

Researchers suggest cholera vaccination strategies for Zimbabwe

June 2 2011, by Claudia Adrien

Mathematical models analyzing how a cholera outbreak spread in Zimbabwe are providing new insights into the most effective vaccination strategies for preventing future cholera epidemics, according to University of Florida researchers.

The mathematical models employed to analyze a large [cholera outbreak](#) in Zimbabwe in 2008-2009 suggest that mass vaccinations deployed strategically could prevent future [cholera](#) epidemics in that country and others.

The researchers' findings, published online in late April in the [Proceedings of the National Academy of Sciences](#), provide a tool for aid agencies in Zimbabwe and in other nations prone to cholera to deliver treatments more cost-effectively.

"We wanted to know where the hot spots of the outbreaks were occurring, and we needed to factor how many people one sick person could potentially infect," said the paper's lead author, Zindoga Mukandavire, a postdoctoral associate from Zimbabwe with an appointment at UF's Emerging Pathogens Institute.

To find answers, the UF-led research team examined how cultural, political and economic factors influenced routes of cholera transmission. Cholera is a [waterborne disease](#) caused by a bacterium that affects the human intestinal track and an afflicted person may experience days of diarrhea and dehydration, which can lead to death.

The cholera bacterium is not native to the natural environment of Zimbabwe and researchers think it was imported from neighboring nations during the 1970s. During the 2008-2009 [cholera epidemic](#), nearly 100,000 people were sickened and 4,300 died. UF researchers estimate the majority of those cases were the result of human-to-human transmission.

Researchers looked closely at cultural and other practices that might contribute to the spread of the epidemic. In order to account for regional differences in such factors, the researchers tracked weekly cholera incidence rates for each of the country's 10 provinces.

One practice that stood out was funeral feasts, which are common in Zimbabwe and other African countries. At these feasts, people often eat in a communal fashion, and it is also customary to shake hands with the bereaved, who may have been infected as they cared for the deceased under unsanitary conditions. The bodies are often transported from towns and cities for burial in the rural areas.

"Cholera transmission through these types of direct contacts among people accounted for much of the observed illness," said Dr. J. Glenn Morris Jr., director of the UF Emerging Pathogens Institute and an author of the paper. "There were also striking differences in transmission patterns from province to province, reflecting differences in environment, socio-economic conditions, and cultural practices."

The country's economic meltdown during the study period likely contributed to cholera outbreaks. As the public health system and infrastructure collapsed, burst sewers and unprotected wells lead to contaminated drinking water. In addition, the economic crisis made life-saving oral rehydration medication financially unaffordable for many Zimbabweans afflicted by cholera.

The differences observed among provinces suggest that approaches to disease control should be tailored to specific regional characteristics. For example, different areas may require different rates of vaccination to control the disease, potentially resulting in cost savings in less severely affected regions.

Provided by University of Florida

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