

Unlike COVID-19, Ebola outbreak in DRC disproportionately affected children

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Editor's note: For the latest news on coronavirus disease 2019, visit <https://www.aappublications.org/news/2020/01/28/coronavirus>.

While the world is gripped with the sudden arrival and pandemic spread of the novel coronavirus disease 19 (COVID-19), the Ebola virus disease (EVD) epidemic that began in 2018 appears to be coming under control in the Democratic Republic of the Congo (DRC).

The two epidemics have been very different in terms of their behavior, spread and impact. In contrast with the COVID-19 outbreak, which is spreading efficiently and asymptotically, the EVD is spread only through contact with ill people.

As of March 10, more than 116,335 COVID-19 confirmed cases and 3,892 associated deaths had occurred in 107 countries (overall 1%-4% case fatality rate). In contrast, there have been 3,444 cases of the EVD as of March 10, but with a staggering case fatality rate of 66%. The case fatality rate was 40% in the 2014-'16 West African EVD outbreak. In other words, there have been more than half as many deaths from the DRC EVD (2,264 cases) among the 3,444 cases reported as of March 10 as there have been among the 116,335 cases in the COVID-19 outbreak.

The EVD cases include 3,310 confirmed and 134 probable cases, which have been mostly limited to the North Kivu and Ituri provinces in the northeastern region of the DRC. Of these cases, 56% (1,931) have been female, 28% (975) children younger than 18 years and 5% (171) have been health care workers. The EVD epidemic appeared to peak between March and September 2019. There had been no new cases reported for over 51 days, giving hope that the epidemic could be declared over. However, a report emerged of a 26-year-old man who died of the disease on April 10, just three days before the official declaration would have been made (42 days since the last survivor was declared free of infection). At press time, the case was still being investigated.

Management and control strategies

The initial management was complicated by the ongoing armed conflict in the DRC, which made it more challenging for organizations such as the World Health Organization (WHO), *Medecins sans Frontieres* and UNICEF to be fully operational. Outbreak control, including surveillance, contact tracing and management, has been supported by 11 Ebola treatment centers (ETCs) and 25 transit centers.

Vaccination also has been a major component of control, with 300,330 people immunized with the rVSV-ZEBOV Ebola vaccine (Merck) between Aug. 8, 2018, and March 7, 2020, with an efficacy of 97.5%.

Another 20,339 people have received the Ad26.ZEBOV/MVA-BN-Filo vaccine (Janssen Pharmaceutical Companies) in the Karisimbi Health Zone since its introduction on Nov. 14, 2019.

Pregnant women (with 75%-95% case fatality in prior outbreaks) and lactating women have been allowed to receive the vaccines.

As with other outbreaks of EVD, early supportive care with rehydration, oxygenation and symptomatic treatment was critical. No antiviral drug is licensed by the Food and Drug Administration to treat EVD. However, of four investigational treatments that have been evaluated during the DRC outbreak, REGN-EB3 (Regeneron Pharmaceuticals) and mAb114 were associated with much higher survival (30% case fatality rate vs. of 66%).

Impact on children

It is noteworthy that this EVD outbreak disproportionately affected children (about 30% of all confirmed cases), and 40% of these children were under 5 years of age. The case fatality rate has been 70% for children younger than 1 year and 78% for those 1-4 years, similar to the observation during the 2014-'16 West African outbreak.

The higher fatality rate may be because children have been less likely than adults to be referred to an ETC and are more likely to have died in the community. The rationale for lower referral is not clear but is thought to include reduced competence of health care workers in recognizing EVD symptoms in children and reluctance by parents or guardians to have their children transferred to ETCs. When referral does occur, the case fatality rates in children and adults are similar.

Confounding the EVD problem was an outbreak of measles in the same region that led to more deaths (2,758 deaths from January to late August 2019) than all the deaths attributed to EVD to date. The role of the known immunosuppression of measles virus in enabling the higher case-fatality rate of EVD in children is unclear.

In addition, it is estimated that at least 2,100 children have been orphaned by this outbreak, and they will need special attention to ensure they can be supported to grow into fully contributing members of society.

Fortunately, there has been virtually no spread outside the DRC, with the exception of Uganda. While 2,300 alerts have been investigated in 39 countries, only four cases have been confirmed in Uganda, and these have been contained without secondary spread. Due to the control of cases and the small geographic area involved, the WHO is not advising against travel to the DRC.

What should pediatricians do?

The disparate mortality rates for children and adults highlight the importance of training more practitioners who are familiar with early diagnosis and care provision for children and recognition of their unique needs.

Our international pediatric colleagues should explore the reasons parents were reluctant to take their children to ETCs to see if such factors can be addressed to prevent deaths.

Pediatricians everywhere should continue to strongly advocate for early consideration of children for immunization and medical countermeasure trials. Finally, pediatricians should continue to be strong advocates for the integration and adoption of orphaned children into extended and other families.

Dr. Davies is a member of the AAP Council on Disaster Preparedness and Recovery Executive Committee and the Emerging Infections and Outbreaks Subcommittee of the Committee on Infectious Diseases.

