

**GLOBAL CHALLENGES
EBOLA OUTBREAK****INNOVATIONS FOR
SUCCESSFUL SOCIETIES****CHASING AN EPIDEMIC:
COORDINATING LIBERIA'S RESPONSE TO EBOLA, 2014–2015**

Leon Schreiber drafted this case study in consultation with Jennifer Widner of Princeton University based on interviews conducted in Monrovia, Liberia and London in November and December 2015.

Princeton University's Grand Challenges program supported the research and development of this case study, which is part of a series on public management challenges in the West African Ebola Outbreak response.

SYNOPSIS

In mid 2014, the largest-ever outbreak of Ebola virus disease overwhelmed health-care services in Liberia. The country's fragile health-care system, damaged by a 14-year civil war, could not respond to all of the demands it faced. The rate of new infections rose, and schools and health facilities closed. Collaborating with international partners, the Liberian government created a dedicated Incident Management System (IMS) to coordinate all elements of the country's fight against the disease. The IMS team created a clear decision-making framework, provided responders with adequate infrastructure and technical support, and set up a coherent procedure for communicating with a frightened and anxious public. At the end of the outbreak, the question was whether Liberia's approach offered a model for managing responses to infectious disease outbreaks in other, similar settings and whether there were ways to improve coordination further.

INTRODUCTION

Two short lines in the March 25, 2014, edition of the *New Republic Liberia* newspaper reported something Liberians did not want to hear: six people from neighboring Guinea had recently crossed the border into Liberia in search of treatment for Ebola virus disease, and five of them had died.¹ The Ebola virus was highly infectious (most of those exposed were infected) and pathogenic (most of those infected developed the disease). The disease was virulent and usually fatal. It had no known cure and few treatment options. By April 9, only two weeks after the news story, Liberia had 22 confirmed or suspected new infections, an unknown number of unreported cases, and 12 deaths.²

In an effort to contain the outbreak, Liberia's health minister, Dr. Walter Gwenigale, immediately appointed the country's chief medical officer, Dr. Bernice Dahn, to lead a National Public Emergency Task Force. Dahn organized technical subcommittees focused on the medical, social, and logistical aspects of the response and convened daily meetings that included representatives of a variety of outside organizations. For a time, these efforts appeared to have succeeded. Internal affairs minister Morris Dukuly recalled that after the initial deaths in March, the government had the impression that "it had evaporated more or less. . . . For a month we thought we had defeated it," he said. "Then it came back in [June] with a vengeance."

As people traveled to visit relatives and conduct business, the disease had quietly spread from rural areas such as Lofa County, on the Guinea border, to Monrovia, Liberia's densely settled capital, and by June 17, Ebola had officially claimed its first victims in the city.³ The number of new cases per week rose steadily, reaching about 80 by the second-to-last week of July. The country's president, Ellen Johnson Sirleaf, later described the situation as one of "total confusion, chaos, disbelief, fear—[and] no means to respond because we didn't have the knowledge, we didn't have the equipment."⁴ The country's health-care system was still in the early stages of recovery from a 14-year civil war.

Sirleaf realized that lack of coordination between different government agencies, as well as between the Liberian government and international partners, posed perhaps the most pressing challenge to her government's efforts to contain the virus. Amid the rapidly escalating scale of the epidemic, the emergency task force was unable to mount a large-scale response effectively. With local government offices, nongovernmental organizations (NGOs), and ministries all trying to sort out their roles and reach thousands of citizens in far-flung communities, Dahn, the technical committees, and health ministry capacity were badly overstretched.⁵

On July 26, Liberia's independence day, Sirleaf declared a national state of emergency and announced she would personally chair a new Ebola National Task Force. That presidential task force consisted of high-level representatives of Liberian government ministries, foreign governments, and international organizations. Sirleaf appointed Dukuly, Liberia's minister of internal affairs, as co-chair.

But the urgency of finding a better system for managing the day-to-day response remained. Carrying out the case management, disease surveillance, logistics, and communications functions required to contain the spread of the disease while coordinating the large number of Liberians and outside groups that had offered to assist required ingenuity.

The stakes could hardly have been higher. To Dukuly, there was “no incident in recorded history—not even the civil war—that challenged the very existence of this country like the Ebola virus.”

THE CHALLENGE

Three types of problems had hobbled the original coordination system: low organizational capacity, limited infrastructure, and a fragmented communications system. During June and July, those challenges had undermined effectiveness as the size and complexity of the outbreak, the number of groups involved in the response, and the level of anxiety rose.

Originally, Dahn had set up technical committees within the health ministry to facilitate the main functions the task force aimed to carry out, but the procedures put in place had quickly proved inadequate. The response required the cooperation of other ministries that controlled port, airport, finance, and other critical functions, but decision making did not adequately involve those other government departments. Moreover, Dahn herself was thoroughly overburdened. By channeling all decisions and actions through her and through the health ministry, the task force design caused bottlenecks and also led to the neglect of other health-care issues. Dahn had no deputies who could assume some of her duties when, for instance, she had to attend to non-Ebola-related matters or several problems arose at once.

Further, under the existing system, the responsibilities of each technical committee were neither clearly defined nor adequately supported, so it was also hard to know whom to contact to solve a particular problem. A team from the US Centers for Disease Control and Prevention (CDC) that visited in late July concluded, “When logistics challenges were identified (e.g., lack of fuel for vehicles to transport teams to investigate potential cases or to transport a burial team), there was not a single point of contact among the large assembled [task team] to provide the logistical and administrative support to respond to these needs.”⁶

Amos Gborie, Liberian deputy director of environmental and occupational health services who later helped manage the Ebola response, said there also was no system to monitor progress and “no information sharing. . . . No one knew what was happening.” Ministries, local governments, clinicians, nongovernmental organizations, suppliers, and donors lacked a way to track actions taken—a vital capability when different organizations divided labor.

The arrival of relief workers and other personnel from aid organizations beginning in July exacerbated the existing coordination problems. James Dorbor Jallah, former deputy minister of planning who co-chaired Sirleaf’s ministerial task team, recalled how international organizations “wanted to run their own

platforms independently because that's what they were used to. . . . The mentality was to operate in silos, which [resulted in] duplication and inefficiencies." One of the biggest challenges involved finding ways to integrate those disparate domestic and international bodies into a single, coherent coordination and decision-making framework.

Limited infrastructure also impeded effective action. Those responsible for directing key functions worked in different parts of the capital. The group that dealt with medical aspects of the response operated from the health ministry's building on the outskirts of Monrovia. But the logistics people were based across town in the offices of the General Services Agency, which managed government property. The result of such fragmentation was that "people were meeting all around the place," said Tolbert Nyenswah, a young assistant minister of preventive health care who later played a central role in the outbreak response.

Further, the office space that was available was unsuited to information sharing. Nyenswah said task team meetings usually took place in rooms that were far too small to accommodate all attendees, so meetings often ended up with "one hundred persons in one room." There were no workstations, no Internet connections.

Those logistical gaps, as well as a lack of adequate hospital facilities and lab capacity, were partly the consequence of a devastating 14-year civil war, which had ended only a decade earlier after claiming almost 300,000 lives and destroying much of the country's physical infrastructure. None of Liberia's hospitals had isolation wards, and protective medical equipment was in short supply.¹ Jallah recounted how the shortage of resources led to "people dying everywhere, bodies being left in the street, . . . people were actually praying so that someone in the Ebola treatment unit would die so that you could take their place."

On top of the coordination and infrastructure problems, the government faced a difficult communication challenge. Ebola was transmitted through direct physical contact with the bodily fluids of infected people or with materials contaminated with those fluids. That meant that behavioral change was the solution to interrupting transmission,⁷ yet safe practices sometimes posed wrenching human dilemmas because they countermanded universal human instincts to, say, comfort a relative with a hug or greet someone with a handshake. It was vital to launch compelling, coherent, and consistent messaging campaigns that would persuade citizens to change the ways they comported themselves in their relationships with others, including family members.

The opposite was happening. Every government agency, NGO, and religious group projected its own message, or so it seemed. According to Robert Kpadeh, deputy information minister at the time, "the way you fight Ebola basically [depends] on the dissemination of information . . . [but in] the beginning, we had a serious challenge with a scattered approach."

Peter Harrington, seconded by the United Kingdom-based Tony Blair Africa Governance Initiative to serve as communications adviser, echoed those

sentiments: “Messaging early on was massively uncoordinated and decentralized—and lacked targets or distribution channels. What you got was this incoherent cacophony of different messages. . . . During the early phases, up to about September, everyone was doing their own messaging.”

Other circumstances also threatened to limit the Liberian government’s ability to adapt and improve its response. Because of the country’s limited available resources, outside financial help was essential. And although a range of nongovernmental organizations and individual governments provided early logistical support, the World Health Organization (WHO), which was responsible for coordinating international responses to infectious disease outbreaks, delayed sounding the alarm, thereby limiting the amount of initial international financial support for response to Ebola. It was only after August 8, when the WHO finally declared the outbreak a “public health emergency of international concern,”⁸ that significant financial support started to arrive.

The government did not have the luxury of time in finding solutions to coordination problems. From March to the end of July 2014, Liberia had registered more than 325 cases of confirmed or suspected Ebola virus disease and 156 deaths—lower than the numbers in Guinea and Sierra Leone but worryingly on the increase. The virus had spread to almost all of Liberia’s counties.

FRAMING A RESPONSE

The minister of health at the time, Gwenigale, recognized the need for change. “Dr. G,” as he was known, had earned respect as the only doctor who treated patients, regardless of affiliation, during the country’s civil war. But infectious-disease outbreaks were not among his specialties, so on July 1, Gwenigale’s ministry asked the American ambassador to Liberia for assistance from the CDC.

During the preceding weeks, Dr. Kevin De Cock, head of the CDC’s global health center, who was based in Nairobi, Kenya, had also grown deeply worried about the news and epidemiological data he was seeing from West Africa. In response to the health ministry’s request for assistance, De Cock quickly organized a CDC team to visit Liberia. It was not the CDC’s first appearance on the scene. When the initial cases had appeared in March, both the CDC and the World Health Organization had sent people to assist, but the advisers left after it appeared the disease was under control. Now circumstances were dire, and with technical support from De Cock’s seven-person CDC team, the ministry went “back to the drawing board,” Nyenswah said.

An initial meeting between ministry officials, the CDC team, and WHO representatives revealed two schools of thought about how to strengthen the response. One option was to use a humanitarian cluster system as a way to help manage essential tasks. Developed to speed coordination during wars or natural disasters that snarled government functions, the cluster system pre-identified United Nations organizations to lead main functions such as logistics, telecommunications, health, nutrition, and emergency shelter, with the United

Box 1: The Origins of Incident Management

The ideas behind the IMS developed in the 1970s as part of an effort to improve the coordination of California's responses to fast-moving and unpredictable wildfires. The US Federal Emergency Management Agency endorsed the IMS command-and-control structure in 1987, and the US Coast Guard in 1989 became one of the first adopters outside the US Forest Service. The approach was thrust into the international spotlight after the US Department of Homeland Security formally adopted it as a national model for the coordination of emergency responses in the aftermath of the September 11, 2001, terrorist attacks.

(For more on development of the IMS in the United States, see:
<http://www.uninets.net/~dsrowley/The%20Fires%20that%20Created%20an%20IMS.pdf>).

Nations Office for the Coordination of Humanitarian Affairs providing oversight. The clusters grouped together both UN and non-UN humanitarian organizations, providing clear points of contact and facilitating division of labor and accountability.⁹ But this situation was a bit different; law and order had not broken down and there was a viable government in place. Moreover, the cluster system had not been used before to respond to infectious-disease outbreaks.

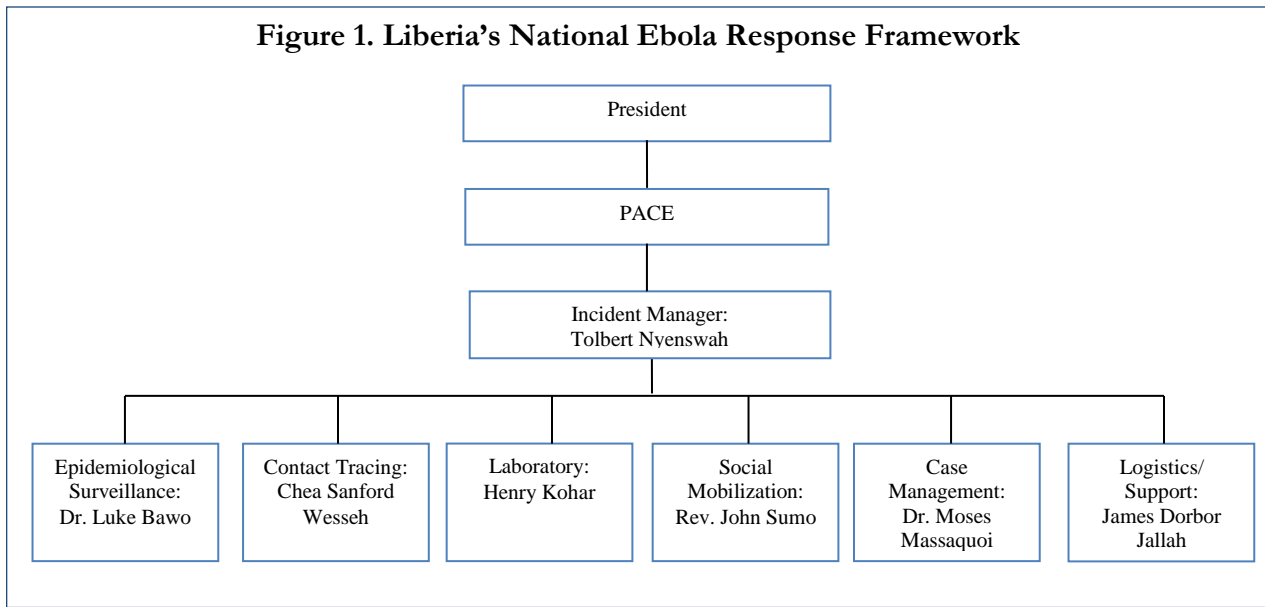
The CDC recommended an alternative approach: the creation of a dedicated Incident Management System (IMS). The IMS structure would separate Liberia's Ebola response from the rest of the overburdened health service, designate a single contact point for each main function, and coordinate all organizations around task teams under its umbrella. The IMS proposal placed Liberian government officials in the leadership roles. (text box 1)

As a result of its determination to build local ownership for the response, in early August the Liberian government decided to adopt the IMS approach while reserving possible support roles for some of the UN clusters.

De Cock described the IMS as a "fairly standardized approach to incident management," adaptable to many circumstances. The IMS model set out a clear chain of command within a joint operations center; offered standardized role descriptions and procedures for organizing personnel, facilities, equipment, and communication; and provided guidance for creating an incident action plan based on measurable tactical objectives. To avoid overburdening key staff members, the approach recommended that the span of control—the number of people reporting to a senior manager—not exceed 5 to 1.¹⁰ The model was scalable and adaptable. (Given the importance of cross-border Ebola transmission, the CDC had proposed during the early months of the West Africa Ebola outbreak that a regional IMS be created that brought Sierra Leone, Liberia, and Guinea together, but lack of resources precluded that option.) By mid July, De Cock and his team instead focused on working with the government to adapt the system to Liberia's needs.

First, Gwenigale and his ministerial team refined the command-and-control structure. Although different groups offered suggestions on what the IMS

Figure 1. Liberia’s National Ebola Response Framework



organizational chart should look like, Gwenigale’s team, together with De Cock and his deputy, Satish Pillai, who had a doctorate in evolutionary biology, eventually settled on what they thought was the best framework for grouping and linking key components of the response (figure 1). They set up task forces to handle the medical response (data collection, forecasting, treatment) as well as communication, logistics, administration, and planning. They determined how best to link the national IMS to the county-level response and external partners. And they improved the organization of IMS meetings to ensure that each goal had clearly identified action items and to track task completion. When possible, they tried to work within the ministry of health’s existing framework to facilitate implementation of the changes.

The plan was for international and nongovernmental organizations playing active roles in the response to participate in the key committees, each co-chaired by a Liberian official and someone from the corresponding UN cluster.

On August 10, on advice from the health ministry, President Sirleaf appointed Nyenswah, then assistant minister for preventive health care and a graduate of Johns Hopkins University, the dedicated incident manager to lead the Ebola response. This step enabled Dahn to focus on the sizable task of restoring normal health-care services, which had ground to a halt.

Nyenswah said the president’s role was critically important. Nyenswah was an assistant minister, but his role as IMS chair meant he would be directing the work of more-senior officials, including people in other ministries. Without the president’s backing, it would have been hard to win those officials’ cooperation. Moreover, Nyenswah said, Sirleaf’s action meant he “had direct access to the presidency” and the “authority to make decisions on moving the response forward.”

The president also appointed two deputy incident managers “to ensure the response continued to have command and control when [Nyenswah] was in

higher-level coordination meetings related to the response.”¹¹ The first was Francis Katch, who had a doctoral degree in medicine and was responsible for medical aspects of the response. Crucially, the other was Jallah, whose previously separate logistics group was also fully integrated into the IMS.

An important feature of the restructured IMS approach was the signaling effect it had. Minister of Information Lewis Brown emphasized that “we, the Liberian government, were determined to be in charge of this” response. With the changes in place by late August, “absolutely everything about the response now came under the IMS.”

To ensure that the government continued to be in charge of policy decisions and to provide a forum for building coordination across ministries, Sirleaf also moved to complement the work of the IMS by defining the role of her presidential task force. Emmanuel Dolo, one of the president’s most trusted advisers, worked with senior officials in the presidency and the Africa Governance Initiative to provide managerial support of the task force, which was renamed the President’s Advisory Council on Ebola (PACE). Dolo, who led the PACE secretariat, said that with the creation of PACE, “the president was pretty clear . . . that this was not going to be a situation where the international people were going to control it.”¹² The move provided another signal of local ownership over the response, as well as clear leadership on the part of the Liberian government.

A strong motivating factor behind the creation of PACE was the need for rapid action on high-level policy decisions regarding such issues as school closures, cremation policies, safe burial practices, and border closures. Elizabeth Smith, an adviser from the Africa Governance Initiative who worked closely with Dolo, emphasized that “no matter how much political authority was vested in the leadership of the IMS, there [were] certain decisions that needed to be taken elsewhere.” The IMS operated under a planning horizon of 24 hours in managing the day-to-day response,¹³ but PACE provided a mechanism to “escalate things that weren’t day-to-day issues,” Smith said. PACE’s longer planning horizon additionally provided an opportunity “to simultaneously consider wider issues in the health-care system” such as the restoration of normal health-care services.

In addition, by providing a platform whereby the president and senior ministers could stay abreast of the latest developments in the response, PACE provided “a kind of check and balance that ensures that what needs to happen is in fact happening,” Smith said. That oversight role also served to “keep all of the political [actors] involved,” added Brown. “We wanted to keep the country and all of its leaders still engaged, because you didn’t want people breaking away and feeling irrelevant in the process.” In total, Smith said, PACE could be regarded as “a high-level strategic decision-making and monitoring system within the [overall coordination] structure.”

But a clear division of labor was vital if PACE was to function effectively in supporting the IMS’s implementation role. It was “important to establish terms of reference to make it clear that PACE wasn’t there to do the day-to-day

Box 2. Funding Liberia's Ebola Response: The Role of the IMF

The outbreak of Ebola created a budget challenge for the governments of Liberia, Sierra Leone, and Guinea, both because of the need to hire people to assist in response and because of reduced tax revenue when business activity fell. Following WHO's August 2014 declaration of the Ebola outbreak as a "public health emergency of international concern," the International Monetary Fund (IMF) stepped in. Although unable to provide direct budgetary support, IMF policy makers decided they could act more rapidly than other international organizations to make funds available by providing debt-service relief. That step enabled the government to use money earmarked to pay interest on the debt for the Ebola response. Rodgers Chawani, IMF economist responsible for Liberia, said that "under the exceptional circumstances, the IMF tried to mobilize resources in the fastest possible time."

In late September, the IMF accelerated payment of \$48.3 million in debt-service relief to Liberia. When leaders of the G20 major economies called to accelerate assistance in November, the IMF responded by extending a further, \$45.6 million to Liberia under its Rapid Credit Facility, which provided support in a single, up-front payout.

The IMF also created an entirely new financial instrument—the Catastrophe Containment and Relief Trust—to respond to the Ebola epidemic. The new tool expanded the circumstances under which the IMF could provide exceptional assistance to include public health disasters. In February 2015, Liberia received an additional \$36.5 million in debt relief from the trust. Chawani explained the thinking behind the approach was that "as they are dealing with this crisis, their debt-service obligations should not be a constraint."

Many donors helped fund supplies or extra help, but the IMF's actions enabled the Liberian government to pay civil servants and continue playing its leading role in the response.

management and to scrutinize general decisions if there was no need," Smith explained, further elaborating by pointing out that the terms of reference drawn up by Dolo also incorporated the notion that not all members would necessarily attend PACE meetings on a week-to-week basis. "The idea was, rather, that people would come according to what issues were being discussed," Smith said. There was nevertheless "standing membership for key multinational agencies, including the UN and diplomatic representation." PACE meetings were scheduled to take place every Friday at 4 p.m.

Once the basic structures had been put in place, Dolo's secretariat provided continued support for PACE. Apart from organizing the meetings and ensuring that Sirleaf had an accurate view of the state of the response, the secretariat had an important agenda-setting role. It signed off on the government's national Ebola response strategy, for example.¹⁴

Dolo often attended IMS meetings and identified pertinent issues through direct consultations with Nyenswah. The secretariat also worked with Dahn to gauge the potential impact that PACE decisions would have on the restoration

of non-Ebola-related health-care services. But according to Smith, they also “liaised with a much wider range of ministries . . . [in] trying to spot the strategic issues that needed escalation, decisions, or resourcing so that nothing got dropped.”

The secretariat’s advisory role eventually culminated in the circulation of so-called PACE papers, which presented to the president and key decision makers a range of policy options and their possible implications. Thereafter, the president would issue invitations to ministers for their attendance at PACE meetings based on the topics to be discussed. There was no system of formal voting in PACE, and most decisions were based on consensus. However, the way PACE had been constituted as part of a nationwide state of emergency “meant that the president had ultimate authority,” Smith said.

The existence of the state of emergency also accounted for PACE’s status as a “quasi, unofficial cabinet that made decisions in an emergency situation,” Dukuly said. Although cabinet meetings still took place, “decisions by PACE did not [end up] with the cabinet. . . . PACE made the decisions.”

GETTING DOWN TO WORK

With PACE designated as the ultimate decision-making body and the IMS as the sole vehicle responsible for executing the response, it was time for Nyenswah and his team to address the coordination, logistics, and communication problems that had thus far hampered the government’s efforts. Winning the race against Ebola required the integration of all aspects of the response into the IMS framework. Responders also needed logistical and administrative support to implement solutions and track progress. Finally, efforts to contain the virus depended on the creation of a more coherent and unified approach to messaging about Ebola.

Building an integrated IMS

The appointment of a dedicated incident manager and deputies with the authority to lead the IMS, as well as the inclusion of the logistics working group and the separation of the IMS from the regular health system, provided a solid foundation for mounting a more integrated response. But much remained to be done.

The first step was to create thematic working groups or subcommittees for specific functions. The existing ministerial task force had a similar structure, and it proved relatively easy to build on what Gwenigale, Dahn, and other leaders had created earlier. The working groups for epidemiological surveillance, contact tracing, laboratory testing, social mobilization (communication), case management, and logistics all became parts of the IMS.

Nyenswah worked to define the leadership structure of each of those six thematic working groups. In addition to retaining the Liberian officials who were already leading each of them, he decided to assign major international partners to co-chair the groups. Nyenswah said the step was important in order

“for the key partners to buy into the IMS system, [so] they became part of decision making.”

International partners were assigned to the different areas based on their individual expertise. For example, Jallah explained, the logistics working group was co-led by the World Food Program (WFP) “because in the UN system, WFP is the lead when it comes to logistics.” In turn, the case management and contact tracing groups were co-led by WHO with technical support from Doctors without Borders, while epidemiological surveillance was co-chaired by the CDC. In turn, social mobilization was co-led by the United Nations International Children’s Emergency Fund (UNICEF). Jallah stressed the significance of the way that structure created the conditions necessary for “collaborative leadership.”

The effort to get the new system up and running took time, and with each passing week, public anxiety grew. Liberia’s president expressed dismay that the new system seemed to swing into action more slowly than she had hoped. But after conversations with CDC director Tom Frieden during the third week of August, she agreed to stick with the planned reorganization.

September saw a further adjustment. Shortly after the pairing of leadership responsibilities within the IMS, UN resident coordinator in Liberia Antonio Vigilante announced a partial activation of the UN humanitarian cluster system in response to the Ebola outbreak. Although that measure had the potential to enhance the IMS’s logistical and technical capacities, it also presented a challenge because the UN clusters might compete with the PACE–IMS system the government was introducing.

The aim was to try to combine the strengths of both systems. With the IMS already in place, clusters had to operate “in a way that would support the IMS,” said Laurent Dufour, who led UN Office for the Coordination of Humanitarian Affairs support of the clusters in Liberia. In the case of clusters that did not match corresponding committees within the IMS, the UN decided to adopt the IMS model of joint leadership, a step that meant that the clusters “would be co-led by the respective [government] ministries,” Dufour said. The result was that, for example, the UN cluster on health was co-led by the Liberian ministry of health, the cluster on protection was jointly led by the ministry of justice, and the water, sanitation, and hygiene cluster was co-led by the ministry of public works. Dufour pointed out that in practice, the existence of the IMS meant that “with the exception of logistics and, to some extent, education and water-sanitation-and-hygiene (WASH), none of the clusters had a real coordination role. They were [working] in support—but not managing or coordinating. That was in the hands of the IMS.”

The water-sanitation-and-hygiene cluster supported several IMS working groups. It administered sanitation services in Ebola treatment units, for which the case management group was responsible, and it worked with the social mobilization group, focusing on hygiene promotion as a means to slow the spread of Ebola. At the same time, it provided solid-waste-management assistance for the logistics arm of the IMS. Sheldon Yett, Liberia’s UNICEF

country representative, said this essentially meant that the clusters were “plugged into the IMS” as additional support for the response.

Improving coordination further required the establishment of clear decision-making procedures within the IMS. “IMS meetings were fairly chaotic, and it was very difficult to move forward on strategy issues and get focused, [because] the meetings were so large,” said Frank Mahoney, MD, who represented the CDC in the IMS. Nyenswah’s solution to this problem was to create a separate, much smaller group focused on the most important operational aspects of the response. A strict meeting schedule stipulated that the operations meeting took place at 8 a.m. every day, followed by the full IMS meeting at 9 a.m.

Although full IMS meetings included representatives from each of the working groups as well as people involved in other aspects of the response, only the senior-most IMS managers attended the 8 a.m. operations meetings. Mahoney referred to them as “the gang of six”—comprising Nyenswah and his top advisers—along with leaders from the CDC, WHO, and the US Disaster Assistance Response Team, which helped lead outside assistance and which attended at Sirleaf’s request. The reduced size of the meeting, combined with such high-level representation, facilitated much-swifter decision making. Mahoney recalled that they “talked about accountability and about what were the most-urgent things that needed to be done. . . . [The meetings] helped tremendously in solving operational problems.”

The operations meetings also gave IMS leaders the opportunity to discuss “sensitive things”—including such issues as mandatory cremations and school closures—“that you didn’t want dealt with in public,” said Mahoney. A further advantage was that the meetings enabled Nyenswah to hold working group leaders directly accountable. He could invite those leaders to the 8 a.m. operations sessions and demand explanations when specific problems had arisen. The operations group took matters of broader concern to the larger, 9 a.m. full-IMS meeting.

The full meetings of the IMS followed firm protocols. Nyenswah led the sessions, with the international partners and Liberian government officials seated across the table from each other. Each working group had a chair or an alternative with decision-making authority who attended.¹⁵ The agenda adhered to a standard format: key actions completed during the previous 24 hours, actions to be completed during the next 24 hours, and major challenges that had arisen.¹⁶ To support decision making, Nyenswah also created a task listing that assigned responsibilities and set forth deadlines for action items.

The improved meeting protocols enabled Nyenswah to tighten his grip on agenda setting and decision making. According to Mahoney, in the meetings “different groups had very strong opinions on what to do, so there were often debates about the best approach.” Most of the decisions were based on consensus, but “it was clear to everyone, both in the large [IMS meetings] and in the small [operations meetings], that the person making decisions was Tolbert [Nyenswah]. What he said was to be followed.”

Nyenswah added that implementation of decisions followed immediately: “After IMS meetings, each of the thematic groups would go into their thematic group meetings and link up with the [health teams] in each of the 15 counties.” Because physical distance often made it impossible for representatives from Liberia’s 15 county health teams to attend the meetings, it was up to the leaders of each working group to liaise with them.

A final element in strengthening coordination was the sharing of information with PACE, Sirleaf’s advisory council. PACE secretary Dolo attended IMS meetings as a representative of the president. The practice enabled Dolo to identify issues firsthand. Reciprocally, Nyenswah attended all PACE meetings and made weekly presentations to PACE on the state of the response. Direct personal communication between Nyenswah and Dolo further ensured that only relevant matters made it onto the PACE agenda.

Mahoney said that even when the roles of the two organizations intersected, the continuous flow of information between IMS managers and the PACE secretariat ensured that “there wasn’t ever a time that PACE was [micromanaging] the response.”

Rather than direct the IMS in a top-down manner, PACE considered mostly policy issues—and their potential implications—when the IMS requested a decision. Mahoney said PACE “helped the whole government understand the response, and it dealt with issues like school closures and decisions over elections that were beyond the IMS,” adding, “It was also a good venue to interact with other governments . . . and hold the IMS accountable.”

Supporting and tracking the response

The next step was to create an Emergency Operations Center (EOC) to coordinate and track responses. The IMS formed a 10-member team within the health ministry for that purpose. To manage the center, Nyenswah appointed Amos Gborie, Liberian deputy director of environmental and occupation health programs who had worked on infectious disease outbreaks like cholera. Gborie explained that “the EOC was the unit [meant] to help the IMS function well.” Gborie had a mandate to be proactive: “We did not just wait to get instructions,” he said. But problems arose immediately. The health ministry lacked infrastructure—workstations, computers, and Internet access, for example—and administrative support, and the space was cramped. Nyenswah bemoaned the fact that “we didn’t have the space to really make decisions or hold coordination meetings.”

The first temporary center relocated to a refurbished home in the former Liberian telecommunications building in Monrovia on September 27. In addition to providing the IMS with much more space, the building had Internet access and was equipped with big meeting rooms and whiteboards. The first floor housed the support services workgroups, and the medical elements of the response were located on the second floor, where health ministry staff could sit side by side with partners such as the CDC. An Ebola emergency hotline was part of the new facility.

The move had an immediately positive impact. According to Mahoney, “co-locating the working groups was critically important. When the IMS was run out of the ministry, people would go to the meeting and go home or back to their offices. They couldn’t work together.”

In the new building, every working group had a designated area. Although Mahoney said, “We should really have had separate working-group rooms,” he stressed that “having a place where people could work together really helped a lot.” Gborie said, “One of the first things we started seeing was team building. We could now look around the room and see [the different working groups].”

With the hard infrastructure in place, Gborie and the EOC team turned their attention to tracking progress and sharing information across different groups within the IMS. In addition to its role in circulating meeting minutes following IMS meetings¹⁷—and with technical advice from Africa Governance Initiative advisers—the EOC settled on the creation of a dashboard system for information sharing. The dashboard incorporated a straightforward approach to tracking progress on various aspects of the Ebola response according to three colors: red, orange, and green.

The colors indicated progress for each of the response’s individual working groups. Items marked in red required urgent attention; orange signaled that some attention was required; and green deemed items were on track. For example, the November 28, 2014, dashboard assigned orange status to the social mobilization working group’s recruitment efforts, noting that the task was 43% complete. The same version gave green status to epidemiological surveillance, recognizing the group’s increase in laboratory capacity. The rationale behind the use of those colors was that “sometimes people are not too [concerned] about what is in the writing, but when you just show something that is in red, that picture remains in the minds of those who are responding,” Gborie said.

The EOC team wanted to avoid comprehensive yet impractical indicators to monitor progress. Instead, they “tried to think about what is realistic for people to fill in and what kinds of data we really needed,” said Peter St. Quinton, a member of the Africa Governance Initiative team, which advised Gborie. “It became about providing an update on what was happening in different areas—and particularly about what issues needed unblocking.”

To build its tracker, the EOC consulted the working-group leaders on the types of information each had available. Indicators that already existed, as in the case of the logistics group, went immediately onto the dashboard. St. Quinton acknowledged that “in some areas, we really struggled to gather information, especially with things like food security and development projects. But on the medical side, it got into a bit of a rhythm.” The consultation with the working groups, as well as the dashboard’s use of the term *owners* to refer to them, also served to build a sense of responsibility for functions and results.

Gborie cited the example of Ebola treatment units to describe how objectives were measured: “If you said we need 15 units to achieve the objective of Ebola case management, then we would check the following on a weekly basis: ‘How many do we have?’ and, ‘How many are under construction?’ In that

way, we can measure progress.” The individual working groups updated their sections of the dashboard.

The contact-tracing task team kept track of new infections, which was the key indicator of success in containment. (See companion case study *Hunting Ebola: Building a Disease Surveillance System in Liberia, 2014–15*.) The team used specialized tracking systems developed for epidemiologists.

EOC staff members also periodically attempted to verify the information provided by the working groups, principally through telephone calls to the field or by attending working-group meetings.

Once completed, the consolidated dashboard was circulated to all members of the IMS on a weekly basis. It also formed the basis of Nyenswah’s progress updates to PACE.

In spite of the difficulty of obtaining the requisite data at regular intervals, weekly e-mails containing the latest dashboard updates were soon serving as the backbone of the IMS system for tracking progress and sharing information. Accountability improved, and the international partners could easily identify areas of need where they could contribute to the government’s efforts.

The dashboard’s utility was somewhat limited by the fact that it never got formally presented during IMS meetings. Nevertheless, the fact that it was shared across the entire IMS and that it tracked the actions of all of the different elements of the response led Mosoka Fallah, who has a doctorate in microbiology and immunology and is the chief epidemiologist in Monrovia, to conclude that it “made people feel accountable and responsible.”

Speaking with one voice

IMS managers also had to deal with the problem of scattered public messaging. Creating a coordinated communications framework was critical to fighting Ebola. “Ebola is as much a social phenomenon as it is a biological phenomenon,” said Harrington of the Africa Governance Initiative. Changing behavior was key, because Ebola’s transmission mechanism worked through direct contact with infected bodily fluids. In practice, stopping the outbreak meant convincing “a person with a sick child not to touch the child, and a person whose friend is ill not to take the friend to the hospital themselves,” Harrington said. “Ebola preys on human relationships, on that human compassion.” In effect, asking Liberians to beat Ebola therefore meant intervening in those relationships. It meant asking people to withhold gestures of compassion—to temporarily “suspend their humanity,” Harrington said.

The IMS social mobilization working group, which had the job of coordinating Ebola communications, faced a massive challenge. Creating the kind of behavioral change that was needed required appropriate and consistent messaging. But by August “there were hundreds of NGOs involved and many were pushing their own agendas,” Harrington said.

For Reverend John Sumo, a respected Liberian clergyman who co-chaired the social mobilization working group, the first order of business was to establish the IMS’s authority. “We stood our ground and said all messages on

Ebola should emanate from us. [The ministry of health's] logo needed to be on those messages. If not, the messages are not from us," Sumo said.

The existence of the IMS as the central management body for the response made it possible to pressure many groups to comply with messaging decisions. If organizations were found to be distributing unauthorized messaging materials, "we took them to task during the IMS meetings and even confiscated some" materials, Sumo said. Establishing the IMS as a clearinghouse for Ebola messaging also benefited from the cooperation of the ministry of information, which served as the primary mouthpiece for communication campaigns. Members of the IMS social mobilization group attended the ministry's weekly strategy meetings, and ministerial press briefings on Ebola were organized in consultation with Nyenswah and Sumo.

The government's initial messaging campaigns had used the slogan "Ebola is deadly." But reports from the field soon indicated to Sumo that the slogan was not working. Large sections of the public concluded that "if Ebola is deadly, then you will die anyway and don't need to go to the treatment unit," he said. Skepticism also persisted about whether Ebola actually existed or whether it was an elaborate conspiracy.¹⁸ The IMS's response was to launch a new national campaign with a different tone: "Ebola is real." According to Sumo, the focus shifted toward "saying it is real but can be prevented." The campaign included a hip-hop song by the same title that went to the top of the charts in Liberia.¹⁹

By November, the IMS had largely succeeded in establishing its authority over Ebola messaging. Harrington said the social mobilization working group had "gotten to a place where people acknowledged that they had to get approval from this committee before they put material out." In addition to launching the "Ebola is real" campaign, the IMS had also drawn up a document containing approved messages from which government agencies and civic groups could draw in their communications.

Challenges remained. The working group was overloaded with requests for approvals. Sumo also noted that "Ebola is real" quickly "became dull in the ears of the people," and "the next thing we needed was a call to action." On the plus side, the IMS had significantly improved the operational state of the response and reduced the risk that services or supplies would not be available when needed. This gave the social mobilization team more confidence that it could "make promises the hard infrastructure can keep," said Harrington.

The team went back to the drawing board. The idea was to create an appropriate messaging campaign that would simultaneously serve as the principal guideline for other campaigns run by NGOs. The team created a message-and-materials-development working group within the social mobilization committee and reached out to its IMS colleagues working in epidemiology. Harrington recalled that they started by asking a simple question: What are the five behaviors that [if changed] would get the country to zero Ebola cases? Armed with the epidemiologists' response, the team "worked 15 hours a day over a weekend to hash out a draft that fit on one page," Harrington said.

The outcome was the “Ebola must go” campaign. The tagline for the campaign was “Stopping Ebola is everybody’s business,” and the five key behaviors the epidemiological team identified appeared as subheadings on posters and flyers. The guidelines for the campaign focused on following prescribed methods for burials, reporting suspected Ebola cases, isolating the sick, cooperating with contact tracers, and, for patients, remaining in quarantine for the prescribed time. Each subheading had three bulleted items with additional information. “Ebola must go” addressed the need for a new, more action-oriented message. The guideline document condensed the original 40 pages of sometimes confusing guidance down to one page.

Sumo’s team had to build a strong coalition in support of “Ebola must go.” The team first presented the campaign to IMS senior leadership, who endorsed it. The next step was to secure buy-in from international partners during a meeting of the social mobilization working group. When Sumo declared during that meeting, “This is what we’re using from now on,” the previous months’ work in organizing the IMS paid off. Although some NGO representatives pushed to broaden the message so it would focus on their work areas, the working group ultimately adopted Sumo’s version.

The social mobilization committee tested “Ebola must go” with focus groups before Nyenswah presented PACE with the proposed change in messaging. Once PACE endorsed the ideas, the campaign was ready for implementation. To spread the message, the team used existing distribution channels, including the 10,000 volunteers it had trained across all 15 counties. Sumo highlighted the way “chiefs, pastors, and imams were brought on board and empowered to explain [the campaign]. Traditional leaders went on the radio to explain it in vernacular [languages]. . . . We also focused on interpersonal communication by carrying the materials from house to house.”

On December 8, Sirleaf officially launched the campaign in the town of New Georgia, where households had self-quarantined and contained the disease.²⁰ She also publicly committed the government to reaching “no new cases” by the end of the year.

OVERCOMING OBSTACLES

When Liberia finally began turning the tide against Ebola in late 2014, the unpredictability of the epidemic was causing new coordination roadblocks. Earlier efforts had focused on getting a grip on an accelerating outbreak. But toward the end of the year, the challenge morphed into ensuring that the government would ultimately meet the president’s target of zero new infections. As Sirleaf herself said: “We all have to intensify our efforts to travel that very difficult last mile. To go from 100 to 90 is hard, but to go from 10 to 0 is even harder.”²¹

By December, half of all new Ebola cases in Liberia were being reported only in Montserrado County, home of the capital. Because of the high numbers of people traveling to and from the area, “Montserrado was transporting Ebola to the rest of the country,” Nyenswah said. The IMS’s response had to evolve to

meet the new goal. Even though the IMS was the national coordinator, it relied on the government's county health teams to implement certain elements at the local level. But with the case count escalating in Monrovia, which fell under the jurisdiction of Montserrado County, it became clear to Nyenswah that "there was no way the Montserrado County health team could handle the situation." Fallah agreed that "Montserrado was unique and complicated and needed a separate [system]."

Dan Hymowitz, an Africa Governance Initiative adviser who worked on the response in Montserrado County, summarized the prevailing situation in Montserrado as "many partners handling different parts of the response and unclear boundaries between the IMS, the county health team, and the partners on who should do what." In Montserrado there were needs "to move at a very granular level . . . [and] to decentralize the response," Nyenswah said.

In December, the IMS's senior leaders decided to "find other people [who] are energetic and to set up an IMS for Montserrado," Nyenswah recounted. He announced creation of the Montserrado Incident Management System (M-IMS). He also appointed Sonpon Sieh, who was head of the national HIV-AIDS control program, to lead the new unit. Sieh, in turn, reported to the operations team of the national IMS. The M-IMS was set up as a response to the fact that Ebola was now concentrated largely in Montserrado, and its primary goal was to coordinate the work of the county health team and the numerous organizations operating in the Liberian capital.

But the M-IMS got off to a rocky start. Nyenswah acknowledged that the county health team initially resisted the move "because you take power from a county officer and give it to another person." Sieh pointed out that "there was still some lingering resentment" on the part of the county health team and that "some of them continued to report to the national IMS." It eventually took the intervention of Dolo, as a representative of the president, to convince them to report to the M-IMS instead of the county. Sieh recounted how, during one of the early M-IMS meetings, Dolo lifted Sieh's hand into the air and said: "This is the guy for Montserrado; we don't want to hear from anybody else."

Hymowitz, who was Sieh's primary adviser, explained that the key dilemma they faced was, "How much do we take control versus just corralling what's already happening?" He said there "was a mix of the national response's doing things, NGOs' doing things, and the county health team's doing some things." The question that now confronted the M-IMS was how to consolidate the response. For example, Fallah, who chaired contact tracing in Montserrado, was already running extensive operations in the county. As tensions over control increased, Sieh threatened to fire Fallah, who was an indispensable member of the contact-tracing operation. Without an agreed-upon coordination framework in place to guide the M-IMS's work, it "felt like things were unraveling" only two weeks after it had been created, Hymowitz said.

After much discussion, the M-IMS reached a compromise agreement with the teams operating in Montserrado County. The M-IMS decided to divide the county into four geographic sectors. In each sector, the teams of case

investigators and contact tracers would continue to have autonomy over their work. At the same time, Sieh introduced teams of M-IMS supervisors, “who went around all four sectors.” The intention was for those supervisors to monitor the sectors and identify areas where the M-IMS could provide targeted support.

Fallah explained that “the idea was to have an integrated team [in each sector] where you had case investigators, contact tracers, and active surveillance all coordinated from within the sector. Then [the M-IMS was] looking at them from the top, and we [could] support them within the sector.” Hymowitz said that even though that compromise “added another layer and further complicated the coordination arrangements,” it was the only way to get everyone on board and ensure a balance between decentralization and coordination. He emphasized the way in which agreement on the need for that adaptation “provided a huge amount of momentum.”

In implementing the sector approach, the M-IMS had adapted a version of the national IMS framework. It incorporated the principle of collaborative leadership by assigning domestic and international co-chairs to each of the four sectors. Four young Liberian health officials led the sectors, and each was paired with a partner: the CDC in sector one, MSF in sectors two and three, and Global Communities in sector four. They also managed to secure a building to house the teams in each of the four sectors.

The M-IMS also adapted the national IMS’s dashboard, which was managed by a team of epidemiologists. Whereas the national group “wanted to see the whole picture,” the fact that data collection had significantly improved by the time the M-IMS was created—combined with its more granular approach—meant that the M-IMS “wanted much-more-detailed data,” Sieh said. The result was that the Montserrado dashboard included detailed information on precisely where Ebola cases occurred, as well the time it took to respond.

The unit implemented a strict meeting schedule. The core operational team, consisting of Sieh and his two deputies as well as the sector coordinators, met three times a week. There was also a weekly Saturday meeting of the full M-IMS, which reviewed data from the dashboard. Sieh said he met once a week with the national IMS “to tell them exactly what was unfolding.” The information shared during those meetings flowed into Nyenswah’s weekly briefings to PACE. Despite the initial challenges, this framework solidified the vision of decentralization behind the creation of the M-IMS.

In February, Liberians witnessed a powerful demonstration of the need for a decentralized system when Ebola evolved into a largely urban disease for the first time ever. In early February 2015, the IMS received information that Ebola had spread to the underworld of Monrovia. The leader of a drug gang in a densely populated, crime-ridden area called Red Light had become infected. He was killed a few days later during a fight with a rival group, and his death potentially exposed dozens of gang members to the virus. The nickname of one of the alleged attackers, “Time Bomb,” was an apt metaphor for the potentially

explosive implications of Ebola's spread throughout an urban community whose residents deeply distrusted authorities.

Fallah's contact tracers moved quickly and were ultimately able to track down Time Bomb and his associates in Montserrado's sector four. Following tense negotiations with the group, the M-IMS convinced them to undergo 21 days of voluntary quarantine in exchange for daily supplies of food and other basic goods. Although none of them ultimately tested positive for Ebola, the M-IMS's ability to mount a swift response helped contain such potentially explosive situations.

ASSESSING RESULTS

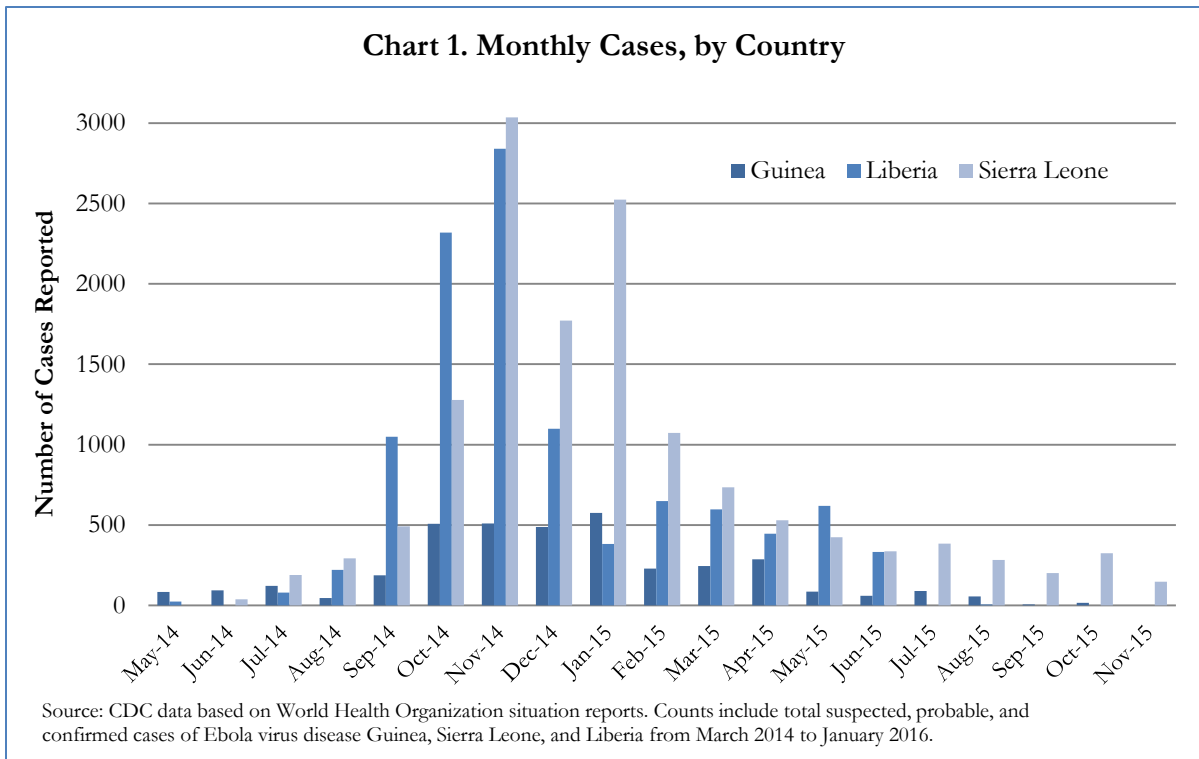
Liberia's ability to weather the horrors of Ebola impressed responders. When Ebola struck, many feared the country might collapse, said Deirdre Rogers, a consultant for John Snow Inc., a United States–based public health consulting firm. “But it didn't,” she said. “And that was a testament to the government's ability to keep it together. . . . Remarkably, [Ebola] didn't destabilize [the country] like it could have. Some credit is due there to the government.”

Compared with the CDC's dire September 2014 forecast that as many as 1.4 million people could become infected with Ebola in the region,²² the fact that the number of confirmed cases in Liberia was ultimately limited to 10,675 (with 4,809 total deaths) was a noteworthy achievement.²³ On May 9, 2015, WHO declared Liberia Ebola free, although there were small outbreaks the following June and November. Of the three countries affected severely, epidemiological data showed that Ebola spiked faster in Liberia than in Guinea and Sierra Leone and that the rate of new infections was brought under control more quickly in Liberia.²⁴ (Response systems on the IMS model started later in Sierra Leone and Guinea but appear to have had more difficulty in bringing the outbreaks under control.)

Within Liberia, it was unclear how much of the improvement had stemmed from better coordination, how much from messaging and subsequent behavior change, and how much from autonomous community action. All three were almost certainly necessary, however, and no single element by itself would have proved sufficient to contain the outbreak. Fallah, the chief epidemiologist in Monrovia, said: “What I've learned is that Ebola is driven by human behavior, by human choices. . . . Part of the reason we succeeded was the cooperation of the community.”

Dolo, who led the PACE secretariat, agreed that “the success we had in Liberia arose out of the fact that we had community engagement. . . . [Communities] became the most indispensable resources in dealing” with Ebola.²⁵

Even though it was impossible to infer a direct effect of the response structure on epidemiological patterns, given the number of potentially confounding variables, it was clear the system positively affected key aspects of the response.



The IMS structure, adapted to include elements of the UN humanitarian cluster system, improved coordination, even if its initial weeks were chaotic. Whereas the first few months of the response were characterized by a hodgepodge of different organizations mounting their own activities, the IMS provided a single coordinating forum that could help harmonize these individual efforts and work toward shared goals. The creation of clear reporting hierarchies, as well as the provision of physical and technical infrastructures, eventually remedied the problems that had undermined the effectiveness of the health ministry’s response in the early months of the outbreak. Fallah, who worked on various aspects of the IMS response, said the organization “changed everything. From that point on, . . . people were coordinating together.”

Samwar Fallah (no relation to the epidemiologist), a journalist who extensively covered the Ebola outbreak for the *FrontPageAfrica* newspaper, recalled that “from March to June, the government didn’t have control. It didn’t look like there was any actual coordination, and people were just at the mercy of God. . . . This started to change only when they established the IMS.”

One CDC study of the Liberian response similarly concluded that “instituting the IMS . . . was critical for accountability and coordination of multiple partners.”²⁶ Although the IMS idea originated with the CDC, WHO also credited the approach with “vastly [improving] surveillance, case finding, contact tracing, and overall management of key response activities”—particularly in the urban setting of Montserrado County.²⁷

The separation between the IMS as the implementation arm and PACE as the venue for high-level policy decision making was also important. As Dolo noted, the approach enabled PACE to become “the think tank of the

response.”²⁸ Prior to the establishment of PACE, the government had made a number of policy miscalculations. The most high-profile example was the government’s unilateral decision on August 19 to forcefully quarantine the Monrovia community of West Point following the looting of an Ebola treatment unit there. A 15-year-old boy was killed and two other protesters were injured when the military opened fire on demonstrators.²⁹

With the creation of PACE, coordination between the government and key international partners, along with the structured weekly updates from Nyenswah, enabled the council to make informed decisions when dealing with contentious issues. Still, some of the PACE decisions, such as the need for cremations until new cemeteries were created, remained controversial.

Not everything worked as smoothly as it might have, however. The IMS did not completely meet the challenges of data management. Although data collection gradually improved and, as a February 2016 study concluded, was “instrumental in guiding the response, [data sets] were incomplete, contained duplicates, and could not be analyzed in real time.”³⁰ The problem of unreliable data combined with a failure to present the dashboard during group discussions potentially limited its efficacy as an information-sharing tool.³¹ In spite of those limitations and compared with the lack of information sharing prior to the creation of the IMS, the dashboard proved to be “a useful tool to keep track of

Chart 3: Domain scores* on a dashboard tool for measuring emergency management capacity, by month — Guinea, Liberia, and Sierra Leone, August 2014–June 2015

<i>Country/Domain</i>	<i>Domain scores</i>										
	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
Guinea[†]											
Staff	— [§]	1	2.5	4	4	4	4	3	3	—	—
Infrastructure	—	1	1	3	3	3	3	4	4	—	—
Systems	—	2	2	3	3	3	3	3	3	—	—
Liberia[¶]											
Staff	—	2	3	3	—	3	3	3	3	3	3
Infrastructure	—	1	3	3	—	2.5	2	2	2	3	3
Systems	—	1	2	3	—	3	3	3	3	3	3
Sierra Leone											
Staff	2	2	3	4	4	4	—	4	4	4	4
Infrastructure	1	1	2	3	3	3	—	3	3	3	3
Systems	0	1	3	3	4	4	—	4	4	4	4

* Domain scores are on a 0 to 5 ordinal scale, which reflect lowest to highest capacity. [†] The dashboard tool was only used from September 2014 to the beginning of May 2015 because of implementation of other monitoring methods more suitable for Guinea’s incident management system. [§] No data were collected. [¶] The dashboard tool was not used until September 2014. **Source:** Brooks JC, Pinto M, Gill A, et al. Incident Management Systems and Building Emergency Management Capacity during the 2014–2016 Ebola Epidemic — Liberia, Sierra Leone, and Guinea. *MMWR Suppl* 2016;65(Suppl-3):28–34. DOI: <http://dx.doi.org/10.15585/mmwr.su6503a5>.

what was working and what wasn't working," Jallah said. Coordination with Liberia's 15 counties also remained a challenge throughout, as evidenced by the need to create the M-IMS to support the work of the Montserrado County health team.

The effort to manage a coherent communication strategy served as an example of the IMS's most-fundamental success: providing a platform and rules so that people from different countries, backgrounds, and organizations could work together. Although the system got off the ground only slowly, it proved responsive and it changed with shifting patterns of epidemiological data.

Infrastructure was important for improving coordination and speed, and co-location of related functions at an emergency management center enhanced the response. Later, in August 2015, thanks to the Paul G. Allen Family Foundation as well as Facebook founder Mark Zuckerberg and his wife, Priscilla Chan, MD, the IMS became able to set up a temporary emergency-operations center and later a permanent facility.³²

Despite those positive intermediate impacts, debate persisted about how to best improve emergency response management. One CDC evaluation that assessed emergency management capacity through dashboard information collected from the affected countries found that at least in some months, the Liberian system had slightly lower staff capacity and conformed less to the incident management system model than its neighbors did (chart 3). The study implicitly raised the question of whether the system performed as well as it did because of aspects the CDC study did not take into account—namely, the partnership with the UN clusters—and whether it might have performed better had all the elements of a standard incident management system been stronger.

PREPARING FOR THE NEXT TIME

For the people who followed Tolbert Nyenswah, Mosoka Fallah, and their colleagues, the question was how to learn and adapt.

Ebola had caught Liberia—and the world—off guard. The lack of preparedness meant the disease had a head start on the government's efforts to contain it. That initial government disadvantage meant that "with everything we [were] doing, we had to learn from mistakes," Fallah said. Peter Harrington of the Africa Governance Initiative aptly characterized the response as "one gigantic exercise in adaptive learning." With the late arrival of international support and the delayed creation of the Incident Management System (IMS) coordination framework, it was only in late 2014 that the response finally started catching up with the disease.

Fallah expressed the lingering regret that "we started coordination too late," ascribing the delay to a failure to learn from previous Ebola outbreaks in other countries. During the early stages of the outbreak, lack of understanding of the disease meant that "we were more *reactive* than *proactive* . . . [and] taking a top-to-bottom approach," Fallah said.

Internal affairs minister Morris Dukuly agreed: "I wish we had known the nature of the virus. I wish we had treated it with seriousness because of its very

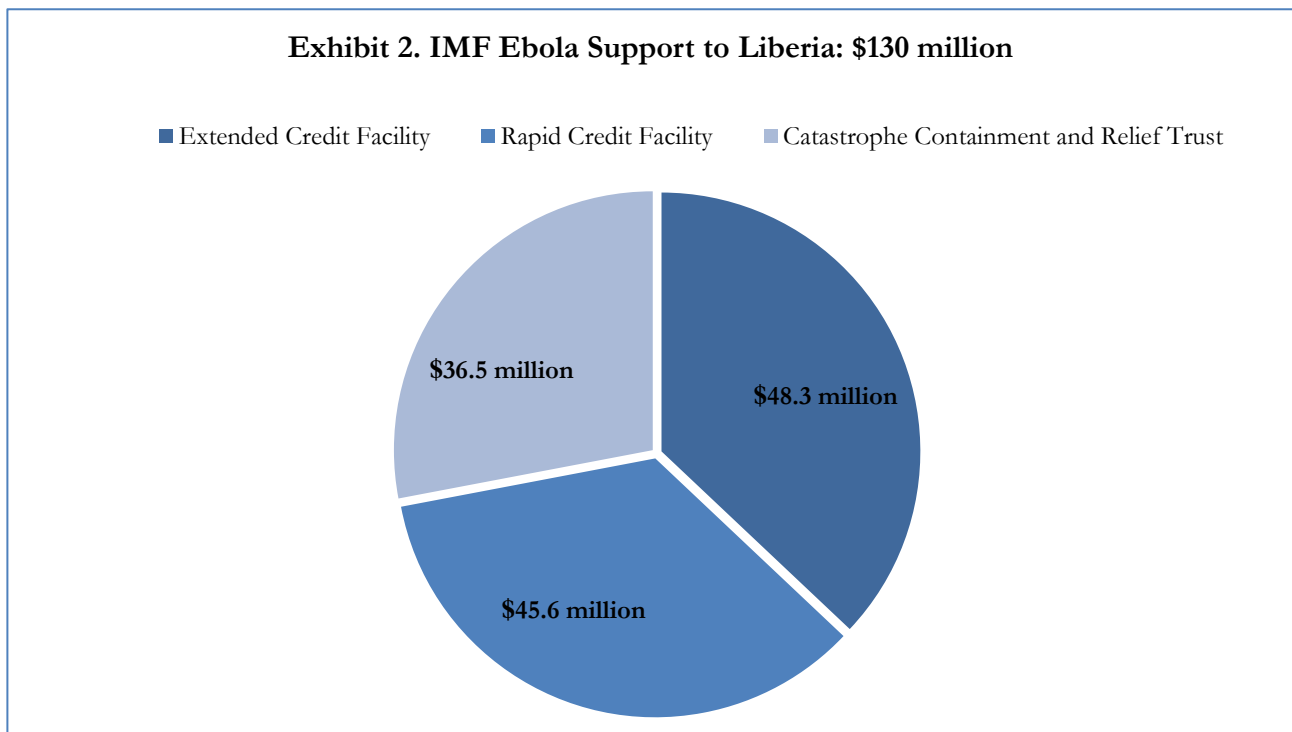
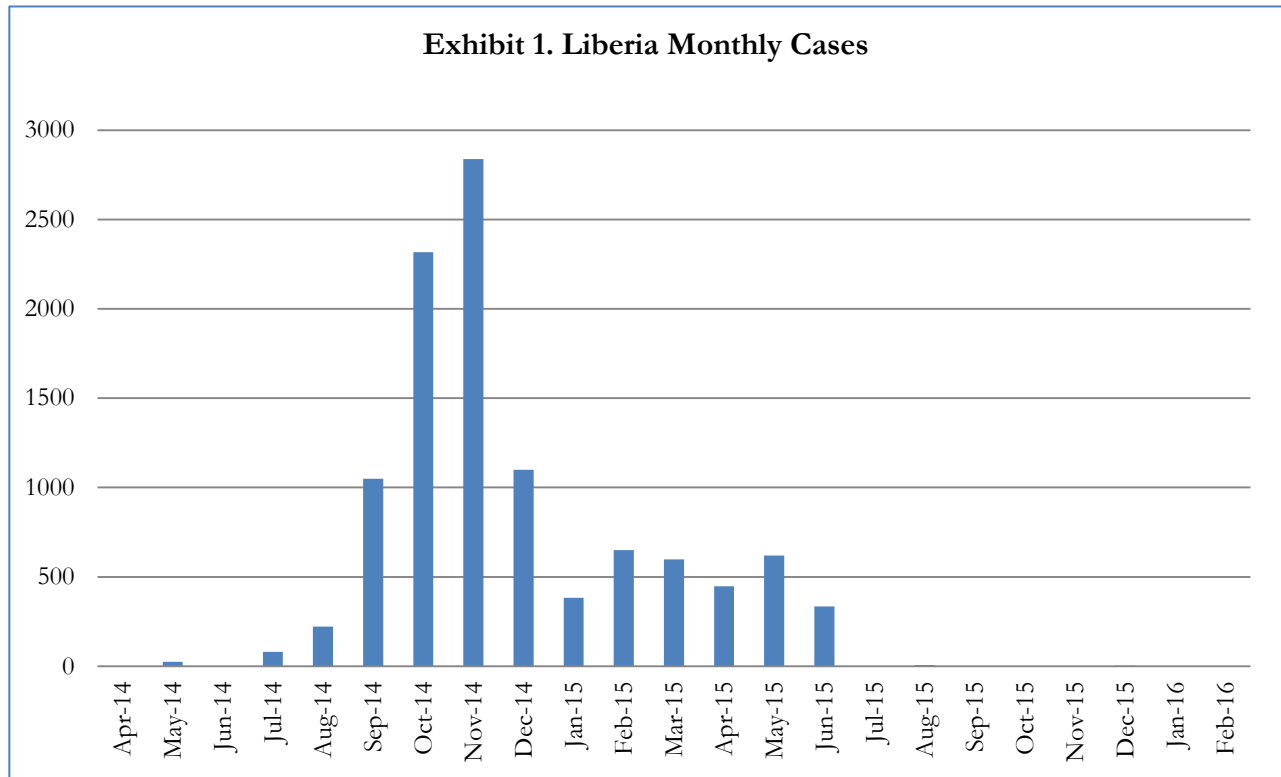
severe nature and the threat it posed to the survival of this country.” He emphasized that with the creation of structures like the IMS, the country is “better prepared. We have more people now who have an understanding of the havoc this virus can wreak.” The challenge is to “not allow the institutions to decay, because Ebola is here to stay.”

Having worked extensively in the field during Liberia’s race against Ebola, Fallah expressed the hope that ultimately, “what happened with Ebola will constantly remind us that we should prepare ourselves so we coordinate better.”

TIMELINE

- 28 March 2014:** The first two possible cases of Ebola are reported in Liberia among people who had visited neighboring Guinea
- 31 March 2014:** The first two Ebola cases are officially confirmed.
- 17 June 2014:** The first cases are reported in Monrovia, as seven people die.
- 27 July 2014:** President Sirleaf creates a National Task Force to coordinate the national Ebola response, chaired by herself and the Minister of Internal Affairs, Morris Dukuly.
- 27 July 2014:** Liberia shuts down most of its border crossings.
- 30 July 2014:** The government announces that all schools across the country have been closed, with some communities placed under quarantine by the military.
- 4 August 2014:** With the death toll standing at 156, Liberia orders the cremation of all people who have died from Ebola.
- 6 August 2014:** President Sirleaf declares a state of emergency on national television.
- 8 August 2014:** Ebola is declared an “international health emergency” by the World Health Organization.
- 10 August 2014:** National Incident Management System, headed by Assistant Health Minister Tolbert Nyenswah, is created in response to the outbreak.
- 12 August 2014:** After being approved by the WHO, President Sirleaf announces that an experimental drug sent from the US will be used to treat patients in Liberia.
- 18 August 2014:** A group of residents from the West Point slum in Monrovia loots a local Ebola clinic in protest against the decision that patients from other parts of the capital were brought there. They removed some of the patients and took medical equipment and blood-stained mattresses from the facility, leading to fears of mass infections in West Point.
- 20 August 2014:** The entire West Point slum is quarantined for 21 days and a statewide nighttime curfew is issued. Doctors Without Borders declares the situation in Liberia to be “catastrophic”.
- 22 August 2014:** Violence breaks out in West Point after soldiers opened fire on protesting crowds, with an inquiry later finding that soldiers had fired “with complete disregard for human life.” [This event is actually on August 19]
- 30 August 2014:** Just 10 days into the quarantine, the government announces on the radio that the restrictions on West Point would be lifted the next morning.
- 16 September 2014:** President Obama announced that the US will send 3,000 troops to West Africa, including Liberia, to build Ebola treatment centers.
- 20 September 2014:** A 150 bed treatment center opens in Monrovia. Its capacity is exceeded within 24 hours.
- 23 September 2014:** The WHO announces 3,458 total cases, 1 830 deaths, and 914 lab confirmed cases in Liberia.

- 25 September 2014:** The Chief Medical Officer, Dr. Bernice Dahn, places herself under quarantine fearing infection. She later tested negative for the virus.
- 2 October 2014:** A new 60-bed clinic opens in Kenema.
- 3 October 2014:** A facility with 48 beds is opened in Paynesville by the German/Liberia Clinic.
- 14 October 2014:** Another 100 US troops arrive, bringing the total to 565.
- 19 October 2014:** Monrovia is now the epicenter of the disease, with 305 new cases reported during the previous week.
- 22 October 2014:** Cuba sends a medical team to Liberia.
- November 2014:** The National IMS starts working to decentralize the Ebola response.
- 13 November 2014:** With new cases having dropped from a peak of 500 to 50 per day, Liberia lifts the state of emergency. The death toll in the country stands at 2,800.
- Late December 2014:** Montserrado Incident Management System (M-IMS) is created; Sonpon Sieh is appointed to head the unit.
- 17 December 2014:** The government launches the “Ebola Must Go” communications campaign.
- Mid-January 2015:** The M-IMS is divided into teams of four sectors across Montserrado.
- 13 January 2015:** The government announces that new cases of Ebola are now restricted to Montserrado and Grand Cape Mount counties.
- End of January 2015:** Liberia down to only five confirmed cases; the US military indicates that it will end its relief mission.
- 20 February 2015:** Liberia opens its land borders.
- 9 May 2015:** After 42 days pass without any new infections, the country is declared Ebola free.
- 29 June 2015:** A new Ebola case is discovered, with two additional cases confirmed by 2 July.
- 3 September 2015:** After 10,672 cases and 4,808 deaths, Liberia is declared Ebola free by the WHO for a second time.



References

- ¹ “Ebola Threat,” *The New Republic Liberia*, March 25, 2014, accessed January 21, 2016, through LexisNexis, <http://www.lexisnexis.com/hotttopics/lnacademic/>.
- ² Sam Zota Jr., “Liberia: 12 Ebola Deaths Reported,” *AllAfrica*, accessed January 26, 2016, <http://allafrica.com/stories/201404101037.html>.
- ³ “Seven die in Monrovia Ebola outbreak,” *BBC News*, June 17, 2014, accessed May 13, 2016, <http://www.bbc.com/news/world-africa-27888363>.
- ⁴ “Timeline: How We Lost Control of the Ebola Virus in 2014,” BBC, accessed January 23, 2016; <http://www.bbc.co.uk/timelines/z9gkj6f>. Quote also appears in <http://www.pbs.org/wgbh/frontline/film/outbreak/transcript/>, dated August 9, 2014.
- ⁵ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41), Centers for Disease Control and Prevention, October 17, 2014, accessed January 16, 2015, http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6341a4.htm?s_cid=mm6341a4_w.
- ⁶ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ⁷ Ebola Virus Disease, Fact Sheet 103, World Health Organization, January 2016, accessed January 15, 2016, <http://www.who.int/mediacentre/factsheets/fs103/en/>.
- ⁸ *Statement on the 1st meeting of the IHR Emergency Committee on the 2014 Ebola outbreak in West Africa*, World Health Organization statement, August 8, 2014, accessed January 26, 2016; <http://www.who.int/mediacentre/news/statements/2014/ebola-20140808/en/>.
- ⁹ Cluster Coordination, United Nations Office for the Coordination of Humanitarian Affairs, accessed January 17, 2015, <http://www.unocha.org/what-we-do/coordination-tools/cluster-coordination>.
- ¹⁰ This description comes from multiple sources. See Pierce Nelson, Donor Funds Bolster West African Emergency Response, CDC Foundation, December 12, 2014, accessed January 26, 2016, <http://www.cdcfoundation.org/blog-entry/donor-funds-bolster-west-african-emergency-response-now-and-later>, and “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹¹ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹² Strengthening Collaboration on Humanitarian Emergency Response, Center for Strategic and International Studies, November 13, 2015, accessed January 16, 2016, <https://www.youtube.com/watch?v=kX-tyeeRn0c>.
- ¹³ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹⁴ The full document is available at: http://www.unicef.org/emergencies/ebola/files/National_Ebola_Response_Strategy_Sept_2014.pdf.
- ¹⁵ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹⁶ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹⁷ “Developing an Incident Management System to Support Ebola Response—Liberia, July-August 2014,” *Morbidity and Mortality Weekly Report* 63(41).
- ¹⁸ Terrence McCoy, “The major Liberian newspaper churning out Ebola conspiracy after conspiracy,” *Washington Post*, October 17, 2014, accessed January 18, 2016, <https://www.washingtonpost.com/news/morning-mix/wp/2014/10/17/the-major-liberian-newspaper-churning-out-ebola-conspiracy-after-conspiracy/>.
- ¹⁹ Uri Friedman, “How to Make a Hit Song about Ebola,” *The Atlantic*, August 25, 2014, accessed January 18, 2016,

<http://www.theatlantic.com/international/archive/2014/08/how-to-make-a-hit-ebola-song/378980/>.

²⁰ “Ebola Must Go?—and So Must Prejudice against Survivors,” NPR, December 9, 2014, accessed January 18, 2016,

<http://www.npr.org/sections/goatsandsoda/2014/12/09/369382711/-ebola-must-go-and-so-must-prejudice-against-survivors>.

²¹ “Liberia: Govt Upbeat about Ebola Progress, Wants It Out in 2014,” *AllAfrica*, December 9, 2014, accessed January 18, 2016, <http://allafrica.com/stories/201412100270.html>.

²² Jessica Glenza, “Up to 1.4m people could be infected with Ebola by January, CDC warns,” *The Guardian*, September 23, 2014, accessed January 13, 2016,

<http://www.theguardian.com/society/2014/sep/23/ebola-cdc-millions-infected-quarantine-africa-epidemic>.

²³ 2014 Ebola Outbreak in West Africa—Case Counts, Centers for Disease Control and Prevention, January 13, 2016, accessed January 19, 2016,

<http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/case-counts.html>.

²⁴ 2014 Ebola Outbreak in West Africa – Reported Cases Graphs, Centers for Disease Control and Prevention, January 13, 2016, accessed January 19, 2016,

<http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/cumulative-cases-graphs.html>.

²⁵ Strengthening Collaboration on Humanitarian Emergency Response, Center for Strategic and International Studies, November 13, 2015, accessed January 16, 2016,

<https://www.youtube.com/watch?v=kX-tyeeRn0c>.

²⁶ “Ebola and Its Control in Liberia, 2014-2015,” *Emerging Infectious Diseases*, 22(2), February 2016, accessed January 19, 2016, http://wwwnc.cdc.gov/eid/article/22/2/15-1456_article.

²⁷ “Liberia succeeds in fighting Ebola with local, sector response,” World Health Organization, April 2015, accessed March 30, 2016,

<http://www.who.int/features/2015/ebola-sector-approach/en/>.

²⁸ Strengthening Collaboration on Humanitarian Emergency Response, Center for Strategic and International Studies.

²⁹ Clair MacDougall, “Liberian Government’s Blunders Pile Up in the Grip of Ebola,” *Time*, September 2, 2014, accessed January 20, 2016, <http://time.com/3247089/liberia-west-point-quarantine-monrovia/>.

³⁰ “Ebola and Its Control in Liberia, 2014-2015,” *Emerging Infectious Diseases*.

³¹ “Ebola and Its Control in Liberia, 2014-2015,” *Emerging Infectious Diseases*.

³² See <http://www.pgafamilyfoundation.org/news/news-articles/press-releases/new-initiatives-in-the-fight-against-ebola> and <https://www.cdcfoundation.org/blog-entry/building-beyond-ebola-paul-g-allen-family-foundation>.

Innovations for Successful Societies makes its case studies and other publications available to all at no cost, under the guidelines of the Terms of Use listed below. The ISS Web repository is intended to serve as an idea bank, enabling practitioners and scholars to evaluate the pros and cons of different reform strategies and weigh the effects of context. ISS welcomes readers' feedback, including suggestions of additional topics and questions to be considered, corrections, and how case studies are being used: iss@princeton.edu.

Terms of Use

In downloading or otherwise employing this information, users indicate that:

- a. They understand that the materials downloaded from the website are protected under United States Copyright Law (Title 17, United States Code). This work is licensed under the [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/). To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.
- b. They will use the material only for educational, scholarly, and other noncommercial purposes.
- c. They will not sell, transfer, assign, license, lease, or otherwise convey any portion of this information to any third party. Republication or display on a third party's website requires the express written permission of the Princeton University Innovations for Successful Societies program or the Princeton University Library.
- d. They understand that the quotes used in the case study reflect the interviewees' personal points of view. Although all efforts have been made to ensure the accuracy of the information collected, Princeton University does not warrant the accuracy, completeness, timeliness, or other characteristics of any material available online.
- e. They acknowledge that the content and/or format of the archive and the site may be revised, updated or otherwise modified from time to time.
- f. They accept that access to and use of the archive are at their own risk. They shall not hold Princeton University liable for any loss or damages resulting from the use of information in the archive. Princeton University assumes no liability for any errors or omissions with respect to the functioning of the archive.
- g. In all publications, presentations or other communications that incorporate or otherwise rely on information from this archive, they will acknowledge that such information was obtained through the Innovations for Successful Societies website. Our status (and that of any identified contributors) as the authors of material must always be acknowledged and a full credit given as follows:

Author(s) or Editor(s) if listed, Full title, Year of publication, Innovations for Successful Societies, Princeton University, <http://successfulsocieties.princeton.edu/>

