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Status of the Ebola Outbreak in West Africa: Overview and Issues for Congress

Tiaji Salaam-Blyther
Specialist in Global Health

Susan B. Epstein
Specialist in Foreign Policy

Bolko J. Skorupski
Research Assistant

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Summary

The 2014-2015 outbreak and spread of Ebola Virus Disease (EVD, or Ebola) in West Africa became an international public health emergency that, in no small part due to international intervention, abated significantly by the end of 2015 and early 2016. The issue remains of interest toward the end of the 114th Congress for a number of reasons, including ongoing concerns about the status of disease and risks of future outbreaks, and interest in the disposition of funds appropriated by Congress in response to Ebola, especially in view of the more recent health challenge posed by the Zika virus. This report discusses ongoing efforts to control Ebola in West Africa, analyzes persistent challenges in fighting the spread of the disease, and tracks Ebola emergency funds.

Key milestones in the Ebola outbreak include the following:

- In March 2014, the World Health Organization (WHO) announced that a "rapidly evolving outbreak of Ebola virus disease (Ebola)" had begun in Guinea, West Africa. Retroactive studies indicated that the virus had likely begun to spread in late December 2013, but that weak disease detection and surveillance systems had failed to identify the outbreak. From Guinea, the disease spread to Liberia and Sierra Leone and continued to infect thousands in the three countries until mid-2015, when a coordinated, high-level response by the international community began to slow the rate of new infections.
- In August 2014, WHO declared Ebola a Public Health Emergency of International Concern (PHEIC) and one month later, United Nations Secretary-General Ban Ki-moon established the United Nations Mission for Ebola Emergency Response (UNMEER) to coordinate the U.N. response to the outbreak. WHO came under some broad criticism for what was viewed as a late designation for the emergency. Following the PHEIC declaration, the United States and other actors exerted a concerted effort to contain the disease, and cases began to decline rapidly.
- By the end of December 2015, the fight against the West Africa Ebola outbreak reached a pivotal point. On December 29, WHO declared that human-to-human Ebola transmission had ended in Guinea, marking the first time all three countries had stopped the original chains of transmission at the same time. By this time, WHO had reported over 28,000 confirmed, probable, and suspected Ebola cases worldwide, including more than 11,000 deaths.
- On March 29, 2016, WHO declared that the West Africa Ebola outbreak was no longer a PHEIC, although the disease was still in a phase that could experience infrequent flare-ups. In addition, Guinea, Liberia, and Sierra Leone continue to face considerable infrastructural constraints.

Congress appropriated $5.4 billion in FY2015 emergency supplemental appropriations for domestic and international responses to the Ebola outbreak (in Consolidated and Further Continuing Appropriations Act, 2015, P.L. 113-235, December 2014). Of the funds appropriated for international responses (in Title IX, Division J), roughly half were for the Department of State and the U.S. Agency for International Development (USAID). These funds, which totaled more than $2.5 billion, were limited for Ebola responses, although the law permitted funds from some accounts to be used for preparedness efforts in countries "at risk of being affected by" the outbreak.

With some Ebola supplemental funds still unobligated, some in the 114th Congress have looked to these funds as a potential source for responses to the emergent Zika virus. The Obama Administration has requested new funds to support a Zika response and has also reprogrammed some Ebola funds for Zika. The House and Senate have considered legislation in response to the request (S. 2843 and H.R. 5044, respectively. For more information, see CRS Report R44460, *Zika Response Funding: Request and Congressional Action*). Some Members of the House Appropriations Committee have called on the Administration to expend unobligated Ebola funds before considering the Zika request. Other Members oppose this idea and maintain that remaining Ebola funds should be preserved and used to strengthen the still weak health systems in West Africa that initially failed to detect and contain the outbreak.

Contents

Figures

Tables

Appendixes

Contacts

Background

In March 2014, the World Health Organization (WHO) announced that health officials in Guinea had identified a "rapidly evolving outbreak of Ebola virus disease (Ebola)."[1] Retroactive studies indicated that the virus had likely begun to spread in late December 2013, but that weak disease detection and surveillance systems had failed to identify the outbreak. From Guinea, the disease spread to Liberia and Sierra Leone and continued to infect thousands in the three countries until mid-2015, when concerted efforts to contain the disease by the international community began to curb new infections and deaths.[2]

WHO declared Ebola a Public Health Emergency of International Concern (PHEIC) in August 2014. By then, the disease had reached Nigeria, had infected 1,779 people, and had claimed 961 lives.[3] Some groups, including Doctors Without Borders, criticized WHO for the delayed designation. Following the PHEIC declaration, the United States and other actors exerted a concerted effort to contain the disease, and cases began to decline rapidly. As an indication of a reversal in the trend, some 950 people in West Africa contracted Ebola each week in September 2014. By July 2015, average weekly cases fell to five.

On December 29, 2015, the fight against the West Africa Ebola outbreak reached a pivotal point. WHO declared that human-to-human Ebola transmission had ended in Guinea, marking the first time all three countries had stopped the original chains of transmission at the same time.[4] Liberia had stopped transmission two weeks earlier and Sierra Leone had interrupted transmission in November 2015.[5] By this time, WHO had reported 28,637 confirmed, probable, and suspected Ebola cases worldwide, including 11,315 deaths. Although WHO had declared that the outbreak had ended in Guinea, the organization cautioned that small outbreaks could occur. Since that pivotal moment in December 2015, WHO has reported 19 more cases, including 8 deaths.[6] All but 15 of the 11,323 Ebola-related deaths that have occurred worldwide were contracted in Guinea, Liberia, and Sierra Leone.

U.S. Government Ebola Funding

In September 2014, one month after WHO characterized Ebola as a PHEIC, Congress enacted legislation (P.L. 113-164, Continuing Appropriations Resolution, 2015) that provided $88 million for a U.S. Ebola response: $30 million for U.S. Centers for Disease Control and Prevention (CDC) Ebola response activities in West Africa and $58 million for research and development of specific treatments and vaccines for Ebola, to remain available until September 30, 2015. Congress had also permitted the Department of Defense (DOD) to reprogram roughly $750 million of FY2014 Overseas Humanitarian Disaster and Civic Aid (OHDACA) funds to build Ebola treatment units (ETUs) in Liberia and support ongoing U.S. efforts in the region.

[1] WHO, "Ebola Virus Disease in Guinea," Disease Outbreak News, March 23, 2014.

[2] For more on debates about WHO's response, see, *U.S. and International Health Responses to the Ebola Outbreak in West Africa*, October 29, 2014.

[3] WHO, *Situation Report,* August 8, 2014.

[4] WHO, "End of Ebola Transmission in Guinea," Press Release, December 29, 2015.

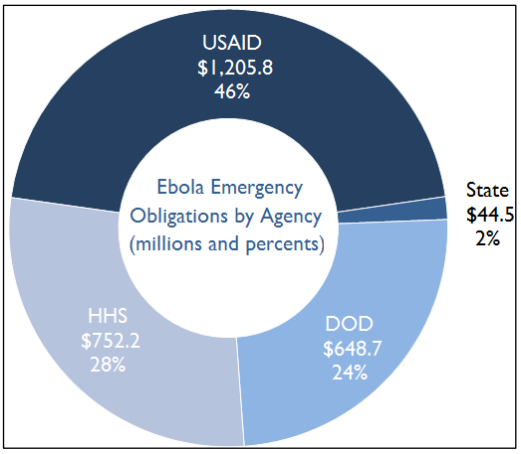
[5] WHO, *Ebola Situation Report*, December 30, 2015.

[6] WHO, *Ebola Situation Report*, March 30, 2016.

In October 2014, President Barack Obama announced that the United States would launch a "whole-of-government" response to the Ebola outbreak, which would include deploying the U.S. military to construct up to 17 ETUs in West Africa.[7] One month later, the Administration submitted a $6.2 billion budget request to fund the plan, which included $1.5 billion for a Contingency Fund.[8] In December 2014, Congress enacted the Consolidated and Further Continuing Appropriations Act, 2015 (P.L. 113-235), providing several federal departments and agencies $5.4 billion in FY2015 emergency supplemental appropriations for the U.S. government Ebola response. Since these funds are emergency spending, they were effectively exempt from spending limits, per the Budget Control Act of 2011 (BCA, P.L. 112-25).[9]

Figure 1. U.S. Obligations for International Ebola Responses

(as of March 1, 2016)



Source: Created by CRS from correspondences with Administration officials and USAID, *Ebola Response and Preparedness: Section 9004 Report*, March 2016.

Acronyms: Department of Defense (DOD), Department of Health and Human Services (HHS), Department of State (State), and U.S. Agency for International Development (USAID).

U.S. Government Ebola Funding in West Africa

Of the funds Congress appropriated for international Ebola responses, roughly half were provided to the Department of State and the U.S. Agency for International Development (USAID) through Title IX, Division J of P.L. 113-235 (**Figure 1**). The foreign affairs funds, which totaled more than $2.5 billion, were limited to use for the Ebola response, although the law permitted funds from some accounts to be used for preparedness efforts in countries "at risk of being affected by" the outbreak, such as Mali and Nigeria (which both experienced imported Ebola cases).[10] Section 9001 authorized the Secretary of State and the USAID Administrator to make certain transfers of funds between accounts within Title IX, albeit only for Ebola-related purposes, and with a 15-days-in-advance written congressional notification to the appropriations committees.

As of March 1, 2016, the Department of State and USAID have obligated (or committed) less than half of the $2.5 billion international Ebola emergency funding (**Table A-1**). USAID organized Ebola response activities into four pillars (**Table A-2**).[11] Almost 70% of the Ebola funds were aimed at Pillar 1: controlling the outbreak (**Figure A-1**).

[7] White House, "The U.S. Response to the Ebola Epidemic in West Africa," Press Release, October 6, 2014.

[8] White House, "Emergency Funding Request to Enhance the U.S. Government's Response to Ebola at Home and Abroad," Fact Sheet, November 5, 2014.

[9] For more information on discretionary spending limits and Ebola funds designated for emergency requirements, see *OMB Final Sequestration Report to the President and Congress for Fiscal Year 2015*, January 20, 2015, at https://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/sequestration/sequestration_final_january_2015_president.pdf.
While Congress agreed to authorize DOD's use Overseas Contingency Operation (OCO) funds for some of its Ebola activities, it preferred to pass an emergency supplemental for Department of State, USAID, HHS, and other DOD response efforts.

[10] P.L. 113-235, 128 Stat. 2692-2695, December 16, 2014.

[11] For more information on domestic funding for Ebola, see CRS Report R43807, *FY2015 Funding to Counter Ebola and the Islamic State (IS)*.

In January 2016, USAID disbanded its Disaster Assistance Response Team (DART) in West Africa, which had coordinated the whole-of-government U.S. response to the Ebola outbreak. Under the DART, each agency led particular parts of the response. For example, USAID managed and coordinated U.S. international Ebola responses; CDC led the medical and public health components; the National Institutes of Health (NIH) conducted and supported research and development of new Ebola diagnostic, treatment, and preventive tools; and the Department of State advanced diplomatic efforts. Other department and agencies also provided support for specific purposes. The DOD, for example, deployed nearly 3,000 troops to the region who constructed ETUs. Other U.S. officials posted temporarily to the region included more than 1,000 CDC personnel and 465 USAID staff.[12] U.S. agencies have collaborated in West Africa to

- procure rapid Ebola diagnostic tests;
- support contact tracing;
- construct ETUs to facilitate the isolation of Ebola patients and fund community care centers;
- train thousands of health care workers on how to screen individuals for potential Ebola signs and symptoms and how to implement contact tracing programs;
- provide mobile laboratories and open new laboratory testing facilities in the region to increase;
- diagnostic capacity;
- promote coordination, operations, and communication efforts surrounding the response; and
- support the operation of emergency operations centers, safe burial teams, and health care systems in West Africa.

Ongoing Ebola Efforts in West Africa

Ebola control efforts in West Africa are in Phase 3, characterized by limited transmission across small geographic areas and low probability of large-scale Ebola outbreaks. In Phase 1, WHO and implementing partners, including the United States, focused on isolating and treating Ebola cases and ensuring safe burial of all Ebola deaths. During Phase 2, responders emphasized disease surveillance, contact tracing, and community engagement. The marked decline in cases that occurred during the second phase signaled a transition to the third phase.

On March 1-2, 2016, WHO convened a meeting with stakeholders, including USAID and CDC, to assess Ebola control efforts in Guinea, Liberia, and Sierra Leone. At the meeting, health officials from the three countries "expressed confidence in the capacity…to effectively manage residual risks of new Ebola infections—pointing to the rapid government-led containment of recent flare-ups of the disease."[13] Since the primary Ebola outbreak ended in December 2015, the three countries have successfully led collaborative efforts to contain small outbreaks. Representatives from the three countries also highlighted increased efforts to utilize cross-country cooperative approaches for Ebola control. In March 2016, for example, Guinean, Liberian and WHO officials along with other partners

[12] Joint Inspectors General, *International Ebola Response and Preparedness: Lead Inspector General Joint Strategic Oversight Plan on U.S. Government Activities*, October 2015, p. 10.

[13] WHO, "Guinea, Liberia and Sierra Leone 'Effectively Managing' Ebola Flare-Ups," Updates from the Field, March 16, 2106, http://www.who.int/csr/disease/ebola/managing-flare-ups/en/.

identified and contained a small outbreak, which caused 13 suspected cases in Guinea and Liberia (the outbreak originated in Guinea and was imported into Liberia).[14]

In response to the March 2016 outbreak, local Guinean health authorities reactivated the emergency coordination mechanism that was instituted at the height of the Ebola epidemic to manage an inter-agency response, which included the deployment of 75 WHO epidemiologists, surveillance experts, contact tracers, vaccinators, social mobilizers, health promoters, and infection prevention and control experts. The interagency team also included non-governmental organizations, which provided food packages, hygiene kits, and cash stipends to the more than 1,000 contacts who had been identified and placed under medical observation.[15] More than 1,500 people have been vaccinated with the experimental Ebola vaccine VSV-EBOV to contain the March 2016 flare-up.[16] The vaccine was developed by NewLink Genetics and Merck Vaccines USA in collaboration with the Public Health Agency of Canada. A large clinical trial conducted in 2015 by the Guinean Ministry of Health, WHO and implementing partners, including NIH, demonstrated that it was highly effective at preventing Ebola infection.[17] The "ring vaccination" strategy, which involves vaccinating anyone who has come into contact with an Ebola-infected person, as well as their own contacts, has become part of standard operating procedures when responding to Ebola flare-ups.

Ongoing U.S. Efforts to Address Ebola in West Africa

According to a March 2016 report by the Inspectors General of USAID and U.S. Department of Health and Human Services (HHS), USAID and CDC have carried out a number of efforts to restore primary health services in the affected countries. In Guinea, for example, the U.S. government supported the restoration of basic health services at 90 facilities by supporting IPC training for over 2,800 health care workers. USAID supported the development of infection prevention and control (IPC) training curriculum, conducted IPC training, and supervised health practitioners to ensure adherence to IPC protocols, while CDC aided in the development of a national IPC policy and strategy and supported IPC action plans in recently affected prefectures.[18] These activities have been conducted in addition to the substantial initiatives U.S. agencies carried out to identify, treat and isolate Ebola patients during the height of the epidemic. The **Appendix** includes additional examples of U.S. support for restoring health services in the three countries.

Due to the precipitous decline in new cases towards the end of 2015, the United States has reduced funding for Phase 1 and Phase 2 types of activities. No U.S.-funded ETUs remain operational, though "ETUs managed and funded by host governments and other donors were still operational and available to respond to new cases."[19] In addition, at the end of 2015, the United States was providing support for only one laboratory in Guinea and three laboratories in Liberia.[20] The USAID-funded non-

[14] WHO, *Zika Virus Disease, Microcephaly, and Guillain-Barré Syndrome*, April 28, 2016, p. 9.

[15] WHO, "Looking, hopefully, towards an Ebola-free future," Updates from the Field, April 15, 2016.

[16] WHO, "Liberia and Guinea Discharge Final Ebola Patients in Latest Flare-Up and Begin 42 Days of Heightened Surveillance," Updates from the Field, May 2, 2016.

[17] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, December 31, 2015, p. 13. For more information on Ebola vaccine, see WHO, "Ebola Vaccines, Therapies, and Diagnostic," Questions and Answers, October 6, 2015, http://www.who.int/medicines/emp_ebola_q_as/en/.

[18] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, December 31, 2015, p. 14.

[19] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, March 31, 2016, p. 10.

[20] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, December 31, 2015, p. 11.

governmental organization Global Communities began demobilizing safe burial teams in Liberia at the end of 2015 and in Sierra Leone, implementing partners also transitioned from using safe burials as a core Ebola response after the country was declared free of Ebola transmission.[21]

The USAID and HHS Inspectors General reported that USAID and CDC supported case investigation and contact tracing efforts in Liberia and Guinea in November 2015 and March 2016, when new Ebola cases emerged, and CDC collaborated with NIH, WHO, and the Liberian government to vaccinate approximately 170 primary and secondary contacts.[22] These actions indicate that the United States continues to play an important role in containing flare-ups in the region, though long-term plans for strengthening the health systems of the affected countries remain unclear.

Challenges in Controlling Ebola in West Africa

On March 29, 2016, WHO declared that the West Africa Ebola outbreak was no longer a Public Health Emergency of International Concern PHEIC, since Ebola no longer constituted an extraordinary event, the risk of international spread was low, and countries had demonstrated the capacity to respond rapidly to infrequent flare-ups.[23] The three countries, nonetheless, continue to face challenges both in sustaining Ebola control efforts and in addressing broader health issues within their borders. At the March meeting convened by WHO, representatives from the three countries expressed concerns about the long-term capacity to sustain the significant human resources that are required to respond to Ebola flare-ups, address the long-term health needs of Ebola survivors, and prevent further transmission. Country leaders also were skeptical that they had the capacity to maintain lab capacity, establish and train rapid response teams, sustain infectious diseases surveillance and response systems, and ensure that Ebola survivors have access to specialized services for health complications like eye and neurology care, as well as to semen- and breast-milk-testing programs. These are currently being buttressed by support from the international community, but the duration of such support is in question. The section below discusses some of the challenges faced by the affected countries in controlling and eliminating Ebola.

Treating Long-Term Health Complications Among Ebola Survivors

Although the Ebola virus typically clears from the blood as the acute symptoms resolve, the virus may persist in other parts of the body for an undetermined amount of time. These sites include the inside of the eye, central nervous system (brain and spinal cord), testes, and mammary glands. Researchers continue to examine the implications of this persistence for survivors' health and for potential transmission of the disease. Some Ebola survivors may experience health complications weeks or months after recovering from Ebola and these symptoms may persist for years. Between 50-75% of Ebola survivors report musculoskeletal pain, joint stiffness, arthritis, eye pain and redness, dry eyes, sensitivity to light, and blurry vision. Over 25% of Ebola survivors who report to health facilities have reported tinnitus (ear ringing and roaring) and hearing loss. Other common health problems reported by Ebola survivors include abdominal pain, headache, and memory impairment. Although considered rare, relapse of Ebola has been reported.

[21] Ibid, p. 12.

[22] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, December 31, 2015 and March 31, 2016.

[23] WHO, "Statement on the 9th Meeting of the IHR Emergency Committee Regarding the Ebola Outbreak in West Africa," WHO Statement, March 29, 2016.

Blindness

Survivors have reported a range of ocular problems up to 17 weeks after discharge, including uveitis, cataracts, retinal and optic nerve disease. Ocular disease in Ebola survivors can lead to blindness and requires early treatment. Ocular care and other specialty care are provided primarily by foreign health workers, as the three countries face severe health-worker shortages, particularly among specialists. A growing number of Ebola survivors are going blind due to inadequate access to ocular specialists. Treating ocular disease in Ebola survivors is particularly difficult, as scientists are uncertain of the risks surgeons face while operating on a person carrying the Ebola virus. This uncertainty has led to a near cessation of ocular surgery that could save the eyesight of Ebola survivors.[24]

Muscle Weakness and Nerve Damage

Many Ebola survivors report peripheral neuropathy (numbness in one or more peripheral nerves, typically causing numbness or weakness in the hands and feet) and tremors. Other less common health problems reported by some Ebola survivors include muscle weakness, seizures, and Parkinsonism. The causal link of these conditions with Ebola has not yet been fully determined.

Infant Mortality

Ebola in pregnancy is associated with a high rate of obstetric complications and poor maternal and perinatal outcomes, with neonatal (the time period between birth and the first month of life) mortality approaching 100%. WHO has identified one newborn with an Ebola infected mother who has survived after having received experimental therapy.[25] Health practitioners may contract Ebola from infected pregnant women through contact with infectious intrauterine contents (amniotic fluid, placenta, and fetus) during delivery and/or management of obstetric complications. There is presently no evidence that women who become pregnant after they have recovered from Ebola run the risk of transmitting Ebola to their babies.

Preventing Human-to-Human Transmission

Health experts are uncertain about how long the Ebola virus remains in the bodies of survivors. The virus has been identified in the eyes, semen, and other bodily fluids of survivors one year after recovering from Ebola. Male survivors are being advised to use condoms during sexual intercourse and are encouraged to undergo regular screenings until two negative test results are achieved. Scientists are uncertain about the precise duration and infectivity of Ebola virus in breastmilk. Ebola virus has been detected in the breastmilk of female Ebola survivors up to 16 months after onset of symptoms. As a result, WHO encourages Ebola survivors who are lactating to have their breastmilk tested for Ebola virus. If Ebola virus is detected, WHO recommends that women suspend breastfeeding, use premixed infant formula (as opposed to powdered formula that requires added water—access to clean water is limited in the three countries and diarrhea, primarily caused by ingestion of tainted water, is a leading cause of childhood death in the three countries), and have their breastmilk retested every 48 hours until two consecutive "undetected" results are obtained.[26] Poverty rates are high in all three countries, diminishing the likelihood that lactating mothers with Ebola can afford premixed infant formula. Access to health care is still limited in the countries, diminishing the likelihood that lactating mothers with Ebola might receive advice about the safe and appropriate use of infant formula. In addition,

[24] Emily Baumgaertner, "Is Ebola Hiding in the Eyes of Survivors?" *The Atlantic*, March 30, 2016.

[25] WHO, "*Clinical Care for Survivors of Ebola Virus Disease*," Interim Guidance, February 24, 2016, p. 21.

[26] Ibid, p. 22.

breastmilk testing is extremely limited and it is unclear how many lactating women carry Ebola virus within their breastmilk.

WHO recommends that Ebola survivors undergo regular follow-up health assessments for at least one year, irrespective of whether they have experienced negative health symptoms. WHO recommends, for example, that the patient be evaluated two weeks after discharge, monthly thereafter for six months, and then every three months to complete the year. Most experts agree that ensuring that more than 11,000 Ebola survivors have access to health care and treatment for adverse health outcomes is a daunting task that the affected countries are not equipped to provide alone.

Ensuring Long-Term Behavior Change

In all three countries, maintaining behavioral change, including safe burial practices, remains a challenge. The March 2016 outbreak in Guinea, for example, is believed to have been sparked by contact with an Ebola corpse at a traditional burial. Ensuring long-term use of condoms also presents a challenge in the region. Even before the Ebola outbreak in 2013 (when the last household survey was conducted) less than 1/3 of all surveyed Liberians reported using a condom during their last high-risk sexual encounter. The United Nations Population Fund (UNFPA) is providing free condoms and awareness-raising campaigns to prevent sexual transmission of Ebola and other sexually transmitted diseases like HIV/AIDS.[27]

Maintaining Infection Prevention and Control (IPC) Protocols

Some analysts have expressed concerns about the ability of the Guinean, Liberian, and Sierra Leonean governments to maintain newly acquired capabilities and protocols within their health systems. Although some of Liberia's health facilities, such as Redemption Hospital, Monrovia's only free general hospital, have adopted procedures for checking new patients, established isolation units, and are better equipped to apply infection prevention and control (IPC) protocols, some observers are skeptical that these facilities can maintain the new protocols, especially as related international funding for Ebola decreases. According to a program director with the International Rescue Committee (IRC), "The fear is that now that Ebola's over, all of that will just go out the window."[28] Observers are particularly apprehensive about whether supplies, IPC practices, and supplemental payment of health personnel will continue as international assistance decreases. Media reports following Liberia's November 2015 Ebola outbreak, for example, noted lapses in IPC protocol.[29] One expert concluded that the "very gaps in basic infection control that facilitated the epidemic's growth in the first place have still not been addressed."[30] Media reports also indicate that some health clinics continue to experience interruptions in running water, for instance, inhibiting the capacity to adhere to IPC protocol.

[27] UNFPA, "Ebola Prompts Efforts to Boost Condom Use in Liberia," News, July 1, 2015.

[28] The Atlantic, "A Liberia Hospital After Ebola," May 29, 2015.

[29] Foreign Policy, "How Liberia's Latest Ebola Case Slipped Through the Cracks," November, 26, 2015; Washington Post, "Ebola mystery: It's back in Liberia, and officials are stumped about how boy got infected," November 20, 2015.

[30] Foreign Policy, "How Liberia's Latest Ebola Case Slipped Through the Cracks," November, 26, 2015.

Broader Health Challenges in Guinea, Liberia, and Sierra Leone

As noted, the Ebola control efforts in West Africa are in phase 3, which means that the region is experiencing infrequent flare-ups of Ebola cases with limited transmission. Phase 3 activities require deeper engagement and support for addressing systemic issues that inhibited the affected countries from promptly detecting and controlling the Ebola outbreak when it began. Despite the low Ebola caseload, WHO asserted in September 2015 that "[o]ver the course of 2016 there will still be a number of complex technical issues and high consequence risks to be managed which require significant government and partner coordination."[31] The organization warned that the reduced number of Ebola cases may prompt "experienced national and international Ebola responders to see the job as complete and leave," but argued that "[p]artners and donors form a core and essential part of the response." CDC has acknowledged that maintaining health care gains made during the first and second phases, reinforcing practices to combat complacency, and improving poor communication practices continued to pose a challenge.[32] All three countries continue to face considerable infrastructural constraints. At the end of December 2015, for example, USAID was still helping Guinean health officials to resolve supply chain management issues that impeded reliable distribution of personal protective equipment to health facilities.[33]

Analysts are also concerned about how the numerous Ebola deaths of health workers, lingering mistrust of government health facilities, and long-term health issues facing the more than 11,000 Ebola survivors may affect the ability of the countries to restore and improve their health systems. Even before the outbreak began, people in these countries had limited access to health services and had the highest infant, child and maternal rates in the world (**Figure A-2**). For example, 10% of all Guinean children younger than five, 7% of Liberian children in the same age group, and 16% of Sierra Leonean children under five years died before age five in 2013, mostly from preventable causes. On average, 4.5% of all children worldwide died before age five in 2013, while in sub-Saharan Africa 9% of all children died, on average, before their fifth birthday.[34] At the height of the outbreak, delivery of services was severely disrupted. In Liberia, the epidemic contributed to a 61% decline in outpatient visits. Malaria care for children declined by 39% in Sierra Leone and immunizations fell by 21%. Similarly, at the height of the epidemic in Guinea, primary medical consultations dropped by 58%, hospitalizations by 54%, and vaccinations by 30% compared to 2013.[35] In addition, the high number of Ebola deaths among health workers has further limited the supply of health personnel and has led to additional restrictions on delivery of health services. More than 500 health workers have been killed by Ebola in the three countries.[36]

[31] WHO, *Ebola Response Phase 3: Framework for Achieving and Sustaining A Resilient Zero*, September 2015, p. 12.

[32] USAID and HHS Inspectors General, p. 10.

[33] Ibid.

[34] Calculated by CRS from WHO, *World Health Statistics Report*, 2015.In 2013, infant mortality rates (the probability of dying before age 1per 1,000 live deaths) were 64.9 in Guinea, 53.6 in Liberia, and 107.2 in Sierra Leone. In 2013, child mortality rates (the probability of dying before age 5 per 1,000 live births) were 100.7 in Guinea, 71.1 in Liberia, and 160.6 in Sierra Leone. In 2013, infant and child mortality rates in sub-Saharan Africa were 59.9 and 90.1, respectively, and the average infant and child mortality rates for the world were 33.6 and 45.6, respectively, in 2013.

[35] WHO, "What is Early Recovery?" WHO web page on Emergencies, preparedness, response, http://www.who.int/csr/disease/ebola/health-systems-recovery/early-recovery/en/, accessed on March 28, 2016.

[36] WHO, *Ebola Situation Report*, October 7, 2015.

Although comprehensive data is not yet available, health experts expect that non-Ebola related illnesses and deaths have increased due to interruptions in basic health care delivery, including safe labor and delivery services, vaccination campaigns, and care, prevention and treatment services for infectious diseases like HIV/AIDS, tuberculosis (TB), and malaria. A recent analysis concluded that during the Ebola outbreak, approximately 600 more Liberians than normal died from TB, and 1,000 more from malaria and HIV due to inadequate capacity in the health care system.[37] Observers are also concerned about the long-term impact of Ebola-related health worker deaths on the ability to provide basic health care, including ensuring Ebola survivors have adequate access to commodities and services that can prevent Ebola transmission.

The outbreak also severely damaged the Guinean, Liberian, and Sierra Leonean economies. The Sierra Leonean economy, for example, is estimated to have contracted by 21.5% in 2015, and around 7,500 jobs were lost in the country, following the closure of two mines.[38] Although employment levels have reportedly rebounded to pre-Ebola levels, surveyed employees were working fewer hours and earning lower wages. Roughly 12% of Liberian businesses surveyed during the peak of the outbreak have since closed and economic growth in Guinea fell from 2.3% in 2013 to 0.6% in 2014. Guinean financial experts expect, however, that the country's economy will expand by 4.3% in 2016, and observers project that Sierra Leone's economy may grow by 20% in 2017.[39]

Although the economies of the three countries are reportedly recovering, the economic deficits incurred during the outbreak may slow the pace at which the countries can rebuild and bolster their health systems. As one recent study concluded, the repercussions of inadequate health infrastructure "will continue long after our study period," and play a factor in "perpetuating the vicious cycle of poverty and disease that leaves children unable to receive education and adults incapable of achieving their potential productivity and fully contributing to the development of their communities."[40] In its plan for health system development, Liberia's Ministry of Health describes its own health facilities as "ill-designed and poorly equipped to provide the necessary occupational and patient safety needed for the delivery of safe and effective health service," conditions that a virus such as Ebola can easily exploit.[41] Liberia's Ministry of Health has estimated the cost of building a resilient health system that restores capacity lost due to the Ebola outbreak, and is capable of addressing future epidemics and other health threats at $489 million through FY2016 and FY2017, with an additional $1.21 billion through FY2022. Moreover, the recent drop in global commodities prices has led to a drop in domestic spending and may further limit the Liberian government's investments in its public infrastructure.[42]

[37] "Effects of Response to 2014-2015 Ebola Outbreak on Deaths from Malaria, HIV/AIDS, and Tuberculosis, West Africa," *Journal of Emerging Infections Diseases*, Vol. 22, Number 3, March 2016.

[38] "Africa Takes Grim Stock of the Economic Impact of Ebola," *enca.com*, January 12, 2016, https://www.enca.com/africa/africa-takes-grim-stock-economic-impact-ebola.

[39] Ibid.

[40] "Effects of Response to 2014-2015 Ebola Outbreak on Deaths from Malaria, HIV/AIDS, and Tuberculosis, West Africa," Journal of Emerging Infections Diseases, Vol. 22, Number 3, March 2016.

[41] Liberian Ministry of Health, "Investment Plan for Building a Resilient Health System in Liberia," April 15, 2015.

[42] President Sirleaf announced that the Liberian government "will be unable to meet the targeted level of public sector investment that is required to meet our obligation to ongoing infrastructure projects and new priorities that are essential for our economic diversification goals." See "Liberia to slash spending 11% amid mining slow down," Reuters Africa, January 26, 2016; "After Ebola," The Economist, November 14, 2015.

Issues for Congress

Congress has an enduring interest in the status of the Ebola outbreak in West Africa, not least of which involves the disposition of funds dedicated to the Ebola response. Roughly half ($1.3 billion) of the $2.5 billion provided to the Department of State and USAID for international Ebola responses have remained unobligated as of March 1, 2016 (**Table A-1**). Roughly 46% ($600.4 million) of the unobligated Ebola funds, which was appropriated for training, reimbursement for early response actions, and rehabilitation of the water infrastructure, would expire by the end of the fiscal year. The remaining $686.4 million has no deadline and was provided largely for activities aimed at preventing the re-emergence of Ebola, such as building lab capacity, strengthening surveillance, conducting contact tracing, and screening suspected Ebola cases. The use of these unobligated funds is under discussion, particularly in response to emerging health crises. This section explores this debate and other issues that Congress might consider as it oversees the use of emergency Ebola appropriations and monitors responses to other health-related concerns.

Possible Use of Unobligated Ebola Funds for Zika

In May 2015, the Government of Brazil informed WHO that it had identified an outbreak of Zika virus.[43] The disease has since spread to over 30 countries in the Western Hemisphere, including the United States, and may be linked to a significant increase in microcephaly cases among newborns and Guillain-Barré syndrome in the region.[44] In February 2016, President Obama requested nearly $1.9 billion to support a U.S. domestic and international Zika response.[45] More than $375 million was requested specifically for international efforts. The supplemental request includes language to use unobligated Ebola funds for "other infectious diseases," and authority to reimburse foreign affairs accounts for obligations incurred before enactment of the supplemental. The request also proposes transfer authority to move resources between accounts for greater flexibility. Also, the Administration announced on April 6, 2016 that it had identified $510 million from existing Ebola funds that could be quickly reprogrammed for Zika; and on April 8, 2016, USAID notified Congress of its intent to redirect $295 million of the $510 million for the Zika response effort.

In May 2016, the House and Senate took separate actions on Zika funding. On May 16, 2016, the Chairman of the House Appropriations Committee introduced the Zika Response Appropriations Act, 2016 (H.R. 5243). The bill would provide $622.1 million that would be available until September 30, 2016, for domestic and international Zika response efforts. Nearly half of the funds are designated as emergency funds. The bill also includes rescissions of certain Ebola-related appropriations and the HHS nonrecurring expenses fund.[46] Provisions in the bill provide that its appropriations shall be subject to the same requirements for funds that applied to the Consolidated Appropriations Act, 2016 (P.L. 114-113). This would include any restrictions on the use of funds that were contained therein, such as the applicable prohibitions on the use of funds for abortions. The House passed the measure on May 18, 2016, without amendment.

[43] WHO, "Zika Virus Infection—Brazil and Colombia," Disease Outbreak News, October 21, 2015. For more information on the Zika outbreak, see CRS Insight IN10433, *Zika Virus: Global Health Considerations*, by Tiaji Salaam-Blyther.

[44] For more on the Zika outbreak, see CRS Insight IN10433, *Zika Virus: Global Health Considerations*.

[45] White House, "Preparing for and Responding to the Zika Virus at Home and Abroad," Fact Sheet, February 8, 2016. For more on Zika funding, see CRS Report R44460, *Zika Response Funding: Request and Congressional Action*.

[46] Currently, in the absence of a publicly available CBO score, the budgetary effects of these rescissions, including the extent to which they might achieve budgetary savings, are unclear.

Also in May, Senate action has occurred in the context of the FY2017 Military Construction-Veterans Affairs and Transportation-Housing and Urban Development appropriations bills. The texts of these bills were combined for the purposes of initial consideration in the Senate, and offered as a substitute amendment to an unrelated measure (S.Amdt. 3896 to H.R. 2577). On May 12, 2016, Senator McConnell (on behalf of Senator Blunt) proposed an amendment to that substitute (S.Amdt. 3900 to S.Amdt. 3896) that would provide $1.1 billion for Zika response and preparedness, which would be available until September 30, 2017 (with the exception of Global Health Funds, which would be available until expended). On May 19, 2016, the Senate adopted S.Amdt. 3900, followed by the pair of appropriations measures (i.e., H.R. 2577) to which it was amended.

In a recent hearing, USAID Administrator Gayle Smith argued against the reprograming of remaining Ebola funds. Resources, she remarked, are still needed to assist West African countries to prepare for future outbreaks, support laboratory testing and disease surveillance, and train health workers.[47] Members of Congress who have opposed reprogramming unobligated Ebola funds have maintained that residual Ebola funds should be preserved and used to strengthen the weak health systems in West Africa that initially failed to detect and contain the outbreak.

Future U.S. Efforts to Address Ebola in West Africa

It is unclear what role the U.S. government plans to play in supporting long-term recovery in the region. The December 2015 report on U.S. Ebola activities in West Africa published by the Inspector Generals of USAID and HHS indicated that "[d]espite plans to gear up recovery efforts, few new programs and activities were undertaken. While 82 USAID awards concluded during [Quarter 1 of FY2016], for example, no new Ebola-related awards were initiated."[48] The Inspectors General report also indicated that USAID obligations appeared to be declining. In the first quarter of FY2016, for example, USAID obligated $2.2 million for activities to mitigate second-order impacts, compared to $55.5 million in new obligations for similar activities during the previous quarter.[49] During the second quarter of FY2016, USAID obligated $12.7 million in the region, primarily in support of community efforts to detect and report Ebola cases.[50] As of March 1, 2016, almost 70% of USAID obligations were associated with activities to control the Ebola outbreak (Phase 1), while addressing second order impacts (like food insecurity) and strengthening global health security (Phase 3) both amounted to 16% of USAID obligations.[51]

Coordination of International and U.S. Response to Ebola and Future Outbreaks

Some health observers recommend that the U.S. government should take a more active role to ensure that the WHO is better suited to address future outbreaks, provide incentives to ensure that vulnerable countries increase their health security, and provide consistent, permanent funding for disease outbreak preparedness and response. Specifically, they propose that the USAID or the CDC develop incentives

[47] Gayle Smith, USAID Administrator, Senate Appropriations Subcommittee on State and Foreign Operations, Hearing on FY2017 Budget Proposal, March 15, 2016.

[48] WHO, *Ebola Response Phase 3: Framework for Achieving and Sustaining A Resilient Zero*, September 2015, p. 4.

[49] Ibid.

[50] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, March 31, 2016, p. 10.

[51] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities*, December 31, 2015, p. 8.

for countries to adopt best practices in disease response and preparedness. By incentivizing progress toward strengthening disease surveillance and preparedness systems, they argue that the United States could more effectively leverage limited resources and ensure a better response to future outbreaks.[52]

Other proposals include revising existing approaches that seem to depend on ad hoc interagency task forces and emergency budget requests. Some global health analysts propose that the Government Accountability Office (GAO) examine possible budget instruments for ensuring permanent preparedness and protection. Other recommendations include contributing to the World Bank's Pandemic Emergency Financing Facility or developing a U.S. global health emergency fund that would allow for faster release of financing for foreign countries and provide coordinated funding mechanism at each stage of pandemic preparedness, response, and recovery.[53]

Integrated and Consistent Reporting Requirements

Some observers propose that Congress require U.S. agencies to report data on Ebola spending and progress in a more integrated, consistent, and publicly available manner. Quarterly progress reports from USAID on ongoing Ebola efforts provide an overview of the activities supported but do not provide adequate information on outputs and outcomes. Similarly, Congress lacks sufficient information on the outcomes of activities supported by HHS and other implementing agencies that lack reporting requirements. Because public health crises such as the Ebola outbreak involve multiple agencies and budgets, some argue that appropriate mechanisms should exist to record how monies are being spent and to specifically link performance indicators and targets.[54]

Investing in Research

In 2015, three disease outbreaks (dengue, chikungunya, and Zika) have spread from Latin America and the Caribbean into the United States. These and other diseases that have been mostly neglected by the global pharmaceutical industry lack vaccines to prevent transmission or treatment regimens. Several groups call for increasing investments in research and development for "neglected diseases." A consortium of health experts estimates that the international community would need to double current investments in health research and development from $3 billion in 2014 to $6 billion by 2020 to meet global health goals.[55]

According to a report written by the Global Health Technologies Coalition, the United States accounts for roughly 70% of public investment and 45% of global investment in global health research and development.[56] The report also indicated that the United States provides the highest amounts of funding for research and development for 26 of the 30 most neglected diseases, and as of 2012, supported more than half of the global health products in the development pipeline. Since peaking in 2009, however, U.S. funding for global health research and development has fluctuated (**Figure 2**).

[52] Statement of Amanda Glassman, Director, Global Health Policy Center for Global Development Committee on Senate Foreign Relations Subcommittee on Africa and Global Health Policy, April 7, 2016.

[53] Ibid.

[54] Ibid.

[55] Global Health Technologies Coalition, *Achieving a Bold Vision for Global Health: Policy Solutions to Advance Global Health R&D*, 2016, p. 6.

[56] Ibid.

Figure 2. U.S. Investment in Research and Development for Neglected Diseases

(2014 U.S. $ millions)

Source: Adapted by CRS from Global Health Technologies Coalition, *Achieving a Bold Vision for Global Health: Policy Solutions to Advance Global Health R&D*, 2016, p. 6.

Notes: Estimates. Data sources: Global Health Technologies Coalition, "Saving lives and creating impact: Why investing in global health research works," *Policy Cures*; 2012; and M. Moran et al., "Neglected Disease Research and Development: The Ebola Effect," *G-FINDER, Policy Cures*; 2015.

Some global health experts have proposed that Congress increase funding for Food and Drug Administration (FDA) Priority Review Voucher (PRV) program to encourage additional investments in research on neglected diseases. The PRV allows companies to fast-track a product through the FDA regulatory process. Others propose adding a "novelty" requirement to the program to ensure that the PRV program encourages new investments rather than improvements on existing medication that is highly profitable. Another recommendation is that Congress revise authorizing language to ensure that products granted a FDA priority voucher are affordable.[57]

[57] Statement of Sophie Delaunay Advisor, Doctors Without Borders Medicins Sans Frontieres (MSF) Committee on Senate Foreign Relations Subcommittee on Africa and Global Health Policy, April 7, 2016.

Appendix. Supplemental Information

Table A-1. FY2015 Foreign Affairs Emergency Funds Appropriated for Ebola Response and Related Activities, and Unobligated Balances

(current U.S. $ millions, as of March 1, 2016)

Agency, Account or Activity	P.L. 113-235	Unobligated Funds	Period of Availability	Purpose(s)
STATE DEPARTMENT/USAID				
USAID, Operating Expenses	19.0	14.6	Until Sept. 30, 2016	Operating costs to address Ebola outbreak in West Africa, including temporary staffing and technical support.
USAID, Inspector General	5.6	3.2	Until expended	Oversight of Ebola response in West Africa.
USAID, International Disaster Assistance (IDA)	1,436.3	536.8	Until expended	Disaster assistance to address humanitarian needs for West Africa, such as rapid response, maintaining surveillance, screening, and contact tracing.
USAID, Global Health Programs	312.0	145.6	Until expended	Expanded USAID global health security activities to control infectious diseases and limit spread of Ebola, including surveillance and building lab capacity.
State/USAID, Economic Support Fund	711.7	583.8	Until Sept. 30, 2016	Training and program assistance to prevent economic and government instability during Ebola crisis, including reimbursement for earlier response. Activities include rehabilitation of the water infrastructure, strengthening health information systems, and developing technology to prevent the spread of Ebola.
State, Diplomatic, Consular Programs (D&CP)[a]	36.4	2.0	Until Sept. 30, 2016	Medical support and evacuation capacity, repatriation assistance, and other needs.
State, Repatriation Loans Program	ns	ns	ns	Repatriation loans to U.S. citizens as necessary related to Ebola outbreak. Funding not specified in P.L. 113-235. Explicit transfer authority is provided for up to $1 million from D&CP into this account.[b]
State, International Organizations and Programs (IO&P)	ns	ns	ns	Estimated U.S. contributions to UNMEER. Funding not specified in P.L. 113-235. Explicit transfer authority is provided for up to $35.3 million from IDA for this account.[b]
State, Contributions to International Organizations (CIO)	ns	ns	ns	Funding not specified in P.L. 113-235. Explicit transfer authority is provided for up to $35.3 million from IDA and $50 million from Global Health Programs for this account.[b]
State, Nonproliferation, Anti-terrorism, Demining, and Related Programs	5.3	0.0	Until Sept. 30, 2016	Biosafety and hazardous materials training in affected countries, efforts to mitigate illicit acquisition of Ebola virus and to promote biosecurity practices associated with outbreak response efforts.[b]

Agency, Account or Activity	P.L. 113-235	Unobligated Funds	Period of Availability	Purpose(s)
State/USAID Total	**2,526.3**	**1,286.8**	—	—

Sources: Departmental spend plans and/or quarterly reports for HHS, State/USAID, and Defense, as required by P.L. 113-235, and obtained by CRS; and additional departmental communications.

Note: Amounts may not add due to rounding; "ns" means not specified.

a. The State, Diplomatic, Consular Programs (D&CP) amount was provided to CRS by the Department of State and is not included in the quarterly spend plans.

b. P.L. 113-235, 128 Stat. 2694, Sec. 9001.

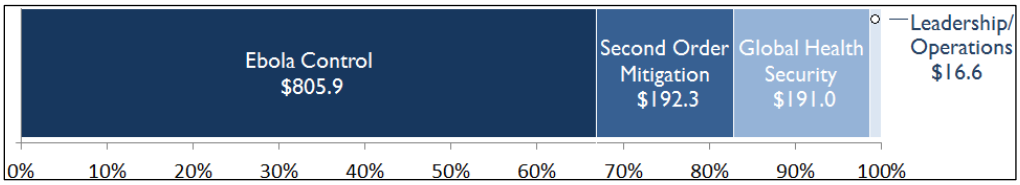
Table A-2. Ebola Interventions, by Pillar

Control the Outbreak	Mitigate Second-Order Impacts	Build Coherent Leadership and Operations	Strengthen Global Health Security
Support national and sub-national health and humanitarian responses	Address food security	Coordinate USG Ebola response	Strengthen disease surveillance capacity
Isolate and treat Ebola cases	Strengthen health systems and rebuild health workforce		Improve capacity to respond rapidly and effectively to Ebola in unaffected countries
Investigate transmission chains	Restore non-Ebola health services and rebuild sustainable capacity		Developing and testing national Ebola preparedness plans
Train health workers, distribute personal protective equipment (PPE), and improve infection prevention and control (IPC) in health facilities	Strengthen government institutions, civil society, and communities		
Communication and social mobilization	Attract innovation and investment in communication technology		
Logistics management			

Source: Created by CRS from interagency Inspector General Offices, *International Ebola Response and Preparedness*, October 2015, pp. 4-5.

Figure A-1. USAID and State Obligations, by Pillar

(as of March 1, 2016)



Source: Created by CRS from USAID, *Ebola Response and Preparedness Report*, Quarterly Report to Congress, May 11, 2016.

Examples of U.S. Support for the West Africa Ebola Outbreak

USAID and implementing HHS agencies have carried out to support restoration of basic health services and advance long-term EBOLA control. The examples below were summarized from the February 2016 report jointly published by the Inspectors General of USAID and HHS.

USAID. Across the three countries, USAID has supported the construction of temporary isolation units at health care facilities to integrate EBOLA care into existing health infrastructure, building and strengthening rapid response capacity, and institutionalizing infection prevention and control (IPC) protocols and EBOLA screening at government hospitals. In Sierra Leone, USAID supported the construction of 90 semipermanent isolation units to address EBOLA cases and treat other communicable diseases. Across the three countries, USAID funded efforts to strengthen the government supply chain system. In Liberia, for example, USAID provided technical assistance to quantify IPC commodities and improve warehouse management, while in Sierra Leone, USAID provided technical assistance to monitor and track supplies and essential medicines.

USAID also led interagency transition planning in each country to determine how U.S. government-supported activities would be transferred to host governments or other implementing partners. In Liberia, USAID provided technical assistance to reopen primary health care facilities that provide routine maternal and child health services, completed baseline facility assessments at 61 health facilities, provided essential medicines to community clinics, and supported immunization campaigns. The USAID Disaster Assistance Response Team (DART), which coordinated all U.S. Ebola responses in West Africa, disbanded on January 4, 2016.[58] Since then, country program offices in Guinea, Liberia, and Sierra Leone have led EBOLA responses in the respective countries.

CDC. In Liberia, CDC has supported the development of a national training curriculum that promotes health care worker safety and quality of health care services that reached more than 1,000 health care workers, and provided technical assistance to the Liberian Ministry of Health for the development of a new IPC quality management unit. In Sierra Leone, CDC funded training on the country's national IPC guidelines for 50 hospital and district workers in October 2015. CDC also led U.S. efforts to enhance EBOLA surveillance by facilitating the procurement and appropriate use of alternative EBOLA diagnostic tools and providing mobile laboratories.

In Sierra Leone, CDC sponsored the STRIVE trial to assess the safety and efficacy of the rVSV-ZEBOV candidate. The trial, conducted in December 2015 and jointly conducted by the College of Medicine and Allied Health Sciences (COMAHS), University of Sierra Leone, the Sierra Leone Ministry of Health and Sanitation (MoHS), and CDC enrolled and vaccinated more than 8,000 participants.[59] In Liberia, CDC supported health officials to conduct voluntary semen screening and counselling programs for male survivors to educate male survivors about transmission risks and provide them with the necessary tools to reduce the risk of transmission. According to WHO, 405 male survivors had their semen screened as of January 3, 2016.[60] CDC also supported semen testing programs in Sierra Leone, which reportedly enrolled more than 650 male EBOLA survivors as of December 14, 2015.[61] The program, entitled Project SHIELD, was led by Britain and implemented in partnership with the Government of Sierra Leone and also trained health care workers and peer networks to provide sexual risk reduction counseling.

Other HHS Agencies. Several U.S. agencies collaborated to support clinical trials that evaluated the safety and efficacy of several EBOLA vaccine and therapeutic candidates in the United States and West Africa. In Liberia, for example, CDC and NIH partnered with government officials in Guinea, Liberia, and Sierra Leone to conduct the PREVAIL I study, which enrolled 1,500 volunteers in the three countries to test the safety of and the immune system response to two Ebola vaccine candidates (cAd3-EBOZ vaccine, co-developed by NIH and GlaxoSmithKline, and the rVSV-ZEBOV, developed by scientists at the Public Health Agency of Canada and licensed to a subsidiary of Merck & Co., Inc.)[62] When new EBOLA cases emerged in Liberia in November 2015, the FDA facilitated export of and

[58] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities: Fiscal Year 2016, First Quarter*, December 31, 2015, p. 14.

[59] Ibid and CDC, "Sierra Leone Trial to Introduce a Vaccine Against Ebola (STRIVVE) Q&A," Press Release, December 16, 2015.

[60] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities: Fiscal Year 2016, First Quarter*, December 31, 2015, p. 18.

[61] Ibid.

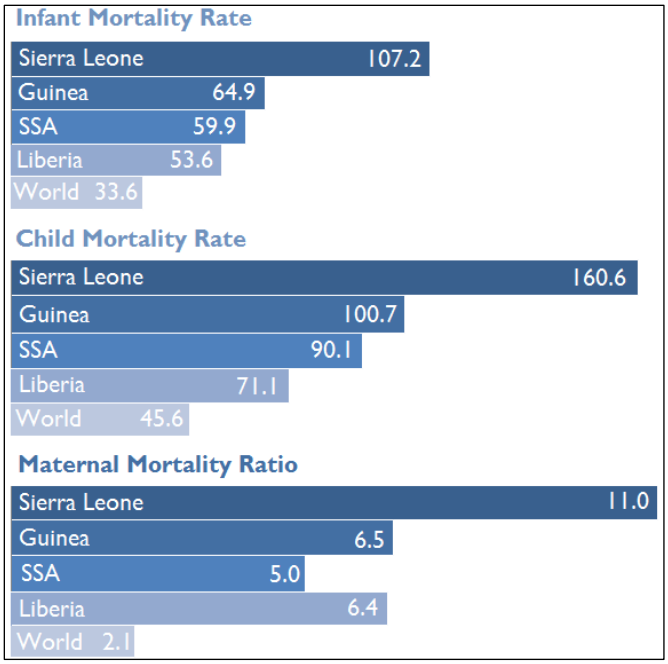
[62] NIH, "Ebola Vaccine Trial Opens in Liberia: Study Led by Liberia-NIH Partnership Will Test Two Experimental Vaccines," Press Release, February 2, 2015 and NIH, "Experimental Ebola Vaccines Well Tolerated, Immunogenic in Phase 2 Study," Press Release, February 23, 2016.

access to the rVSV-ZEBOV candidate to that country. In that vaccination campaign, the Government of Liberia and NIH vaccinated approximately 170 individuals.[63]

In June 2015, NIH, CDC, and the Government of Liberia launched the PREVAIL III study to help understand the long-term consequences of EBOLA, characterize associated health problems, determine whether "survivors develop immunity that will protect them from future Ebola infection, and assess whether [survivors] can transmit Ebola infection to close contacts and sexual partners."[64] As of January 4, 2016, more than 1,788 individuals had been enrolled in the study.

Figure A-2. Infant and Child Mortality Rate and Maternal Mortality Ratios

(deaths per 1,000 live births)



Source: Created by CRS from WHO, *World Health Statistics Report*, 2015.

Acronym: Sub-Saharan Africa (SSA).

[63] USAID and HHS Inspectors General, *U.S. Government International Ebola Response and Preparedness Activities: Fiscal Year 2016, First Quarter*, December 31, 2015, p. 13.

[64] Ibid, p. 18.

Author Contact Information

Tiaji Salaam-Blyther
Specialist in Global Health
tsalaam@crs.loc.gov, 7-7677

Susan B. Epstein
Specialist in Foreign Policy
sepstein@crs.loc.gov, 7-6678

Bolko J. Skorupski
Research Assistant
bskorupski@crs.loc.gov, 7-9450