



**Testimony before the
Committee on Foreign Affairs,
Subcommittee on Africa, Global Human
Rights, and International Organizations
United States House of Representatives**

**Eradicating Ebola: Building on Lessons Learned &
Medical Advancements**

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For Release upon Delivery

2pm, June 4, 2019

INTRODUCTION

Good morning Chairwoman Bass, Ranking Member Smith, and members of the Subcommittee. I am Dr. Robert R. Redfield, Director of the Centers for Disease Control and Prevention (CDC). Thank you for the opportunity to testify before you on the Ebola outbreak in the Democratic Republic of the Congo (DRC), and thank you for your continued commitment to CDC's work in global health security.

Through collaboration within the interagency and with international partners, CDC is uniquely situated to help end this outbreak and ensure the health and security of Americans. We have comprehensive Ebola response capabilities developed over 40 years at the forefront of Ebola virus research and further refined by direct engagement in more than 20 Ebola outbreak responses. In the wake of the worst Ebola outbreak in history, the 2014-2016 West Africa outbreak that claimed over 11,000 lives, CDC has made significant advancements in Ebola science, surveillance, and response. For example, we confirmed that live Ebola virus can persist in specific body fluids, such as in seminal fluids, for over a year following infection. We have also trained epidemiologists and laboratory scientists, and provided testing materials for African countries at greatest risk of an Ebola outbreak. In addition, in June 2015 we established CDC's Global Rapid Response Team, a cadre of over 500 highly-trained CDC responders ready to deploy on short notice anywhere in the world to respond to global health emergencies.

In response to the current outbreak in the eastern DRC, as of May 29, CDC expert disease detectives and other staff have completed 265 deployments to the DRC, neighboring countries, and the World Health Organization (WHO) headquarters in Geneva to coordinate activities and provide expertise in surveillance, laboratory testing, data analytics, vaccine implementation, emergency management, infection prevention and control, health communications, and border health. Our operational expertise allows us to quickly and efficiently identify the unique scientific and social variables of outbreaks and address them with proven interventions.

However, the unique challenges of this Ebola outbreak mean this fight is even more difficult than past responses. The complex humanitarian context in North Kivu and Ituri provinces has severely limited CDC's direct

participation at the outbreak's epicenter, which is located far from the capital city of Kinshasa in an area threatened by armed conflict, crime, and civil unrest, as well as heavy cross-border movement. Violence in the impacted communities has hampered Ebola disease surveillance, contact tracing, and vaccination efforts. The affected population has low levels of trust in the government and the international community. The DRC is also experiencing other serious infectious disease outbreaks, such as cholera and malaria, further stressing its health system. Additionally, disease control in the impacted area is challenging because of weak healthcare and public health infrastructure.

I have visited DRC twice since the Ebola outbreak began – once in August 2018, before the security situation escalated, and then again in March 2019. I was able to see first-hand the work being done. I heard directly from our international partners on the ground how valued and desired CDC's contribution is, with their greatest request being expanded CDC technical leadership and expertise in the field. My visits reinforced for me the essential role CDC is uniquely positioned to play in supporting the Congolese to change the trajectory of this outbreak. The current outbreak is the largest and longest single country Ebola outbreak to date, with case counts continuing to increase and key response indicators moving in the wrong direction.

STATUS OF THE EPIDEMIC

On August 1, 2018, the DRC Ministry of Health and Population reported an outbreak of Ebola virus disease in North Kivu Province. As of May 29, 1954 cases have been reported, with 1314 deaths (a 67 percent fatality rate). Due to challenges in detecting and reporting posed by the security situation, CDC suspects the true number of cases could be much larger. As of May 29, cases have been reported in 22 health zones of North Kivu and Ituri provinces. To date, no cases of Ebola have been confirmed in any other provinces in the DRC or in any of the neighboring countries.

Past outbreaks of Ebola in the DRC typically occurred in sparsely-populated, rural areas. The current outbreak—like the 2014-2016 outbreak in West Africa—includes densely-populated urban areas, increasing the likelihood of human-to-human spread. The outbreak initially affected the Mandima health zone and then spread to the

town of Beni (315 cases), which has a municipal population of 340,000 and a greater area population of about one million. More recently the outbreak has been heavily affecting the adjacent North Kivu health zones of Katwa (589 cases) and Butembo (220 cases), which together also encompass an urban area with a population of approximately one million.

The security situation in the area remains very unstable; insurgents murdered a WHO epidemiologist on April 19 and set fires at multiple Ebola Treatment Units. Additionally, in recent weeks, there have been clear indications that the outbreak may be on the verge of entering a more dangerous phase, with significantly more rapid spread within the impacted region and potentially beyond it. Numbers of new cases have been steadily increasing, and fewer of these new cases are promptly entering effective medical isolation before they can infect others.

Moreover, from May 7 to May 27, among the 326 new cases with contact information, 75 percent were either unknown contacts (not known as contacts of previous Ebola patients) or known contacts but not being followed by responders at the time of symptom onset.

STATUS OF RESPONSE EFFORTS

The Government of the Democratic Republic of Congo (DRC) is leading the response, with strong assistance from WHO. CDC is providing technical guidance to the DRC government, bordering countries, and partners, bringing to bear decades of experience, global health investments, and lessons learned in the West Africa Ebola response. For example, CDC has been instrumental in updating trainings on ring vaccination protocols, which strategically focus vaccination efforts on the contacts of cases and people who are in close contact with those contacts. All partners are working together toward one goal: to end this outbreak as soon as possible.

In August 2018, CDC and USAID briefly deployed Ebola experts to Beni for a few days, but they were pulled back due to security concerns. In the context of a December 2018 DRC presidential election, where several areas of the country experienced a deterioration in the overall security situation, the U.S. Department of State reduced the number of U.S. government personnel in Kinshasa by issuing a departure order on December 17, 2018.

When the departure order was lifted on Jan. 31, CDC staff returned to DRC to directly support the DRC

government, WHO, and the integrated U.S. Disaster Assistance Response Team (DART) led by USAID with the emergency outbreak response. As of June 3, 11 CDC staff are in DRC in the capital of Kinshasa as well as the North Kivu provincial capital of Goma, which has become the DRC government's base of operations to respond to the outbreak. Goma is about 300 kilometers from the main outbreak area in Butembo, and is considered to be more secure. In March, two CDC staff deployed to the town of Bunia in Ituri Province for two weeks to assist with the investigation of a newly confirmed Ebola case. CDC made local responders aware that there may be unrecognized chains of transmission in Bunia, and CDC advised local Bunia staff to better standardize and share information across vaccination and contact tracing teams. CDC works closely with Embassy Kinshasa to ensure the safety of deployed personnel, and defers to the State Department to assess the security situation and determine access to the outbreak areas. While not currently operating out of Beni, Butembo, and other outbreak areas, CDC remains prepared to return when it is safe to do so.

CDC also has deployed staff to augment our country offices in the neighboring countries of Uganda, Rwanda, and South Sudan, which are preparing for the possibility of imported cases arriving from the DRC. From August 6, 2018 through May 29, 2019, 182 CDC staff have participated in a combined 265 deployments in response to the Ebola outbreak: 78 deployments to DRC; 76 to Geneva; 48 to Uganda; 38 to Rwanda; and 25 to South Sudan.

Risk Communications and Health Education

Given a demonstrated lack of community trust, disinformation about Ebola and the response, and community prioritization of violence reduction and long-term humanitarian concerns, it is imperative that we improve cooperation and engagement with local communities. CDC social and behavioral scientists have deployed to DRC, WHO headquarters, and several countries bordering the DRC to guide risk communication and community engagement strategies. Experts from CDC, WHO, the International Federation of Red Cross and Red Crescent Societies, and UNICEF have set a strategic direction for risk communication activities and produced a framework that has been shared widely with response partners in DRC. In late March, these partners met in Goma to reflect on what was working well and what could be done differently. While efforts are ongoing to improve risk

communication and community engagement, many in the field are spending much of their time responding to resistance to or refusal of Ebola interventions, instead of working to proactively engage communities. CDC is working with the DRC Ministry of Health and other partners to improve fundamental aspects of risk communication. In May, partners met to review messages and develop plans for improving the quality of community engagement activities across all partners as well as to support MOH's plans to activate community-based committees in the response. In addition, we continue to work with Red Cross to share feedback from communities, with an emphasis on incorporating community concerns and priorities into the response.

Contact Tracing

Contact tracing is the effort to find everyone who comes in contact, either directly or through contaminated materials, with a sick Ebola patient. Contacts are watched daily for signs of illness and if ill, are isolated before they can infect others. One missed contact who develops disease can keep the outbreak going. When a case is not known to be a contact, they are usually only identified in a late stage of illness and have spread the infection to others already. On May 28, a total of 17,728 out of 19,737 (90 percent) known contacts of people with Ebola were being followed. However, as noted earlier, among the new cases with contact information from May 7 to May 27, 75 percent were either unknown contacts or known but not followed at the time of symptom onset. The high proportion of cases that are not known contacts or lost to follow-up indicates that the quality of contact tracing must improve if the outbreak is to be contained; contact tracing efforts have been hindered by the volatile security situation. CDC designed "train-the-trainers" courses for frontline response workers, focusing on contact tracing methods. CDC also created an Ebola "Exposure Window Calculator" smartphone app for case investigators.

Infection Prevention and Control in Healthcare Settings

Healthcare settings have played an important role in amplifying transmission in this and many prior outbreaks. Implementing proper infection control and prevention practices is critical to stopping the spread of the virus within the healthcare delivery system and to the community. Prompt identification and isolation of patients

arriving at healthcare facilities with possible Ebola virus infection is essential so they may be safely evaluated and, if necessary, transported to an Ebola Treatment Unit for further care. Infected people who are not initially recognized to have Ebola may receive care at multiple facilities before Ebola is suspected, exposing numerous patients and healthcare workers to the virus. Unfortunately, patients are often arriving at the specialized Ebola Treatment Units late in their illness, and other healthcare facilities in the area are not necessarily prepared to effectively or safely care for Ebola patients. As of May 29, 107 local healthcare workers have contracted Ebola in the DRC. Within DRC, CDC is collaborating with WHO and Ministry of Health to improve the use of checklists, supervision and standard procedures for infection prevention and control across health facilities.

In the bordering countries of Uganda and Rwanda, CDC is providing assistance to response partners to improve the capacity of healthcare facilities to rapidly identify and isolate suspected Ebola cases, train personnel, and improve infection prevention and control. At least 150 healthcare personnel have been trained by CDC in Uganda and Rwanda since October 2018. Using information from interviews conducted at border crossings, refugee transit centers, and district health offices, CDC identified clinics and hospitals in border districts of neighboring countries that would be most likely to receive an imported case of Ebola from the outbreak area. CDC assessed triage practices at these facilities, interviewed and informed staff about risks of imported Ebola, and prioritized facilities for additional training and support.

Border Health

The two DRC provinces affected by this outbreak, North Kivu and Ituri, both border Uganda. North Kivu also borders Rwanda, and Ituri province touches South Sudan. There is significant population movement across these country borders. The Mpondwe Border Crossing is the busiest official ground crossing on the border between Uganda and the DRC, with a peak of 19,000 travelers passing through each day. At the Rubavu District Point of Entry between Goma, DRC and Gisenyi/Rubavu City, Rwanda, 60,000 people cross daily. This high volume, which includes pedestrian, commercial car, and truck traffic, poses significant concerns for potential cross-border transmission of infectious diseases. The WHO assesses that there is a very high risk of regional spread.

Preparedness activities in bordering countries are ongoing and CDC is providing technical assistance on their border health security efforts. Building on long-term in-country CDC presence as well as collaborations from the earlier 2018 outbreak, CDC is working with the DRC Ministry of Health and Population and other partners to adapt and implement screening protocols at country-prioritized airports and ground crossings, and to map population movement into and out of the outbreak zone to determine where surveillance and other public health interventions should be enhanced. As of May 29, over 61 million travelers have been screened at 80 priority ports and crossing points in the DRC since the outbreak began.

Vaccine Implementation

CDC conducted a clinical vaccine trial in Sierra Leone during the West Africa Ebola outbreak, enrolling and vaccinating nearly 8,000 healthcare and frontline workers. This and several other studies have provided evidence that the rVSV-ZEBOV (Merck) investigational vaccine is safe and protects against infection with the Ebola virus. While more scientific research is needed before the vaccine can be licensed, the vaccine is being used in the current outbreak, predominantly in a ring vaccination strategy that targets contacts of Ebola patients for vaccination as well as secondary and more recently tertiary contacts. WHO and the DRC Ministry of Health co-lead the vaccination effort, with CDC contributing expert advice. While security concerns have prevented CDC from participating in field activities, we have embedded CDC staff in the DRC Vaccine Commissions in Kinshasa and Goma to analyze data and improve the quality of ring vaccination efforts.

CDC has also collaborated with WHO colleagues in Rwanda, South Sudan, and Uganda to implement preventative vaccination among health care workers in geographic areas near the DRC border, and has provided technical assistance to these countries as they consider the use of Ebola vaccine. In addition, we have applied our expertise to update Ebola vaccination protocols, operating procedures, and training and communications materials for use at national and local levels, and facilitated trainings for national staff. Our work across multiple countries has helped standardize procedures and facilitate the use of best practices. As of May 28, over 126,500 individuals had been vaccinated in DRC. On May 7, the WHO Strategic Advisory Group of Experts (SAGE) on

Immunization published interim recommendations to expand Ebola vaccination strategies and address security concerns. Their recommended vaccination strategies include ring vaccination, using “pop-up vaccination” sites at a distance from the residences of contacts, and targeted geographic vaccination, where all Ebola patient contacts in a given village or neighborhood are identified and invited to receive vaccine at a more secure location. These SAGE recommendations also include alternative dosing to help ensure vaccine continues to be available as well as new use of a second investigational vaccine for those at a lower, but still present, risk of Ebola.

Responders have begun to offer broader geographically targeted vaccination in some high-risk areas, which could notably increase the rate of vaccine use. With these continued and expanded vaccination efforts we continue to underscore that strengthening implementation of basic public health measures, especially effective engagement and comprehensive identification of contacts, will be essential in conjunction with any vaccination strategy.

OUTLOOK OF THE EPIDEMIC

Broadly speaking, Ebola transmission can be stopped and the outbreak terminated when at least 70 percent of cases are effectively isolated after becoming ill; that is, moved to an Ebola Treatment Unit before they have infected anyone else, or have their contacts and secondary contacts fully vaccinated. This needs to be sustained for at least two to three months to end the outbreak. However, both the outbreak and the security situation on the ground has been getting worse in recent months and continues to be highly variable, so it is difficult to predict with certainty what will happen. Without significant and continued improvements, the DRC could be facing an epidemic that rapidly increases from the current 1945 cases within this calendar year; at that point, the possibility of the outbreak spreading to neighboring countries will significantly increase. CDC is committed to leveraging its resources and global health security expertise to help end the outbreak and prevent that.

RISK TO THE UNITED STATES

CDC understands that an international outbreak of Ebola puts the United States at risk and we appreciate the trust placed in CDC to keep Americans safe from public health threats both at home and abroad. At this time, we believe the direct risk to the United States remains low based on the travel volume and patterns from the outbreak areas to the United States and the implementation of border screening measures at key airports and ports in the DRC and neighboring countries. CDC recently helped organize exit screening workshops in Kinshasa and Goma to bolster screening efforts and prevent spread of disease. On average, of the approximately 325,000 air travelers arriving in the United States daily, about 43 travelers are from the DRC, largely from unaffected regions. CDC continues to implement routine border health security measures at U.S. Ports of Entry and has issued a Level 2 (Practice Enhanced Precautions) travel notice for the DRC. CDC has been in regular contact with the non-governmental organizations operating in the outbreak areas, and we provide monitoring and pre-departure health assessment recommendations for healthcare workers. Travel notices are designed to inform travelers and clinicians about current health issues related to specific international destinations, and range from Level 1 (Practice Usual Precautions) to Level 3 (Avoid Nonessential Travel). In addition, the U.S. Department of State has identified the outbreak area as a “do not travel” zone because of armed conflict, crime, and civil unrest. Current CDC guidance for managing Ebola cases in U.S. healthcare settings has been reviewed and provided to healthcare facilities as part of domestic preparedness efforts. CDC’s Laboratory Response Network stands ready to perform testing on Ebola specimens should any need arise, with testing kits deployed across the United States.

BIG PICTURE: GLOBAL HEALTH SECURITY

The ongoing response to Ebola in DRC demonstrates CDC’s continued commitment to strengthen global health security. CDC has been engaged in global health security work for over seven decades and is able to leverage the essential public health assets developed by notable initiatives like the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the President’s Malaria Initiative, and global polio eradication to support core global health security programs and ensure the safety of Americans. With an understanding of the increasing threats posed by infectious diseases globally and in the context of the West Africa Ebola outbreak, CDC received \$582

million in supplemental funding for a five-year effort in support of the Global Health Security Agenda (GHS). GHS was launched by a growing partnership of nations, international organizations, and non-governmental stakeholders in 2014 with a stated vision of a world safe and secure from global health threats posed by infectious diseases. Since GHS's launch, CDC's global health security work has helped partner countries build and improve their public health system capacity. With CDC's support, partner countries were able to effectively contain meningitis in Liberia, Marburg virus in Uganda, multidrug-resistant tuberculosis in India, and vaccine-preventable diseases including measles and pertussis in Pakistan and diphtheria in Vietnam, among other threats across the globe. These outbreaks were stopped at their source, saving lives and reducing the amount of time it takes to effectively respond from months and weeks to days.

Support for global health security enables CDC to continue protecting Americans by detecting and preventing infectious disease threats before they reach our borders. We are seeing progress in the 17 priority countries where we have invested our global health security resources: all 17 have improved rapid response to disease threats through established or expanded public health workforce training of field-based epidemiologists, 13 have improved prevention of vaccine-preventable diseases through increased community immunization coverage, 15 have ensured effective public health emergency operation centers through training of emergency management officials, and 9 have increased their ability to identify country-prioritized pathogens through improved national laboratory testing capacity.

The DRC serves as an example of a country where CDC investments have built capacity since program operations began in 2002, including activities specifically to prepare for an Ebola outbreak. These efforts have also fostered strong relationships with the DRC and surrounding countries' ministries of health that have proved critical in times of crisis. The May 2018 outbreak of Ebola in the Equateur province of the DRC raised international concern due to logistical challenges caused by the large and remote area. That outbreak was ultimately limited to 53 cases and 29 deaths. The swift response, which included CDC and other U.S. government personnel in the field, ensured it was quickly controlled. Without a doubt, our global health security activities in the DRC enabled a faster, more effective and successful response to the May 2018 outbreak, and provide an important

foundation in the current Ebola response, even considering the complex security situation and special difficulties posed by this outbreak.

The DRC Field Epidemiology Training Program (FETP), developed with assistance from CDC and modeled after CDC's own training programs, has trained around 220 frontline and advanced disease detectives who are crucial to accurately detecting and identifying outbreaks. The DRC graduated its first cohort of FETP residents in 2015. These disease detectives are supporting the current Ebola outbreak and serve as an example of how CDC supports sustainable capacity development of countries to respond to outbreaks within their own borders. There are presently 49 FETP-trained staff deployed in at least seven outbreak health zones. Training programs like these work effectively because they are complemented by decades of field experience that CDC experts bring, teaching new epidemiologists how to rapidly identify diseases and respond effectively to prevent spread. CDC maintains long-standing collaborations in the DRC for priority diseases, including monkeypox virus response and prevention, building capacity and skills that have been beneficial for Ebola response. Sustainable investments, such as resources and expertise to train laboratory technicians, renovate and upgrade two laboratories, and establish a National Emergency Operations Center in the DRC, are all being leveraged in the current Ebola response.

Our global health security work is enhancing the world's ability to respond to other emerging health threats. More than 70 countries have an FETP program, resulting in more than 12,000 graduates around the world. In Liberia, improved laboratories, epidemiology training, surveillance, and surge capacity resulted in the identification of an April 2017 meningitis outbreak within one day of the first discovery of a case. By comparison, it took 90 days for the country to recognize the first Ebola case in 2014. The Uganda Virus Research Institute has emerged as a regional reference laboratory for viral hemorrhagic fevers thanks to collaboration with CDC and its subject matter experts. In addition, Uganda's Public Health Emergency Operations Center, established with CDC support in 2013, is a model for other global health security program countries. This center has been activated for over 75 outbreaks and public health events. Due to improved capacity, Uganda has detected 16 viral hemorrhagic fever outbreaks as of July 2018, and responded quickly to keep outbreaks small

and contained. They also detected a yellow fever outbreak in spring of 2016 in only four days, compared to over 40 days that it took to identify the yellow fever outbreak of 2010.

Another important component of CDC's global health work is the agency's ability to monitor threats globally and to provide rapid response through deployment of staff from across the agency. CDC's Global Emergency Alert and Response Service (GEARS) closely monitors 35 to 45 outbreaks a day through event-based surveillance and supports emergency deployments to respond to selected outbreaks. GEARS brings together the Global Disease Detection Operations Center (CDC's electronic surveillance analysis and response system for global threats) and the Global Rapid Response Team (GRRT). Since its inception, the GRRT has trained over 500 CDC personnel, who have provided nearly 22,000 person-days of response support.

As we saw during the West Africa Ebola epidemic, the current measles outbreak, and the Middle East Respiratory Syndrome (MERS) outbreak, infectious disease threats do not respect borders. An outbreak that starts in another country could hit our shores in a matter of hours; this is why CDC works globally to stop health threats before they enter the United States. CDC ensures our domestic preparedness by building global capacity in health security.

CONCLUSION

CDC's number one priority during any public health emergency is to save lives. CDC never loses sight of its primary mission to protect the health and safety of the American people, and we know that global health security is national security. CDC works overseas to ensure that health threats do not reach U.S. borders, most importantly by working to stop these threat outbreaks where they start. CDC works to protect the United States from direct health threats, protect U.S. interests in global economic security, and ensure that lessons learned overseas can be applied here to increase the strength of the U.S. public health system. While significant progress has been made, we know that we will continue to see the emergence of both known and unknown threats that will require the laboratory and surveillance infrastructure that CDC continues to support. The current Ebola outbreak remains a particular challenge for DRC and the global health community, and there are

no signs that the outbreak is slowing. However, CDC's global health programs have allowed us to build strong working relationships with the DRC and surrounding countries' ministries of health, and we will continue to work with USAID and our sister agencies in the Department of Health and Human Services, as well as WHO and other international partners, until this outbreak comes to an end.

The ability to rapidly detect and effectively respond to threats to the public's health is a top priority for CDC.

CDC works around the clock to not only ensure its readiness but the readiness of those on the front lines. CDC remains vigilant, because at any given moment, thousands of infectious diseases are circulating in the world.

We don't know exactly which outbreak or potential pandemic threat is coming next, but we know it is coming.

The work we do now ensures that, when the next major outbreak or pandemic threat does arrive, we are able to protect the health of Americans and save lives.