

## Notes from The Field

### Ebola Virus Disease Cluster — Northern Sierra Leone, January 2016

Charles Alpren, MBChB<sup>1</sup>; Michelle Sloan, MA<sup>2</sup>; Karen A. Boegler, MSPH<sup>3</sup>; Daniel W. Martin, MSPH<sup>2</sup>; Elizabeth Ervin, MPH<sup>4</sup>; Faith Washburn, MPH<sup>2</sup>; Regan Rickert, MPH<sup>2</sup>; Tushar Singh, MD, PhD<sup>5</sup>; John T. Redd, MD<sup>2</sup>; Interagency Investigation Team

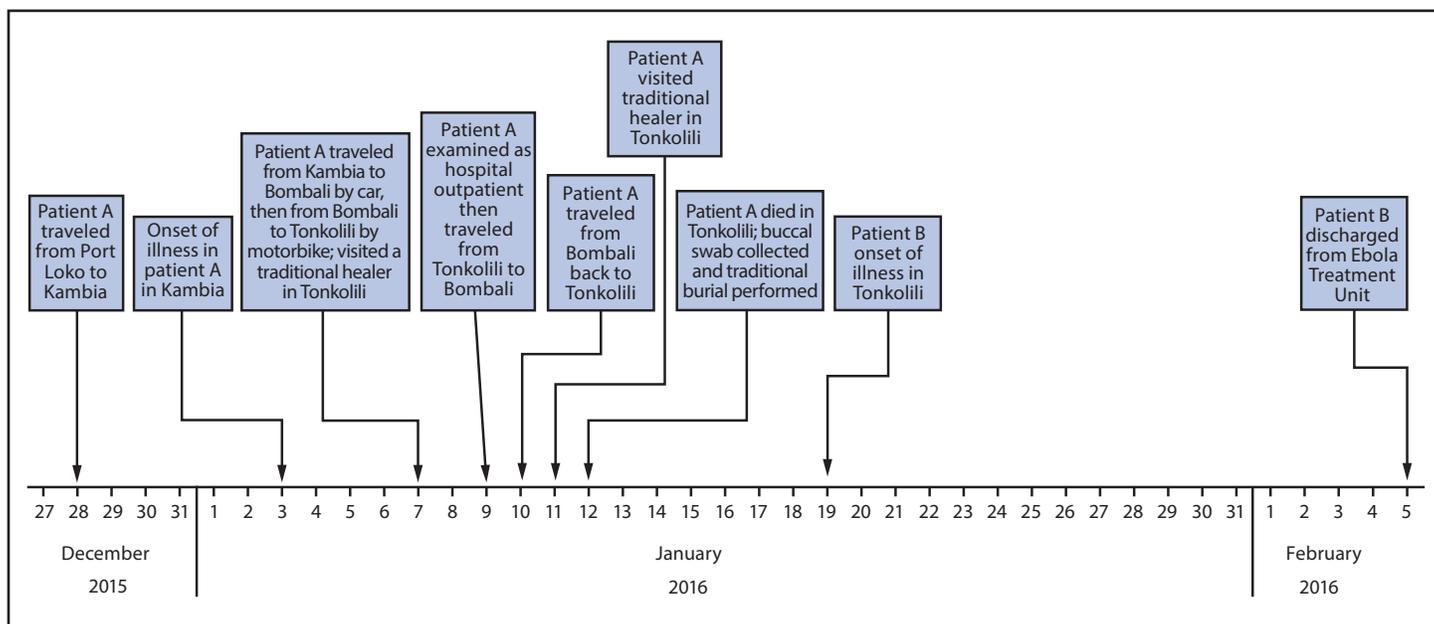
On January 14, 2016, the Sierra Leone Ministry of Health and Sanitation was notified that a buccal swab collected on January 12 from a deceased female aged 22 years (patient A) in Tonkolili District had tested positive for Ebola virus by reverse transcription–polymerase chain reaction (RT-PCR). The most recent case of Ebola virus disease (Ebola) in Sierra Leone had been reported 4 months earlier on September 13, 2015 (1), and the World Health Organization had declared the end of Ebola virus transmission in Sierra Leone on November 7, 2015 (2). The Government of Sierra Leone launched a response to prevent further transmission of Ebola virus by identifying contacts of the decedent and monitoring them for Ebola signs and symptoms, ensuring timely treatment for anyone with Ebola, and conducting an epidemiologic investigation to identify the source of infection.

Patient A lived in Port Loko District and traveled to Kambia District on December 28, 2015, where she stayed with family and became ill on January 3, 2016 (Figure). Her initial

complaints were severe weakness, constipation, and an episode of self-induced vomiting. On January 7 she left Kambia by car, stopping briefly in Bombali District to change to a motorbike before proceeding to Tonkolili, where she was cared for by relatives and saw a traditional healer. She was seen as an outpatient at a government hospital on January 9, but was not tested for Ebola virus. After this visit, she continued to Bombali to see another traditional healer and spent the night there, returning to Tonkolili on January 10. On January 11, she sought care from the traditional healer in Tonkolili a second time. She died in Tonkolili on January 12. As per national policy for all deaths at that time, a routine postmortem buccal swab was collected for Ebola virus RT-PCR by a person trained in swab collection. Her family and community members performed a traditional burial during which they washed the decedent's body and her clothes, prior to RT-PCR results being available.

Investigations identified 131 contacts across four districts, with the majority in Tonkolili (46 persons [35%]) and Kambia (45 [34%]). Where possible, contacts were monitored for 21 days after their last possible exposure to patient A; however, 12 contacts potentially at high risk and 36 persons of interest from Kambia were not located. Because some contacts were not located, Kambia implemented enhanced community surveillance for 2 months after the end of contact monitoring.

**FIGURE.** Timeline of events for patients A and B in the Tonkolili cluster of Ebola virus disease (Ebola) — Sierra Leone, December 2015–February 2016



Interviews with contacts of patient A failed to identify a source of infection. The viral genome obtained from her buccal swab (1601\_C12\_KT014149b, GenBank KX121193) indicated a high similarity (one and two nucleotide differences) to two viral genomes from Western Area, Sierra Leone, from November 2014 (KP759709, KP759704). The minimal genetic change in the viral genome during the interval from November 2014 until patient A's illness onset suggests viral persistence in a survivor as the source of infection (3), although no survivors were identified who could conclusively be linked to patient A.

On the night of January 19, a high-risk female contact of patient A who was in quarantine (patient B) complained of weakness, chest pain, nausea, and a single episode of self-induced vomiting. Patient B was isolated on the morning of January 20, and her blood tested positive for Ebola virus by RT-PCR that day. Patient B's viral genome (2001\_C11\_KTO14515b, GenBank KX121194) was identical to that of patient A. Patient B was transferred to an Ebola Treatment Unit in Freetown, Sierra Leone, where she was successfully treated; she was discharged on February 5.

After the declaration of the end of Ebola virus transmission in Sierra Leone, the nation's policy of performing buccal swabs for Ebola virus RNA on all decedents continued. Without this policy, patient A's infection would not have been detected.

The success of this response, the first led by the Sierra Leone Ministry of Health and Sanitation after transition from the National and District Ebola Response Centers on January 1, 2016, can be measured by the case's detection from a routine swab, genetic sequencing performed by locally trained scientists, and the limitation of transmission of Ebola virus from the index case to a single, identified high-risk contact.

<sup>1</sup>CDC-Sierra Leone Country Office; <sup>2</sup>Division of Global Health Protection, Center for Global Health, CDC; <sup>3</sup>Division of Vector-Borne Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; <sup>4</sup>Viral Special Pathogens Branch, Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, CDC; <sup>5</sup>Epidemic Intelligence Service, CDC.

Corresponding author: Daniel W. Martin, DMartin4@cdc.gov, 404-639-0476.

### Interagency Investigation Team

Andrew Bangalie, eHealth Africa; Micah Bass, MPH, CDC; Sarah D. Bennett, MD, CDC; Isaac Akuamoah Boateng, MD, World Health Organization; Deanna Campbell, MPH, CDC; Cynthia Cassell, PhD, CDC; Matt Cotton, PhD, Wellcome Trust Sanger Institute, United Kingdom; Nadezhda Duffy, MD, CDC; Ian Goodfellow, PhD, University of Cambridge, United Kingdom; Sara Hersey, MPH, CDC; Eddie L. Jackson, CDC; Umaru Jah, School of Public Health, University of Makeni, Sierra Leone; Augustine S. Jimissa, MBChB, Ministry of Health & Sanitation, Sierra Leone; Ansumana S. Kamara, MSc, CDC; Fatmata Kamara, MSc, CDC; Paul Kellam, PhD, Wellcome Trust Sanger Institute, United Kingdom; Rebecca Levine, PhD, CDC; Luke Meredith, PhD, University of Cambridge, United Kingdom; Leigh Ann Miller, PhD, CDC; Stephanie Moody-Geissler, MPH, CDC; Robert Musoke, MSc, World Health Organization; Dhamari Naidoo, MSc, World Health Organization; John Ndyahikayo, MBChB, World Health Organization; Gibril Njie, MPH, CDC; My Phan, DPhil, Wellcome Trust Sanger Institute, United Kingdom; Andrew Rambaut, DPhil, University of Edinburgh, United Kingdom; Foday Sesay, MBChB, Ministry of Health and Sanitation, Sierra Leone (all these individuals meet authorship criteria).

### Reference

1. World Health Organization. Ebola situation report. Geneva, Switzerland: World Health Organization; 2015. [http://apps.who.int/iris/bitstream/10665/184623/1/ebolasitrep\\_16Sept2015\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/184623/1/ebolasitrep_16Sept2015_eng.pdf?ua=1)
2. World Health Organization. Sierra Leone stops transmission of Ebola virus. Geneva, Switzerland: World Health Organization; 2015. <http://www.who.int/mediacentre/news/releases/2015/sierra-leone-stops-ebola/en/>
3. Blackley DJ, Wiley MR, Ladner JT, et al. Reduced evolutionary rate in reemerged Ebola virus transmission chains. *Sci Adv* 2016;2:e1600378. <http://dx.doi.org/10.1126/sciadv.1600378>