

# Community contribution to the control of Ebola outbreaks in Uganda, 2000-2022

Samuel Okware describes the role that communities have played in the control of Ebola outbreaks in Uganda from 2000 to 2022.

## Introduction

Ebola virus disease (EVD), commonly known as Ebola is a highly fatal emerging infectious disease common in man and non-human primates. Ebola is an acute infectious febrile illness caused by the Ebola virus and usually associated with bleeding manifestations. Five major types exist. The most deadly include the Zaire ebolavirus, the Sudan ebolavirus and the Bundibugyo ebolavirus. Milder species includes the Cote d'Ivoire ebolavirus with a single reported fatality and the Reston ebolavirus. The first recognised outbreak of Ebola occurred simultaneously in 1976 in Yumbuku in DR Congo near the Ebola river and the neighbouring Nzara community in South Sudan. <sup>(1)</sup> Ebola has no known cure. Case fatality is high at 80-90% for the Zaire ebolavirus and 53-70 % for the Sudan ebolavirus. The largest outbreaks occurred in 2015 in West Africa, affecting Guinea, Liberia, and Sierra Leone; with nearly 30000 cases and 11,000 deaths reported. <sup>(2)</sup> The Uganda outbreak of 2000 too was also severe recording 425 cases and 224 deaths. Some 31 cases and 23 deaths occurred among health care workers.

## Transmission

Index cases are initiated by indirect human exposure to fruit bats and intermediate hosts including, non-human primates. Human to human direct contact during social interactions at burials and nursing care of patients have the highest risk in rural settings. Exposure to body fluids especially blood, vomit, stool, urine and nasal secretions of either dead or sick patients is highly infectious. Bush meat of infected animals can also transmit the infection. No transmission has been reported before symptoms develop or until the detection of viral antigens. Asymptomatic infection seems unlikely. In the outbreak in West Africa some 2.6% of household contacts with no symptoms tested positive.<sup>(3)</sup> Sexual transmission is rare but has been reported. Ebola (EBOV) can persist in immunologically protected sites such as breast milk among survivors.<sup>(4)</sup> This has a potential to restart new cascades of Viral Persistence -Derived Transmission of EBOV (VPGTe).

Organs rich in lymphoid tissue such as the liver, spleen, thymus, and lymph nodes and macrophage are primary targets for the virus. Damage to the liver leads to reduction in the synthesis of clotting factors. This impairs the coagulation system. Damage to the adrenal gland reduces production of steroids, sodium loss and hypovolaemia and subsequent impairment of blood pressure homeostasis and maintenance. These disturbances lead to convulsions, shock, and diffuse coagulopathy in late stages.

## Ebola outbreaks in Uganda 2000-2022

The first outbreak of Ebola in Uganda occurred in 2000 in the district of Gulu, 400 km north of Kampala, the capital city of Uganda. This was the largest known epidemic in Uganda. Unknown index cases occurred in Rwot Obilo, a village 14 km towards the border with South Sudan. The community was not aware of the developing outbreak, until two nurses died in Lacor hospital on the 8th of October 2000 Lacor regional hospital. <sup>(5)</sup> This was followed shortly by the death of three more student nurses. On the 14th October the Sudan Ebola virus was confirmed among the blood samples. The casualties included 31 health care workers including a hospital

director. Security challenges existed in the region. About 2 million persons lived in camps for the internally displaced. Some 44,000 children travelled to towns and commuted freely back and forth to Gulu town for fear of abduction by Liberation Resistance Army (LRA) rebels which were operating in the region then. Two patients in Gulu escaped to Masindi and Mbarara districts, but were followed, isolated and contained. The outbreak lasted 6 months, mostly due to delays at community level.

**Table 1 Ebola cases by year and district, Uganda, 2000-2022**

Year	District	Cases detected	Deaths	CFR
2000	Gulu	393	203	51.7%
	Mbarara	5	4	80.0%
	Masindi	27	17	63.0%
<b>Total</b>		<b>425</b>	<b>224</b>	<b>52.7%</b>
2007	Bundibugyo	116c	39	34 %
2011	Luwero	1	1	100%
2012, Jun-Aug	Kibaale	24	17	70%
2012, Nov-Dec	Luwero	7	4	57%
2022, Sept	Mubende	35	25	71%*

In 2007, a new Ebola outbreak occurred in Bundibugyo district on the border with DR Congo. Unexplained community deaths were reported by the media of a strange disease affecting people in the district starting August 2007. Routine Investigations yielded no positive results and routine Ebola serological tests too were negative. A cluster of 20 deaths occurred on the 5th November. Health care workers were some of the casualties. Blood samples were sent to CDC Special Pathogens Branch unit, Georgia, USA for tertiary analysis. On the 27th November 2007, a new novel Ebola virus was isolated. The new virus was identified as the Bundibugyo ebolavirus. Community participation and involvement was mobilized that integrated non-governmental organizations, religious and faith-based entities and school children. An isolation ward were set up at Bundibugyo hospital and Kikyo health center. Case management started and was led by members with experience of the previous Gulu outbreak. Collaboration with WHO and the Medicin Sans France provided logistic support and additional expertise. Some 116 cases and 39 deaths (case fatality 34%) occurred. The outbreak lasted 6 months, but once the diagnosis was confirmed, community engagement and participation quickly brought down the outbreak within one month. This again demonstrates the role of support by the community

Again on the 6th May 2011 a 13 year old girl in Luwero district was admitted to Bombo hospital, 40 km north of Kampala. She had a 5 day history of fever, diarrhoea and vomiting. She developed vaginal bleeding the following day and was isolated. A blood sample taken confirmed the Ebola Sudan subtype. The girl died the following day. This was communicated instantly to the community using all media and door to door approach by word of mouth. This mobilisation created universal awareness and public education in all communities. The outbreak was instantly controlled with just one fatality, and without secondary cases. The community followed up 24 contacts. Most of Luwero is covered by tropical forests rich

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in wildlife, including primates of various kinds. The community reported bats inhabiting some classrooms and school dwellings. This quick detection and action ably prevented further transmission. Community action was spontaneous and leveraged containment efforts.

A fourth Ebola outbreak erupted on the 12th July 2012, in the district of Kibaale in Western Uganda. The index case was a 16-year-old female from Kikaara village 55 km west of Kagadi town. She was clearing up forest land with her husband when she got sick with fever. She was admitted to the nearest Hapuyo Health Centre III for investigation following complaints of high fever, diarrhoea and vomiting. Her condition deteriorated, then developed nasal bleeding before she died. Nine relatives died and included the mother, sister and a priest who participated at the burial rituals. One health care worker who had contact with the case also died. There was some delay in detection and report of unusual death in the community, but when mobilised, the community quickly supported contact tracing of nearly 500 contacts. This community involvement raised awareness and case search. After 6 weeks the epidemic was contained with 24 cases and 16 deaths confirmed.

In December 2012, the fifth Ebola outbreak resurfaced in Luwero district. The outbreak was confirmed within days and contained in 6 weeks; leaving 7 cases with 4 deaths. Again, from the previous experience the community fully participated in the containment.

On 20th September 2022 the Uganda Ministry of Health declared a new outbreak of Ebola in Mubende district. This was the first time in a decade that Uganda declares a case of Ebola Virus Disease (EVD). Suspicious sample from a 24-year-old patient from Mubende Hospital was confirmed to be Sudan ebolavirus. The Rapid National Response team confirmed several clusters of community deaths. Late detection and realisation by the community had enhanced the spread of the disease to other districts of Kyegegwa, Kasanda and

suspicion and the late diagnosis and confirmation.

#### The national response based on community engagement

The national response is implemented through an integrated health care delivery system through a decentralised strategy through districts and corresponding administrative units at lower levels at county, subcounty, parish and villages. The system is further supported by community-based organisations including faith-based organisations. Traditional healers too support health care delivery using their tools in remote rural areas. Surveillance system exists in each region and district. Reports are regularly sent to Ministry of Health by the district health officer on a monthly basis. The village health teams are the primary structures for holistic health promotion and care delivery at community level. The teams are vital in providing community-based surveillance of health events in their villages. These village structures promote integration of implementation and cohesion especially in outbreak management. All administrative, Political and Technical entities were fully integrated into the response.

#### Community engagement by level and function:

The Village Health Team is composed of nine members. The composition includes religious and cultural leaders, schools, and volunteers for community-based surveillance. Essential tools include a Village Health Register, Algorithms for case finding including community deaths, daily reports, Community Based Drug distribution and referrals. Regular weekly meetings are part of the functions at this critical level.

The Parish Council and Planning Committee coordinates and supervises the efforts of the village committees in outbreak management. Similar task forces exist at the subcounty, county and district. The Government immediately provided supplementary funding and mobilized all sectors to work with a national task force (NTF). Similar task forces were developed at district (DTF), county (CTF), sub county (STF), parish (PTF) and village levels (VHF). At each district level a Rapid Response Team (RRT) was set up. The team at each district was composed of a district surveillance focal person, district health educator and a district laboratory focal person.

#### Community based surveillance

A country wide community-based surveillance strategy was launched to maximise contact tracing and public education and the timely isolation of cases and contacts. It supported referral, and scientific burials of victims. Community based teams were facilitated to identify cases and contact tracing and referred them to the hospital using special designated ambulances operated by mobile teams. Cases were recorded in the village register, shared with the mobile contact tracing teams from the district. The district surveillance and consolidated daily reports for sharing with designated screening and isolation centers. This ably facilitated early detection and case tracking. These efforts are coordinated

at the district task force for surveillance and communication centre

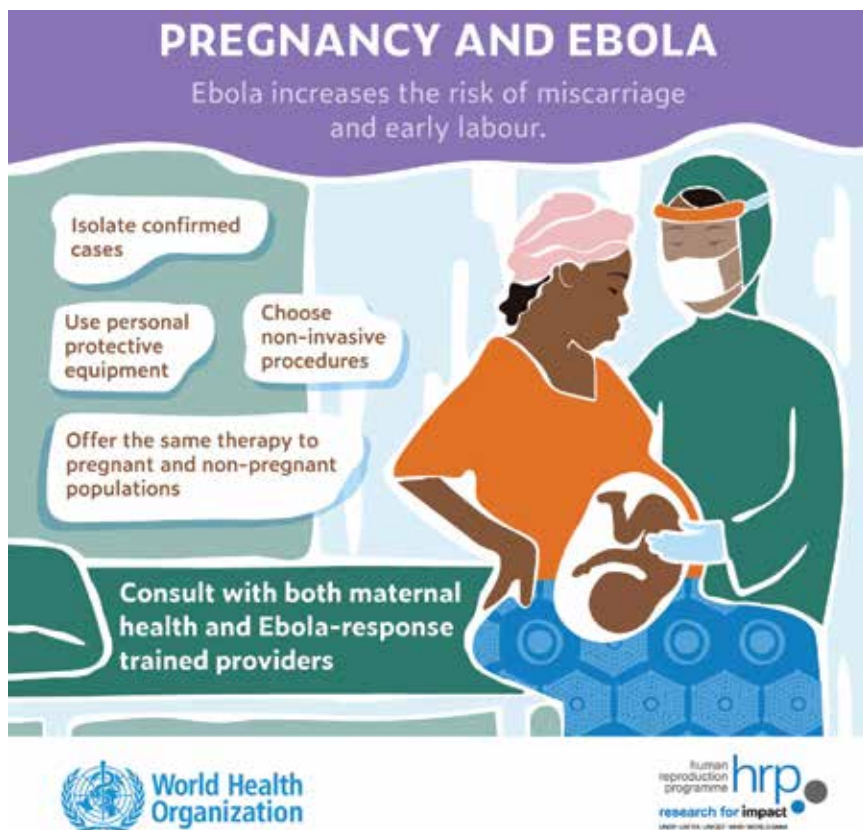
Each village had a village scout who led active case search, and public education. The scouts met daily and shared progress. A radio communication linked the village teams to a designated ambulance service and the mobile team. Cultural leaders too were mobilised.



Photo courtesy of WHO

Kagadi several miles away. So far, some 25 known deaths out of 35 confirmed cases have been recorded in nearly two weeks. The early involvement of the community was low due to minimal community





In addition, low positive predictive value of about 40% for the laboratory tests was a major weakness that delayed early diagnosis and action. The community here had the advantage of linking their suspected cases to the known epidemiological link in the community.

#### Community Promoting home-based care

Treating Ebola is a labour intensive and costly undertaking. In the Luwero epidemic, some USD 3 million was used to mount a national response. It cost an estimated USD 29 to treat a case in intensive care for one week. In addition, motivation and risk allowances are required. Personal protective materials if maintained improved confidence and commitment in the isolation wards. It was demonstrated that the workers if sufficiently compensated performed beyond expectations. This was not possible due to limited resources. Communities implemented home-based care for relatives for the subsequent care after admission, which model significantly reduced and shared costs and responsibility. The package for care consisted of supportive palliative remedies, fluids and personal protective supplies and public education materials. It was administered by the trained village health care workers from the community and improved quality of patients.

Photo courtesy of WHO

A cascade of training of trainers for health care workers was carried out in all districts. Non-Governmental Organizations including schools, journalists and faith-based organisations were trained and supported. They participated fully in educating the community by word of mouth. Village teams moved from house to house on foot. Radio messages, discussions, film shows and media coverage alerted the households.

Burial and safe disposal of the dead was coordinated by a district burial coordinator who liaised with the hospital coordinator and the village health teams. Trained burial teams with past experience were recruited, retrained and liaised with the village scouts to ensure safe and timely burials. On discharge, the patients were tested to ensure safety and went through a series of stringent protocols and check lists conducted by trained counsellors. Post Ebola clinics and clubs were set up for follow up of health and social outcomes. Incentives were paid to those for each Ebola case reported and revalidated. Such community mobilisation created universal awareness and case detection and tracking.

#### Community action in delayed detection and action

Delays in early detection prolonged the spread of infection and late action. For instance, analysis of the timelines from onset of the disease in the community to admission in health facility by district ranged from Gulu (6 weeks delay); Bundibugyo (6 months); Kibaale (6 weeks). Most (75%) of the delays were at community level. Once the diagnosis was made, it took between 5 and 17 days to contain the outbreaks in Luwero and Kibaale respectively and only 5 days in Luwero. The corresponding figure for the Gulu epidemic was longer (91 days). It also took 41 days to contain the Bundibugyo outbreak. Thus, late detection facilitated the extensive spread of the infection in both instances. Community engagement significantly reduced the delay periods.

#### Conclusion

The review has demonstrated that early detection and action contributed to the best outcomes in the control of the outbreaks. Early community-based surveillance contributed to early detection and was a key component of the national response. This was well demonstrated in the Luwero outbreak following robust community engagement. There were many challenges which only collaboration with the community could answer. This included the low reliability of the syndromic case definition and the low reliability of diagnostic tests available. Community based epidemiological surveillance facilitated contact tracing of most borderline cases for ultimate screening. Thus, community engagement is vital in outbreak management surveillance of emerging infections and should be strengthened by broadening village and community networks.

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