

New studies show cholera emerging as a driver of progress in public health in Haiti

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The deadly cholera epidemic that rocked earthquake-shattered Haiti in 2010, claiming 8,000 lives and counting, has rallied the public health community to seek water and sewer improvements that, combined with vaccination, could prevent some 89,000 future cholera infections. These findings are among the many insights published this month in a special section of the *American Journal of Tropical Medicine and Hygiene - AJTMH and PAHO: Commemorating the 3rd Anniversary of the Cholera Outbreak in Haiti: Invited Papers* documenting the public health response to the largest national cholera outbreak in modern history.

"This dreadful disease has become a clarion call for action that could have far-reaching benefits for the people of Haiti beyond ending [cholera](#) transmission," said Jon Andrus, MD, deputy director of the Pan American Health Organization (PAHO), which collaborated with the American Society of Tropical Medicine and Hygiene (ASTMH) in producing the special section. "We've struggled to improve Haiti's overall public health for decades," he added. "Now we arrive at a critical juncture where from the depths of a terrible epidemic there is an opportunity for Haiti to rise up to a new level of protection against infectious diseases."

Andrus noted that it was a [cholera epidemic](#) in 19th century London that led to the discovery and prevention of water-borne diseases. (It was known as the fight against the Great Stink). The intense global focus on the disease also was instrumental in accelerating the first meeting of the World Health assembly in 1947 in response to a cholera outbreak in

Egypt. Now evidence is emerging that cholera could be similarly transformative for Haiti.

PAHO, along with the US Centers for Disease Control and Prevention (CDC) and UNICEF, recently joined forces with the governments of Haiti and the Dominican Republic to develop a national plan for cholera elimination. The \$2.2 billion program would target the bulk of investments to improvements in the water, sanitation and hygiene (WASH) conditions that are the main conveyance of cholera infections.

The Need To Scale Up WASH

One study in the *Journal* conducted by researchers at the CDC finds that even relatively modest improvements—such as providing more latrines and community water pipes and disinfecting water with chlorine—could over the next two decades prevent up to 78,567 cases of cholera. The study notes that by adding the oral [cholera vaccine](#) (OCV) to the picture—and achieving a 20 percent coverage rate within five years—the number of cases averted could rise to 88,974.

The researchers conclude that while immunizations can be a useful tool, particularly in the short term, ultimately the "WASH infrastructure provides a long-term, sustainable solution for prevention of cholera." They note that improved WASH services have the additional benefit of preventing transmission of other water-borne diarrheal diseases, such as rotavirus and *Escherichia coli*, that are a leading killer of children under five in Haiti.

"WASH coverage extends far beyond its effects on cholera alone," the study states.

For example, a separate study by scientists at the CDC and Haiti's National Public Health Laboratory analyzed patients treated for diarrheal

disease at four hospitals in Haiti between April 2012 and March 2013. It found that while cholera was the main source of illness, rotavirus remained a "significant cause" of diarrheal disease in children under five in Haiti.

An analysis in the Journal by researchers from the CDC and the Center for Strategic and International Studies (CSIS) observes that every dollar invested in WASH improvements generates anywhere from US \$5 to \$46 in economic benefits. But the authors caution that to realize this return, there will need to be better coordination of the complex array of programs and partners involved in water and sanitation work in Haiti.

A New Role for Vaccines in the Fight Against Cholera

The special cholera section of the Journal also includes evidence that cholera vaccine has a role to play in fighting the epidemic, despite the many challenges to achieving meaningful coverage in Haiti. A pilot project undertaken in rural Haiti in 2012 by the NGO Partners In Health and Haiti's Ministry of Health vaccinated 72 percent of the targeted population. And of those who received the first dose (of the two dose regimen), 90 percent also received the second dose.

A parallel project in an urban area conducted by the Haitian Group for the Study of Kaposi's Sarcoma and Opportunistic Infections (its French acronym is GHESKIO) was similarly successful: it reached 75 percent of its targeted population, and 90 percent returned for the second dose.

Louise Ivers, MD, senior health and policy adviser for Partners In Health and associate professor of global health and social medicine Harvard Medical School, who has worked in Haiti for over a decade, said there are several reasons the vaccine campaigns succeeded. Ivers said there were intensive efforts to engage the communities through meetings with community leaders, focus groups, radio shows and even trucks outfitted

with PA systems. She also said that in the rural project, prior to offering immunization there was a census undertaken to better understand the demographics of the targeted population. And during that effort, people were given bar-coded cards to present on immunization day.

That innovation kept lines for vaccines moving briskly, Ivers said, because census takers already had recorded typical registration information—such as name and address—and only had to scan a bar code on the card to retrieve it, which was done with standard tablet computers. Also, every day, information on who was vaccinated was uploaded to a central computer and compared to the census to reveal who in the community had not yet been vaccinated.

Another reason for the high coverage, Ivers said, was the simple fact that cholera was devastating communities everywhere and people were very receptive to a vaccine that could protect them.

"We interviewed people in focus groups before the vaccination campaign and they had very emotional stories to tell about their experience with cholera. So it was not a far off, distant issue but a real and immediate threat," she said. "Vaccines should not be viewed as a silver bullet that can subdue cholera in Haiti but wider use of them, such as in campaigns targeting particularly vulnerable populations, can play a meaningful role in protecting people from illness and death."

An analysis of vaccination policy by officials from PAHO and the Sabin Vaccine Institute agrees that cholera vaccination can be one component of an elimination plan. They see vaccines as particularly helpful in the "short- and medium-terms until significant and sustained advances in infrastructure for sanitation and delivery of potable water are achieved."

They note that supply concerns are being addressed by a global effort to stockpile 2 million doses of cholera vaccine.

Edward Ryan, MD, director of the Tropical & Geographical Medicine Center at Massachusetts General and past president of ASTMH said that these articles speak to the Society's longstanding commitment in its work toward achieving clean water and adequate sanitation worldwide. This partnership with ASTMH PAHO, the CDC, and UNICEF is a key effort to accomplish the collective goal.

"The biggest national [cholera outbreak](#) in modern times is still not under control and it's happening right on America's doorstep," Ryan said. "So it is gratifying to see our global [health](#) community with our Haitian colleagues rallying to the cause and providing the many insights we need to not just eliminate cholera but to conquer a wide range of water-borne diseases."

More information: www.ajtmh.org/content/89/4.toc

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