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Global collective action in health

The WDR+20 landscape of core and supportive functions

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Abstract: This paper discusses shifts in development assistance for health (DAH) since 1990, analyses the nature of the current distribution of funding, and considers future implications. Based on Jamison et al. (1998) and Frenk and Moon (2013), we introduce an 'essential functions' framework, which provides a function-based taxonomy for global collective action in health, and apply that framework to several prominent actors and modalities for DAH. Potentially overlooked advantages to the complex DAH landscape and the special challenge of DAH for middle-income countries are discussed, as well as key challenges and questions about the future balance of essential functions of global health.

Keywords: development assistance for health, official development assistance, global health, WHO, Global Fund, GAVI
JEL classification: F63, I10, I15

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1 Introduction

The 1993 World Development Report helped launch an unprecedented era of growth and innovation in development assistance for health (DAH).[1] Twenty years later, the global health landscape has changed dramatically, with many new actors spending far larger amounts of funding in novel ways. Following the United Nations (UN) Millennium Declaration in 2000, which established the Millennium Development Goals (MDGs), DAH almost tripled to reach around US$28 billion annually (IHME 2012).

Over the past decades there has also been a shift in the burden of disease away from causes associated with under-nutrition and infection to non-communicable, chronic diseases that require complex treatment and preventive interventions (Lozano et al. 2013). Health systems, especially in low- and middle-income countries, face a complex set of challenges as they try to meet the needs of accelerated, polarized, and protracted epidemiological transition (Frenk et al. 1996). This is further compounded by the health challenges of globalization such as climate change (Frenk and Moon 2013). Despite the magnitude of these new challenges, global financing in these areas remains a tiny proportion of DAH (Atun et al. 2012).

The new, complex landscape of DAH has raised concerns about the efficiency and effectiveness of global collective action, or international co-operation, for health. These concerns are heightened as funding growth flattens, epidemiological profiles evolve, and the MDGs expire, triggering debate on how sovereign governments and international organizations should prioritize different global health objectives. However, there are likely some advantages to complexity as well, such as innovation from increased competition among international organizations and more options for leaders in low- and middle-income countries. Reflection on the current global health landscape and debate about the future role of global collective action is timely. One key question is how the new combination of funding, actors, and assistance mechanisms is prioritizing what have been termed the 'essential functions' (Jamison et al. 1998) of global health organizations.

This paper discusses shifts in DAH since 1990, analyses the nature of the current distribution of funding, and reflects on the future. Drawing on recent work by the Institute for Health Metrics and Evaluation (IHME 2012); Ravishankar et al. (2009); Atun et al. (2012); and others, Section 2 summarizes how DAH financing has grown since 1990 and shifted dramatically since 2000. Section 3 introduces an 'essential functions' framework, based on Jamison et al. (1998) and Frenk and Moon (2013), which provides a function-based taxonomy for global collective action in health. In Section 4, we apply that framework to several prominent actors and modalities for DAH, especially major new ones since 1993, in order to analyse trends in the prioritization among essential functions. Two boxes then briefly cover corollaries to Section 4—some potentially overlooked advantages to the complex DAH landscape (Box 1), and the special challenge of DAH for middle-income countries (Box 2). Section 5 concludes and raises key challenges and questions about the future balance of essential functions of global health.

[1] This paper uses the IHME's definition of development assistance for health: 'financial and in-kind contributions made by channels of development assistance—that is, by institutions whose primary purpose is providing development assistance to improve health in developing countries' (IHME 2011).

2 Dramatic changes in funding for DAH (1990-2010)

2.1 Aggregate funding increases

The 1993 World Development Report (WDR), *Investing in Health*, urged the international community to devote more resources to health. Specifically, the report recommended immediately restoring health funding to 7 per cent of official development assistance (ODA) (up from its decline to 6 per cent in 1986-1990), and envisioned that an additional US$2 billion could 'finance a quarter of the estimated additional costs of a basic package in low-income countries and of strengthened efforts to prevent AIDS'. In many ways, the response of the global community surpassed even the most optimistic scenarios imagined 20 years ago. Since 1990, development assistance for health (DAH) has grown at an 8.7 per cent compounded annual rate, nearly quintupling from US$5.7 billion in 1990 to US$28.2 billion in 2010 (in constant 2010 US$). DAH growth has since stagnated, plateauing after 2010 (IHME 2012). This growth in DAH has likely been driven by a number of factors, including concerns about global security, constraints to WHO's leadership in global health (Bloom 2011), increased awareness of health challenges in developing countries (especially related to HIV and AIDS and the MDGs), and greater understanding of externalities in global public health.

There is suggestive evidence that DAH flows have increased relative to other development assistance flows as well. Although ODA figures do not capture all elements of DAH (for instance, they exclude the contributions of some emerging economies, and of NGOs and philanthropic foundations),[2] they still indicate the prioritization of health relative to other issues on the global agenda. Since falling from its historical average of 4.5 per cent to a low of around 4 per cent in the early 1990s, the basic health share of total ODA reached 6 per cent in 2010 (OECD 2013).

2.2 Shifting distribution of funding: channels, regions, diseases, and sources

About one-fifth of DAH now originates from or is channeled through new private and public institutions that did not exist in the early 1990s, including UNAIDS, GAVI, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the Bill and Melinda Gates Foundation. Development banks such as the World Bank and the Inter-American Development Bank have also taken a more prominent role in supplying DAH than they did in the early 1990s. By contrast, the relative contributions of bilateral and UN agencies have diminished (Table 1). Among the bilateral institutions, the United States accounts for one quarter of all DAH, up from one sixth in 1990, and the UK's share has also grown rapidly, from less than 1 per cent in 1990 to more than 4 per cent of the total DAH in 2010.[3]

[2] With the exception of the Bill and Melinda Gates Foundation.

[3] When tracking multi-laterals, IHME eliminates double-counting among channels that provide sufficient data.

Table 1: Gross DAH flows by channel of assistance in 2010 US$ millions

Channel	1990	% total	2010	% total
Bilateral Agencies	2,823.4	49.2	12,009.7	42.7
United States	927.2	16.2	7,119.5	25.3
United Kingdom	56.3	1.0	1,168.6	4.2
Development Banks	280.4	4.9	2,384.6	8.5
UN Agencies	1,967.3	34.3	4,507.9	16.0
US-incorporated NGOs	499.8	8.7	2,960.0	10.5
US Foundations (non-Gates)	118.6	2.1	454.2	1.6
European Commission	52.4	0.9	359.3	1.3
GAVI	0	0	1,068.0	3.8
Global Fund	0	0	3,292.9	11.7
Gates Foundation	0	0	1,123.3	4.0

Source: IHME (2012) (estimates for bilateral DAH).

The aggregate quintupling of global DAH has occurred with considerable regional variation in DAH growth (Table 2). The high proportion of unallocable funds limits comparability across time, but some broad trends seem clear. Sub-Saharan Africa has witnessed rapid growth in assistance over the past two decades, with a 15-fold increase from US$0.57 billion in 1990 to US$8.1 billion in 2001, driven substantially by investments to address the high AIDS burden in the region. Since the collapse of the Soviet Union, DAH to Central Asia has also grown, increasing by a factor of almost 60, from very low levels in the early 1990s to US$896 million in 2010. The allocable share to South and Southeast Asia has increased less markedly. DAH flows to Latin America and the Caribbean and Middle East and North Africa have grown more slowly than overall DAH growth.

Table 2: DAH by recipient region in 2010 US$ millions

Region	1990	% total	2010	% total
Sub-Saharan Africa	566.3	9.9	8,074.10	28.7
South Asia	267.8	4.7	1,780.50	6.3
East Asia and the Pacific	298.7	5.2	1,551.20	5.5
Europe and Central Asia	15.4	0.3	896	3.2
Latin America and the Caribbean	364.1	6.3	1,618.50	5.8
Middle East and North Africa	120.6	2.1	521.4	1.9
Global*	45.2	0.8	3,476.90	12.4
Unallocable by region**	4,063.70	70.8	10,241.30	36.4
Total	5,741.90	100	28,159.80	100

Notes: * Contributions that donors categorize as 'benefiting the entire world', which includes research and other global public health goods. ** DAH for which IHME has no recipient country information is coded as 'unallocable'.

Source: IHME (2012).

The allocation of DAH by disease group has also changed over the past 20 years (Table 3). Again, the high proportion of unallocable funds makes comparisons across time difficult,

Table 3: DAH by disease group in 2010 US$ millions

Disease group	1990	% total	2010	% total
HIV/AIDS	198	3.5	6,757.40	24
Maternal, newborn, and child health	1,217.50	21.2	5,166.80	18.4
Malaria	38.6	0.7	1,856.70	6.6
Health sector support	8.7	0.2	1,180.90	4.2
Tuberculosis	56.7	1	1,095.10	3.9
Noncommunicable diseases	30.8	0.5	185.1	0.7
Other*	1,950.50	34	5,945.70	21.1
Unallocable**	2,241.20	39	5,972.10	21.2
Total	5,741.90	100	28,159.80	100

Notes: *Represents DAH for other health focus areas not yet tracked by IHME. ** 'Unallocable' corresponds to DAH for which IHME did not have project-level information on disease-focus.

Source: IHME (2012).

particularly for the 'Global' category, which appears to have been poorly tracked in 1990. Still, Table 3 is a reflection of how the disease profile of the world has evolved since 1990. The emergence of AIDS as a priority area is evident in the 34-fold increase in DAH for this disease over the two decades. Today, nearly a quarter of all DAH (and nearly a third of allocable DAH) is AIDS expenditure. The share of resources spent on malaria and tuberculosis has also increased substantially, while the share earmarked for non-communicable diseases (e.g. heart diseases, cancers) has remained very low, at less than 1 per cent, from 1990-2010 (IHME 2012).

2.3 New role of middle-income countries

Large middle-income countries (MICs) —Brazil, Russia, India, China, and South Africa (BRICS) —have also increased their DAH over the past 20 years.

Table 4 shows the volume and growth of overall assistance (non-health specific) from the BRICS between 2005 and 2010, as estimated by GHSi (2012). The influence of these countries in the global health arena has grown commensurately, as they have become more active and prominent in international organizations like the WHO and global forums such as the recent WTO rounds.

Evidence collected by the AidData initiative (AidData 2013) shows that assistance from Brazil flows primarily to Lusophone African countries (e.g. Angola, Cape Verde, Mozambique) and its South American neighbours. Russia's DAH is primarily to neighbouring countries in Central Asia and the Commonwealth of Independent States, motivated in part by a desire to prevent infectious diseases from entering Russia (Bliss 2010). Although India's assistance for health is currently low relative to its assistance to other sectors, there are signs of growing involvement in global health. Since 2009, India has committed over US$100 million to bilateral health projects in South Asia, Southeast Asia, and Africa (GHSi 2012).

China's engagement is primarily in Africa and dates back to the 1960s. Its assistance to the continent has been expanding and intensifying since 2000 (Lui et al. 2011), and includes donation of medical equipment and drugs, health workforce training, and anti-malaria campaigns. China is also actively promoting health co-operation with its Southeast Asian neighbours. While South

Table 4: Foreign aid from BRICS

	Launch of foreign assistance programme	Total foreign assistance, US$ millions, 2005	Compound annual growth rate, 2005-2010 (%)	Total foreign assistance, US$ millions, 2010
Brazil	1960	158	20.4	400
Russia	1955	101	36.1	472
India	1964	463	10.8	680
China	1950	1,300	23.9	3,900
South Africa	1968	97	8.0	143
Total		2,000	22.9	5,600

Source: Global Health Strategies Initiatives (GHSi) (2012).

Africa has provided less financial assistance than the other BRICS, it has been forming South-South alliances, providing technical assistance to South African Development Community countries, and advocating for greater influence of African countries in setting the global health agenda (GHSi 2012). In addition to supporting other low- and lower-middle income countries, the BRICS are providing global health public goods by carrying out health R&D to produce lower-cost health technologies and pioneering innovating programming (GHSi 2012).

There is ongoing debate concerning the optimal role of middle-income countries within the DAH Landscape (Bliss 2010). While they are expanding in their role as DAH donors and shapers of the global health agenda, they face significant domestic health challenges of their own, and their DAH receipts still outweigh their contributions.

3 Conceptual framework: the distribution of DAH by function

Five years after the publication of the 1993 World Development Report, Jamison et al. (1998) proposed a framework that categorizes and provides a rationale for the essential functions of 'international collective action' for health. Collective action is 'an economically rational approach to the provision of public goods … and international collective action responds to opportunities of which benefits cover many nations' (Jamison et al. 1998: 516). We adopt this definition, but use the more current term 'global collective action' following others (Reich and Takemi 2009; Kickbusch and Kökény 2013).

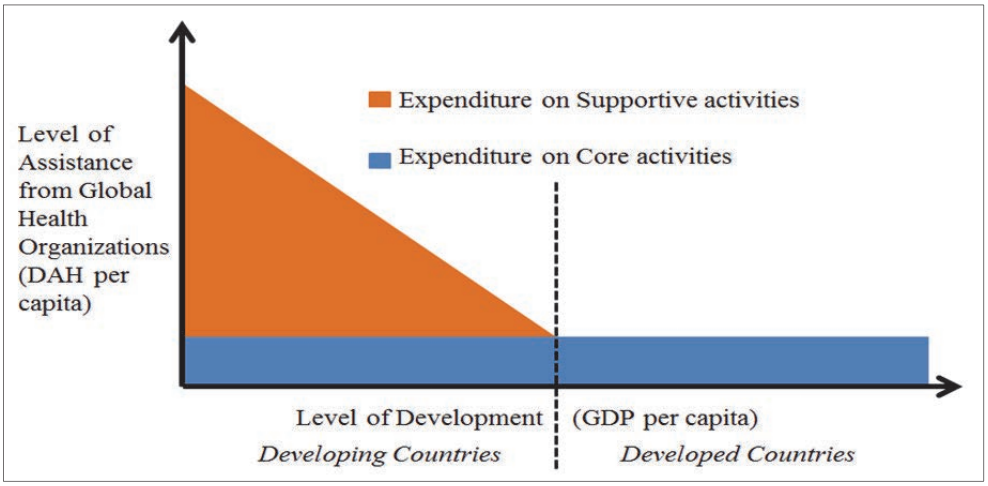
The first category, *core functions*, responds to the cross-national interdependence of the global health system that is the source of global public goods and health externalities. Due to spillover effects, costs and benefits of health activities do not accrue to a single nation state, so global collective action is required to encourage more efficient outcomes in health, the determinants of health, and health-determined outcomes of human, social and economic development. The authors view the fulfillment of core functions as the key role of global health organizations such as WHO.

The second category, *supportive functions*, responds to financial or other capacity constraints within individual countries. Supportive functions largely coincide with traditional development aid—for example, providing assistance to developing countries where national health systems are underdeveloped and lack the resources to address national health challenges. These functions also include emergency support in situations where capable governments are temporarily

disabled by extenuating circumstances, such as natural disasters. Supportive functions tend to be ethics-based obligations undertaken in solidarity with populations in need. Global collective action in the supportive role is expected to diminish and become more targeted as countries' basic needs are met and economic development continues, and should move toward facilitating or supplementing rather than wholly providing goods and services that are the responsibility of sovereign states.

In this framework, supportive functions tend to wane across the continuum of economic development from countries in crisis and the poorest countries to high-income market economies. Thus, the need for supportive activities, and hence the role of international actors in providing them, declines as the economies become stronger and income increases in an equitable manner (Figure 1). Still, support for certain groups may be lacking even in wealthy countries under conditions of exclusive social norms, ethnic and racial divisions, and political or humanitarian crisis, or if wealth is spread very unevenly across a population. Indeed, the supportive functions of large DAH providers like the World Bank are often targeted at low-income groups in middle-income countries.

Figure 1: Declining emphasis on supportive functions as countries develop



Source: Based on Jamison et al. (1998).

More recently, Frenk and Moon (2013) employed a similar framework that includes a new rationale and several new functions. Since this framework is compatible with the core vs. supportive distinction made by Jamison et al. (1998), we merge the two frameworks to create a comprehensive, function-based taxonomy for global collective action in health. An important addition from Frenk and Moon is the mobilization of global solidarity, a rationale for supportive functions that arises from the very unequal distribution both of health problems and the resources to address them.

Table 5 summarizes the unified framework—from here on referred to as 'the essential functions framework'—with recent examples offered for each category. In the subsequent sections, we discuss several prominent new actors and modalities for DAH and attempt to map these onto the framework, in order to analyse trends in the balance between core and supportive functions.

Table 5: Categories of essential functions for global health organizations

Category	Rationale	Function	Sub-function	Example organization	Example activity
Core	Correction of market failures for improved global health	Production of *global* public goods	Research and development (especially for problems of global importance)	Bill and Melinda Gates Foundation	HIV Vaccine Research
			Information and databases for shared learning	IHME	Population health data collection
			Comparative evidence and analysis	Think tanks	Research studies, policy briefs
			Harmonized norms and standards for national use and international regulation	World Health Organization	Guidance on use of new vaccines
		Management (surveillance and control) *of externalities*	Surveillance and border control, especially during epidemic outbreaks	Center for Disease Control	Disease surveillance during avian flu outbreak
		Stewardship	*Convening for consensus building, priority setting, rule setting, and cross-sector health advocacy*	United Nations	Declaration on non-communicable diseases
Supportive	Ethical obligations and *mobilization of global solidarity*	Act as agent for dispossessed, (*mobilize global solidarity)*	Provision of basic needs in failed states	Bilateral aid agencies	Provision of emergency healthcare during conflict in Syria
			Assistance in natural or artificial disasters	Bilateral aid agencies	Aid to Haiti after 2010 earthquake
			Protection of vulnerable groups	UN High Commissioner for Refugees	Response to disease outbreaks in refugee camps
		Support development, (*mobilize global solidarity)*	International technical Co-operation	Nearly all 'traditional' DAH has elements of this	
			Development financing	World Bank	Lending and grants to low- income country health sectors 8

Sources: Based on Jamison et al. (1998) and Frenk and Moon (2013). Boxes in italics are incorporated from Frenk and Moon.

4 Not just more money: a changed landscape of essential functions amid new actors and modalities of DAH

As DAH quintupled in volume from the early 1990s to 2012, the number of new actors and modalities for mobilizing, channeling, and delivering DAH also multiplied at a remarkable rate. In this section, we apply the unified essential functions framework to today's DAH landscape. We begin with what can be gleaned from IHME data, then move to exploratory evidence across a sample of several prominent actors and modalities. It is beyond the scope of this study to account for every actor and modality that has emerged since 1993,[4] so we focus on the WHO and World Bank, three institutions that Atun et al. (2012) argue have 'truly innovative' financing mechanisms on a global scale (Global Fund, GAVI, and UNITAID), the largest new actor-donor in DAH (Gates Foundation), and the largest bilateral development assistance agency (USAID). This section concludes by mapping these institutions into the essential functions framework (Table 11), revealing that while each major global health organizations provides a mix of functions, some tend to engage more in core activities (e.g., WHO and UNITAID) while others have a decidedly supportive focus (e.g., Global Fund and GAVI). Overall, there is evidence of a greater emphasis on supportive functions in the recent rise in DAH.

4.1 Core and supportive functions of large global health organizations

How has the distribution of DAH funding changed since 1993 vis-à-vis the core and supportive functions in the essential functions framework? The IHME statistics describe financing flows in many ways (e.g., in Table 2 and Table 3), but no available categories are directly linked to the essential functions that global health organizations should be striving to deliver, as put forth by Jamison et al. (1998) and Frenk and Moon (2013). The 'Global' line-item in Table 2 does distinguish DAH that is not specific to a particular region, such as contributions to health research and the creation of public goods that benefit multiple regions or the entire world. But this comparison is confounded by the large proportion of DAH that is 'unallocable by region,' 71 per cent in 1990 and 36 per cent in 2010, preventing any solid conclusions about change over time by functions.

Since IHME data do not allow clear distinction between funds allocated to core and supportive functions, we explore evidence from publicly-available budgets of selected global health actors. There are clear limitations to this approach, since budgets and grant portfolio summaries are not standardized, and often are not explicit about what activities are included in specific line-items. Furthermore, focusing on specific line-items in budgets potentially misses linkages between various activities and broader impacts and externalities generated by the organization. Still, this analysis provides some preliminary indications of whether development financing for health has shifted between core and supportive functions since the early 1990s.

World Health Organization

Despite widespread critiques and concerns about diminished status of the WHO in the new DAH landscape (Bloom 2011), the organization continues to lead in global health policy as a producer of global public goods and steward of knowledge and best practice. We highlight

[4] IHME only tracks private sector charitable funding that is channeled through a subset of US-based NGOs and foundations. DAH from private sector sources that are not currently accounted for by IHME are growing and significant. For example, the Wellcome Trust, a private UK-based research-funding charity, made US$42 million in international health grants in 2006, according to McCoy et al. (2009).

examples of three relatively new WHO activities: prequalification programmes (PQP), vaccine position papers, and clinical practice guidelines.

As the volume of medicines and vaccines purchased by low- and middle-income countries directed and through bulk purchasers like PEPFAR, UNICEF (which purchases on behalf of GAVI), and the Global Fund has grown rapidly in recent years, the need to establish global standards of quality for these commodities has become more pressing. To fill this gap, WHO runs *prequalification programmes* (PQPs) for medicines, vaccines, and diagnostic tests. PQP started in 2001 with a focus on AIDS, tuberculosis, and malaria medicines. WHO currently allocates nearly US$16 million to the prequalification of medicines. PQP extends invitations to manufacturers to submit their products for a five-step procedure, including assessment and inspection. A similar process is in place for vaccines and diagnostic tests. By providing approval of medical products that meet safety, quality, and efficacy standards, WHO significantly reduces the need for purchasers to incur costs in seeking information about the drugs, vaccines and diagnostics (WHO 2013a).

WHO's *vaccine position papers,* based on recommendations of the WHO Strategic Advisory Group of Experts on immunization, summarize key information on diseases and associated vaccines, providing national public health officials and immunization programme managers with WHO guidance on their proper use. The central contribution of these papers is concise, analytical evaluation of the scientific evidence from clinical trials on the effectiveness of vaccines. The first paper, released in August 1998, was on Varicella. The most recent vaccine position paper (January 2013) is on Rotavirus. The papers are reviewed periodically and updated to reflect the latest evidence (WHO 2013b).

A third global public good produced by the WHO are its *clinical practice guidelines*. The WHO releases publications to inform best practices on a range of topics, from breastfeeding to poison control. The Guidelines Review Committee, established in 2007, is responsible for ensuring that these global guidelines are developed transparently, based on evidence, and of high quality. Since 2008, the WHO has released 90 guidelines documents on: Child health, Chronic diseases, Environmental health, HIV/AIDS, Maternal health, Mental health, Nutrition, Patient safety, and Tuberculosis. When properly produced by consolidating reliable information developed using formal methods of review and consensus, WHO's guidelines save time and reduce information costs for all global health actors, particularly practitioners in resource-limited settings who might not have capacity to determine their own policies and practice guidelines (WHO 2013c).

While WHO's role has been challenged as DAH funding, actors, and modalities have proliferated (IHME's Global Burden of Disease project is a prominent example), it continues to have a strong influence on how DAH is prioritized and implemented, and is the obvious and single agency able to produce many required public goods. The three WHO activities described above are examples of core activities.

However, there is some evidence that WHO may have experienced a shift toward more supportive activities since 1990. WHO's regular budget funds are raised from membership dues and are pooled to finance WHO's programme budget. Its extra-budgetary income comes from voluntary contributions from donor countries and is earmarked for specific projects (often disease-specific programmes). Extra-budgetary expenditure has increased as a share of WHO total expenditure, from 61 per cent in 1990 to 82 per cent in 2010.

Closer inspection of the WHO programme budget 2010-11 performance assessment (WHO 2012), which compares proposed commitments against actual expenditure, shows that 35 per

cent of all spending was for headquarter activities. The remaining expenditure was on regional and country offices. If we assume that spending at the regional and country level was largely for country- specific assistance, this has significant implications concerning the WHO's balance between core and supportive functions. Fifty per cent of WHO spending was both extra-budgetary and at the regional office level, raising the possibility that world's leading intergovernmental health organization spends the majority of its resources on country-specific supportive activities.

The World Bank

Much of the World Bank's assistance through country-specific (and increasingly country-directed) lending, but it is important not to overlook its transformative, core-type contributions to global health. The World Bank's portfolio covers 19 intertwined sectors, and many of its know-how contributions, such as its catalytic research on conditional cash transfer programmes and results-based financing, are difficult to monetize. Indeed, with the continued growth of developing economies, the World Bank increasingly focuses on helping countries make best use of their own health financing through knowledge services, rather than directly providing development assistance for health.

Still, broadly speaking, a distinction can be drawn between the WHO, which concentrates on core health functions, and the World Bank, which focuses mostly on strengthening health systems and providing technical assistance (World Bank 2013) in a supportive function role. While WHO's DAH has nearly doubled over the past decade (from US$1.1 million annually in 1990-92 to US$2.1 million annually in 2010-12), the World Bank's health aid has grown much faster and now equals that of WHO (up to US$2.0 million annually in 2010-12 from US$0.2 million in 1990-92). This raises the question of whether, on top of the apparent shift in emphasis within the WHO, the balance of health assistance between these two international organizations has shifted in favour of supportive activities.

The Global Fund

The Global Fund for AIDS, Tuberculosis, and Malaria (the Global Fund) was established in 2002 to provide grants to governments and civil society in low- and middle-income countries for prevention, treatment, and care and support of persons affected by the three diseases. Primarily funded by bilateral donors with some additional private sector contributions, the Global Fund is a financing mechanism, designed to mobilize, pool and distribute funds for programmes rather than to implement programmes itself.

This new actor in DAH is also a key recipient of funds from two new fundraising modalities for DAH: Debt2Health and (PRODUCT)RED. Debt2Health is one of several examples of 'debt swaps', whereby donors forgive a portion of debt held by recipient countries in exchange for specific investments in Global Fund-financed projects (Hecht et al. 2010). (PRODUCT)RED is a brand licensed to several prominent multinational companies who donate half of their profits on select (PRODUCT)RED items to the Global Fund, generating US$162 million from January 2006 to June 2011 (Atun et al. 2012).

Atun et al. (2012) list several of the Global Fund's innovations, which appear to cover mainly supportive functions. The Global Fund's grants are used for disease control activities in individual countries, mainly supportive functions of service delivery and improved programme management. The Global Fund's grant portfolio by type of expenditure (Table 6) suggests that it plays a strongly supportive role as a global health organization that focuses resources on the poorest countries, and on diseases that are concentrated among the poor.

Table 6: Global fund DAH by type of expenditure, 2002-12

Cost category	US$ millions	% total
Health products and health equipment	2,700	21.2
Medicines and pharmaceutical products	2,500	19.7
Human resources	1,900	14.9
Training	1,200	9.4
Infrastructure and other equipment	1,000	7.9
Monitoring and evaluation	550	4.3
Living support to clients/target populations	600	4.7
Planning and administration	600	4.7
Communication materials	510	4.0
Procurement and supply management costs	390	3.1
Overheads	370	2.9
Technical assistance	230	1.8
Other	160	1.3
Total	12,710	100.0

Note: All cumulative budgetary numbers reproduced are in nominal US$.

Source: Global Fund Annual Report (2012).

At the same time, the Fund has generated important public goods, for example by acting as a market shaper for AIDS drugs and malaria bed nets, effectively lowering prices for all low- and middle-income countries. Through its price and quality reporting system (PQR) launched in 2009, the Global Fund also makes the prices and terms for all the key medicines and health products it finances publicly available (Global Fund 2011). That information is a public good which is widely utilized by countries. In addition, one might argue that the pooled and standardized allocation of those funds (according to need, good governance, and performance) is itself a core function whose benefits (e.g., improved control of infectious diseases) accrue to the entire global community, and which would likely be undersupplied if left to individual states. Other Global Fund core activities overlap with WHO activities—monitoring, global surveillance, data collection, and convening non-state actors for health. The Fund also plays a translational role in core functions, translating WHO's global guidelines to the subnational level.

However, as shown in Table 6, nearly all of the Global Fund's expenditure is recurring (medicines, labour, equipment) and aligns mostly under the 'support development' activity of the essential functions framework.

GAVI Alliance

The GAVI Alliance is a public-private partnership founded in 2000 to finance the provision of new and underused vaccines to children in developing countries. The alliance is comprised of the major global health actors in immunization: the WHO, the World Bank, UNICEF, and the Gates Foundation, as well as dozens of partners from governments, civil society organizations, and the pharmaceutical industry.

GAVI performs mostly supportive functions for global health as it aims to improve access to immunizations for children in low-income countries, a basic public health task that normally falls under the responsibility of national governments. From its inception to mid-year 2013, GAVI

has disbursed over US$5 billion (Table 7). Over that period, over three-quarters of the approved expenditure went to accelerating the introduction of new and underused vaccines (e.g. rotavirus, pneumococcal, pentavalent, measles second dose, and meningitis A vaccines) in eligible low- and lower middle-income countries. The other major expenditures—health systems strengthening (increasing access to immunization by improving health service delivery, financing, and leadership) and Immunization Services Support (improving immunization performance via flexible, performance-based funding)—also focus on delivery in low-income countries, and thus GAVI financing may be considered heavily supportive.

Table 7: GAVI DAH by programme, 2001-2013

Programme	US$ millions	% total
Civil society organizations	24.3	0.5
Health systems strengthening	430.4	8.6
Injection safety support	107.8	2.1
Immunization services support	323.2	6.4
Vaccine introduction grant	51.7	1.0
New/underused vaccine support	3,947.9	78.7
Cash support	0.9	0.0
Operational support	129.7	2.6
Total	5,015.9	100.0

Source: gavialliance.org, accessed 11 July 2013.

Similar to the Global Fund, GAVI is both a new actor (organization) and a channel for new modalities of DAH, notably the International Financing Facility for Immunisations (IFFIm) and Advance Market Commitments (AMCs) for vaccines. The IFFIm transforms long-term pledges of up to twenty years from donor governments into 'vaccine bonds' sold on capital markets, generating large volumes of funds that are then immediately available for GAVI's immunization programmes, greatly improving both upfront budgets and long-term budget predictability (IFFIm 2013). AMCs are commitments global health donors make to purchase newly-developed health products (e.g., a pneumococcal vaccine in GAVI's case), spurring research and development investments by the private sector that otherwise would likely not have occurred due to insufficient market demand. In addition to incentivizing initial production, GAVI has negotiated discounted prices for the pneumococcal vaccine and has introduced the vaccine in 24 countries since 2010, with an additional 26 countries approved for introduction. GAVI estimates that as many as 1.5 million child deaths may be averted by 2020 by the pneumococcal AMC (GAVI Alliance 2013a).

Also like the Global Fund, GAVI serves its supportive functions in ways that could be interpreted as core activities, such as pooling resources that would otherwise be fragmented to improve the predictability of global funding for immunizations globally through the IFFIm and incentivizing research and development through the pneumococcal AMC. Even its primary purpose, supporting vaccines for poor children, arguably has a core feature: eliminating negative global health externalities by slowing the spread of vaccine-preventable diseases. Most importantly, GAVI acts as the dominant funder of vaccines for low-income countries (through its procurement agent—the UNICEF Supply Division), shaping the market for a wide range of vaccines, maintaining contracts with a diverse set of manufacturers, and keeping prices low. Finally, GAVI funds some core functions through its support of other organizations, but this constitutes a minor proportion of GAVI's total spending. In 2013, GAVI budgeted US$55

million to support WHO and UNICEF in core activities, including surveillance, development of standards, product profiles, and guidelines for implementation (GAVI Alliance 2013b).

UNITAID

Founded in 2006 by the governments of Brazil, Chile, France, Norway, and the United Kingdom, UNITAID is a global health financing and purchasing facility. Based in Geneva and hosted by the WHO, the organization uses a levy on airfares and other innovative financing mechanisms to improve access to treatment and diagnostics for AIDS, malaria, and tuberculosis in low-income countries. In addition to contributions from its founding members, UNITAID receives funding from the upper-income countries of Cyprus, South Korea, Luxembourg, Spain; the Gates Foundation; and the low-income countries of Cameroon, Congo, Guinea, Madagascar, Mali, Mauritius, and Niger. Civil society groups are represented in UNITAID's governance structures (UNITAID 2013).

UNITAID claims to be 'the first global health organization to use buy-side market leverage to make life-saving health products better and more affordable for developing countries'. The leverage is substantial, backed by about US$1.3 billion in funds raised as of the end of 2010, and successful, as the organization has secured reductions of 25 per cent to 50 per cent in the price of second- line AIDS treatments and pediatric antiretroviral medicines in partnership with the Clinton Foundation (Atun et al. 2012).

At first glance, UNITAID's drug purchases (Table 8) appear to fulfill a supportive function in that that they are targeted to populations in low-income countries whose governments could not otherwise afford or manage to deliver life-saving drugs for conditions with high disease burdens. However, UNITAID's activities are probably better characterized as providing core functions because their primary purpose is to create global markets by mobilizing funds and reduce global prices through its procurement process. By creating global-level incentives and shaping markets, UNITAID essentially achieves core function objectives through activities that are supportive in the short term. Its financial support to WHO's Pre-Qualification of Medicines and Quality Assurance of Diagnostics also contributes to global health public goods, as do its efforts to eliminate market inefficiencies and make drugs more affordable through projects like ESTHERAID (ESTHERAID 2013).

Gates Foundation

The Bill and Melinda Gates Foundation is the largest private grant-making foundation in the world (McCoy et al. 2009). Since its inception in 1994, it has invested over US$13 billion in global health (Gates Foundation 2010). In 2011, the Gates Foundation contributed nearly US$2 billion in DAH through its Global Health programme, equivalent to over 7 per cent of total DAH. Its activities cover a wide range of disease areas and over 100 countries, including the United States. The Global Health Division's stated purpose is 'to harness advances in science and technology to save lives in developing countries' (Gates Foundation 2010). Its focus areas include Discovery and Translational Sciences, Enteric and Diarrheal Diseases, HIV, Malaria, Neglected Infectious Diseases, Pneumonia, and Tuberculosis.

Relative to the mandates of the three new actors discussed above, The Gates Foundation's mission places the most emphasis on scientific research, a core function. From 1998 to 2007, over a third of the value of its grants went to research and development or basic research (McCoy et al. 2009). It has taken on a similar core function in the global health system by providing grants to WHO for core activities, and also by funding IHME, which works to

Table 8: UNITAID project funding commitments*, 2006-11

Project	US$ millions	% total
HIV: Procurement and supply of pediatric ARVs	388.1	25.4
HIV: Procurement and supply of second-line ARVs	305.8	20.0
HIV: PMTCT	104.5	6.8
HIV: Safeguarding availability of ARV treatment (ESTHERAID)	16.0	1.1
Malaria: ACT scale-up initiative	78.9	5.2
Malaria: ACT Liberia and Burundi	1.3	0.1
Malaria: Affordable medicines facility for malaria	180.0	11.8
Malaria: Assure artemisinin supply system	9.3	0.6
Accelerating scale-up of long-lasting insecticide treated nets	109.3	7.2
TB: Increased access to first-line TB drugs	27.6	1.8
TB: UNITAID project support for pediatric TB	37.7	2.5
TB: UNITAID project support for Multi-drug resistant TB (MDR) scale-up initiative	55.7	3.6
TB: MDR-TB acceleration of access initiative	11.8	0.8
TB: MDR-TB diagnostics	89.6	5.9
Cross-cutting: Programme project support for WHO quality assurance of medicines and diagnostics	61.6	4.0
Cross-cutting: Global fund round 6 for funding multi drug resistant TB medicines	52.5	3.4
Total for 16 project areas	1,543.8	100.0

*Note that this Table reflects commitments, not DAH.

Source: UNITAID Financial Report (2011).

improve the world's health monitoring infrastructure. At the same time, the Foundation disburses large grants to developing countries for health services delivery, playing a supportive role. Prominent examples include the HIV prevention project Avahan in India and the MACEPA malaria project in Zambia.

The Gates Foundation's grant portfolio thus includes funding for both core and supportive functions, but its reporting of grants by disease area (Table 9) makes it difficult to estimate precisely the core vs. supportive funding balance. 'Delivery' of vaccines, which occurs via grants to GAVI, is a supportive activity. 'Discovery' includes vaccine and drug discovery and vector control, and is thus mostly in the domain of core activities such as research and development. 'HIV' includes both research and development and service delivery (mostly through the Global Fund), and hence includes both core and supportive functions. 'Infectious Diseases' covers both delivery to populations in need of support and research of improved treatment and delivery methods. 'Policy and Advocacy' is mostly assistance to the Global Fund. 'Family Health' has elements of a global good, including funding for research on maternal nutrition and fetal development, birth outcomes, and child development; but also includes large country-based projects in India, Nigeria, and Ethiopia. Due to its multiple emphases on research, information, policy analysis[5] and delivery, the Gates Foundation provides mixed financing with respect to the

[5] Policy analysis could fall under core or supportive functions in the framework—much policy analysis is country- specific and therefore more supportive, but policy analysis of global relevance may be included under core research or norm-harmonization activities.

Table 9: Gates Foundation global health grants paid, 2011

	US$ millions	% total
Infectious diseases (ID): Malaria	199.7	10.6
ID: Tuberculosis	120.3	8.0
ID: Pneumonia	88.9	5.6
ID: Enteric and diarrheal diseases	92.5	5.6
ID: Neglected and other infectious diseases	93.4	5.4
Delivery: Polio	357.7	18.8
Delivery: Vaccines	313.8	7.7
HIV/AIDS	232.7	14.3
Family Health (FH): Family planning	62.3	2.2
FH: Maternal, newborn, and child health	131.6	8.0
FH: Nutrition	53.7	1.2
Policy and advocacy	135.2	7.1
Discovery cross-cutting	81.0	3.8
Special initiatives	13.8	1.9
Total	1,977.5	100.0

Source: Gates Foundation Annual Report (2011).

essential functions framework. However, over 40 per cent of its Global Health grants in 2011 went to the Global Fund (through 'Policy and Advocacy' activities) or GAVI (through 'Delivery' activities), both of which are heavily supportive organizations. On the whole, Table 9 suggests that while the Gates Foundation makes significant contributions to global public goods, it devotes the majority of its resources to supportive functions.

USAID

USAID's 2010-2011 Progress Report to Congress disaggregates USAID's health budget by both region and programme (see Table 10), but—similar to the IHME categories or budget line-items of organizations like the Gates Foundation—it is still difficult to definitively distinguish funding for core and supportive activities. Each programme category does have a Global Health bureau component that is not region-specific, but the activities funded in these programmes are functionally quite varied. As described on the Agency's website, the Global Health bureau 'supports field health programmes, advances research and innovation in selected areas relevant to overall Agency health objectives, and transfers new technologies the field through its own staff's work, co-ordination with other donors, and a portfolio of grants' (USAID 2013).

Global Health bureau activities include some core functions. For example, USAID's longstanding support of Demographic and Health Surveys (DHS) produces a key global public good (knowledge) used to analyse trends in population, disease, and service delivery; and shape policies at national and global levels. USAID funds scientific research across a large number of its health programmes (averaging US$190 million per year in FY 2011 and 2012), as well as prevention programmes for emerging diseases (US$106 million per year since FY 2005), but this represents a relatively small share of USAID's total spending on health (USAID 2012). USAID also plays a core role through its 'Antimicrobial, Surveillance, and Other Infectious Diseases' and 'Pandemic Influenza' programmes. The investments in these areas are focused on mapping and containing pandemic threats, an activity with large international externalities.

Table 10: USAID health budget*, FY 2010 (US$ millions)

	Bureaus							
Programme category	Global health	Democracy, conflict, and humanitarian assistance	Africa	Asia and Middle East	Europe and Eurasia	Latin America and Caribbean	International Partnership	Grand total
Child survival and maternal health	51.9		170.3	274.8	10.7	63.0	78.0	648.7
Nutrition	17.0		34.6	19.3		34.4	2.0	107.3
Vulnerable children		13.0			3.3		2.0	18.3
HIV/AIDS	246.9		2,091.4	143.3	14.5	128.1	1,167.4	3,791.6
Malaria	55.0		519.0	6.0		5.0		585.0
Tuberculosis	34.5		77.3	86.5	17.5	18.2	15.0	249.0
Antimicrobial, surveillance, and infectious diseases				37.3	5.4		65.0	107.6
Pandemic influenza							201.0	201.0
Family planning and repro. health	104.1		249.6	211.1	8.0	80.1	10.0	663.7
Grand total	509.4	13.0	3,142.2	778.3	59.4	329.5	1,540.4	6,372.2

*Note that this Table reflects budgeted funds, not expenditures, and does not include other USG agencies that provide DAH (e.g., CDC).

Source: USAID Progress Report to Congress (2011).

Beyond these areas, the majority of expenditure under the Global Health bureau falls into the international technical co-operation and development financing activities under the essential functions framework. Humanitarian Assistance is purely supportive, since USAID protects vulnerable groups and is 'acting as an agent for the dispossessed.' All health issue line-items (e.g., Child Survival and Maternal Health) include some research, but are mostly focused on delivery and are thus supportive—such as providing vitamin A supplements to infants, scaling-up malaria diagnosis and treatment interventions in priority countries, and delivering TB diagnostics and treatment.

In order to make a conservative estimate of the percentage of USAID funding that goes to core functions, it was assumed that 50 per cent of 'Global Health' expenditure and 80 per cent of all regional expenditure is supportive. Excluding USAID funding that is allocated to international partnerships, these assumptions imply that at least 77 per cent of its budget is spent on supportive functions and less than 23 per cent on core function.

4.2 Summary mapping of current DAH functions and selected actors vs. 1993

Table 11 maps core and supportive functions and activities to selected prominent actors in DAH. The Table highlights several key findings. First, there has been growth in the number of actors carrying out essential functions in global health. Both number and breadth of sphere of

Table 11: Global health organizations and essential functions, 1993 and 2013

Main functions of global collective action	Function	Sub-function	Substantial role in the activity today?									
			Selected actors (1993) (not exhaustive)				Selected new actors since 1993					
			WHO	World Bank	HIC Bilaterals	Foundations (non-Gates)	MIC Bilaterals	Global Fund	GAVI	UNITAID	Gates	Academics and Think Tanks
Core	Promotion of global public goods	Research and development	✔		✔	✔				✔	✔	✔
		Information and databases for shared learning	✔	✔	✔	✔		✔	✔	✔	✔	✔
		Comparative evidence and analysis		✔								✔
		Harmonizing norms and standards for national use and international regulation	✔					✔	✔	✔		
	Management of externalities	Border control, especially during epidemic outbreaks.	✔		✔							✔
	Stewardship	Convening for consensus-building, priority-setting, and cross-sector health advocacy.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Supportive	Act as agent for dispossessed, mobilize global solidarity	Provision of basic needs in failed states		✔	✔							
		Assistance in natural or artificial disasters	✔	✔	✔		✔				✔	
		Protection of vulnerable groups		✔	✔	✔	✔	✔	✔	✔		
	Support development	International technical co-operation	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
		Development financing		✔	✔	✔	✔	✔	✔	✔	✔	

Source: Authors.

action have increased, beyond the 'traditional' actors that dominated in 1993.[6] Second, there was already overlap between functions provided by traditional actors in 1993, and there is even more overlap today. The shaded row shows that every actor listed in the Table plays a significant role in the core function activity of 'consensus building on health policy', a role that may have formerly been expected to be the clear domain of the WHO. Thus, this is likely partly a response to a vacuum that needed to be filled, and a new richness of debate among different actors.

[6] The Table focuses on funding actors. There has also been tremendous growth in service delivery organizations, including a proliferation of NGOs. As early as 2003, for example, one-third of the Global Fund's funds were committed to NGOs (Copson and Salaam 2005).

Finally, there are broad conclusions that can be drawn about which organizations focus on core vs. supportive functions. The World Bank, bilateral health donors, GAVI, the Global Fund, and the Gates Foundation all appear to devote the majority of their financial resources to supporting development, while WHO (through its standard-setting activities) and UNITAID (through its market shaping activities) and are heavily involved in the production of global public goods and other core functions. However, no actor or group of actors is solely active in core or supportive functions. Only three activities are limited to fewer than half of the actors listed here: harmonized norms, surveillance/border control, and provision of basic needs in failed state. This highlights the need for careful examination to assess whether there is inefficient duplication of activities and allocation of resources in ways that do not add positively and significantly to global health outcomes.

Box 1: Potential advantages to a more complex DAH landscape

Given the many critiques of the increasingly complex DAH landscape, helpfully reviewed by Moon and Omole (2013), it is easy to overlook some major advantages of today's landscape relative to that of 1993. Some of these successes are reviewed in a four-article series on the global health system by Moon et al. (2010).

First, DAH has arguably been one of the most innovative sectors of international development over the past 20 years, both in terms of financing (including mobilization, pooling, and allocation) and in development and delivery of health best practices and technologies. The four new financing modalities discussed here (Debt2Health, AMCs, IFFIm, and (PRODUCT)RED) are just a few of a wide array of new ways to raise, co-ordinate, and target funding. See the Taskforce on Innovative International Financing for Health Systems report (Fryatt and Mills 2010) for more relevant examples.

Second, the new, more diverse landscape offers more choices for nearly all stakeholders in pursuing health goals and influencing the global health agenda. DAH recipients have gained new possibilities for seeking solutions to pressing health problems, such as GAVI's IFFIm for essential vaccine technologies, and a host of new agenda-setting forums beyond the World Health Assembly (e.g., WTO rounds, international health conferences). Indeed, low-income countries can now turn to a much wider range of public and private donors for funding than was available in 1993, more external institutions for policy advice, and many more providers of technical assistance. There are also new regional alliances among BRICS and other middle- income countries, giving less developed countries an opportunity to exert greater influence over global health policy and on how donor assistance is spent within their borders (Bliss 2010).

A third feature of the new DAH landscape, shown here by the mapping of new actors and modalities to core and supportive functions in Table 11, is often interpreted as disadvantageous 'duplication' of functions; but may be advantageous competition in the production and delivery of vital goods and services for global health. Especially with a proliferation of think tanks and academic institutions joining the research efforts of the large global health organizations (Bennett et al. 2012), there is increased capacity to detect and share lessons learned from multiple organizations working on similar problems. These think tanks and policy research organizations, including many located in developing countries, are generating a wide range of data, analysis, and recommendations for global and national health policies and programmes.

Box 2: The 'grand convergence' and the middle-income country dilemma

The 'grand convergence' is a recently-articulated goal among global health leaders to close the gap in preventable mortality and infection between the top and bottom quintiles of the world's population. A key challenge is that achieving the grand convergence will require substantial progress in middle-income countries (MICs), but without large amounts of DAH, which is largely directed to low-income countries and has plateaued since 2010.

While the supportive activities of many global health organizations (e.g. PEPFAR) target low-income countries, MICs bear the brunt of mortality, as shown below. More than half of all under-5 deaths in 2010 occurred in lower middle income countries, and over three- quarters of all tuberculosis deaths were in upper and lower middle-income countries. Overall, middle-income countries are home to 74 per cent of the world's poor and bear over half of the global burden of disease. MICs are unable to access large amounts of DAH. India, for example, accounts for 22 per cent of global DALYs lost, but received less than 3 per cent of total DAH in 2010.

% of global deaths by World Bank country income category					
	HIC	*UMIC*	*LMIC*	LIC	All
Under-5 (all causes)	1	*10*	*55*	34	100
Tuberculosis	1	*11*	*65*	23	100
Malaria	0	*1*	*46*	53	100
HIV/AIDS	1	*28*	*36*	35	100

Note: Calculations based on IHME Global Burden of Disease data, 2010.

Using DAH to MICs strategically and mobilizing domestic financing for health in MICs are thus critical challenges. Both core and supportive activities could be part of the response. Core activities (and examples) such as setting norms and standards (WHO vaccine position papers), generating and transferring knowledge (protocols on LLIN procurement), promoting intellectual property sharing (patent pools), and shaping markets (UNITAID procurement pools) can all boost the efficiency and effectiveness of domestic health spending in MICs. Targeted supportive activities can facilitate technology transfer (vaccine technology), help build sustainable institutions (South Africa Public Health Institute), and use innovative financing to incentivize MIC-led results (World Bank interest rate buy-downs for polio results in Nigeria).

5 Conclusions

This paper explores the changes in DAH since 1993 using a framework for global collective action in health. Several key findings emerge. First, there has been a dramatic increase and shift in the distribution of DAH. DAH funding has nearly quintupled since 1990, is channeled through several large new organizations, has shifted regionally (especially toward sub-Saharan Africa), has adjusted to a changing global disease burden (most notably in response to the AIDS epidemic), and is being sourced from new donors and modalities of revenue generation.

We unified frameworks from Jamison et al. (1998) and Frenk and Moon (2013) to strategically assess how DAH is allocated to essential functions for global health. While the assessment is preliminary and has clear limitations, we find the financial resources of most of the largest and most prominent new global health actors seem to be allocated mainly to supportive functions. This is contrary to the expectation that DAH would be increasingly devoted to core functions as low- income countries' economies grew over time. Perhaps the clearest symbols of this trend are the substantial increase in World Bank funding for health contrasted against much slower growth in the WHO budget, the increase in funding from PEPFAR, and the creation and expansion of the Global Fund and GAVI, which perform mostly supportive functions.

As illustrated in Table 11, there are also clear overlaps in core and supportive functions across a large number of actors in DAH today, and the overall landscape of functions and actors is much more diverse than in 1993. This intra-organization mix of core and supportive functions runs contrary to the idea that organizations should specialize exclusively and focus on activities within a specific domain of global health.

This assessment raises some key challenges and questions for the future agenda of development assistance for health. The first is a methodological challenge of creating a different kind of DAH tracking. There have been impressive and useful improvements in the global health community's ability to track DAH funding since the early 1990s. More detailed, regular, and higher quality tracking of funds by channel, disease group, geographic region, and source is now accessible and continually being improved. But these categories cannot inform assessments of whether DAH is performing the essential functions of global collection action for health, and whether the distribution of funding across essential functions is appropriate. There is a need to develop ways of tracking DAH according to a functional framework like the one presented here, which links funding to essential functions to, possibly, desired end results. Going forward, we recommend analysis of trends in expenditure on core and supportive functions.

Beyond tracking funds by function, strategic planning is needed to ensure the provision of essential functions by global health organizations in the future. As the 2015 endpoint for the MDGs nears, a consensus is emerging in the global health community around a 'convergence' agenda that aims for the near elimination of preventable health disparities between high-income countries and low-income countries by 2035. This is spurring the creation of investment agendas for priority conditions such as maternal and child health, AIDS, malaria, and tuberculosis, as well as calls for DAH to focus more on the non-communicable disease burden in low and middle-income countries—all of which have a heavy emphasis on delivery and other supportive functions. Given the importance of core functions, and the expectation that DAH should increase emphasis on core functions with economic development, it is also necessary to develop a post- 2015 investment agenda for core functions.

Questions that must be addressed in such a strategy include: (1) What should the targets and time horizon for increasing core functions be? (2) Which organizations should take lead roles in certain functions? (3) What levels of funding are required to ensure key core function goals (e.g., pandemic surveillance, research milestones for global priority diseases, etc.) are accomplished? And (4) What kinds of supportive activities are most likely to build national health systems' capacity and reduce dependence on external assistance?

The role of the WHO is another key question in guiding future global collective action in health. Table 11 shows that WHO competes in a crowded market for the production of global public goods, and raises questions of whether a centralized co-ordinator or steward is needed to harmonize the actions of the many actors currently involved in core functions. Bloom (2011) is one proponent of such an approach, writing that 'the world urgently needs an organization that can convene the best expertise and provide a centralized resource for health-related knowledge'. Others have stressed the uniqueness of the WHO as the only international organization whose rulemaking powers can carry the weight of international law (Sridhar and Gostin 2011), which they see as a critical ingredient in ensuring global collective action. Many have called for WHO reforms to improve collective action for global health. Perhaps the clearest change necessary from our findings is reversing the trend toward voluntary, extra-budgetary support, which tends to focus on country and disease-tailored supportive activities, rather than core functions.

The unified framework of essential functions for global collective action for health is useful in assessing functional shifts in DAH since 1990, but it does not provide a way to benchmark the efficiency or effectiveness of one distribution of core and supportive functions against counterfactual distributions. Our final conclusion is that the global health community needs new ways to assess the trade-offs between investing in supportive versus core functions, and whether one institutional division of labour for global health is superior to another.

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