

Without swift influx of substantial aid, Ebola epidemic in Africa poised to explode

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A scanning electron micrograph of Ebola virus budding from a cell (African green monkey kidney epithelial cell line). Credit: NIAID

The Ebola virus disease epidemic already devastating swaths of West Africa will likely get far worse in the coming weeks and months unless international commitments are significantly and immediately increased, new research led by Yale researchers predicts.

The findings are published online first in *The Lancet Infectious Diseases*.

A team of seven scientists from Yale's Schools of Public Health and Medicine and the Ministry of Health and Social Welfare in Liberia developed a mathematical transmission model of the viral disease and applied it to Liberia's most populous county, Montserrado, an area already hard hit. The researchers determined that tens of thousands of new Ebola cases—and deaths—are likely by Dec. 15 if the epidemic continues on its present course.

"Our predictions highlight the rapidly closing window of opportunity for controlling the outbreak and averting a catastrophic toll of new Ebola cases and deaths in the coming months," said Alison Galvani, professor of epidemiology at the School of Public Health and the paper's senior author. "Although we might still be within the midst of what will ultimately be viewed as the early phase of the current outbreak, the possibility of averting calamitous repercussions from an initially delayed and insufficient response is quickly eroding."

The model developed by Galvani and colleagues projects as many as 170,996 total reported and unreported cases of the disease, representing 12% of the overall population of some 1.38 million people, and 90,122 deaths in Montserrado alone by Dec. 15. Of these, the authors estimate 42,669 cases and 27,175 deaths will have been reported by that time.

Much of this suffering—some 97,940 cases of the disease—could be averted if the international community steps up control measures immediately, starting Oct. 31, the model predicts. This would require additional Ebola treatment center beds, a fivefold increase in the speed with which cases are detected, and allocation of protective kits to households of patients awaiting treatment center admission. The study predicts that, at best, just over half as many cases (53,957) can be averted if the interventions are delayed to Nov. 15. Had all of these

measures been in place by Oct. 15, the model calculates that 137,432 cases in Montserrado could have been avoided.

There have been approximately 9,000 reported cases and 4,500 deaths from the disease in Liberia, Sierra Leone, and Guinea since the latest outbreak began with a case in a toddler in rural Guinea in December 2013. For the first time cases have been confirmed among health-care workers treating patients in the United States and parts of Europe.

"The current global health strategy is woefully inadequate to stop the current volatile Ebola epidemic," co-author Frederick Altice, M.D., professor of internal medicine and [public health](#) added. "At a minimum, capable logisticians are needed to construct a sufficient number of Ebola treatment units in order to avoid the unnecessary deaths of tens, if not hundreds, of thousands of people."

More information: *Lancet Infectious Diseases*,
[dx.doi.org/10.1016/S1473-3099\(14\)70995-8](https://doi.org/10.1016/S1473-3099(14)70995-8)

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