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Outside an Ebola treatment center in Makeni, Sierra Leone, the sun
sets on wooden racks holding staff members' Wellington boots, with
soles facing up so the UV light can destroy any remnants of the virus.

EVALUATION OF THE USAID/OFDA EBOLA VIRUS DISEASE RESPONSE IN WEST AFRICA 2014–2016

January 2018

SYNOPSIS

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TABLE OF CONTENTS

INTRODUCTION.....	1
Overview of the Outbreak and OFDA Response.....	2
Evaluation Design and Methods.....	2
OBJECTIVE 1: EFFECTIVENESS OF THE RESPONSE.....	3
Evaluation Question 1	3
Recommendations.....	3
Evaluation Question 2	3
Recommendations.....	4
Evaluation Question 3	4
Recommendations.....	4
OBJECTIVE 2: EFFECTIVENESS, PROGRAMMATIC COMPONENTS.....	5
Evaluation Question 4	5
Program Component 1: Effective Incident Management and Coordination	5
Program Component 2: Adequate Isolation and Treatment Capacity.....	5
Program Component 3: Assist Safe Human Remains Management.....	5
Program Component 4: Restore Health Care System Safety and Functionality.....	6
Program Component 5: Social Mobilization with Clear Messages on EVD	6
OBJECTIVE 3: RELEVANCE OF THE RESPONSE	6
Evaluation Question 5	6
Recommendations.....	7
Evaluation Question 6	7
Recommendations.....	7
Evaluation Question 7	8
Recommendations.....	8
OBJECTIVE 4: COORDINATION OF THE RESPONSE	9
Evaluation Question 8	9
Recommendations.....	9
Evaluation Question 9	9
Recommendations.....	10
Evaluation Question 10	10
Recommendations.....	10

INTRODUCTION

Under USAID contract AID-OAA-I-15-00022/Order No. AID-OAA-TO-16-00034, International Business & Technical Consultants, Inc. (IBTCI) conducted an independent performance evaluation of the USAID Office of U.S. Foreign Disaster Assistance (OFDA) support for the Ebola Virus Disease (EVD) outbreak response in West Africa, 2014–2016. This performance evaluation focused on activities funded under Pillar One of the U.S. Government’s (USG’s) EVD outbreak response strategy. The goal of the USG’s Pillar One

response was to reduce the spread of EVD. The evaluation was guided by four complementary objectives relating to the overall effectiveness, effectiveness of different programmatic components, relevance, and coordination of OFDA’s response.

This report presents key findings and high-level conclusions and priority recommendations for all four evaluation objectives. Details and additional findings are presented in the respective individual evaluation objective reports.

Overview of the Outbreak and OFDA Response

This evaluation’s four individual objective reports document the onset of the outbreak, its phases of escalation in each of the most-affected West African countries—Guinea, Sierra Leone and Liberia—and the steps that OFDA took to mitigate the epidemic. Selected epidemiological indicators

included EVD incidence, reproduction number, and the proportion of cases resulting from unidentified chains of transmission. The evaluation mapped epidemiological trends against UN-defined phases of the response, which roughly aligned with inductively derived OFDA responses.

MAJOR CONCLUSIONS

1. The OFDA-supported response was implemented when EVD incidence rates were either already at their peak or declining. However, OFDA-supported programs and activities, once started, contributed to stopping further disease transmission. In Liberia, where cases were declining as OFDA efforts were still ramping up, OFDA kept the curve from bending up again by supporting holistic coverage, which helped control and contain micro-outbreaks. In Guinea and Sierra Leone, OFDA contributed more to bending the curve in containing widespread micro-outbreaks.
2. A lack of clear criteria for OFDA’s responsibility for health emergency response, coupled with the necessary time to amend agreements and fund implementing partners (IPs) once OFDA was designated as the lead operational platform, resulted in a late response. This absence of a sizable, robust OFDA response prior to October 2014 diminished the effectiveness of overall response.
3. The most effective USG-funded activities were nationally-led incident management and coordination, social mobilization, and safe human remains management. OFDA’s response initially gave greater emphasis to clinical approaches to case management than to community components of isolation and prevention. As OFDA scaled up community engagement interventions such as health education, household isolation of ill individuals, home hygiene kits, community outreach, adapting safe burial practices, and emphasized the involvement of local leadership and community-based organizations, a downward trend in new cases is clearly seen in the data. Funding community engagement and community-based care centers earlier in the outbreak would have been extremely beneficial.
4. Serious and persistent obstacles to prioritizing interventions were: 1) the lack of availability and use of data on community engagement, social mobilization, socio-cultural demands, and formal and informal health communications capacities; and 2) the missing linkage of such data on social-cultural dimensions of the response to epidemiological reports. OFDA and IPs failed initially to consider the stigmatization faced by EVD survivors, frontline burial and community health workers (CHWs), and volunteers, and their psychosocial needs.
5. A strength of OFDA’s response was its flexibility in supporting a variety of interventions overall, adaptively leveraging institutional partnerships. However, it also posed a limitation, when OFDA could rely only on a few, established nongovernmental organizations (NGOs) and a few United Nations (UN) agencies with expertise in country.
6. The EVD response demonstrated that when an outbreak of a lethal disease occurs in a resource-poor setting, OFDA’s ability to rapidly mobilize and lead an intra-U.S. inter-agency effort was relevant and effective. OFDA’s leadership role for the whole-of-government response successfully incorporated an unprecedented degree of collaboration among OFDA, Department of Defense (DOD), and Health and Human Services (HHS)—particularly with the Centers for Disease Control and Prevention (CDC).

MAJOR RECOMMENDATIONS

In future international public health emergencies, OFDA should do the following:

1. Assume it may need to play a lead role and have an eye to responding early, before outbreaks grow and expand to large populations.
2. Plan to fund a portfolio of different, inter-linked public health and facility-based programs, as seen in the EVD response. OFDA should prepare to balance funding across surveillance, coordination, community engagement, safe burials, other infection prevention and control (IPC), community care centers, and other functions, each of which can be a weak link if neglected.
3. Guide IPs to coordinate to consider the psychosocial and duty of care needs of frontline EVD workers and of EVD survivors, especially in national and regional emergencies, to share learnings, concerns, and solutions.
4. Establish a monitoring, evaluation, and learning working group with purpose of strengthening OFDA's M&E capacities through sharing technical expertise, tools, and innovative practices.
5. Prepare internally with bolstered expertise in epidemiologic analysis and public health toolkits, in close association with CDC.

Misinformation and lack of awareness among the public regarding EVD transmission modes, combined with inadequate health care facilities and lack of health staff trained in EVD response techniques, allowed EVD to spread rapidly in its initial phases. Although CDC was present and providing technical support earlier in Guinea, the larger programmatic response scaled up when DOD set up the first laboratory and OFDA deployed the first Disaster Assistance Response Team (DART) in Liberia on August 5, 2014 and established a corresponding Response Management Team (RMT) based in Washington, DC.

By the summer of 2014, as transmission spread from Guinea, Liberia, and Sierra Leone to Nigeria, Senegal, and the United States, the USG launched a large response to control EVD by supporting governments and partners in the three most-affected countries, with OFDA designated as the lead coordination agency for all USG actions. Over the course of the response, DARTs included disaster response and public health experts from OFDA, DOD, CDC, the National Institute of Health, and the United States Public Health Service Commissioned Corps to assist host country governments in containing the EVD outbreak.

OFDA adapted over time, moving beyond an early focus on a clinical containment approach that prioritized making health facility beds available at Ebola Treatment Units (ETUs) and hospitals, gradually moving toward a more localized, community-based public health approach (e.g., Community Care Centers (CCCs)) of isolation, triage, and testing that prioritized public health engagement for IPC, health communications, safe burials, and behavior change.

In all, OFDA allocated more resources and operations to Liberia than to Guinea and Sierra Leone. This was because in August, 2014, Liberia appeared to be the leading crisis area in the outbreak with the most cases reported; additionally, more IPs were available to work in Liberia. OFDA presumed that the UK would assume a lead role with the government of Sierra Leone in responding to that country's EVD outbreak, and that France would take on a similar role with the World Health Organization (WHO) and the Government of Guinea in leading that country's EVD response. In Guinea, eventually an array of U.S., French, European Union, Russian, Cuban, and other donors supported the response.

Evaluation Design and Methods

This performance evaluation was designed to evaluate actions taken by—and activities funded by — OFDA between March 1, 2014 and January 4, 2016 to address EVD in Liberia, Guinea, and Sierra Leone. It was designed with a utilization- focused approach—to provide findings, conclusions, and recommendations that can be applied, are scalable, and actionable to OFDA. Data collection methods included: a review of over 4,000 publicly-accessible peer-reviewed and gray literature, some 800 reports from OFDA IPs, and surveillance data; semi-structured focus groups (n=196); semi-structured key informant interviews (n=285); an online self-assessment of DART and RMT members (n=49); roundtable discussions

with other responders; and three quantitative surveys. These surveys included: a field- level, representative household survey (n=16,365); a survey of community health workers (n=288); and a contact tracer survey (n=250). Original data collection in Liberia, Sierra Leone, and Guinea occurred from March to July 2017.

As multiple actors and programs contributed to the EVD response, Contribution Analysis was used to analyze the plausible relationship of outcomes to OFDA-supported interventions.

OBJECTIVE 1: EFFECTIVENESS OF THE RESPONSE

Evaluation Question 1

To what extent did the set of OFDA-supported activities and models of intervention achieve the outcomes and objectives, as defined by each IP and as part of OFDA's intentions?

Conclusion. OFDA-supported programs and activities substantially contributed to OFDA's desired outcome of EVD containment and reduction in disease transmission. However, the response was slow to start—there were delays and lags in amending OFDA contracts and moving funds (see details for Evaluation Q6). EVD incidence rate was falling by the end of 2014, by the time most IPs began their activities. While the rate of new cases slowed, there were still hundreds of new cases being reported each week. OFDA-supported activities were targeted to geographic areas of high EVD transmission and re-emergence.

Key Findings. The OFDA-supported response was implemented when the EVD incidence rates were either already at their peak or declining. Consequently, prior to October, 2014 the response had only limited effect in Liberia and less effect in Sierra Leone and Guinea in controlling the EVD transmission. After October 2014, when funding and activities increased and intensified, OFDA supported programs and activities contributed to reducing the number of new EVD cases.

OFDA relied heavily on established emergency IPs such as humanitarian NGOs and a few UN agencies with experience and expertise in country, and was responsive to their proposals and refinements for EVD control activities. Available activity monitoring by IP indicators showed that more than 90% of the activity monitoring input and output targets were reported to be achieved although, as in many emergencies, this reflected only activities and thus reveals

little about actual change in bending the epidemic curve. This was a major limitation in analyzing the USG contributions to bending the epidemic curve and will continue to be a problem in the future for OFDA.

RECOMMENDATIONS

1. *OFDA should recognize it may be needed or called upon to respond in future public health emergencies* and recognize that by responding earlier in an outbreak, the spread to large populations can be prevented and loss of life and expense to OFDA's budget can be mitigated.
2. *Conduct internal assessments of the grant agreement processes and procedures to identify bottlenecks for funding and amendments.* OFDA should create necessary protocols to reduce lag-time between the award of an agreement and the start of a program's implementation.
3. *Work with CDC and others to maintain a system of enhanced epidemiologic intelligence* to scan for emerging international information. Engage in public health diplomacy with WHO to ensure timely declaration of a public health emergency of international proportions.
4. *Establish a monitoring, evaluation, and learning (ME&L) working group with the purpose of strengthening OFDA's ME&L capacity through sharing technical expertise, tools, and innovative practices.* Adapt performance management systems to monitor and verify outcomes of functions necessary and specific to the control of an infectious disease outbreak (e.g., documented sources of transmission, number of new cases detected among contacts under surveillance, number of suspect cases identified by CHWs sent for treatment, etc.).

Evaluation Question 2

Which USG-funded activities, alone or in combination, made the most significant contribution to controlling the EVD outbreak in West Africa?

Conclusion. While most USG-funded activities were necessary and complementary to each other in controlling the EVD outbreak, incident management, coordination, social mobilization, and safe human remains management activities were pivotal activities.

Key Findings. OFDA, CDC, and IPs had lead roles in national and subnational command and control functions.

As such, OFDA decisions about activities, locations, and timing were made in conjunction with national authorities and coalitions of implementers, working in concert toward mutually agreed upon targets and priorities. OFDA, CDC, and IPs used available epidemiological data to inform incident management and coordination of activities. However, joint incident management and coordination teams were unable to adequately integrate and use large-scale data collection about local conditions, impacting IPs' incident management and coordination response decision-making.

Social mobilization, community engagement, and cooperation with formal and informal regional and local leadership were preconditions for other measures to be effective. Such priorities as case identification, early treatment-seeking behavior, household and community IPC, safe human remains management, contact tracing, and epidemic surveillance systems—coupled with related response IP activities (e.g., isolation, and quarantine)—when absent of social mobilization, resulted at times in community resistance and non-compliance.

The household survey conducted as part of this evaluation showed that by the conclusion of the outbreak, more than 95% of interviewed households with suspected or confirmed EVD deaths in Liberia and Sierra Leone and 80% in Guinea reported that they understood and had practiced safe burial for deceased household members.

Many ETUs were in place and run by other agencies, such as *Médecins sans Frontières* (MSF), the UK Department for International Development (DFID), or the French military. The largest USG investment in ETUs was via DOD, though most of these ETUs were completed only after EVD case numbers had fallen and these ETUs went unused. A few ETUs that OFDA supported through NGOs were effective earlier, erected as part of an integrated outreach to communities and helped with isolation of infectious cases.

Evaluation Question 3

Of the many activities designed to address specific aspects of the set of inter-related control measures, how well did each of the OFDA-funded activities fit within the overall response and efforts to control the outbreak?

Conclusion. While OFDA's theory of change identified the multiple program areas needed to achieve the desired outcomes, increasing experience with, and lessons learned from, the response showed the need for ensuring that activities were simultaneously implemented in the same geographic location and were linked to one another. OFDA-supported activities filled clearly identified gaps. OFDA's support was primarily to NGOs and UN agencies which, in turn, supported national and local authorities. (How well specific program components worked in achieving the desired outcome is addressed under Evaluation Q5.)

Key Findings. Over the course of the response, OFDA's awards to IPs shifted from being for disparate and disconnected activities to a more coherent and cohesive model which addressed the range of new micro-outbreaks that continued to occur. In Liberia, this was characterized as the Rapid Isolation and Treatment of Ebola (RITE) strategy. This shift accelerated and supported containment

RECOMMENDATIONS

1. *Once a significant outbreak has been detected and a U.S. response directed, respond earlier in the outbreak with appropriate interventions in all affected or vulnerable geographically contiguous regions.* Ensure participation with and support to national and subnational coordination platforms.
2. *In future public health emergencies, OFDA should plan to fund a portfolio of different, inter-linked public health and facility-based programs, as seen in the EVD response.*
OFDA should prepare for these to balance funding across surveillance, coordination, community engagement, IPC, safe burial and other integral functions, each of which may be a weak link if neglected.
3. *OFDA should support the complementarity of interventions, with grant agreements that foster multi-pronged approaches* that build community trust through social mobilization and outreach at the same time as health care systems are being adapted for outbreak response.

of the outbreak, as demonstrated by further declines in the reproduction number and improvements in contact tracing effectiveness.

IPC activities of ring IPC training and the RITE strategy supported restoration of health care system activities and prevented wider spread of EVD in the event of flare-ups.

RECOMMENDATIONS

1. *Establish communication and coordination linkages with Global Health Security Agenda agencies.* In order to prioritize resources and develop appropriate interventions in similar future outbreaks, OFDA should develop the ability to appraise the core capacities and vulnerabilities of different health systems to respond to outbreak events.
2. *Develop the capability to provide protective personal equipment (PPE) at scale.*
3. *Document operational lessons about this disease control experience* with NGOs and other partners.

OBJECTIVE 2: EFFECTIVENESS, PROGRAMMATIC COMPONENTS

Evaluation Question 4

What were the determining factors that contributed to success or failure of each of the different types of programs that OFDA supported?

PROGRAM COMPONENT 1: EFFECTIVE INCIDENT MANAGEMENT AND COORDINATION

Conclusion. Determining factors in OFDA's effectiveness in this program component included: the ability to rapidly establish trusted relationships with host-country governments; the sourcing of technical advisors and training support; the provision of large-scale financing, logistics, supply, and transportation; localizing programs through IPs; and leveraging relationships with relevant UN agencies and regional bodies like the African Union. OFDA's main challenges in implementing this program component were delays in initial OFDA engagement, turnover in field personnel (short rotations), and the absence of an adequate monitoring and learning system to measure, understand and compare the effectiveness of interventions.

Key Findings. OFDA demonstrated that it could be effective either as a lead partner, as in Liberia, or in a secondary role, as in Sierra Leone and Guinea, in all cases supporting national government authority and filling gaps where necessary.

RECOMMENDATIONS

1. *Institute an ME&L system at the beginning of emergency operations* for ongoing learning and to collect real-time evidence, and to monitor IP performance, and validate strategies through a feedback loop with affected communities.
2. *Review operational procedures to ensure greater continuity in the field* for personnel when responding to similar situations, principally to achieve overlap or longer durations of DART team deployments.

PROGRAM COMPONENT 2: ADEQUATE ISOLATION AND TREATMENT CAPACITY

Conclusion. OFDA's organizational prowess in mobilizing massive resources and contracting capable international NGOs and PIOs, as well as its capacity to implement health and complementary interventions, were the determining factors for OFDA's success in rapidly increasing treatment and isolation capacity to varying degrees in the three countries. A major challenge for planning isolation and treatment programs was the availability of accurate data on relevant demographic and epidemiological variables.

Key Findings. OFDA contributions included funding for the renovation of buildings into new ETUs and CCCs, staff, supplies, and equipment, and technical expertise in humanitarian crises. DOD and CDC set up enhanced laboratories to increase capacity and speed of diagnosis; OFDA included these in its response. Initially, OFDA and IPs failed to consider how survivors, and burial workers suffered from trauma and stigma in their communities.

RECOMMENDATIONS

1. *Strengthen adequate treatment and isolation capacity by using a disease-appropriate "IPC continuum" model* that creates consistent context-appropriate barriers to transmission (e.g., PPE, sterilization materials, hygiene equipment, and training) at the household, community, and treatment facility levels.
2. *Provide guidelines for IPs to coordinate about duty of care concerns for local staff and volunteers*, and for the consequences of an outbreak for survivors.
3. *Conduct and publish ongoing operational research on critical response challenges* during future pandemic responses, similar to what CDC does in its contemporaneous *Morbidity and Mortality Weekly Reports*.

PROGRAM COMPONENT 3: ASSIST THE SAFE MANAGEMENT OF HUMAN REMAINS

Conclusion. OFDA was effective in sponsoring a large share of safe and dignified burial services in Liberia and being a significant contributor in Sierra Leone and Guinea. Challenges included a lack of public awareness about how EVD spreads, absence of mechanisms for including affected communities' perspectives when planning and implementing interventions, and community resistance to burial workers—who performed traumatizing work.

Key Findings. OFDA learned from and worked closely with IPs (notably International Federation of Red Cross and Red Crescent Societies and Global Communities, which had prior local experience and trusted relationships) to build public understanding of EVD, promote cultural acceptance of safe and dignified burial, and provided supplies and training of personnel to conduct safe burials.

RECOMMENDATIONS

1. *Stockpile safe burial resources* for rapid emergency deployment.
2. *Engage early in a response in high-level consultations with religious and traditional leaders* to identify local sensitivities.

PROGRAM COMPONENT 4: RESTORE HEALTH CARE SYSTEM SAFETY AND FUNCTIONALITY

Conclusion. After health care facilities became major sites of transmission at the outset of the outbreak, the health sectors in all three countries effectively collapsed. OFDA was effective in providing major funding and in-kind support to restore functionality of health care facilities by mainstreaming IPC through large increases in skilled personnel, training, supplies, and protocols. Major determining factors were its ability to assess the needs of the health system and coordinate delivery of multiple inputs rapidly. These inputs included supplies, training, advisers, protocols, and public health messages through IPs with local experience. Factors that reduced the effectiveness of this program area included a scarcity of trained human resources, particularly for EVD.

Key Findings. OFDA-funded IPC strengthening contributed to interrupting EVD transmission and reducing EVD mortality among national health care workers, thereby securing the workforce of already fragile health system. Secondary problems in the health system occurred when most health facilities focused on EVD to the exclusion of other health problems, resulting in temporarily turning away people infected by malaria, other life-threatening diseases, women in labor, and young children with pneumonia.

RECOMMENDATION:

1. *Ensure that in future outbreaks, this program component mobilizes from the outset* to assemble population and health system data to strategize for epidemic and non-epidemic complementarity.

PROGRAM COMPONENT 5: SOCIAL MOBILIZATION WITH CLEAR MESSAGES ON EVD

Conclusion. OFDA successfully acknowledged and adjusted to the central importance of social mobilization in how well program components worked. OFDA shifted its support, making this a major program intervention area over time. Even so, little real-time data were collected through social mobilization activities that could then be integrated into overall response planning.

Key Findings. OFDA funded a variety of approaches to social mobilization in all three countries. The use of consortia, such as one in Liberia which joined together local civil society groups nationwide, was effective. OFDA funded several activities that involved youth, women's groups, and traditional and religious leaders in social mobilization efforts. Data from the household surveys conducted in each country affirmed that involvement of local, trusted groups was a determining factor in reducing civic resistance to EVD response activities.

RECOMMENDATIONS

1. *OFDA should allocate resources to engage external subject matter experts to coordinate with OFDA to build a data infrastructure* that will collect and analyze data and integrate findings into broader response data analysis and decision-making. Also, OFDA should make parallel investments in developing and refining indicators, data collection modules, and research protocols.
2. *Formulate timely, sensitive indicators* of local cultural and socioeconomic factors that condition the success of the rollout of public health programs.
3. *Revise OFDA's theory of change about social mobilization for outbreak response* by adding the assumption that social mobilization is relevant at the outset of the response.

OBJECTIVE 3: RELEVANCE OF THE RESPONSE

Evaluation Question 5

Did OFDA correctly prioritize and weight the most relevant activities over the course of the response in relation to the outbreak's changing epidemiology?

Conclusion. OFDA's early priorities were focused on facility-based responses, case isolation and treatment, and safe burial and inadequately prioritized social mobilization and community-level responses. OFDA supported ETUs in Liberia in accordance with modeled case projections; however, they came online late, limiting their contribution to controlling the outbreak. OFDA appropriately responded to significant shifts in the EVD epidemic by the end of 2014. OFDA's country-by-country approach was ill-suited to addressing the regional view of the epidemic and

the transnational trajectories of the virus. The decision to engage heavily in Liberia at first resulted in intervening overly late in Guinea and Sierra Leone.

Key Findings. Analysis of OFDA awards and communications identify early OFDA priorities as IPC, isolation and treatment (including ETUs), and safe burial, in line with priorities identified by CDC-based models and experience from past outbreaks. At different points of time in mid-2014, all three countries had an EVD reproduction number over two, large caseload projections, and insufficient existing ETU capacity. Comparison of the epidemic curve to ETU bed capacity shows that while the epidemic peaked in Liberia in late September, 2014, most ETUs were not ready until

late November; some were not ready until January, 2015. Analysis of OFDA awards and key informant reports finds that OFDA under-emphasized social mobilization early, but gave more support to community-level interventions and social mobilization in 2015. This occurred alongside USG's decreasing emphasis on ETUs and the recognition that social mobilization was effective in controlling transmission. IPs and national response mechanisms both reported that OFDA was responsive to changes and adapted its approaches appropriately.

The reproduction number was climbing in all three countries in the third quarter of 2014, but in Guinea and Sierra Leone (unlike Liberia), it continued climbing in the fourth quarter. OFDA's evaluation of the epidemic response demands in Guinea and Sierra Leone were initially more informed by informal agreements about allocations of responsibility, rather than the epidemiology of the response. However, despite aggressive response inputs from bilateral and multilateral partners, it was evident that widespread, persistent outbreaks spread over broad geographical regions led to ongoing EVD outbreaks in Sierra Leone and Guinea. CDC's analyses demonstrated that EVD cases were likely being under-counted by as much as one third; newly confirmed EVD cases were associated with a low proportion of known contacts; and the repeated cross-border reintroduction of the virus was proven through phylogenetic analysis. Such findings encouraged OFDA to expand its presence in Sierra Leone and Guinea. In those two countries, OFDA decreased its prioritization of ETUs and focused on IPC training and community-level interventions.

Evaluation Question 6

Were OFDA's funding mechanisms and in-kind support appropriate to respond to the EVD outbreak in a timely and targeted manner in affected areas?

Conclusion. The majority of OFDA funding arrived after the epidemic peak in all three countries, though OFDA's continued funding was crucial for addressing micro-outbreaks and cross-border permeability. Delays were due to a lag in approvals and the disbursement of committed funds to existing partners, as well as the time-consuming process of identifying and bringing in partners new to OFDA.

Key Findings. OFDA's EVD response-funding mechanisms included grants and cooperative agreements to NGOs, contributions through multilateral organizations, use of preexisting (standing) funding frameworks, contracts with private companies, and in-kind support in the form of food aid (via Food For Peace), PPEs, and other IPC supplies. OFDA also deployed personnel via staffing arrangements and a contract with MacFadden.

The delay in containing the outbreak in Sierra Leone and the persistent and widely dispersed micro-outbreaks in Guinea suggest that just a country-specific approach was inadequate. Prior to January, 2015, when OFDA started to fund cross-border activities, OFDA was not sufficiently engaged in a whole-of-region response and there was little evidence of DART coordination across the three countries. OFDA and CDC played key roles in communicating lessons across countries, yet this should have been a stronger emphasis.

RECOMMENDATIONS

1. *In similar public health emergencies, establish a regular formal review of the overall response strategy*, e.g., on a daily or weekly basis, to review and critique public health data and make proactive, documented decisions about aligning priorities with evolving conditions.
2. *Involve emergency response IPs and local leadership consistently in priority setting* by actively seeking IP buy-in and transparent feedback to the donors' response strategy.
3. *Incorporate key epidemiologic indicators such as incidence, reproduction number, the average time between onset of symptoms and admission to a facility for treatment, and the proportion of cases resulting from unidentified chains of transmission* in the prioritization of outbreak response decision-making. *This can be done in conjunction with CDC, but OFDA should have in-house capability; there will arise cases where CDC is not present in an OFDA outbreak response and this capability would be critical.*

In-kind support was timely and appropriate, helping to fill critical gaps in transportation and supplies for IPC and water, sanitation and hygiene activities. Funding of multilaterals was quick. The amount of OFDA funding was sufficient for IP proposals and OFDA was flexible with extensions. But, two funding challenges were consistently reported. First, CDC approval required for technical proposals was lengthy which then delayed implementation, as it involved moving both through headquarters in Atlanta and the field. Second, OFDA restrictions limit the flexibility to build new infrastructure, hampering ETU and CCC construction in many places. Though some regional and cross-border awards were made, funding was largely targeted by country, contributing to DART-specific "silo'ed" country approaches that did not address the regional nature of the epidemic.

RECOMMENDATIONS

1. *Use Standing Contracts and Indefinite Quantity Contracts (IQCs) to increase funding flexibility* and speed. Pre-negotiated standing contracts with implementing partners are an effective mechanism for rapidly initiating response activities.

Issue a general IQC to one or more firms to establish a standing contract for pandemic response.

2. *Work with the CDC to develop an expedited decision-making mechanism* or establish an agreement to enable DART members from CDC to approve proposals on behalf of CDC without having to route them up the chain with the CDC management in Atlanta.

3. *Collect, consolidate, and retain performance and outcome data from private contractors as well as non-profit organizations.*
4. *Enhance DART coordination across countries* to better facilitate cross-border or regional approaches to timely and targeted responses in multi-country outbreaks.

Evaluation Question 7

To what extent did attempting to adhere to technical ‘gold standards’ affect the timeliness and quality of the response by OFDA’s supported IPs?

Conclusion. Few relevant guidelines for managing large EVD outbreaks, dealing with human remains, or preventing community transmission existed at the start of this EVD outbreak. The lack of technical guidelines hindered quality, and adequate guidelines improved it. Guidelines had both a positive and negative impact on timeliness. Early responses were not hampered by an attempt to adhere to strict “gold standards.” Few existed, but initial IPC and contact-tracing guidance s gave responders an initial template to follow and enabled them to act quickly. In some areas where guidance was lacking, early mistakes were made. In a few cases, guideline adherence or confusion over guidelines caused delays. Availability of appropriate guidelines improved response quality. The lack of guidelines early in the response for how to address the specific needs of large and urban vulnerable populations were exposed early.

Key Findings. OFDA, the World Health Organization (WHO), governments, and IPs recognized the lack of standards and guidelines, and moved aggressively to fill the gap. Experienced actors such as MSF shared internal guidelines widely, and a range of actors accepted the technical guidance of other organizations to establish contextually relevant response standards.

Timeline analysis suggests that most standards were in the process of development concurrently with the need for decisions about implementation. Key informants and literature from the early response show that even when initial guidelines proved inadequate in rigor and had to be updated over time, the initial presence of a road map helped prevent delays.

In every area—incident management and coordination, IPC, patient care and treatment, contact tracing, cross-border surveillance, social mobilization, and safe and dignified burials— there were major improvements in the development, use, and relevance of technical standards over the course of the West Africa outbreak. The diffusion of rigorous IPC guidelines led to a significant decrease in nosocomial infections, for instance.

The implementation of more rigorous contact tracing guidelines improved case finding and tracking, decreasing the share of unidentified cases. The development of guidelines made a significant contribution to keeping burial workers and health care workers safe from EVD exposure or infection. Guidelines did not address how needs that vary by gender or those particular to vulnerable populations.

OFDA actions may have been slowed by extended technical deliberations over what standards ought to be in a wide range of matters, ranging from the correct percentage of chlorine bleach solution, the proper procedure for donning and doffing PPE, or construction standards for CCCs.

Most IPs followed guidelines provided by the WHO and CDC. Data from evaluation surveys of contact tracers and CHWs show that the vast majority reported receiving guidelines and that the top sources of guidelines were reliable: Ministry of Health (MOH), WHO, and MSF. Survey data show contact tracers and CHWs followed the standardized guidelines more than 90% of the time.

RECOMMENDATIONS

1. *Provide funding to inventory existing outbreak response guidelines and to document field lessons* and best practices learned in the EVD outbreak, including project design, implementation, mobilizing safe burial teams, organizing community leaders, and CHW mobilization.
2. *Establish a protocol for helping IPs to understand which among available technical guidelines to follow* in the case that guidelines from authorities such as WHO, CDC, or MSF compete or clash in a future response.
3. *Partner with CDC and WHO in the goal to help make technical guidelines more IP-friendly.*
4. *Fund expansion of epidemic response guidance in manuals such as the Interagency Sphere Humanitarian Charter and Minimum Standards.*

OBJECTIVE 4: COORDINATION OF THE RESPONSE

Evaluation Question 8

How effectively did OFDA coordinate all USG efforts as the lead agency in this response?

Conclusion. OFDA performed well, judged by the major contribution of combined USG resources deployed successfully to the field, and contributed to interrupting the transmission of EVD. OFDA's DARTs aligned resources and partners in the field and RMT-managed communications with force and manpower in Washington, DC, joined by the White House, HHS, FFP, USAID/ Bureau for Global Health, Department of State, CDC, and DOD. Coordination was less effective between and across countries at the DART level. Much of the senior USG attention was on Liberia both during the peak in Liberia and even afterwards, though OFDA shifted its strategy and funding to a more regional perspective.

Key Findings. OFDA has traditionally strong coordination mechanisms with DOD. For instance, CDC routed their requests for specimen samples or their own personnel transport to DOD via the OFDA Mission Tasking Matrix (MITAM). In the West Africa outbreak, CDC found it often more effective to make requests to DOD through OFDA. That said, there was a lack of clarity at times about the respective roles and responsibilities of CDC and OFDA. The agencies' ability to share understanding and game plans, however, was enhanced by being part of a joint team.

The coordination between CDC and OFDA occurred at numerous levels. Numbers of staff were effectively cross-posted, including CDC personnel to Washington, DC and OFDA personnel to Atlanta, GA. Learning from these joint efforts should have been better documented and learned.

RECOMMENDATIONS

1. *OFDA should revise its MOU with CDC to include early detection and sharing of potentially important global infectious disease surveillance data in real-time.* Develop regular opportunities to field-train OFDA staff with DOD, CDC, and other USG responders. Place a full-time OFDA specialist based in the CDC EOC in Atlanta.
2. *OFDA and CDC should work together to plan for a range of scenarios in which infectious disease emergencies may occur in the future,* based on different pathogens and their spread, different settings (permissive, non-permissive, conflict, non-conflict, urban/rural, middle/low income, etc.), and on the feasibility of the participation of other U.S. Departments, including DOD.
3. *In anticipation of future pandemics, OFDA should pursue a stronger collaboration with the Laboratory Response Network,* DOD's network of laboratories, and other key laboratories at CDC, the Pasteur Institute, Israel, and other locations.

Evaluation Question 9

To what extent were the activities supported by the USG well-coordinated with the broader international response, including national response structures in the affected countries, and well-coordinated operationally among those organizations that the USG funded?

Conclusion. The success of USG coordination efforts with the international response was mixed. OFDA led the coordination of the USG response with the UN, including Office for the Coordination of Humanitarian Affairs (OCHA) in the UN Secretariat, WHO, and other key UN agencies such as UNICEF, which had an extensive presence in each country, and the World Food Program, which provided UN Humanitarian Air Operations transport. OFDA gave substantial funding to and worked closely with WHO in Geneva and the field. The UN Mission for Ebola Emergency Response (UNMEER) was not given significant attention by OFDA, indicating a deficiency in international coordination.

Key Findings. There were too few inter-donor meetings or pledging events to establish which donors would do what in the field. Based on historical ties, there were assumed lead donor roles, but these responsibilities were never formalized. In practice, in Sierra Leone, OFDA coordinated intimately but informally with DFID, effectively carving the country into regions where each provided lead funding. The U.S. had minimal communication with the representatives of many bilateral donors.

In the three countries, OFDA, DOD, and CDC worked effectively with the national command structures. OFDA and CDC, together, had more resources to dedicate than the WHO in building capacity and engaging field programs in Liberia and Sierra Leone. OFDA coordination with the government of Liberia was the most extensive. OFDA was the major funder of the EVD response in Liberia, paying for international as well as national efforts.

The USG promoted support from within Africa to the three countries by mobilizing health providers with a grant to the African Union and by mobilizing trained, francophone epidemiologists from the Democratic Republic of Congo to Guinea. OFDA gave valuable support to an array of local agencies in West Africa by supporting their role as sub-grantee partners working under prime IP holders.

RECOMMENDATIONS

1. *The USG should sustain its communication and work with the emergency wing of WHO* to assist them in taking on an expanded role in directly managing field operations in large public health emergencies. The OFDA should support WHO in shepherding the International Health Regulations into practice in fragile states and disaster-prone zones and to improve its capacity to be an operations-level humanitarian agency.

2. *OFDA should assist OCHA to expand its own technical capabilities and that of the Inter-Agency Standing Committee mechanisms to define and address different pandemic scenarios.* OCHA coordination with WHO should be supported by OFDA to develop a framework for how OCHA can be more relevant in future public health crises.
3. *The USG should engage in a more substantial way with relevant donors,* such as France, Germany, the European Union, China, and regional WHO entities in planning for future outbreak roles and strategies.
4. *OFDA should continue to participate selectively in global laboratory and research networks* in high-risk epidemic zones, including Lassa Fever, Marburg Virus and other emerging infections.

Evaluation Question 10

How well did OFDA adjust to the changing epidemiology and priorities of the international response?

Conclusion. Once engaged, OFDA adapted its strategy by phase of the epidemic, as new information became available, per country and per region. However, the USG, with OFDA as the lead, responded only after the EVD outbreak had spread widely. OFDA mobilized quickly, but could have been operational earlier in the outbreak.

Key Findings. OFDA initially deferred to CDC as the lead USG responding agency. From March to June, 2014, OFDA monitored the outbreak to determine whether it would be needed to play a role. During this period, OFDA reviewed and tracked data from CDC but did not attempt to insert itself programmatically, deferring to a presumed lead role by CDC. OFDA became the lead agency at the U.S. President's directive, after which it was reacting to the disease's speedy progress. However, by this time, it had already missed a valuable window of opportunity that could have prevented the disaster.

In the first eight months of the outbreak, OFDA's coordination with partners reflected routine assessments of local needs, in large part informed by the information it received from WHO, CDC, local officials, and IPs. CDC and OFDA paid attention to the metrics of infection rates and percentage of cases with known contacts, as well as the geographic patterns of new micro-outbreaks. IPs stated that OFDA's flexibility facilitated their ability to respond to the fast-changing outbreak and shifts in strategy as new information became available.

A high number of modifications for OFDA awardees was noted; common reasons for modifications included major changes in case numbers, tactical changes, or changes in priorities.

RECOMMENDATIONS

1. *OFDA's selection of activities in outbreak response should be chosen to adapt rapidly* to the often-unpredictable geographic spread, the mutation of the disease agent, epidemiological data, and evidence about the effectiveness of specific project designs at the community level.
2. *OFDA should prepare and make available to its staff and its IPs a set of written guidelines* for scaling population-level control of pandemic infectious diseases of humanitarian concern.
3. *OFDA's disaster guidelines should be expanded to recognize the different types of outbreak threats that are potential inter-continental crises* which will recur and expose gaps and vulnerabilities in resource-scarce overseas settings. These should be linked organically to best-practice updates generated in greater detail at CDC.
4. *OFDA and its partners should adapt programs to better support mid-grant changes* which track shifting disease patterns and response priorities.