

# GLOBAL DISEASES, COLLECTIVE SOLUTIONS

Networking in the  
New Epidemic Age

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A number of Global Solution Networks have emerged that address failures of systems, of institutions and of markets. At their most ambitious, they aim to change the rules of the global health game—opening up governance structures, sharing knowledge and science, developing new products, creating markets—all with the ultimate aim of preventing and treating diseases, and saving lives.

These networks have emerged in an *ad-hoc* and opportunistic fashion. More strategic thinking and investment is needed to build networking competencies and to identify opportunities for international institutions to best leverage new forms of collaboration and partnership.



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## Short Summary

*When it comes to global health, there is no “them”...only “us.”*

—Global Health Council

Environmental disruption, mass urbanization and the runaway globalization of trade and transport have created ideal conditions for infectious diseases to emerge and spread around the world. As SARS, influenza and Ebola have illustrated, disease can no be longer easily contained. Rapid spill-overs from local into regional and global crises reveal major gaps in the global system for dealing with infectious diseases, including a lack of new treatments for some of the world’s biggest pathogenic killers, the rise of antibiotic resistance globally, and insufficient coordination in global health.

In response, a number of global solution networks have emerged that address failures of systems, of institutions and of markets. Often inspired or initiated by existing global health actors, these networks have brought together new configurations of public, private, civil and citizen groups to address both emerging and long-standing challenges. At their most ambitious, they aim to change the rules of the global health game—opening up governance structures, sharing knowledge and science, developing new products, creating markets—all with the ultimate aim of preventing and treating diseases, and saving lives.

These networks have emerged in an *ad-hoc* and opportunistic fashion. More strategic thinking and investment are needed to build networking competencies and to identify opportunities for international institutions to best leverage new forms of collaboration and partnership.

## Idea in Brief

*Globalization has highlighted the global interconnectedness of health, in particular, the ability of communicable diseases to travel faster and further than ever before.<sup>1</sup>*

—World Health Organization, 2004

Infectious pathogens are one of humanity’s oldest and most pervasive threats. Throughout history these microscopic foes have exerted a remarkable influence on the shape of our social, economic and political lives. The current era is no exception—infectious diseases significantly contribute to chronic poverty, and the impacts are felt in loss of life or the permanent impairment of victims, and the burden on families, communities and societies. As a whole, infectious diseases represent one of the major development challenges of our time.



So far in the 21<sup>st</sup> century, there have been three severe pandemic threats with global implications: Severe Acute Respiratory Syndrome (SARS), influenza and most recently, Ebola. Even more problematic are the persistent diseases such as HIV-AIDS, malaria, TB, meningitis, cholera and others that continue to ravage poor and vulnerable populations around the world.

These diseases are being tackled by an increasingly complex and diverse global health system. Alongside international organizations such as the World Health Organization (WHO), UNICEF and others, and public health bodies such as the US Centers for Disease Control and Prevention (CDC) and Public Health England (UK PHE), actors from industry, science, civil society, philanthropy and citizen groups are playing an increasingly significant role in combating infectious diseases. Resources are unprecedented and aid funding for global health recently topped US\$30 billion per year,<sup>2</sup> which is more than the gross domestic product of a considerable number of nation states.

Despite these investments, the threat of infectious disease has not disappeared, as the ongoing West African Ebola outbreak has revealed all too clearly. There are growing risks in developed countries too, driven not least by the worrying rise of antimicrobial resistant disease.

In response to the plethora of challenges, there has also been a rise in collaboration across the burgeoning global health system, whereby diverse institutions are working together across functional, geographical and institutional lines to address complex problems. New technologies have enabled new organizational forms. In some cases there have been dramatic, world-saving results—the web-enabled network of government and academic research laboratories that worked to analyze SARS were able to do so at unprecedented speeds, taking only a month from disease detection to identification, and averting the terrifying prospect of a global pandemic. And new collaborations are also emerging in surveillance, innovation, delivery and almost every aspect of global infectious disease management.

Against this background, the Global Solution Networks (GSN) research program has set out to analyze and document the rise of these new organizations, with the aim of illuminating the contextual factors that have driven the rise of new collaborative networks, the various functions of infectious disease GSNs, their strengths and weaknesses in addressing gaps and weaknesses in the global disease response system, and the potential to further develop and strengthen the infectious disease GSN ecosystem in the future.



“...disease experts increasingly refer to our era as a ‘new pandemic age.’”

## The Problem—Evolving Foes, Imperfect Responses

### The Globalization of Disease

We live in what scientists are calling the “anthropocene,” an era of profound human influence on the planet. As we change our world, we are also radically altering the niches for microbes that cause disease. Evidence is growing that the transformations of natural and socioeconomic systems—everything from urbanization and agricultural intensification to pollution and medical practices—are affecting the ecology of infectious pathogens in unprecedented ways.

The intensification and acceleration of global trade and travel means that diseases can be spread more quickly and more widely. Together this perfect epidemic storm of factors has created a scenario in which pathogens can rapidly emerge and re-emerge, find new niches, develop resistance to treatments and spread globally.

Because of this, disease experts increasingly refer to our era as a “new pandemic age.”<sup>3</sup> For example, over the past 20 years, strains of common microbes have developed resistance to the drugs that were previously effective against them. Many diseases that were thought to be under control are coming back with a vengeance, including tuberculosis, malaria, cholera, pneumonia and measles. And there are worrying instances of novel disease emergence, some of which we still do not fully understand. HIV-AIDS is by far the most significant of these, killing over 36 million people since it emerged as a major threat in the 1980s. In addition, we have seen Ebola, numerous other hemorrhagic fevers, hepatitis C, SARS, MERS and MRSA.

A 2007 World Health Organization report warned that infectious diseases are emerging and re-emerging at a faster rate than any time in history, and are spreading more rapidly than ever before.<sup>4</sup> According to recent estimates, almost a fifth of all deaths globally each year are due to infectious disease.<sup>5</sup> Based on research of over 12 thousand separate disease incidences, researchers at Brown University recently found that the past 30 years have also seen a considerable rise in the numbers of emerging diseases and outbreak incidences globally, as well as an increase in the diversity of these diseases.<sup>6</sup>

Although many of these outbreaks are in developing countries, the UK Chief Medical Officer, Dame Sally Davies, has argued that infectious diseases cannot be dismissed in the developed world. She has shown that in 2011 alone, infectious and parasitic diseases were responsible for over 200,000 admissions to English National Health Service hospitals. This was an increase of 10% on the previous year, and a staggering 84% increase on 2007 rates.<sup>7</sup>



Across the US, infectious diseases are the third biggest killer each year, responsible for around 170,000 deaths, twice the level of the early 1980s.<sup>8</sup> Hospital-acquired infections, kill more people in America each year more than do some major cancers.<sup>9</sup> Beyond the immediate health impacts, there are also considerable economic costs of infectious diseases. When SARS emerged in Hong Kong in 2003, the estimated global economic cost of the four-month crisis was between \$40 and \$54 billion.<sup>10</sup> The costs to the global economy of a pandemic influenza outbreak have been projected as being in the trillions.<sup>11</sup>

## The Global Health Response to Diseases—Not Fit for Purpose?

Of course, the people of the world are not defenseless in the face of the new epidemic age: a large array of international and public health organizations are tasked with addressing infectious disease. The obvious question is, how is the global health system dealing with this new epidemic age? Nathan Wolfe, a visiting professor in human biology at Stanford and one of the world's leading "disease hunters," has criticized the global system of disease management as being challenged by "bureaucracy, insufficient and ever-shifting funding, and constantly changing objectives from higher up the food chain."<sup>12</sup>

Interviewees for this study broadly concurred, with most sharing the view that the international response to diseases was not entirely "fit for purpose." They highlighted challenges in three broad areas: system-wide governance, outdated institutions and imperfect markets.

### Challenges—System-wide Governance

For any outsider, the international apparatus for dealing with infectious diseases appears confused and confusing. At least five different types of actors work in global management of infectious diseases:

- **Intergovernmental organizations** with either wholly or partially health-related mandates, including the World Health Organization, the World Bank, UNAIDS and UNICEF;
- **National governmental organizations** operating internationally in the field of infectious disease control, including the UK Department for International Development, the US Centers for Disease Control and the US Presidential Emergency Program for AIDS Relief (PEPFAR);
- **Non-governmental organizations**, such as Médecins Sans Frontières, the Malaria Consortium and the International HIV/AIDS Alliance;



- **Private foundations**, the largest of which is the Bill & Melinda Gates Foundation.
- **Public/private partnerships and consortia** such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, UNITAID, the Global Alliance for Vaccines and Immunization (GAVI), and the Stop TB Alliance.

This institutional labyrinth of actors has been expanding in recent years, both in terms of the numbers of organizations and the funding available for global health programs. According to some experts, this is because of the perception that “existing international arrangements to control specific diseases are inadequate.”<sup>13</sup> Across the array of institutions, there is insufficient coordination and collaboration, with the sector characterized by “competition and turf battles, and far too little genuine collaboration.”<sup>14</sup>

The governance challenge extends beyond simply getting traditional actors to work better both individually and collectively, but extends to how best to capitalize on the diversity of actors operating in global health, and especially in the area of infectious diseases. This critical gap in system-wide governance is widened by growing globalization and the awareness that, while securing one country’s health requires securing the health of others, the means for providing disease management tools as a global public good is imperfect, to say the least. The primary responsibility remains national, albeit bolstered by international resources that are working in developing countries. Despite the growing interconnectedness of diseases themselves, there is still not enough collective action in response.

### Challenges—Outdated Institutions

*We are chasing the whirlwind of 21st century diplomacy with an international system still tethered to 19th century patterns of state behavior and cooperation. Caught in the middle are intergovernmental organizations, such as WHO, which appreciate the disease trends but remain accountable to sovereign states and their interests.*<sup>15</sup>

Professor David P. Fidler,  
in Evidence to  
UK House of Commons Select Committee

There is a mismatch between global health problems and the traditional array of institutions and mechanisms to deal with them.<sup>16</sup> International organizations such as the WHO are seen as retaining a unique credibility and authority, but also as increasingly “hampered by funding shortages and donor-imposed earmarks, an inflexible bureaucratic governance structure, and difficulty prioritizing in the face of unrealistic demands.”<sup>17</sup> Within many institutions and disease-specific programs, the paradigm of “vertical management” of specific, single diseases is seen to dominate. Although not inherently bad, such vertical programs can be, and often are, dominated by a “planning mindset.” This means that they tend to be “externally driven



and top-down in their approach, leading to inadequate engagement of populations in planning and implementation.” They can also “distort priorities in favor of global objectives over local needs, and weakening ownership and responsiveness.”<sup>18</sup>

Public health responses do not, in general, deal well with an evolving disease challenge, as is perhaps best illustrated by the inadequate response, to date, to the challenges of antibiotic resistance.<sup>19</sup> The routine and widespread use of antibiotics, for example, is creating an environment in which diseases can become more virulent due to drug-resistance. There is not enough capacity in developing countries to deal with the implications, either nationally or globally.

There is a perception of too narrow an institutional approach to specific disease-related health problems. For example, while over two thirds of emerging diseases are zoonotic, or animal in origin, there is inadequate collaboration between animal and human health researchers and practitioners. Diseases are also not widely understood as resulting from socioeconomic transitions, and the risks are not taken into account. For example, Africa is undergoing its largest-ever road-building program and, although previous infrastructure development efforts have resulted in disease emergence and spread, this risk does not appear to feature in any of the assessments being undertaken by international agencies.<sup>20</sup> These findings correlate with findings from various sources, arguing that global institutions are not set up to deal with complex and changing realities.<sup>21</sup>

One of the obvious, and very literal, examples of this is the inability of the global health system to cope with the adaptive nature of malaria, which is again threatening to develop drug resistance and become more prevalent, just as it did in the face of the last major eradication effort of the 1960s-70s. Investments in disease management systems were seen as highly erratic, and seldom maintained over time because of a lack of consistent political concern about disease and pandemic risks. In particular, political will for disease preparedness measures tends to spike during crises and ebb afterward. “Although this makes sense from a short-term political perspective, it leads to greater expenditure overall, and a poor utilization of resources.”<sup>22</sup>

At a broader level, the lack of good governance, transparency and political and economic instability can have devastating impacts on local capacity for disease management, as is being witnessed in the three post-conflict West African states where Ebola has taken hold

### Challenges—Imperfect Markets

For many emerging and resurgent infectious diseases, the relative absence of safe and effective countermeasures, from drugs and vaccines to management protocols, is linked to market failures. There are still no effective vaccines or drugs for diseases such as dengue, tuberculosis (TB), malaria and trypanosomiasis. More basic and applied research is needed, which requires both more funding and also better



strategies for developing products that can be disseminated and deployed effectively in resource- and infrastructure-poor settings. The ongoing and unfulfilled need for basic and applied research highlights the fact that, although multinational companies are often in the best position to do this, in terms of information, facilities and finance, the traditional patent-based model of financial reward is not conducive to such firms targeting developing country markets because of the relatively low prices that can be charged for vaccines and other treatments.

Ebola is a clear example of this, where several pharmaceutical firms had possible cures in development, but had little or no incentive to develop them further prior to the pandemic. Ebola is just one illustration. A report in the *Journal of the American Medical Association* found that over a 25-year period, only 13 of 1,233 new drugs reaching the market worldwide had been developed for tropical diseases due to the prospect of unattractive financial returns. These weaknesses in system-wide governance, in traditional institutions, and in markets all point toward the need for an alternative means by which to coordinating multiple actors with diverse and competing interests.

## The Networked Solution? The Ecosystem of Disease GSNs

### The Era of Partnerships

Leading scientists, aware of the complexity of the problems faced in infectious diseases and the limitations of traditional global health arrangements, have increasingly been calling for new kinds of collaborative organizations to be established. In a recent example, in July 2014, a group of top scientists published a paper on the threat of the evolution of drug-resistance in disease-causing pathogens in which they closed with an impassioned plea to overcome the “feeble” international response to-date through a new collaborative body to address the problem. They saw this as vital because, “no single existing organization is seen to have the breadth of knowledge or scope necessary to deal with the problem. The idea is that, just like the IPCC for climate change, the proposed new consortium will bring together global expertise to fight the drastic threats posed by the emergence of microbial pathogens of all kinds—from HIV and malaria to MRSA and TB.”<sup>23</sup>

It is not just scientists and researchers who see new organizational approaches as the way forward, but also existing global health institutions. In 2013, the CDC suggested that the apparatus for responding to infectious disease was simply not keeping up with the evolving nature of the problem and that “a more useful perspective is that global health requires synergistic

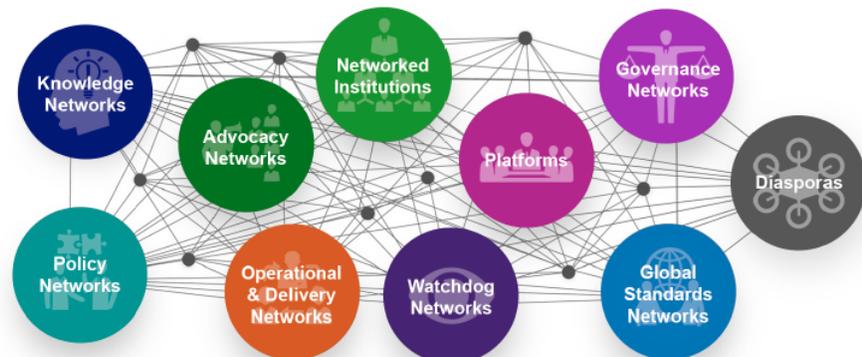


engagement... [appropriate for] an interdependent world.”<sup>24</sup> Of course, there has long been *ad-hoc* cooperation between global health organizations but, driven by the need to make the burgeoning global health system collaborate better, overcome institutional weaknesses and fix the array of failures, there has been a shift toward what some global health scholars have referred to as the “era of partnerships.”<sup>25</sup> Today there are numerous examples of multi-stakeholder collaborations in global disease management, in which different types of organizations come together to address complex challenges that none of them could address individually.

## Introducing Global Solution Networks

A fundamental change is underway in how we solve global problems, thanks to emerging networks of civil society, private sector, government and individual stakeholders. These global solution networks (GSNs) are achieving new forms of cooperation and social change as well as producing global public value.

GSNs address many of the urgent issues facing humanity, from poverty, human rights, health and the environment, to economic policy, conflict and gender and cultural violence.



There are distinct functional roles for each of the GSN types:

- **Watchdog networks** scrutinize institutions to ensure they behave appropriately.
- **Knowledge networks** develop new thinking, research, ideas and policies
- **Operational and delivery networks** deliver the change they seek, supplementing or bypassing traditional institutions.

- **Policy networks** create government policy even though they are not networks of government policy makers.
- **Advocacy networks** seek to change the agenda or policies of governments, corporations or other institutions.
- **Governance networks** have the right and responsibility of non-institutional global governance.
- **Platform networks** create the capability for other networks to organize.
- **Global standards** networks develop technical specifications and standards on key issues.
- **Networked institutions** provide a wide range of capabilities similar to state-based institutions but with a very different *modus operandi*.
- **Diasporas** solve problems through kinship and ethnicity connections.



## Watchdog Networks— Detection and Surveillance of Disease

Watchdog networks strengthen detection and surveillance of diseases wherever and whenever they emerge

*In a world where money and economics dominate international relations, [pandemics] should teach us that no investment is more important than maintaining effective public health and disease surveillance mechanisms.<sup>26</sup>*

Peter Doherty, Nobel Laureate, *Medicine*

The primary role of watchdog networks is the observation of possible disease events and tracking them over time. Although surveillance-focused watchdog networks predate the digital revolution, the past two decades' advances in information and communications technology have transformed the scope, scale and speed of operations. The Internet and associated technologies enabled many more groups—beyond national governments and health professionals—to contribute to and have access to information on disease outbreaks.

The basic functions of watchdog networks in surveillance are early detection of disease, characterization of the disease, and subsequent reporting and

communication directed to decision makers in governments, international bodies and other key audiences. Some systems also document and analyze the factors that have triggered the emergence of disease. The key is how the network brings its members together to achieve these objectives and how it is enabled by technology. For example, ProMed is an example of a first generation Watchdog Network. Established in 1993, it is an Internet-based, public reporting system for rapid international dissemination of information on infectious disease outbreaks. It offers a free public website and an e-mail list, called ProMed Mail, that has subscribers from around the world—currently more than 37,000 subscribers from over 160 countries.

The ProMed mission is “to provide early warning, 7-days-a-week, year-round, of outbreaks of emerging infectious diseases and episodes of acute toxicity, and the spread of antibiotic and disease vector resistance, worldwide, free-of-charge by e-mail.”<sup>27</sup> The system distributes information about outbreaks, often before it is confirmed by WHO, and therefore complements the global surveillance done by WHO and its member states.

The organization was set up in response to what many saw as the fragmentation of disease surveillance systems, and the simultaneous need to consider infectious diseases as global threats that demanded global solutions. The first report of the 1995 Ebola outbreak was on Pro-Med Mail, as were reports of H5N1 influenza in Indonesia in 2003 and SARS in China in early 2003. D. A. Henderson, director of the smallpox eradication campaign, referred to CNN and PMM as the major sources of information for infectious diseases.<sup>28</sup>

In addition to surveillance, there is also a need for disease watchdog networks to play a role in using information to trigger preventative measures, thereby building preparedness for response, and linking to analysis and operations. Perhaps the most significant example of such a network is the Global Outbreak Alert and Response Network, designed to pool public and private information for response to international outbreaks.

## Case Study: GOARN—A Network of Watchdog Networks

Officially endorsed by the World Health Assembly in 2001, GOARN is a partnership of different institutions and networks, and has been described as a “network of networks.”<sup>29</sup> Its role is to coordinate reports of and responses to outbreaks of infectious disease and to provide a framework for delivering support to affected countries. In essence, GOARN’s role is to act as a global safety net, complementing rather than replacing national surveillance systems. Its day-to-day activities and operations are coordinated by an Operational Support Team based in WHO’s Department of Epidemic and Pandemic Alert and Response, while overall strategic guidance is provided by a Steering Committee that consists of up to 20 representatives from member organizations and networks that participate in GOARN.



GOARN is responsible for monitoring reports of public health emergencies of international concern, assessing their significance for global health and, where necessary, taking action to help bring infections under control. These actions might include working through WHO member states but also as an autonomous entity; for example, sending experts to advise particular crisis responses, furthering epidemiological analysis, playing a coordination role, issuing guidance on response protocols and so on.

There are currently about 300 GOARN partners, including scientific institutions in member states, surveillance initiatives, networks of laboratories, IGOs, NGOs and a range of other networks specializing in diseases and other issue areas. GOARN coordinates these actors in rapid disease alerts and response contexts in four specific ways:

1. It locates, mobilizes, and deploys available and relevant expertise and resources from partners institutions, and also from within and across WHO;
2. It communicates (through WHO regional and country offices) with Ministries of Health about their needs and negotiates the terms of reference for GOARN teams;
3. It brings different multilateral resources and international technical experts together as an effective team in the field;
4. It provides a two-way flow of information and communication between WHO, field teams and participating technical institutions.

GOARN's added value comes from its ability to seamlessly link up these different networking functions. While WHO could perform these functions on its own, the network contributes to the tasks in a number of important ways: it deepens communication linkages between members and ensures that knowledge and relevant expertise is kept up-to-date; it facilitates effective connections between institutions so as to deploy the best expertise on the basis of technical considerations; and it enables smooth functioning of multi-stakeholder missions.

Since 2000, GOARN has responded to over 100 events, engaging more than 500 experts from members in over 50 countries, and providing field support to some 40 outbreak-affected countries. All of this happens across a diverse digital infrastructure that supports text messaging, email, and web-based applications, all of which are employed in tandem to ensure the right knowledge and information get to where they are needed at the right time, and importantly, allows a two-way exchange of information across the network.





Map of GOARN members involved in international missions

GOARN was crucial in helping to contain the SARS outbreak in 2003. As identified in the independent evaluation published in 2011, it played “a major role in rapid deployment of international teams to multiple locations, and supported WHO to engage technical institutions in international networks set up to look at critical aspects of the outbreak, and to ensure that the right steps were taken to contain the outbreak.”<sup>30</sup>

The initial information about SARS came not from official government sources but from mobile phones, emails and informal systems—including ProMED—over the first few months of 2003. These reports led the WHO to push the Chinese government for information, leading to the official acknowledgement of the outbreak in March 2003, several months after the first reported case. In the response, GOARN established a network of eleven infectious disease laboratories in nine countries. The network was linked through a secure Web site and daily conference calls, allowing study of the causes and diagnosis of SARS. This network, subsequently described and celebrated in numerous accounts, enabled faster analysis of the SARS virus as well as rapid development of diagnostic and treatment protocols.<sup>31</sup>

GOARN also played a major role in the avian influenza outbreaks of 2004, providing the platform for coordination of the international response, and development of advice and guidance.

In addition to technical development, GOARN’s work in SARS directly influenced the 2005 International Health Regulations (IHRs), which saw a greater emphasis on and legitimation of non-state sources of outbreak information. Building on the role of GOARN, the IHRs also led to changes in how proactive the WHO could be in approaching countries experiencing disease events, and how directive it could be about the necessary actions for responding to outbreaks.



While it was established to address fractures in the international surveillance system, its work has led to significant investments in national alert and response capacity. The growing capabilities of its partners is challenging GOARN to adapt its purpose and function within disease responses, because of changes to the typical demands made of GOARN. Many countries are now less interested in receiving basic response assistance because they can do this work themselves. As the ongoing Ebola crisis has illustrated, this is far from being the case in all countries, meaning that there is still a need for GOARN's work—albeit in major emergency contexts. The challenge for GOARN is how to maintain standby capacity in the face of scarce resources. According to informed interviewees, this has not been an easy task, and GOARN has not always received sustained funding for its work from WHO member states.

The other major challenge faced by GOARN is how to best manage the tension between being an autonomous network in its own right versus being an operational arm integrated into WHO. GOARN has elements of both, which has been beneficial for its operations. For example, being part of WHO gives it legitimacy and weight, but being an autonomous network gives it a degree of independence and a light footprint. At its best, GOARN skillfully navigates this grey area, but the ambiguity has implications for strategy and functioning. In the review of GOARN's work, getting greater clarity on this governance issue was seen as essential for the future strategic direction of the network.

## Reflections on Watchdog Networks

Watchdog networks exemplify unprecedented potential for public and official awareness of disease issues, and mobilization of timely prevention and response measures. The successes of watchdog networks to date have been considerable. As the founder of ProMed Mail put it, these networks have “helped to demonstrate the power of networks and the feasibility of designing widely distributed, low-cost reporting systems. And it has encouraged the development of additional systems using additional technologies. All these efforts help to begin building the heavily networked surveillance systems that will be needed to deal with threats in an increasingly globalized and unpredictable world.”

Watchdog networks continue to develop, with ongoing efforts to integrate regional efforts. The networks that are in place provide a patchwork of approaches that are incrementally edging toward the ambition of an integrated global disease surveillance system. However, a truly integrated and interoperable system still seems some time off.





## Knowledge Networks— Advancing Science, Shaping Policy and Practice

SARS was a critical event for a diverse range of networks. The technological innovations that enabled the rise of watchdog networks also enabled knowledge networks to emerge and develop new approaches to the science of disease analysis and identification.

Knowledge networks generate and disseminate the data and insights that help transfer knowledge and best practices among disparate actors working to achieve similar objectives. They are the origination points for disseminating new thinking to other GSNs, and the broader world.<sup>32</sup> Effective knowledge networks typically foster a culture of openness and inclusion, their methods are transparent, and their activities normally involve multiple stakeholders across multiple regions of the world. Leading knowledge networks harness technology and social media to collaborate, share data, and generate and test new ideas.

In infectious disease responses, knowledge networks might work to advance the basic scientific understanding of new and existing diseases. They may also focus on developing new treatments. Knowledge networks have been established for many specific diseases, from influenza to trachoma. These networks tend to connect researchers with expertise in the microbiology of that disease who are then able to generate specific insights about the nature and behavior of particular disease causing agents.

Recent years have seen the emergence of much broader networks of researchers who are generating knowledge on a wide range of different diseases that is then aggregated to yield important information about the overall evolving microbial landscape, threats and potential responses. These might focus on specific disease-related functions, such as the Geneva-based FIND network which addresses innovations in diagnostics across a range of disease. Some GSNs in this space work across a number of diseases and across a number of knowledge-focused roles. A good example of this broader knowledge network is the Global Virus Network, established in 2011 under the leadership of Robert Gallo, co-discoverer of the HIV virus that causes AIDS. GVN aims to fill the need for greater collaboration in research during the earliest stages of viral epidemics, thereby building research capacity among medical virologists. The 33 research institutes that make up GVN span university research departments, not-for-profit institutions and a small number of private sector laboratories and institutes from 21 countries around the world. The GVN also lists WHO, CDC and other international organizations as partners.

GVN aims to be a “global authority and resource for the identification, investigation, control and suppression of viral diseases posing threats

to mankind.”<sup>33</sup> An important focus of GVN is to provide objective and independent information on disease threats without interference from political pressures. It does this by providing grants to members for novel research into viruses, providing face-to-face and virtual platforms for meetings and the exchange of information and experience and for public education on viruses.

The strength and credibility of GVN lies in its global reach and the depth of its members’ scientific expertise, as well as its ability to deploy resources flexibly at the point of new outbreaks, developing solid scientifically credible information in a timely fashion.

Another very current and pertinent knowledge network focused on the development of new treatments for infectious disease is the consortium that has been established to develop and trial Ebola vaccines. Facing known and unknown infectious disease threats such as Ebola demands the capacity to be able to develop, test, produce and disseminate medical treatments and procedures quickly so they can mitigate the impact of an outbreak. Time is of the essence: the faster medical countermeasures can be developed and distributed, the more rapidly the disease can be contained and the more lives can be saved.

Established in August 2014, the partnership for testing Ebola vaccines brings together global health research charities, foundations, national governments, multi-national corporations and delivery NGOs. The network was initiated as a knowledge network, focusing on undertaking trials of vaccines in several sites around the world, but is intended to shift into operational and delivery work, so as to get any successfully trialed products into the Ebola emergency response. This knowledge network is still emerging, but carries considerable promise for the future.

The groundbreaking nature of this collaboration has been noted by one of the lead scientists, Professor Myron M. Levine, who directs the University of Maryland School of Medicine Center for Vaccine Development. As he puts it, “This is an extraordinary effort of multiple groups working together to bring a promising early-stage candidate Ebola vaccine to field tests in West Africa in record time. On short notice, the project partners have contributed enormous energy, time and resources to respond to the Ebola disease calamity. If the vaccine trials begin according to schedule, a new paradigm will have been established whereby multiple agencies mobilize to address a public health threat by accelerating the preliminary evaluation of a promising potential public health tool.”<sup>34</sup>



## Case Study: The Meningitis Vaccine Programme—Developing Cost-Effective Life Saving Innovations

There are numerous examples of established knowledge networks for product development, especially in relation to vaccines. The past 15 years have seen a shift away from the “trickle-down” model of meeting medical needs in developing countries where vaccines developed for use in the West were adapted to developing country contexts that involved major delays, sometimes on the order of decades. Until the 1990s, it was rare for new products to be developed for first use in developing countries, and the Meningitis Vaccine Programme (MVP) illustrates how GSNs have helped to reverse this situation. As a result of the work of GSNs like MVP, innovation in disease treatment is slowly shifting from the narrow realm of product development, and is instead increasingly being done by these new, not-for-profit initiatives and networks that creatively engage the public and private sectors to accomplish their health improvement goals.

The Meningitis Vaccine Programme brought together the Gates Foundation, WHO and the NGO Path. This happened in the wake of the largest meningitis epidemic in African history, which affected 250 thousand people across the sub-Saharan region and caused over 25 thousand deaths in just under two years. Representatives of a number of African governments issued a statement during a WHO Consultation that the development of a meningitis vaccine was a high priority. Following investment from the Gates Foundation, the MVP established an international consortium that included European biotech firms, American research scientists and Indian manufacturers.

The consortium’s product development efforts were accompanied by enhanced surveillance efforts and studies to better define the burden in the so-called “meningitis belt” in sub-Saharan Africa. Early consultation and collaboration with policy-makers in the affected countries helped to identify and generate the information needed to set policies for the use of new treatments. Affordability was addressed through development of low-cost production methods in parallel with clinical licensing trials.

Through this mechanism, vaccine design, development and delivery were considered simultaneously from the outset, with disease control as the overarching goal. Throughout the development process affordability was regularly discussed between the potential users, the manufacturer (the Serum Institute of India), and the Meningitis Vaccine Project. In less than 10 years, the program managed to develop a vaccine against meningitis A for use in low-income countries. MenAfriVac costs under US\$0.50 per dose and has received a WHO “seal of approval” on its safety, effectiveness and quality.

Interestingly, in order to introduce the vaccine at scale, MVP has turned to an operational and delivery GSN—Gavi—that, among other things, focuses on developing vaccine markets in developing countries. With support from Gavi, MVP has been able to deploy MenAfriVac in Burkina Faso, Mali and the Niger.



Initial evaluations of the rollout of MenAfriVac in Chad to 1.8 million people between the ages of 1 and 29, published last year in *The Lancet*, indicate that meningitis incidence was reduced by 94 percent.

Ongoing challenges for MVP include the need for continual surveillance to determine the period in which the vaccine confers protection to the vaccinated population. There are also issues about whether another strain of meningitis could emerge against which the vaccine is not effective. However, efforts are being made to address these issues.

## Shaping Policy and Practice

Analyzing diseases and developing new treatments is only part of the world health puzzle. And it is not only at the microbial level that the benefits of knowledge networks for disease management can be observed. Knowledge networks also exist to shape policy and practice in disease and health related issues. These can be electronic communication networks that bring together expert groups of researchers and public health specialists to continually improve practices in particular areas. The Global Surveillance Community of Practice is a knowledge network that brings together global surveillance professionals working in public bodies, the media, private sector and NGOs, and gives them access to a range of different electronic discussion forums on surveillance practices and approaches.

At the other end of the spectrum, knowledge networks for influencing policy and practice might comprise fully-fledged, long-term arrangements between a range of specific institutions. For example, one of the most critical public health problems in developing countries relates to women and children, encompassing areas such as safe, infection-free births, and common childhood ailments such as respiratory and diarrheal infections. The Global Network For Women and Children's Health was initiated in 2001 as a public-private partnership between the NICHD and the Bill and Melinda Gates Foundation. The Global Network brings together researchers in the US, India, Pakistan, Guatemala, Zambia, Kenya and the Democratic Republic of Congo. Through its research partnerships, the Global Network studies feasible, cost-effective, sustainable interventions to address public health challenges and to improve health outcomes for women and children in the developing world,

## Case Study: AHPSR—An Alliance for Building Health Systems

The Alliance for Health Policy and Systems Research (AHPSR) is an international collaboration hosted by WHO. Since its inception in 1999, its goal has been to promote the generation and use of health policy and systems research as a means to improve the health systems of low- and middle-income countries. Through its work with more than 350 partners



around the world, the Alliance aims to make progress toward this goal with three objectives:

- Stimulating the generation and synthesis of policy-relevant health systems knowledge;
- Promoting the dissemination and use of health policy and systems knowledge in policy making;
- Strengthening capacity for the generation, dissemination and use of health policy and systems knowledge among researchers, policy-makers and other stakeholders.

Although it is clearly a global governance network, it also has many features of a knowledge network, in that it provides context and infrastructure for the emergence of new strategic governance approaches across members. Each of the groups of members is seen as contributing their own perspectives, approaches and expertise toward the shared vision of the Alliance. The members are diverse and include national and local governments, multilateral and bilateral agencies, research institutions and universities and civil society organizations.

The Alliance is supported by a number of international donors, and is governed by a board and a Scientific and Technical Advisory Committee (STAC). In its external reviews it has been referred to as the “only global player with an exclusive focus on health systems.” Its particular strengths are its ability to bridge national efforts with global institutions and initiatives, and in particular its approach to “upward synthesis” as a means of connecting the local with the global. A particular area for development is the inclusion of member organizations from developing countries, and doing so in a way that enables them to effectively network with each other, enabling a greater degree of mutual learning.

## Reflections on Knowledge Networks

Knowledge networks for infectious diseases are very broad in their scope, in part because the diversity of factors around infectious disease that demand systematic evidence and research. Because of the scientific basis of public health, and the considerable ongoing investment around the world, it is unsurprising that networks in this area are among the most sophisticated and well-developed to be found in the infectious disease issue space. Moreover, because of the sheer diversity of infectious disease agents, related treatments and users of knowledge, there are many different kinds of networks—ranging from electronic message boards through to legally constituted organizations—with many different kinds of members.

As the Ebola crisis has illustrated, the major challenge for these networks is ensuring that their work is timely and connected to ongoing public health priorities and challenges, and that they are able to generate scientifically rigorous evidence in the timeframes demanded by the outbreak of crises.



This raises all kinds of ethical and professional challenges for those involved in such networks. For example, in the wake of Ebola, there were calls for rolling out experimental and untested drugs in West Africa; in at least one example, hospitals have been closed because of staff protests at such efforts.



## Operational and Delivery Networks—Preventing, Treating and Coordinating

One of the major obstacles to the delivery of effective responses to infectious disease is the structure and mandate of existing organizations. D. A. Henderson, Director of the successful smallpox eradication program, once said that the path to success was to “break every rule in the WHO book.”<sup>35</sup> As various accounts have since suggested, the smallpox eradication program was not a well-oiled mechanical process, but in fact a sustained process of strategic learning, networked around the world by the available technologies of the time.

Operational and delivery networks (ODNs) have emerged as an important means by which to enable operational effectiveness without “breaking the rules.” These networks provide the “integration glue” that aligns and coordinates the activities of disparate service providers into more coherent and effective responses to global disease outbreaks. ODNs might be focused on preventing and eradicating disease, on development and delivery of treatments and related programs and on providing new innovative mechanisms for financing innovation and supporting operational and delivery work. They may also be focused on the coordination of responses to outbreaks.

### Case Study: Stop Transmission of Polio (STOP)—Networked Approaches to Strengthening Healthcare Human Resources

In 1988, the Global Polio Eradication Initiative (GPEI) was established through a partnership between agencies of the UN, government health agencies including the CDC, and international NGOs. The campaign has been virtually a complete success, with a reduction of over 99% of the annual incidence rates of wild polio between 1988 and 2012, and the transmission chain broken in all countries except three: Afghanistan, Nigeria and Pakistan. However, with the recurrence of outbreaks in countries such as Syria and other previously polio-free regions, the effort was put on emergency footing. One central



component of the work of the network is supporting operational delivery through mobilizing human resources and technical assistance via a program called Stop Transmission of Polio (STOP).

The STOP program is a coordinated effort of multiple GPEI partners. During 2000–2012, the Canadian Public Health Association collaborated with the CDC to identify, recruit and deploy French-speaking participants for the STOP program. Rotary International and the Bill & Melinda Gates Foundation have contributed to funding for STOP volunteer field assignments. WHO and UNICEF organize field assignments through their regional and country offices. In addition, partners assist during the Atlanta-based training, providing technical and logistical support.

Since it was established, this initiative has led to the identification, training and deployment of volunteers to over 2,200 assignments in 69 countries. In 2012, these volunteers amounted to almost 1,500 volunteer person-months in the field, enabling country-level immunization programs to be delivered and simultaneously creating new cohorts of trained staff with experience in public health programs.

The initial objectives of STOP field assignments were to conduct and support surveillance and to plan, monitor and evaluate large-scale polio immunization campaigns. Over time these objectives were expanded to support measles mortality reduction, the development of data management systems for disease surveillance, routine childhood immunization, health communications and social mobilization.

STOP teams typically comprise a diverse mix of health professionals, including nurses, physicians, epidemiologists, veterinarians and information systems and communication specialists. STOP volunteers include public health professionals from around the world to meet the demand for assistance. The flexibility of the STOP network enables volunteers to fill human resource gaps or build local capacity as needed.

The STOP program has made an important contribution to the mission of eradicating polio by providing critical technical support to deliver polio eradication activities. It has also provided a broader range of technical support for immunization operations and health systems delivery more generally. One of its challenges for the future is that, as its Independent Monitoring Board has found, it may “pay too little attention to the human factors, [and be] over-orientate[d]... to the technical elements of the challenge.”<sup>36</sup> For a network focusing on strengthening human resource deployment, this is a far from trivial issue.



## Reflections on Operational and Delivery networks

Operational and delivery networks perform some of the most challenging roles in the disease GSN ecosystem, because they are simultaneously attempting to both bring new ideas and innovations into the system, and to change the way the system works. While their ambition cannot be faulted, there are major organizational and political challenges to overcome, not least those of navigating interests that inevitably start to diverge more sharply when operational entities compete for access to the same funding pools. There are issues here for governance and accountability, because of the sheer scale and scope of some of the programmatic challenges. For networks such as STOP and MVP, the challenge is to capitalize on their success in mobilizing resources on a large scale, but not fall into the bureaucratic traps that have encumbered their institutional predecessors. This has proved a difficult balancing act for many such networks.



## Policy Networks—Creating and Shaping Global Policy Priorities

Global health policy making is a complex endeavor, bringing together nation states, international organizations and a variety of global agreements, legal mandates and ethical and social protocols. It is a space that, by definition, requires the engagement of multiple stakeholders representing various interests, often in multiple regions of the world. The GSN program defines policy networks as Internet-enabled networks of participants that contribute a broad range of skills, experiences, perspectives and resources to constitute an effective policy-making unit.<sup>37</sup> The goal of policy networks is not necessarily to wrest control of the policy making process from governments, but rather to supplement traditional top-down policy processes and to engender a greater degree of transparency, consultation and collaboration with stakeholders.

Policy networks with a focus on disease play a variety of roles: influencing policy in countries or internationally, building capacity for engagement in policy matters among key actors, putting key issues on the table for discussion and agreement. As with the other GSNs, these may be disease-specific and seek to influence policy around a disease and its relative priority among health decision makers. One prominent example of such an entity, which has many characteristics of a GSN, is UNAIDS, initially established in 1997 by a number of United Nations entities coming together to tackling HIV-AIDS.

## Case Study: UNAIDS

UNAIDS was developed in the 1990s, with the specific aim of establishing a coordinated response to the most devastating pandemic of the modern era. Its initial role was to coordinate international and global efforts and help galvanize worldwide attention. While the core membership remains UN entities and member states, UNAIDS has expanded over time to include private sector organizations and NGOs. While the focus on coordination remains, UNAIDS is centrally involved in setting global policy directions on HIV-AIDS. This includes facilitating and enabling a Declaration by UN member states about their commitment to battling the pandemic.

The most recent example was its efforts on the annual World Aids Day in 2014, when the partnership put forward overarching policy goals for the international community as a whole. In the past, these had covered everything from specific issues, such as advocating for particular vulnerable groups to be given more resources and attention, to global strategic directions, such as setting global ambitions and indicators for their achievement. The 2014 global policy directions were to end the epidemic by 2030, and set out goals that would need to be achieved by 2020 to do so. These include:

- 90% of people living with HIV knowing their HIV status;
- 90% of people who know their HIV-positive status are on treatment;
- 90% of people on treatment demonstrate suppressed viral loads.

Having framed such global policy directions, UNAIDS also works to monitor how well individual nations adhere to this. This happens through a number of mechanisms, including country progress reports against major declarations, member organization report, and an electronic global progress reporting platform.

The progress review work has been an important mechanism for the UNAIDS contribution to global policy making. It gives UNAIDS the opportunity to contribute to the focusing and sharpening of national policies, to scale up interventions that are making a significant contribution, and to undertake global assessments of progress. For example, it is able to regularly estimate the global HIV funding and highlight any shortfalls between the requirements for addressing global impacts. It recently showed that while global HIV funding totaled \$19.1 billion in 2013, this total was below the estimated \$24 billion needed to address the impacts of HIV.

The question of whether UNAIDS constitutes a success in global policy making was the focus of a series of independent evaluations of UNAIDS that have been conducted regularly from 2001.<sup>38</sup> The first of these evaluations found that UNAIDS had indeed succeeded in creating global policy frameworks around HIV-AIDS, in particular that it has established a clear global mandate and priorities for the global fight against the disease. It also



found that the efforts made by UNAIDS in global coordination of multiple actors were very effective in establishing consensus about policy content and processes. Interestingly, this success was greater at the global level, but was rather more challenging at national levels. The second independent evaluation focused on how UNAIDS had adapted to changing contexts, and expanded the membership of the partnership to include corporations and non-governmental bodies.

The evaluations also highlighted the role UNAIDS has played in bringing evidence and knowledge into global policy making. Fraught with challenges at the national level, the global policy process is messy and non-linear, characterized by one expert as a “slippery interaction between: institutions (structures, and the rules shaping decisions), interests (the individuals or groups who stand to gain or lose from a policy), incidents (external events that can shape policy, e.g., the global economic recession) and ideas (the evidence).”<sup>39</sup>

## Reflections on Policy Networks

UNAIDS clearly shows that policy networks can play a vital role in the infectious disease arena, especially in problems such as HIV-AIDS where policy frameworks are brought to bear on issues where no policies previously existed and there is a need for coordination and consensus building. However, there are some inherent challenges in networks attempting to make global policy, when some of levers of national decision-making may not be fully in the hands of the network. In the UNAIDS case, global frameworks have proved successful, but national implementation has proved more patchy.

This highlights the considerable challenge of navigating the complexity of policy making in global health. As with any global issue, disease-focused policy has local, national, regional and global levels, multiple issues and many different actors. There is no guarantee that global policy successes will translate into changed practices on the ground. But by expanding its focus and bringing in more elements of watchdog networks, UNAIDS has been able to highlight progress against its policy efforts in a systematic fashion.





## Networked Institutions— Forging the Future of Global Health

Networked institutions provide a wide range of capabilities, similar in some instances to state-based institutions, but through an alliance model. The Gavi Alliance is an example of a GSN that literally goes “end-to-end” in delivering vaccines. Its work covers everything from raising funds, shaping global policy frameworks and supporting innovation to creating markets and supporting rollout. Described by numerous donor agency leaders as the “future of aid,” Gavi is a remarkable example of the power of GSNs, and the need to shape global policy agendas around vaccines.

### Case Study: The GAVI Alliance—Bringing New Vaccines to the Developing World

GAVI’s mission is to save children’s lives and protect public health by increasing access to immunization in poor countries. It provides support for new and underused vaccines, injection safety, civil society support and health systems. Since it was established in 2000, Gavi has helped immunize over 288 million children in 72 developing countries and helped reduce the costs of major vaccines by 30% over five years.

Gavi builds on vaccine initiatives to finance the introduction of new vaccines in developing countries. It goes further, however, as it also reshapes the global vaccine market. It is a public/private partnership that brings development and global health expertise together with private sector expertise. The member base is especially diverse, and includes developing and developed country governments, pharmaceutical firms, international organizations (including the World Bank, UNICEF and WHO), research and technical agencies, NGOs and civil society, and foundations and philanthropists. Partners contribute to the Alliance through strategy and policy setting, advocacy, fund-raising, vaccine development and procurement, country support and immunization delivery. By providing a single forum for each partner’s unique perspectives, Gavi has been able to establish fertile ground for collaboration and innovation.

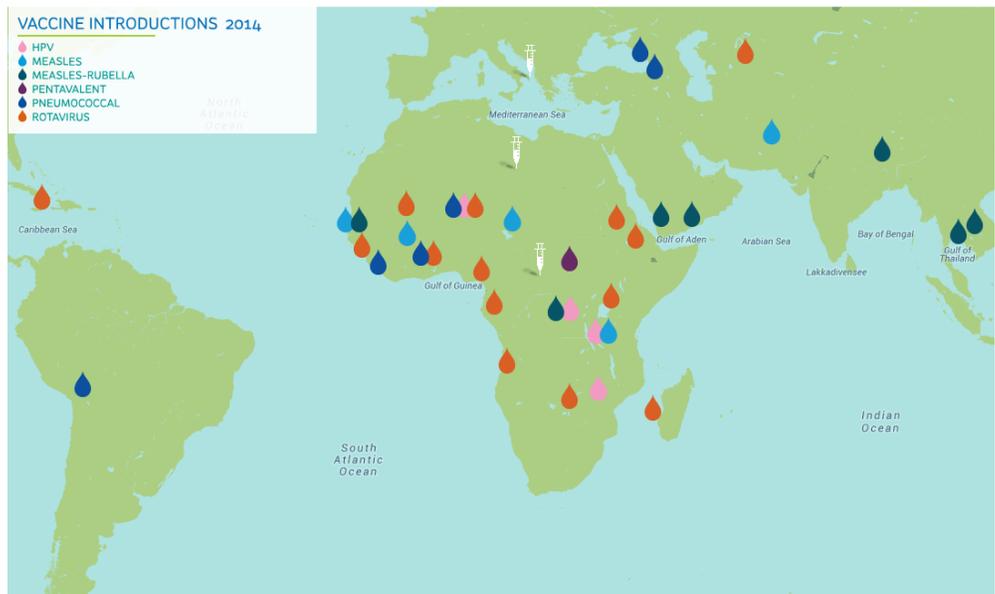
The Gavi business model works by pooling demand from developing countries on one side of the equation, and then providing long-term predictable financial support to meet the demand. This stimulates the market for vaccines, attracting new manufacturers, increasing competition and driving down prices. GAVI has led the way on innovative finance mechanisms such as the International Finance Facility for Immunization (IFFIm) and the pilot Advance Market Commitment (AMC) for pneumococcal diseases.

Specifically, Gavi works to address a number of tangible global policy and operational obstacles that have prevented delivery of vaccines to children in developing countries. These include:

- Getting immunization onto the agenda in donor and developing countries;
- Finding funding to sustain large-scale immunization operations and integrating these into national health systems;
- Working to strengthen the coverage of health systems, in terms of the proportion of population with access to healthcare;
- Making expensive vaccines more affordable for the developing world.

Examples of success include expanding immunization coverage in Gavi-supported countries from 65% to 79%, and supporting two new vaccines for pneumococcal and rotavirus to tackle the two biggest killers of children in the developing world—pneumonia and diarrhea.

According to a variety of sources, the strongest aspect of Gavi is the results it has already achieved in developing global vaccine policies and norms. It has an inclusive partnership structure that attracts a lot of praise, especially from recipient governments who have commended the flexibility and adaptability of the Gavi approach, and the relatively light-handed approach it employs compared to more traditional global health organizations.

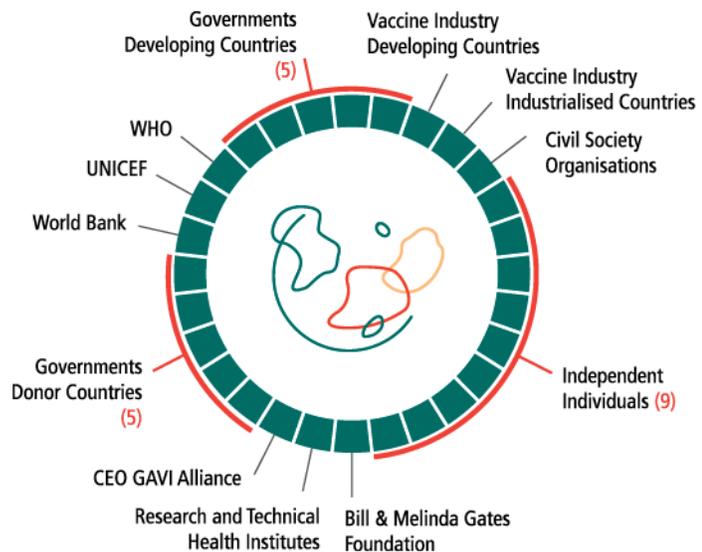


Global Map of Gavi Vaccine Efforts, 2014



The governance of Gavi is noteworthy for its elaborate and careful design. Originally set up with two boards, the current structure was established in October 2008, and is responsible for establishing strategies and policies, making funding decisions and setting budgets. It meets twice a year, usually in June and November. The Board is composed of representatives from donor and recipient governments, the Bill & Melinda Gates Foundation, multilateral organizations, vaccine manufacturers, civil society and academia.

Key GAVI partner institutions and stakeholders (“Representative Board Members”) hold 18 seats. In addition, the Board includes nine individuals with no professional connection to GAVI’s work (“Unaffiliated Board Members”), who provide independent scrutiny and who also bring to the Board their private sector and financial expertise. The Board aims to make its decisions by consensus, but if no consensus can be reached, any decision of the Board requires a two-thirds majority.



Gavi Board composition

## Reflections on Networked Institutions

One of the biggest challenges for infectious disease efforts is the sheer number and influence of the new actors in the space. The issue space has been characterized as one of “open source anarchy,”<sup>40</sup> a perspective that highlights both the need for, and potential of, networked institutions to address crucial organizational challenges. It is perhaps unsurprising that Gavi is championed by a number of its donors, and by the global health community as a whole, as the new face of 21<sup>st</sup> century international cooperation. By bringing together diverse actors to collaborate on critical



policy and implementation goals, Gavi has done more than any other institution to move vaccination toward the status of a global public good.

Gavi's success also highlights an apparent gap in the infectious disease GSN ecosystem, specifically the lack of a GSN focused on global governance of infectious diseases. While there are some general examples of global health governance networks, the majority of governance networks are focused on national levels, or are undertaken by institutions such as the WHO. The WHO's International Health Regulations and the related proceedings of the World Health Assembly dominate the governance landscape, but these still relate to the obligations of states and international organizations. There is a need for governance networks that have a broader scope, and that are able to work on issues of mutual accountability across a constellation of actors and actions. There is also a need to identify new and innovative forms of governance that are more suited to the sheer diversity and dynamism of this issue space. Given this set of challenges, more networked institutions are arguably an obvious way forward.



## Advocacy Networks—Moving Disease Issues Higher up the Agenda of Decision-Makers

All of the networks included so far have some degree of advocacy built into their work, whether for specific ideas, issues or approaches to specific infectious disease challenges. There are, however, some networks for which advocacy goals are given the highest priority in their vision and mission. One of the most prominent examples is The Global Network for NTDs, an initiative of the Sabin Vaccine Institute, which works to “raise the awareness, political will and funds necessary to control and eliminate the seven most common NTDs by 2020.”

### Case Study: The Global Network for Neglected Tropical Diseases (NTDs)

NTDs affect an estimated one in six people around the world. The focus of the Global Network's advocacy work is on the debilitating and yet easily preventable nature of these diseases, their widespread effects and the relatively small amount of resources needed to tackle them, and their widespread effects.

The focus is to work with international partners from government, business, and society focused on finding ways to address the logistical and financial barriers to delivering existing NTD prevention and treatments to affected populations.

The advocacy work has three key areas:

1. Raise awareness among international and national actors;
2. Encourage funding increases and changes in allocation to enhance focus on NTDs;
3. Influence members and partners to support developing country governments in their NTD work.

The network brings together a range of organizations to further their advocacy goals, including international agencies, governments, scientists and program implementing organizations.

The advocacy work of the network is focused on influencing a range of actors and attitudes. Of particular interest is the END7 campaign, which is the only global public awareness campaign dedicated to controlling and eliminating the seven most common NTDs. The END7 campaign uses social media and digital communications to build awareness and understanding of the 7 major NTDs, and also works to raise funds for medicines and treatments.

Particular strategies that are noteworthy include a simultaneous focus on the general public to foster collective will and attitudinal changes, on technical experts and practitioners to further new approaches, and on policy makers to educate and inform, thereby enabling them to develop and champion new legislation. This networked advocacy has been described as “a new model for global health, coordinating the actions of a diverse group of allies and crafting effective strategies that empower countries and affected communities to take a lead role in eliminating these diseases.”

This three-pronged approach has seen some remarkable successes. The network was instrumental in a 5-year, \$350 million commitment by the US government to tackle NTDs globally. It has helped to put NTDs on the G8 agenda, which led to NTDs becoming one of the four pillars of President Obama’s Global Health Initiative. In 2012, the network established the London Declaration on NTDs, signed by leaders of the 13 biggest pharmaceutical companies, UK, US and UAE, the Gates Foundation, the World Bank and other major global health institutes. This has been described as the largest-ever coordinated effort in global health, and has generated almost a billion dollars in research and development. The declaration has growing numbers of signatories, with over 70 organizations signed up, and 40 countries establishing NTD strategies as of 2013.

Other networks that perform such advocacy roles are more focused on specific diseases. These include the Stop TB Partnership, with its origins in an international forum in Washington DC in October 2001, which works to ensure that high quality TB treatment is available to all who need it; and



the Roll Back Malaria Partnership (RBM) which is the global framework for coordinated action against malaria.

## Reflections on Advocacy Networks

Infectious disease advocacy is an incredibly crowded space, with many organizations, networks and individuals competing for influence. Every health issue has its concerned advocates, often with personal connections to victims of a disease. There is therefore only a limited amount of policy-maker and practitioner attention for each advocacy issue. Perhaps the major challenge for advocacy networks is the risk of audience burn-out. Like policy networks, there is also the challenge of how to demonstrate the impact of advocacy work, especially when many other organizations and networks may be campaigning for the same outcomes.

An overarching challenge is how to make the work of infectious disease advocacy networks more strategic and coordinated across networks. For example, it may be that advocacy networks on different diseases find considerable overlap in their advocacy goals. There is considerable, and to date unexplored, opportunity for better alignment of advocacy networks in this space, to identify common tasks and messages, and bring the weight of greater numbers to bear on key target audiences.

## The Way Forward— A Networked Revolution?

### A Renaissance of Ideas

As recently as thirty years ago there were strong networks for only a few disease conditions. These networks usually operated within the auspices of an international organization and through bilateral interactions with governments. Today, as Jeremy Schiffman of American University puts it, “the global health landscape has shifted dramatically with the proliferation of global health networks.”<sup>41</sup>

The GSNs looked at here bring together the different kinds of organizations in the global health labyrinth in novel combinations. They do so in order to tackle specific diseases as well as specific functions that cut across multiple diseases. Looking across just the examples covered here, one is struck by the relative maturity and advancement of GSNs in this issue space, and the



remarkable influence these actors have had on the delivery and ambitions of global health for infectious diseases.

The real value-added of GSNs for infectious disease is that they are “of” the global health system, but not “in” it, and therefore not limited in the same way that traditional international health organizations might be.

Whether set up by existing institutions or rising up between them, addressing existing diseases or anticipating emerging ones, identifying diseases or developing new treatments, sharing information with the public or shaping national health systems, GSNs are making an increasingly important contribution to how new, emerging and resurgent diseases have been managed.

By addressing longstanding gaps and weaknesses in the international system, and delivering tangible results, they are increasingly seen as faster, more focused on performance and accountability, and more effective than their more traditionally organized progenitors and counterparts in global health.

As one expert describes it, GSNs represent “an incredible renaissance of ideas.”<sup>42</sup> Another has drawn a very useful and illuminating analogy between the GSN ecosystem and the open source software movement:

*You now have a source code that runs the software, runs the programs for global health. That source code is accessible and influenced by a range of actors, via people in this networked context, and they are following what is going on. The source code is open-source, it gets iteratively defined by the participation of the range of actors.*<sup>43</sup>

## Expanding the Renaissance

Based on the GSNs looked at here, there are a number of areas where the global health system might seek to enhance, expand and extend the impact of multi-stakeholder collaboration on prevention, identification and response to infectious diseases.

- There is insufficient attention being paid to the need for global public goods to tackle the growing challenge of infectious diseases. There is scope to explore the role of GSNs in global stewardship of disease risks and disease management. In particular, there is considerable potential for a consortium of GSNs to come together to play a more active role in global disease anticipation and resilience.



- An overriding concern is how to ensure this new era of partnerships doesn't become as fragmented as the one that preceded it, and we don't end up with a networked version of the institutional labyrinth. As a representative of the OECD Science Directorate put it: "We are struggling with the question of where the gaps are in the networks, where do they fail and what do they fail to do."<sup>44</sup> One can see a need for a formal "network of networks"—an international cooperative platform that works to integrate efforts across different GSNs, and systematically identify gaps and overlaps.
- More engagement with citizen groups and communities is a must, as noted in the lesson on the relative exclusion of such groups. Many of the GSNs have been set up with citizen groups, especially those in developing countries, as distant beneficiaries. More work needs to be done to bring representatives of such groups into GSNs, and to be open to the challenges and opportunities this brings.
- More work is needed to understand the overall governance landscape of infectious disease and how it changes in light of the ecosystem of GSNs. In particular, it is worth thinking about how to bring new GSNs into the global governance of disease, and what they might contribute to it.
- More reflection is needed on the implications of GSNs for the stakeholders involved: governments, private sector, civil society and citizen groups. It is worth exploring whether these groups are able to engage with and capitalize on the potential of GSNs, and what implications the GSN ecosystem might have for how these institutions are organized, managed and developed into the future.

## Implications for Network Leaders

**Get more clarity about the kind of challenge being faced, how tractable it is, and any pre-existing and pipeline solutions—make sense of the problem space from a technical and scientific standpoint.** GSNs that already include technical and scientific members may make this a part of their responsibilities and may see new partnerships being built or internal capacities expanded.

"Problem-based intelligence" will focus discussion and dialogue among network members, and define and clarify common problems. The nature of



the problems selected obviously affects the kinds of strategic approaches that are employed by the network, prioritization of tasks and in particular whether the network can be very targeted and solution oriented or needs to have a looser and more adaptive approach.

**Take stock of political and policy contexts.** A policy context can shape how issues are framed, what key stakeholders are brought in, how the network is mobilized and who will ultimately benefit from a network outcome. Different disease issues have produced very different networks with different functions and structures evolving to match the policy context of the place and time.

**Pay early and ongoing attention to relationship management and invest in brokering, facilitation and negotiation, and navigating power dynamics.** Resist the temptation to mobilize as many actors as possible in the hope that linking up large numbers of actors will lend legitimacy and political weight to the network. Opening the membership up too wide risks tokenism on the one hand, and creates huge facilitation costs on the other.

This is especially pertinent for GSNs that need to create a workable balance between public, non-profit and private interests. This is no easy task, as there are often institutional, cultural, professional and material divisions that are not trivial, and must be overcome if the network is to be fully representative and achieve its goals. The challenge is doing this in a way that elevates the result from being the lowest common denominator on which all parties can agree, to being the highest common multiple to which everyone can aspire. UNAIDS is perhaps the best example of a disease-focused GSN that has worked to establish a high-level consensus across a range of institutions, and set global goals and priorities.

**It is easy to overstate the symbolic equality of different actors around the network table.** Although the GSNs looked at here do, at their best, transcend the politics surrounding a given issue, this is done not through idealism but rather through careful attention to power dynamics and how they are managed. In particular, the best GSNs pay attention to interests and perspectives of minority members, so that they are not overwhelmed and are not simply token members. The most effective networks build attention to these issues into the way the network is governed and managed. Perhaps the most obvious example looked at here is the sophisticated structure of the Gavi Board, with its multi-stakeholder structure and selection of members that can give impartial and independent perspectives and ensure effective decision-making.

**Engage all four pillars of society: governments, civil society, private sector and citizen groups.** In the case of GSNs working on disease issues, scientists and researchers—employees of these sectors—become important separate stakeholders.

GSNs in the field of global disease tend to lack direct engagement of citizen groups. Engagement with the end-users and beneficiaries is relatively weak. They are more often seen as providing the justification for the network,



and the ultimate focus of the networks' activities, and much less as active network stakeholders.

**Have appropriate, clear and transparently developed governance agreements.** Many successful GSNs have clear protocols and articles of association that define the formal and informal rules of how the network operates. This is especially important for networks that have a resource mobilization and dissemination function.

Careful attention to how the network would work is essential. Wikipedia, for example, self-organizes around carefully defined and articulated rules that are part of the focus of network stewardship. Clear governance will enable GSNs to resolve the challenges of diverse membership, while maximizing the potential to address the critical issues that have seen insufficient progress in the past.

There is no single ideal governance structure that would guarantee success in this regard. Instead, as with all political systems, macro or micro, governance agreements need to match network members' skills, resources, history and objectives. That said, all of the successful networks explicitly addressed some common aspects in their governance arrangements, including vision, mission and principles, roles and responsibilities, decision-making protocols, programs and work plans, and dispute resolution.

**Focus on multi-stakeholder innovation.** This may be innovation in products to address the core problem (e.g., vaccines), it may be innovation in processes to deploy those products (e.g., health systems), it may be innovation in the paradigm of how a particular challenge is addressed or thought about (e.g., integrating animal and human health), or GSNs may even work simultaneously on multiple aspects of innovation.

Where GSNs are located in the innovation space depends fundamentally on the problems being addressed and the availability of tested and usable solutions.

- GSNs may mobilize around the existence of a new product, and work to make it applicable in a context different from the one for which it was developed.
- GSNs may work to develop and implement new innovations and support their dissemination (e.g., the meningitis vaccine).
- A number of GSNs work to create new innovation pipelines, and radically change how products are developed and implemented (e.g., Gavi through its work on advance market commitments).

In all of the cases where GSNs focus on innovation, the multi-stakeholder nature of the innovation process is critical. The MVP needed health organizations to frame the problem, governments and foundations to back it, the private sector to develop it and drive down costs, and scientists and



academics to verify the results. The role of successful GSNs is very much one of orchestration and facilitation of iterative, networked experimentation that enables results to be achieved.

**Have an obsession with performance and impact.** The GSNs looked at here all have clear and consistent ideas about how to measure the effectiveness of what they do. This may be because of their grounding in public health, which, after all, has been the source of many of the most systematic and rigorous evaluative methods and principles. It is also worth highlighting the importance of continual reflection when building network performance systems.

## Closing Thoughts

This report, and the research on which it was based, was conceived, developed and implemented against the background of one of the most significant disease events of recent years: the West African Ebola outbreak. Not since swine flu in 2009 and SARS in 2003 has a disease so gripped public attention, political leadership, social commentary and scientific focus. Unlike those two cases, however, the Ebola story has been far from a positive one. All of the participants in the research process inevitably referred to Ebola and the national, regional and global response in sharing their perspectives. Ebola was described as a “Hurricane Katrina” moment for infectious disease. Just as that disaster did for climate change, Ebola reveals that we are vulnerable, that we are inadequately prepared for what the future might bring, and that the future is here. All the respondents, without prompting, described Ebola as symptomatic of a deeper institutional disconnect in global health, and infectious disease responses in particular. The slowly unfolding crisis, the weaknesses in the national and international responses, and the resulting panic around possible spread out of Africa have served to reveal gaps in the global apparatus for managing new and emerging epidemic threats.

In talking about GSNs against this backdrop, it is important to be positive but also realistic. GSNs have made a remarkable contribution to the infectious disease issue space. In a variety of ways, GSNs have responded to the challenges of an imperfect system, outdated institutions and imperfect markets. They have found ways of bringing different stakeholders together to address these challenges. The GSNs looked at here provide a series of responses to these flaws in a number of specific areas. At their best, they reveal that these challenges can be overcome. And they do so in ways that are inspiring and remarkable: “fast-paced, globally interconnected and potentially world-saving.”

The real lesson of global networks still has to be fully absorbed within the system. That is, if we are serious about threats such as infectious disease, we need to not just forge new networks but to change the system so that



such networks are the norm and not the exception. What we need is a global health system that can rapidly mobilize networks that are able to collectively and effectively deal with the growing threats we face.

In October 2014, Dr. David Nabarro made the following impassioned statement: “Ebola is the most extraordinary challenge that the world could possibly face, and one that will require every piece of ingenuity and collective action that we can mount. Without a global movement, it will be impossible to get this disease quickly under control and the world will have to live with the Ebola virus forever. It’s going to require an enormous, concerted and disciplined effort to do it.”<sup>45</sup>

One hopes that we can learn the lessons from GSNs that have already been implemented, and from the Ebola response, so that such a statement by one of the leading disease experts in the world is less of a plea for what should be, and more of a simple statement of what is. This, clearly, is a process that has only just begun, but the need and the necessary direction of travel is clear.

In the famous words of Winston Churchill: “This is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.”<sup>46</sup>



## Endnotes

- <sup>1</sup> R. Smith, D. Woodward, A. Acharya, R. Beaglehole, N. Drager, *Health Policy and Planning*, Oxford University Press, 2004.
- <sup>2</sup> Institute of Health Metrics and Evaluation (2013) Financing Global Health <http://vizhub.healthdata.org/fgh/>
- <sup>3</sup> Nathan Wolfe, *The Viral Storm: The Dawn of a New Pandemic Age*, Penguin, 2011.
- <sup>4</sup> WHO (2007) The World Health Report 2007: A Safer Future
- <sup>5</sup> R. Lozano, M. Naghavi, K. Foreman, S. Lim, K. Shibuya, V. Aboyans, "Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study" *The Lancet* 80:2095-128, 2010.
- <sup>6</sup> K. Smith, *et al*, "Global rise in human infectious disease outbreaks," *Royal Society Interface*, Volume: 11 Issue: 101, December 2014.
- <sup>7</sup> UK Government Annual Report of the Chief Medical Officer, Volume Two, "Infections and the rise of antimicrobial resistance," 2011.
- <sup>8</sup> Infectious Diseases Society of America, 2014. <http://www.idsociety.org/>
- <sup>9</sup> CDC HAI Prevalence Survey, *New England Journal of Medicine* 2014;370:1198-208, 2014.
- <sup>10</sup> J. W. Lee, W. J. McKibbin, "Estimating the Global Economic Costs of SARS," Institute of Medicine (US) Forum on Microbial Threats, 2004.
- <sup>11</sup> World Bank, "Avian Flu: The Economic Costs," 2004.
- <sup>12</sup> Wolfe, *ibid*.
- <sup>13</sup> House of Lords Intergovernmental Committee, "Diseases Know No Frontiers: How effective are Intergovernmental Organisations in controlling their spread?" 2008.
- <sup>14</sup> *Ibid*
- <sup>15</sup> *Ibid*
- <sup>16</sup> Smith, *et al*, *ibid*.
- <sup>17</sup> Kevin M. De Cock, *et al*, "The New Global Health," *Emerging Infectious Diseases*, 19.8 (2013): 1192-1197, web 9 Dec. 2014.
- <sup>18</sup> R. Atun, S. Bennett, A Duran, "When Do Vertical Programmes Have a Place in Health Systems," WHO, 2008.
- <sup>19</sup> M. Woolhouse and J. Farrar, "An Intergovernmental Panel on Microbial Resistance," *Nature* 509, 555-557, 29 May 2014.
- <sup>20</sup> A. Coghlan, "Africa's road-building frenzy will transform continent," *New Scientist*, 10 January 2014.
- <sup>21</sup> B. Ramalingam, *Aid on the Edge of Chaos*, Oxford University Press, Oxford, 2013.



- <sup>22</sup> L. Saker K. Lee, B. Cannito, A. Gilmore, D. Campbell-Ledrum, “Globalization and Infectious diseases: A review of the linkages,” WHO, Special Topics No 3, 2004.
- <sup>23</sup> Woolhouse and Farrar, *ibid.*
- <sup>24</sup> De Cock, *ibid.*
- <sup>25</sup> G. Roscigno, *et al*, “Innovation and new technologies to tackle infectious diseases of poverty,” TDR Global Report 2013.
- <sup>26</sup> P. Doherty, *Pandemics: What Everyone Needs to Know*, Oxford University Press, Oxford, 2013.
- <sup>27</sup> J. Woodall, “Global surveillance of emerging diseases: the ProMED-mail perspective,” *Cad Saude Publica*, 2001;17 Suppl:147-54, 2001.
- <sup>28</sup> “Global Infectious Disease Surveillance and Detection: Assessing the Challenges—Finding Solutions,” Institute of Medicine (US) Forum on Microbial Threat, 2007.
- <sup>29</sup> *Ibid*
- <sup>30</sup> E. Sondorp, *et al*, “Independent Evaluation of the Global Outbreak Alert and Response Network,” WHO, 2011.
- <sup>31</sup> J. Surowiecki, *The Wisdom of Crowds: Why the Many Are Smarter than the Few and How Collective Wisdom Shapes Business, Economies, Societies, and Nations*, New York, Doubleday, 2004.
- <sup>32</sup> A. Killick, “Knowledge Networks,” GSN Program [gsnetworks.org](http://gsnetworks.org), 2014.
- <sup>33</sup> <http://www.gvn.org>
- <sup>34</sup> Wellcome Trust, “Unprecedented international consortium assembled to accelerate collaborative multi-site trials of candidate Ebola vaccine,” Press Release, 28 August 2014
- <sup>35</sup> Quoted in D. MacKenzie, “Review: Smallpox: The death of a disease” by D.A. Henderson, *New Scientist*, 27 May 2009
- <sup>36</sup> D. Maher, “The human qualities needed to complete the global eradication of polio,” *Bulletin of the World Health Organization*, 2013;91:283-289, 2013.
- <sup>37</sup> Anthony Williams, “Policy Networks,” GSN Program [gsnetworks.org](http://gsnetworks.org), 2014.
- <sup>38</sup> <http://www.itad.com/projects/first-and-second-independent-evaluation-of-un aids/>
- <sup>39</sup> <http://ebm.bmj.com/content/16/4/97.full>
- <sup>40</sup> The US Commitment to Global Health: Recommendations for the Public and Private Sectors, Institute of Medicine (US) Committee on the US Commitment to Global Health, 2009.
- <sup>41</sup> Quoted in H. Worley, H., “The Emergence and Effectiveness of Global Health Networks,” Population Reference Bureau Interview, 2013.
- <sup>42</sup> House of Lords, 2008.



<sup>43</sup> Ibid

<sup>44</sup> Ibid

<sup>45</sup> D. Nabarro, UN Statement, 2014. [http://www.un.org/ebolaresponse/pdf/Nabarro\\_GA.pdf](http://www.un.org/ebolaresponse/pdf/Nabarro_GA.pdf)

<sup>46</sup> W. Churchill, 1942. <http://www.churchill-society-london.org.uk/EndoBegn.html>



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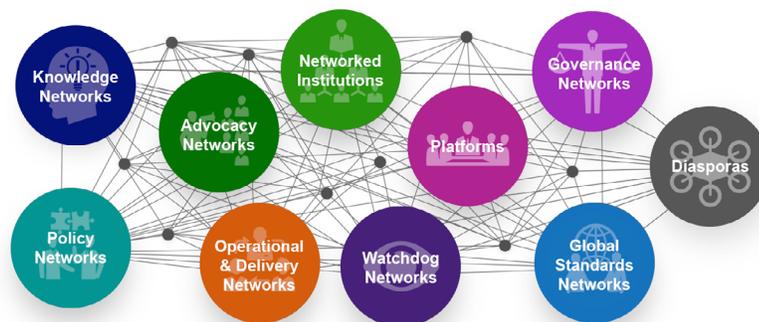
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Ten Types of Global Solution Networks

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