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Haiti Cholera Outbreaks: Experts Urge US to Create Emergency Cholera Vaccine Stockpile for Humanitarian Use

In the wake of devastating cholera outbreaks in refugee camps in earthquake-wracked Haiti, a group of leading experts, from Harvard Medical School, George Washington University, and the International Vaccine Institute (IVI) has urged the United States to create an emergency stockpile of cholera vaccines for future humanitarian use.

"The costs to the U.S. of creating and maintaining a stockpile of several million doses of cholera vaccine would be low," said the experts in an article published online first on November 24 in the New England Journal of Medicine (NEJM). "But the humanitarian benefits of rapid deployment of cholera vaccines to areas at high risk for major cholera outbreaks -- such as earthquake-wracked Port-au-Prince, the Haitian capital where 1.3 million people live in unsanitary refugee camps -- could be enormous."

Prof. Matthew K. Waldor of Harvard Medical School; Prof. Peter J. Hotez of the Department of Microbiology, Immunology and Tropical Medicine, George Washington University in the U.S; and Dr. John D. Clemens, Director General of the IVI in Korea jointly made this suggestion in their NEJM Perspective article entitled "A National Cholera Vaccine Stockpile -- a New Humanitarian and Diplomatic Resource."

In addition to the obvious health and humanitarian benefits that a national stockpile of cholera vaccine could yield, deployment of such a vaccine to regions of the world that are at high risk for a cholera epidemic offers numerous other benefits, the experts stated. "Outbreaks of cholera and other diarrheal diseases impede recovery from natural and man-made disasters," said Prof. Hotez. "They also destabilize poor communities, promoting poverty by interfering with agricultural productivity and adversely affecting food security, and thereby potentially igniting new conflicts or exacerbating existing ones. If the vaccine were available now, it could still be delivered to as-yet-unaffected parts of Haiti in time to stabilize the country."

Cholera is a severe and often rapidly fatal diarrheal disease caused by the bacterium Vibrio cholerae. It can be fatal because the pathogen elicits secretion of large quantities of bacteria-laden fluid from the intestine, resulting in extreme dehydration. It is transmitted through the fecal-oral route and if the drinking water or food supply becomes contaminated with V. cholerae, the disease can spread through a population very rapidly.

It is estimated that the annual global burden of cholera is 3 million to 5 million cases and 100,000 to 130,000 deaths. There is no evidence of a global decline despite major efforts to ensure the provision of clean water and adequate sanitation. Cholera is endemic in many parts of South Asia, and can cause epidemics both in areas where it is endemic and in those where it is not, often as a result of man-made or natural disasters. Last year there were reportedly 4,000 deaths during a protracted epidemic in Zimbabwe, and more than 1,400 people have died in refugee camps in the ongoing outbreaks in Haiti. A recent analysis of the global burden of cholera conducted by the IVI, an international organization dedicated to new vaccines for the world's poor, estimates that approximately 1.5 billion people are at

risk for cholera globally.

Treatment of cholera involves replacement of lost fluid with oral or intravenous rehydration solution and antibiotics, which can be lifesaving and can, shorten duration of illness. However, these interventions can be difficult to administer, when there are inadequate medical facilities, as is often the case in complex humanitarian emergencies. In addition, rapid progression of the disease means that there is only a narrow therapeutic window, making effective treatment a challenge.

Fortunately, three oral cholera vaccines are available. Dukoral® produced by Crucell of Sweden consists of killed V. cholerae cells and recombinant cholera toxin B. Since 1991, Dukoral® has been licensed in more than 60 countries, and is prequalified by the WHO for purchase by United Nations agencies. It has been used in crisis situations in Indonesia, Sudan, and Uganda, as well as in densely populated urban slums in Mozambique. The two other vaccines -- Shanchol® produced by Shantha Biotechnics of India, and mORC-VAX® made by VaBiotech in Vietnam -- consist of killed V. cholerae cells without the added toxin. Both vaccines were licensed in 2009, and Shanchol is currently awaiting prequalification by the WHO. All three vaccines are administered in a two-dose regimen.

Notably, the licensing in India of Shanchol, which was originally developed by the IVI, has added considerably to the momentum for the use of oral cholera vaccines to control endemic and epidemic cholera due to the numerous advantages, it confers. Unlike Dukoral, it does not require administration with a buffer, thereby greatly simplifying its use under field conditions, including refugee camps and other post-crisis situations. In addition, it is a low-cost vaccine, increasing its access to governments and international agencies. Finally, a large efficacy trial in India has shown that the vaccine is more effective and lasts longer in young children (1-5 years old) than Dukoral'. Of critical importance, the WHO's Strategic Advisory Group of Experts (SAGE) issued new updated recommendations for the use of new-generation cholera vaccines in its position paper in March 2010.

Alarmingly, however, fewer than 500,000 total doses of oral cholera vaccines (Dukoral or Shanchol) are presently available for shipment from their manufacturers, making it impossible to consider large-scale vaccination of at-risk populations. "The global shortage of cholera vaccine reinforces the urgency of creating a stockpile," said Dr. Clemens, an international expert in vaccine evaluation for developing countries.

Even though there is no imminent threat of cholera in the U.S., "We believe that our country should stockpile cholera vaccines for rapid deployment to parts of the world that suddenly find themselves at high risk for this disease," Prof. Waldor said. "Until recently, Latin America and the Caribbean region were considered to have a negligible risk of a cholera epidemic. Recent events in Haiti, however, force us to reconsider this belief. Other areas of the world where populations are at great risk include sub-Saharan Africa and South and Southeast Asia."

Moreover, by providing cholera vaccines to countries such as Pakistan with which the U.S. has a troubled relationship, the U.S. could also do its part to promote international stability and peace through vaccine diplomacy, the experts said.

Editor's Note: This article is not intended to provide medical advice, diagnosis or treatment.