PREVENTING EBOLA IN UGANDA: CASE STUDY FROM THE MAKERERE UNIVERSITY SCHOOL OF PUBLIC HEALTH AND THE JOHNS HOPKINS CENTER FOR HEALTH SECURITY

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Introduction

The Kivu Ebola epidemic began on August 1, 2018, when four cases were confirmed in North Kivu Province in eastern Democratic Republic of the Congo (DRC). [1] To date, the epidemic has led to over 3,400 confirmed and suspected cases in the DRC and over 2,200 deaths. Because there is frequent movement from North Kivu across the border into Uganda, including a regular influx of refugees, the Ugandan government and its partners put themselves on high alert and mobilized resources to prevent the importation of cases, detect imported disease quickly, contain the spread of imported disease, and treat sick people appropriately.

In June 2019 the virus reached Uganda, but only four imported cases have been reported as of May 2020 and no in-country transmission has occurred. [2] Uganda has focused on preventing an outbreak and detecting cases. Prevention activities included assembling a multisectoral team and establishing robust coordinating mechanisms, running simulation exercises to assess the country's readiness, and implementing a prophylactic vaccination effort among frontline workers and contacts of suspected cases. Detection activities included health communications and messaging and cross-border surveillance in collaboration with officials from the DRC.

These accomplishments, despite foundational challenges facing Uganda's health system, prompted Makerere University School of Public Health and the Johns Hopkins Center for Health Security to conduct this study, based on an in-depth gray literature review and key informant interviews.

Map of the DRC and Uganda

DEMOCRATIC
REPUBLIC OF
THE CONGO

UGANDA

North Kivu

RWANDA

South Kivu

BURUNDI

TANZANIA

Data Source: Al Jazeera News

Context

Uganda is a rural, landlocked country bordered by the DRC, Kenya, South Sudan, Tanzania, and Rwanda. It is among the bottom 15 countries in the world in terms of GDP.[3] The estimated population is 42 million and the median age is 15—the lowest in the world.[4]

The current president, Yoweri Kaguta Museveni, came to power in 1986 after six years of guerilla war. He removed term limits for presidency and was elected to power in 2011 and again in 2016 in highly contentious elections.[4] The country is

ranked 151st out of 176 countries in terms of corruption,[5] and according to a 2012 US Department of State report, it is estimated to lose US$286 million per year to corruption.[6] In 2006, the NGO Amendment Act stifled activities of nongovernmental organizations in the country, severely limiting their output.

Conflict in northern Uganda between rebel and government forces is ongoing, and the country has an estimated 1.4 million internally displaced people. Neighboring DRC faces similar problems of insecurity, including ongoing ethnic conflict in the border provinces of North Kivu and Ituri, resulting in approximately 1 million internally displaced people—many of whom cross the border into Uganda. This instability near the border greatly increases the risk of disease transmission, including Ebola.

Uganda has a history of responding to Ebola outbreaks dating back to 2000. Lessons from past outbreaks have spurred the government to invest seriously in their epidemic preparedness.[7] Over time, Uganda's response to Ebola has improved considerably.

History of Ebola Outbreaks in Uganda

Year(s)	Species	Number of Cases	Number of Deaths	Case Fatality Rate
2000–2001	Sudan Ebolavirus	425	224	53%
2007–2008	Bundibugyo Ebolavirus	131	42	32%
2011	Sudan Ebolavirus	1	1	100%
2012	Sudan Ebolavirus	11	4	36%
2012-2013	Sudan Ebolavirus	6	3	50%
2019–Current	Zaire Ebolavirus	4	4	100%

Data source for table:
US Centers for Disease Control and Prevention (CDC). Years of Ebola virus disease outbreaks. https://www.cdc.gov/vhf/ebola/history/chronology.html. Last updated October 15, 2019. Accessed May 6, 2020.

Prevention

Coordination and Planning

When the first reports of an outbreak in the DRC were received in August 2018, Uganda's Ministry of Health activated the country's national task force, along with an emergency operations center and a national rapid response team, to lead preparedness and response efforts.[8] The national task force, co-chaired by the World Health Organization (WHO), includes representatives from ministries, agencies, and departments in many sectors, as well as representatives from various partner agencies. It is organized into six committees (based on WHO's pillars of preparedness):

» Epidemiological surveillance, including contact tracing, points of entry, and laboratory testing

» Case management, including psychosocial support, waste management, and safe burials

» Risk communication and community engagement

» Vaccination, therapeutics, and research

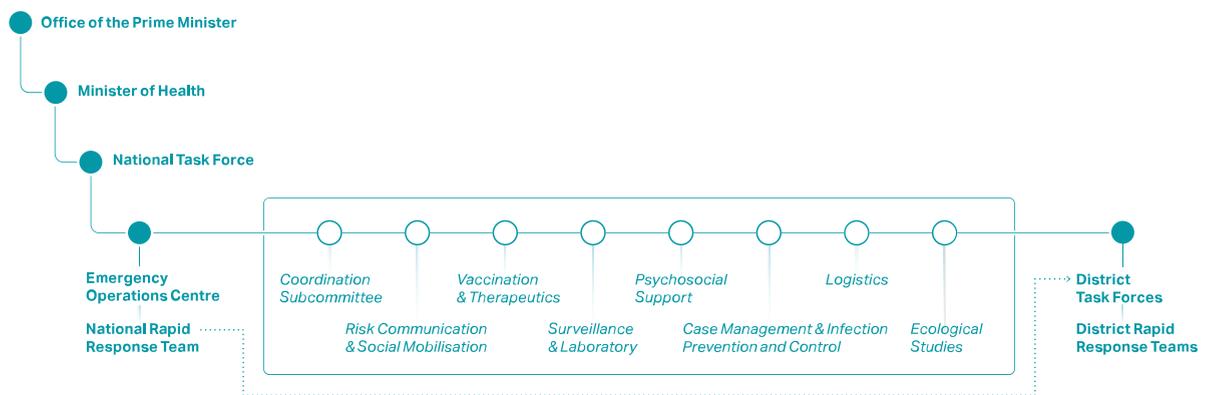» Emergency coordination including budgeting and resource mobilization

» Logistics

Shortly after it was convened, the national task force created a partner coordination matrix in an effort to ensure that the many external partners offering financial and technical assistance neither duplicated efforts nor left big gaps unfilled. These partners include the United Nations Children's Fund, United Nations High Commissioner for Refugees, Doctors Without Borders (Médecins Sans Frontières), US Centers for Disease Control and Prevention, and the Uganda Red Cross. Interviewees agree the matrix helped, but it did not eliminate the difficulties of coordinating so many partners. According to interviewees, certain priorities received too much attention from too many partners, and others received too little from too few.

The national task force also developed an incident management system, organized in the same six-part committee

structure, to coordinate day-to-day activities. The system identified 20 high-risk and 10 moderate-risk districts and established a district task force in each of them, also organized in the same six-part structure. The incident management system was responsible for facilitating communication between the district task forces and the national task force. As always, a decentralized structure has advantages and disadvantages. Being closer to the ground, the district task forces were more nimble and more familiar with the communities in which they were working. They were invited to collaborate with the national task force on operational details, and their knowledge about local issues such as common border crossings and reasons for community resistance to public health advisories helped bolster the response. However, although the district task forces had autonomy, the national task force was responsible for budgeting and other central decisions that affected the districts, which could lead to tension. Occasionally, responsibilities weren't communicated clearly between the two, resulting in delays in epidemiological investigations.

As soon as the at-risk districts were identified, the national rapid response team was sent to each one to conduct a readiness assessment based on WHO guidelines. None of the districts scored above 50 percent on that assessment. Based on the readiness gaps identified, the national task force worked with partners to develop and put into effect a National Ebola Contingency Plan that was continually updated based on formal assessments, simulation exercises, trainings, and feedback from workers at every level of the system. By the end of the year, all 30 at-risk districts averaged 92 percent readiness, a significant improvement in just four months.

Organizational Chart of Responsibilities

Office of the Prime Minister

Minister of Health

National Task Force

Emergency Operations Centre

National Rapid Response Team

Coordination Subcommittee

Risk Communication & Social Mobilisation

Vaccination & Therapeutics

Surveillance & Laboratory

Psychosocial Support

Case Management & Infection Prevention and Control

Logistics

Ecological Studies

District Task Forces

District Rapid Response Teams

Data Source: Aceng JR, Ario AR, Muruta AN, et al.

Preparedness Simulation and Ongoing Training

Given the vast improvement in districts' readiness scores by December 2018, the Ministry of Health suggested a full-scale simulation exercise to assess the preparedness and response plan. The exercise, designed to test the system at the community, district, and national levels, was conducted in April 2019.[8]

One scenario tested community surveillance and management of a suspected case in a non-Ebola Treatment Unit facility in Kasese District—and subsequently safe and dignified burial when the patient died. Another scenario tested the response systems at the Mpondwe border point, a designated port of entry in Kasese District, and referral to an Ebola treatment unit.

A third scenario tested the response systems at Entebbe International Airport.

In all scenarios, the case was detected in a timely manner, although reporting from the community to the national level was delayed. The Ministry of Health used the data from the simulation exercise to design trainings using a train-the-trainer model to disseminate information and skills as quickly as possible.

Prophylactic Vaccination

To keep critical health care workers healthy, the national task force sought permission to use an experimental vaccine—the rVSV-ZEBOV vaccine developed by Merck,[9] which had shown effectiveness against this particular strain in the DRC—under a compassionate use exemption before it received blanket approval by the relevant authorities.

Once permission to use the experimental vaccine was granted, the national task force secured 3,000 doses, established and trained vaccination teams, organized cold-chain logistics, identified the workers most at risk, and commenced voluntary vaccination. An additional 3,000 doses of the vaccine were later secured to scale up vaccination. As of June 2019, 4,699 health care workers have been vaccinated across 165 health facilities.[10] In addition, 78 people who had contact with an infected person from the DRC—and more than 700 contacts of those contacts—were vaccinated.[11]

This was the first Ebola outbreak during which vaccination was possible; understandably, there were delays in ethics and testing approval. In future outbreaks, the process should move faster as long as protocols are already in place, regulatory authorities are more comfortable green-lighting operational research during an outbreak, and responders and communities understand the need to introduce these medical countermeasures as soon as products are approved for use.

To this last point, an interviewee reported that some Ugandan communities were distrustful when they believed the vaccine to be sent from the DRC. The district task forces learned over time that when they explained the vaccine originated from Entebbe, people were more willing to accept it. They also gradually evolved their protocols about which health care workers should administer the vaccine as they discovered who local communities were more likely to trust. Uganda's ability to adapt quickly helped the country implement public health strategies the community was willing to support.

Detection

Community Mobilization and Messaging

Clear, transparent communication has been a pillar of Uganda's strategy. On the day the first imported case of Ebola from the DRC was identified, the national task force met to report on the activities and made a media announcement in the evening. Publicly available situational reports jointly published by the Ministry of Health and the WHO Uganda Country Office were provided weekly or sometimes daily.

Uganda prioritized making sure that key messages about symptoms, where to seek treatment, and how to safely bury the dead reached communities. Radio and television education spots were recorded, authorities made the rounds of the radio talk shows and posted on social media, educators attended community meetings and went door-to-door, and a toll-free telephone number was regularly updated with relevant information. Risk communication and educational awareness messages were translated carefully into local languages, and trusted community and religious leaders were trained to deliver them faithfully to help combat rumors and overcome community resistance. The district task forces also made an effort to streamline operations, because confusion could arise when different groups involved in different activities (for example, contract tracing or vaccination) went to the community on the same day. The goal was for the community to experience "one voice" from the response.

Cross-Border Collaboration and Surveillance

A key source of Uganda's success in avoiding in-country transmission was cross-border coordination with the DRC, which helped Uganda's point-of-entry screening process work well. At a bilateral ministerial meeting in Goma, DRC, in December 2018, the two countries signed a memorandum of understanding on cross-border collaboration for public health preparedness and response. The agreement established four surveillance zones between Uganda and the DRC, which helped ensure regular communication from the DRC about the possibility of suspected cases escaping isolation centers, enabling Uganda to prepare its points of entry and hospitals and to ensure local communities were on alert.[8]

Volunteers were trained on Ebola screening at points of entry and refugee reception centers. Teams screened everyone crossing into Uganda from the DRC, including all refugees at reception centers, sometimes with infrared thermometers. People with elevated body temperatures were then screened for Ebola-like symptoms. Uganda also improved its laboratory protocols and infrastructure for more rapid and more accurate diagnosis.

Interviewees acknowledged that point-of-entry screenings are labor- and resource-intensive, but they have remained a priority for almost two years. As of May 2020, more than 31,000 travelers have been screened at all 30 border crossings and bus terminals between the DRC and Uganda.[11]

COVID-19

The measures taken to prepare for and respond to Ebola have appear to pay off in recent months as COVID-19 began to spread. The Ebola screening measures at the border and airports were rapidly adapted to include COVID-19. In addition, communications campaigns in communities were updated to include information about COVID-19, and laboratory and health care workers were trained to handle samples and patients. Uganda made an early mistake by not immediately recognizing United Arab Emirates as a high-risk country, thereby allowing several imported cases. Otherwise, the response has been effective thus far. As of May 7 2020, Uganda has 101 confirmed cases, 47,620 tests, and more than 2,000 contacts have been traced and tested.[12]

Conclusion

Uganda's 20-year history with Ebola has prompted it to invest in epidemic preparedness and response strategies. This investment has paid off as the country has increasingly prevented or quickly contained outbreaks, despite governance challenges. To address the current Ebola epidemic in the DRC, Uganda has focused on case detection at points of entry, thus far making any sort of containment strategy within Uganda unnecessary. Uganda is using an Ebola vaccine prophylactically with some health workers as another piece of its prevention strategy.

A key part of the government's commitment is its collaborative work with a range of partners. Within the government, task forces are well organized at both the national and district levels. International donors help the country fund preparedness and response, and external partners, especially WHO, provide technical assistance. Finally, Uganda's relationship with the DRC has been a strength, though it has the potential to be fraught. The DRC communicates regularly with authorities in Uganda to warn them of the possibility of infected people trying to cross the border, helping the country target its screening efforts.

Uganda's experience proves that as long as the commitment, funding, and technical capacity are in place, well-thought-out preparedness and response strategies work. That said, as the Ebola epidemic in the DRC continues (it will have been two years in August 2020) and as COVID-19 further complicates matters, sustaining a response that requires constant vigilance will be challenging. Any lapse in detection will test the country's ability to contain the virus and treat the sick.

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