in the world (as of 2016) – India and Indonesia – appear in shades of orange and red in Figure 20. If the country governments highlighted in this map were to increase their health spending to their potential, it would affect a huge number of people, with enormous effects on overall global health.

These potential government health spending increases are also relevant in light of the projected availability of DAH by 2040. DAH made up 0.6% of total health spending globally in 2014; by 2040 that figure is projected to decline to 0.4%. The importance of DAH is not evenly distributed, however. In 2010, DAH made up 35.7% of total health spending in low-income countries and 3.0% in lower-middle-income countries. Those percentages are also projected to decline by 2040, to 26.3% of low-income country health spending and 1.2% of lower-middle-income country health spending. The underlying condition behind these projections, as illustrated in Figure 21, is that DAH growth is expected to rise slowly between 2014 and 2040.

The world has, in the recent past, committed to and followed through on providing DAH. Recently, however, DAH growth has stalled. It may be that low- and lower-middle-income countries will be confronted with the need to raise their health spending to the potential levels outlined in Figure 20 not only to foster health improvements in their populations, but also to mitigate the effects of reduced DAH.

Figure 20

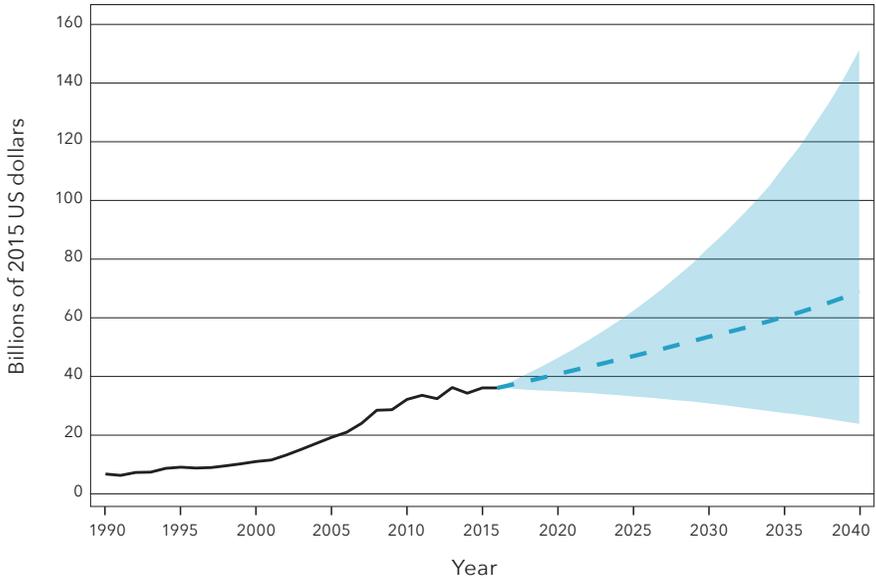
Potential increases in health spending by 2040 in low-, lower-middle-, and upper-middle-income countries



Source: Financing Global Health Database 2016

Figure 21

Estimating future DAH, 2015-2040



2015 and 2016 estimates are preliminary.

Note: DAH projected for each major source through 2040. An ensemble modeling approach was utilized, incorporating more than 381 models, each based on a distinct set of underlying drivers.

Source: Financing Global Health Database 2016

Conclusion

Disparities on the Path to Universal Health Coverage highlights several key trends in health financing. Rising incomes and development levels have enabled more spending on health in most countries. The sources of health funds that people use tend to relate to the development level of the country in which they live: the greater the level of development, the greater the chance that someone seeking care can do so without relying on out-of-pocket funds or DAH. Across the development spectrum, countries' populations purchase similar proportions of different types of health care, even though the raw amounts of health care purchased are far higher in high-income countries than in other countries.

While these trends are clear, they obscure important differences among particular countries. Some countries spend far more on health than their income and development peers, while some spend far less. The exact mix of funding sources also differs appreciably among countries. Even the ways to increase health funding differ among countries.

These variations and complexities indicate that judicious planning is needed to align countries' health financing systems with their population health goals. Many people and countries seek to achieve universal health coverage. Reaching that goal may require substantial changes to any given health system – increasing government funding for health care, for example, and/or taking steps to reduce reliance on out-of-pocket spending – before that health funding system will be able to support the health outcomes it is intended to achieve.

Methodological appendix

Completing the Financing Global Health (FGH) 2016 study required collecting, combining, and analyzing data from a variety of sources. The FGH study involves two analyses, one retrospective and one prospective. The retrospective analysis focuses on the period 1995–2014 (and, for some topics, 1990–2016), while the prospective analysis seeks to project health financing from the present to 2040.

This section offers a brief overview of the methods used in those processes. Full methodological details are available in the two FGH 2016 papers published in *The Lancet*:

Global Burden of Disease Financing Global Health Collaborator Network. Evolution and patterns of global health financing 1995–2014: development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries. *The Lancet*. April 2017.

Global Burden of Disease Financing Global Health Collaborator Network. Future and potential spending on health 2015–2040 by government, prepaid private, out-of-pocket, and donor financing for 184 countries. *The Lancet*. April 2017.

All of these materials are available via IHME’s website at www.healthdata.org/fgh2016. The journal articles are also available, free of charge, at *The Lancet*’s website. The IHME website also hosts a visualization tool (<http://vizhub.healthdata.org/fgh>) that allows users to explore the FGH 2016 data on their own. All FGH materials on the IHME website are freely accessible to the public.

Estimating past and present health financing

Data used in the FGH analyses of past and present health financing – the “retrospective” analysis – were collected from several sources, adjusted to ensure their comparability, and combined into the Financing Global Health database. All of the data sources used for these analyses required adjustments before they could be added to the study database, standardized into a common currency, and then compared with each other and across time.

The data adjustments performed by the FGH researchers differed according to the original data source. For instance, health spending data for 184 countries between 1995 and 2014 originated in the World Health Organization’s Health Expenditure Database. At times, the study team imputed missing values in this dataset. This means that, if the dataset contained a country’s government health spending for 1995 to 2014, but happened to be missing data for 2008, the FGH team could surmise, based on the overall spending trends of that country, what the 2008 spending likely was. Because the WHO database tracks spending by agent, such that it is unclear if government and private spending are sourced domestically, the FGH team removed DAH funds from the government and private spending source categories before using them in analyses.

Data on DAH as a source of funding came from all publicly available databases tracking development assistance. When the same DAH funds appeared in two different places in a dataset – for instance, in the accounts of both the disbursing agency and the receiving agency – researchers adjusted the data so as not to “double count” the same funds.

Data on type of care purchased with health funds came from all available National Health Account (NHA) reports. The FGH study team used a total of 964 NHA reports in its analysis. The categories of care used in NHA reports changed in 2011, requiring care category adjustments to ensure the same funds could be tracked consistently before and after that date.

After these data were collected and standardized, the researchers could use them in statistical analyses. They created statistical models that described how total health spending changed over time (each year from 1995 to 2014) and according to GDP per person using nonlinear penalized splines. The researchers then created similar models that described the observed trends in health spending by source of funds and by type of care. These models built upon each other, thereby allowing the researchers to examine how all of the variables (time, GDP per person, spending source, type of care) interrelated with each other.

For all statistical analyses, FGH researchers calculated uncertainty intervals by a process called “bootstrapping,” in which the original data were transformed to create 1,000 different datasets. Then all of the statistical analyses were rerun on those datasets. This created a range of plausible estimates that could potentially be accurate, depending on the uncertainties inherent in making estimates. The full range of those plausible estimates constituted the uncertainty intervals for the FGH 2016 estimates. The uncertainty intervals for every statistical analysis produced by the FGH study are available in the academic articles published in *The Lancet*.

Estimating future health spending

The task of estimating future health spending started with the data collected and produced in the retrospective analysis. To that, FGH researchers added gross domestic product (GDP) data spanning 1980 through 2015. These retrospective sets of health financing and economic data were used to create a series of statistical models that projected the GDP, all-sector government spending, DAH, government health spending, prepaid private health spending, and out-of-pocket spending of 184 countries through 2040. The researchers tested the performance of all the models and used the best-performing ones to create the country-specific estimates through 2040 that appear in the related academic papers and this report.

These projections of country spending were, in turn, used to complete the second part of the future health spending analysis: the analysis of potential spending scenarios, which examines hypothetical changes countries could make to their government health or overall government spending. The FGH research team first established which countries had the highest projected government health and overall government spending among their peer countries. They could then examine the hypothetical spending increases for each country if it were to spend like its highest-spending peer(s).

To estimate uncertainty intervals for their future spending analyses, the FGH researchers employed three strategies. First, because the researchers used multiple statistical models to project future spending, they could use the range of different projections produced by those many models as preliminary uncertainty intervals. This is called an ensemble modeling strategy. Second, the researchers examined the uncertainty of each of their underlying models and took random draws of the parameter estimates in order to incorporate this uncertainty. Finally, they used established methods to introduce random economic “shocks” to the models. These “shocks” simulate the effects of global, regional, or country recessions and financial emergencies. Taken together, these three methods of incorporating uncertainty into the FGH projections account for many of the possible reasons health spending could change over the next 25 years – from government policy decisions to natural disasters affecting the functions of the world economy.

Limitations of the FGH study

There are some limitations to the FGH study that revolve around data availability and quality. In some cases, the data used in the FGH study can be sparse and its quality variable. Even in cases such as the NHA data, in which the format of the datasets themselves has been standardized thanks to the efforts of a wide variety of stakeholders, the quality of the input data in those sources is sometimes lessened by health systems’ reliance on approximation of spending data rather than its routine collection.

These data are powerful tools for assessing, and potentially improving, the state of health financing. They could be made still more powerful with some improvements. Evaluating, validating, and correcting for any known biases in our sources of health financing data could improve the utility of health financing data for decision-makers. So, too, would making the reporting of DAH data more transparent and comprehensive. Strengthening individual countries’ understanding of health spending within their own systems could improve the input data for all of these sources.

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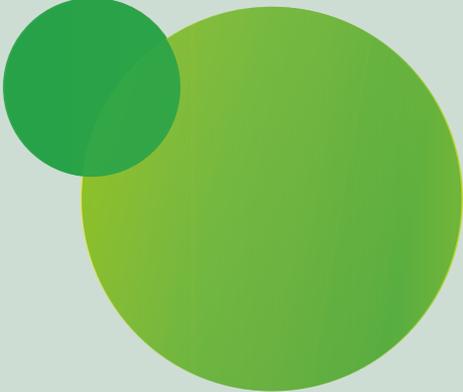
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