

Current projections greatly underestimate impact of Haitian cholera epidemic: study

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Current projections regarding the eventual size and extent of the cholera epidemic in Haiti may greatly underestimate the potential number of cases, according to a report that will appear in *The Lancet* and has been released online. A mathematical model based on current knowledge about the transmission and course of the diarrheal disease arrives at estimates of new cases through November 2011 that almost double those currently projected by the United Nations. The model also reflects the probable impact of public health measures designed to combat the epidemic.

"Our findings suggest that more resources are needed than may be currently planned," says lead author Jason Andrews, MD, of the Massachusetts General Hospital Division of [Infectious Diseases](#). "The number of cases is currently falling, but this is the natural history of an epidemic, and [cholera](#) may continue to exact a significant toll over the next year as it becomes established in Haiti."

Before the devastating earthquake of January 2010, cholera had not been reported in Haiti for more than 100 years; but the aftermath of the earthquake, which largely destroyed the country's already inadequate water and sewer systems, set the stage for the [cholera outbreak](#) that began in October. The initial U.N. projection of a probable 200,000 cases during the first year was soon raised to 400,000 cases. But those estimates were based on rough estimates of 2 to 4 percent of the population being infected.

According to Andrews and his co-author Sanjay Basu, MD, University of California San Francisco, the U.N. projections were not based on known patterns of infection and disease progression. Nor did they take into account the asymptomatic nature of some infections, the potential impact of vaccination or treatment, and the immunity that develops in those who recover from the disease. To arrive at more accurate estimates, they devised a [mathematical model](#) based on information from previous cholera outbreaks that incorporates current understanding of the disease and also includes data from the first months of the Haitian outbreak. Their model predicted that, without additional intervention, 779,000 new cases and more than 11,000 deaths would result from the epidemic from March through November 2011.

The model also simulated the effects of increased access to clean water, vaccination and antibiotic treatment. The advisability of the latter two measures has been controversial, with some experts questioning the feasibility and whether the impact would justify the costs involved. Improving access to clean water – based on reducing the consumption of contaminated water 1 percent each week – was projected to prevent 105,000 cases and 1,500 deaths; vaccinating 10 percent of the population would prevent 63,000 cases and 900 deaths, and offering antibiotic treatment to all severe cases and half the moderate cases was projected to prevent 9,000 additional cases and 1,300 deaths. The investigators estimate that instituting all three interventions could prevent a total of 170,000 cases and 3,400 deaths by the end of November.

"While each intervention alone may have a limited impact on the epidemic, our analysis suggests that a combination of approaches may avert a substantial burden of disease," says Andrews. "There are broader issues pertaining to poverty, sanitation, housing, crowding and rainfall that will undoubtedly impact the burden of cholera but which our model could not capture. But we hope that our findings might stimulate discussion about the anticipated trajectory of this epidemic and the

resources needed to respond to it."

He adds, "We're encouraged by the track records of many organizations working to support the local public health system. Some of the concerns about a vaccination campaign cite inadequate delivery mechanisms, but organizations like Partners in Health have shown great success in delivering multi-dose vaccines for other diseases after the earthquake. These organizations and the Haitian government will need even more support to address the cholera threat over the coming year." Andrews is a research fellow at Harvard Medical School and is also affiliated with the Center for Communicable Disease Dynamics at Harvard School of [Public Health](#).

Provided by Massachusetts General Hospital

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