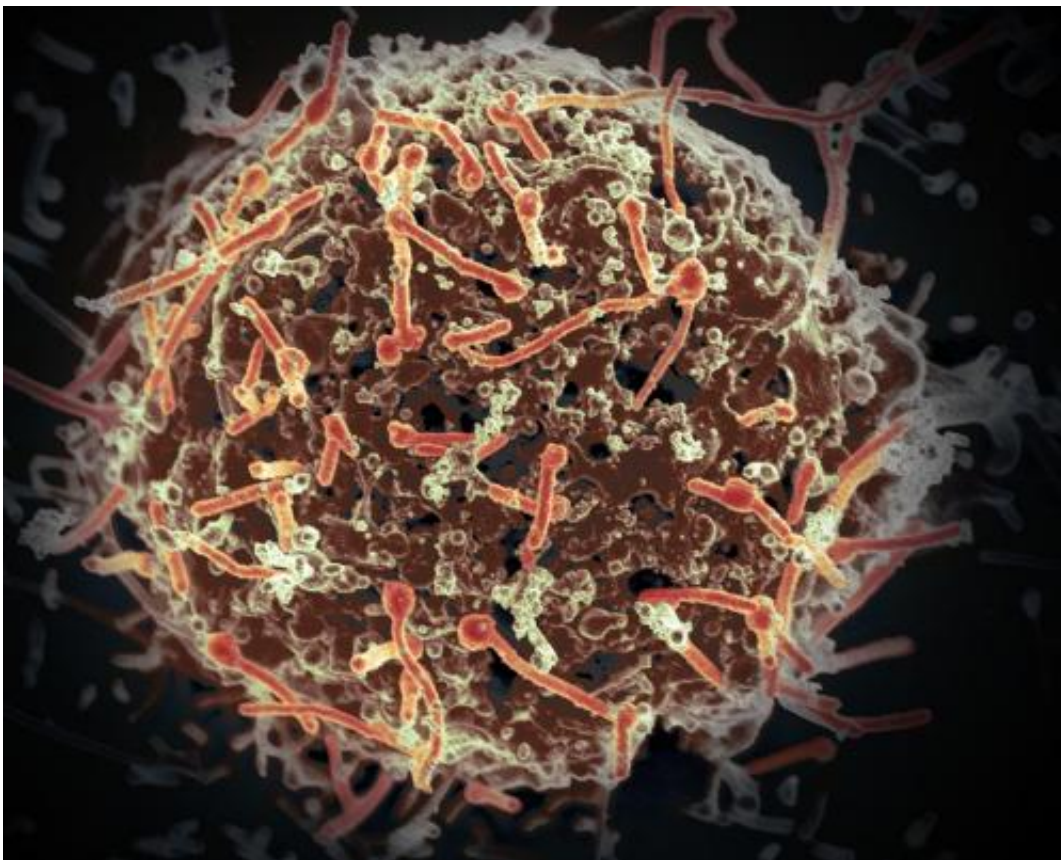


Postmortem on Ebola outbreak in Sierra Leone offers new insights into effective intervention strategies

March 29 2016, by Bob Yirka



The Ebola virus, isolated in November 2014 from patient blood samples obtained in Mali. The virus was isolated on Vero cells in a BSL-4 suite at Rocky Mountain Laboratories. Credit: NIAID

(Medical Xpress)—A team of researchers from China, the U.S. and Sierra Leone has performed a postmortem on the Ebola outbreak that occurred during 2014/15 infecting approximately 8,700 people in Sierra Leone and killing 3,590 of them. In their paper published in *Proceedings of the National Academy of Sciences*, the researchers describe the large amount of data they were able to obtain, how they used it, what was learned and how it showed that modern epidemic strategies can work even in the absence of a vaccine.

The Ebola outbreak started across the border in Guinea, the team noted, with the first case in Sierra Leone found in May of 2014 –it then spread, following roads, the data showed, to one of the country's [major cities](#), Freetown. From there it moved east to the central part of the country, infecting people along roadways and at [health clinics](#) as infected people moved there for help. But then, the government and international agencies mobilized and provided a means for curbing infections: mainly by teaching people to not touch infected people and those that had died of the disease. A program of safe burial was instigated and health workers were given infection proof suits to allow them to work without themselves becoming infected further spreading the disease. The result was immediately positive, the average number of people infected by a single infected person dropped 43 percent during the first month of implementation and 65 percent by the end of the following month.

The team notes that information gathering during the epidemic was extraordinarily high, offering data down to the household level. That showed that during the worst part of the epidemic, the transmission rate was approximately 9 percent, which they note is comparable to the flu—that finding was particularly alarming because Ebola is far less easily transmitted between people—to get it a person has to touch the body of someone infected, or their fluids, before or after they have died.

The data shows, the team reports, that the strategy of 100 percent

isolation can be achieved and works to stop an Ebola epidemic. Sadly, it also showed that the time lag between initial infections and the implementation of the strategy allowed for the needless deaths of thousands of people.

More information: Li-Qun Fang et al. Transmission dynamics of Ebola virus disease and intervention effectiveness in Sierra Leone, *Proceedings of the National Academy of Sciences* (2016). [DOI: 10.1073/pnas.1518587113](https://doi.org/10.1073/pnas.1518587113)

Abstract

Sierra Leone is the most severely affected country by an unprecedented outbreak of Ebola virus disease (EVD) in West Africa. Although successfully contained, the transmission dynamics of EVD and the impact of interventions in the country remain unclear. We established a database of confirmed and suspected EVD cases from May 2014 to September 2015 in Sierra Leone and mapped the spatiotemporal distribution of cases at the chiefdom level. A Poisson transmission model revealed that the transmissibility at the chiefdom level, estimated as the average number of secondary infections caused by a patient per week, was reduced by 43% [95% confidence interval (CI): 30%, 52%] after October 2014, when the strategic plan of the United Nations Mission for Emergency Ebola Response was initiated, and by 65% (95% CI: 57%, 71%) after the end of December 2014, when 100% case isolation and safe burials were essentially achieved, both compared with before October 2014. Population density, proximity to Ebola treatment centers, cropland coverage, and atmospheric temperature were associated with EVD transmission. The household secondary attack rate (SAR) was estimated to be 0.059 (95% CI: 0.050, 0.070) for the overall outbreak. The household SAR was reduced by 82%, from 0.093 to 0.017, after the nationwide campaign to achieve 100% case isolation and safe burials had been conducted. This study provides a complete overview of the transmission dynamics of the 2014–2015 EVD outbreak

in Sierra Leone at both chiefdom and household levels. The interventions implemented in Sierra Leone seem effective in containing the epidemic, particularly in interrupting household transmission.

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