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New Study on Cholera in Haiti Demonstrates for First Time Tweets, Blogs and News Feeds Can Track a Disease Epidemic in Disaster Setting More Rapidly than Traditional Methods

New research in special section in The American Journal of Tropical Medicine and Hygiene on disease in post-earthquake Haiti includes likely identity of first cholera case and Paul Farmer and Louise Ivers' expert perspective on why in midst of massive aid effort cholera "exploded like a bomb"

Deerfield, Il (9 January 2012) -- Internet-based news and Twitter feeds were faster than traditional sources at detecting the onset and progression of the cholera epidemic in post-earthquake Haiti that has already killed more than 6500 people and sickened almost half a million, according to a new study published in the January issue of the *American Journal of Tropical Medicine and Hygiene*.

The study is the first to demonstrate the use of data from "informal" media sources in monitoring an outbreak of a neglected tropical disease in a resource-limited setting, and shows that these sources can yield reliable decision-making data during deadly disease outbreaks almost in real-time, often far earlier than traditional surveillance methods that include surveys of hospitals and health clinics. The research was conducted by scientists at Children's Hospital Boston and Harvard Medical School.

"When we analyzed news and Twitter feeds from the early days of the epidemic in 2010, we found they could be mined for valuable information on the cholera outbreak that was available up to two weeks ahead of surveillance reports issued by the government health ministry," said Rumi Chunara, PhD, of the Informatics Program at Children's Hospital Boston, Research Fellow at Harvard Medical School, and the lead author of the study. "The techniques we employed eventually could be used around the world as an affordable and efficient way to quickly detect the onset of an epidemic and then intervene with such things as vaccines and antibiotics."

The lessons learned from Haiti's ongoing battle against cholera—the globally largest cholera epidemic in recent history—are included in a special section of *AJTMH* that looks back at Haiti two years after the earthquake to find infectious diseases looming large.

Faster Response to Disease Outbreaks: Is There an App for That?

Experts believe one way to improve the response to disease outbreaks in poor countries is through affordable and accessible surveillance that can provide early warning that a crisis is imminent. When Chunara and her colleagues looked to Web-based information sources for insights into Haiti's cholera epidemic, they were motivated by the fact that, even in favorable conditions, results from conventional disease surveillance efforts often are not available for weeks.

Their work began with an Internet tool called HealthMap (<http://www.healthmap.org>), which was launched in 2006 by Children's Hospital Boston to provide "real-time surveillance of emerging public health threats." Chunara and her colleagues used HealthMap to automatically capture any coverage or mentions of cholera from a variety of information sources—including news media, blogs, and discussion groups—that occurred in the first 100 days of the outbreak, from October 20, 2010 to January 28, 2011. The search included information sources from eight languages. In addition, the investigators probed Twitter posts from the same time period for any mentions of cholera.

Overall, the researchers amassed 4697 distinct reports via HealthMap and 188,819 Tweets. They found that in general, they could make an assessment of disease activity using these "informal" sources, including a calculation of the outbreak "reproductive number" which indicates how an outbreak is progressing. At times, the estimate from "informal" sources very closely matched estimates made using case reports released by official sources, but the advantage, they said, is that the data derived from the informal sources is available almost instantly.

"There is a lot of interest in the global public health community about how to harness the most valuable information flowing through the Web to turbo-charge the more traditional surveillance activities, particularly in low resource settings," said James Kazura, MD, director of the Center for Global Health and Diseases at Case Western Reserve University and the new president of ASTMH. "It's another example of how the effort to improve our response to the people of Haiti is generating insights that will be helpful to people around the world. Benefitting from scientific innovation knows no time zones or geographic borders."

Commentary from Paul Farmer and Louise Ivers

But in a commentary in the *Journal* by Paul Farmer, MD, PhD, and Louise Ivers, MD, MPH, of the Boston-based aid group Partners In Health, it is Haiti's cholera outbreak that provides the most poignant example of the challenges facing not just Haiti but the entire world to close the shocking gap between "haves" and "have-nots" of health. In the commentary, they wonder, "If we know so much about cholera... how did it become the leading infectious killer of young adults in Haiti in the middle of the international response to the January 2010 earthquake—the largest humanitarian effort in history? The short answer is that expectations are lowered for diseases that disproportionately afflict poor people."

Farmer is a founding director of Partners In Health, and Chair of the Department of Global Health and Social Medicine at Harvard Medical School. Ivers is the Senior Health and Policy Advisor for Partners In Health and an assistant professor of medicine at Harvard who has lived and worked in Haiti for the last 10 years. The American Society of Tropical Medicine and Hygiene (ASTMH), publisher of the *Journal*, recently recognized her service in Haiti with its Bailey K. Ashford Medal, one of the group's highest honors.

In Haiti's "First" Cholera Case, Glimpses of the Globalization of Disease

In another cholera-related study, Ivers and David Walton, MD, MPH, also of Partners In Health, uncover what they believe is likely the first case of Haiti's cholera epidemic.

They trace it to a 28-year-old man with severe mental health disorders who lived in a rural village in central Haiti downstream from the suspected source of the outbreak--a peacekeeper encampment. He died in mid-October 2010 from what in retrospect appears to have been cholera, a likelihood supported by the fact that shortly after his death his village, Mirebalais, recorded the first cholera hospitalizations of the outbreak. Ivers and Walton found the lack of treatment for the man's mental health problems probably intensified his risk of getting sick and thus played a role in hastening the arrival of the epidemic. They believe this link underscores the often overlooked importance of mental health as a "component of global health."

Ivers and Walton also found the circumstances surrounding this case to be illustrative of the curious way infectious diseases can now rapidly move around the planet and show up in unexpected places. They note that Mirebalais "would not have featured highly on any list of places in which public health authorities had concern for an outbreak of a deadly pathogen imported from overseas."

Yet the fact remains that a South Asia strain of cholera found its way into the town. And from there it rapidly spread. Ivers and Walton report that "in a matter of weeks" after appearing in Mirebalais, the cholera strain that had begun its journey in Asia had spread throughout Haiti, and from there to the neighboring Dominican Republic and overseas to Miami and Boston. (It also has been found in Venezuela, Mexico, Spain, and Canada.)

Reason for Hope in the Midst of Misery

Ivers noted that while the country's cholera epidemic has attracted significant attention, it does not mean that international aid groups or domestic health officials have shifted attention and resources from other health burdens, such as Haiti's battles against malaria, measles, dengue, diarrheal diseases, HIV/AIDS, and malnutrition. She also said it's important not to view Haiti's problems as so monumental and its infrastructure so damaged that health-related interventions stand little chance of success, pointing to HIV, measles and polio efforts by the government over the last decade.

She noted that there was a successful campaign to provide measles vaccinations in refugee camps and Haiti has managed to keep measles and polio out of the country. Haiti also is part of an international effort to eliminate lymphatic filariasis, commonly known as elephantiasis. And on the cholera front, while there has been debate about whether immunizations can or should be implemented in Haiti, Partners In Health has recently secured 200,000 doses of cholera vaccine and plans to launch a pilot program in collaboration with Haiti's Ministry of Health that will start immunizing people in 2012.

"If anyone is concerned about the logistics of delivering health care innovations to Haiti, just ask Haitians for help and they'll figure out how to get it done," Ivers said.

James Kazura, ASTMH president, added, "The lessons we are learning from the international medical response to Haiti should foremost be used to improve the health and well-being of the Haitian people. Next, it highlights the critical role research plays to better prepare the science, medical and aid communities, working together with governments and diplomats, in planning for future disasters anywhere."

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About the American Society of Tropical Medicine and Hygiene

[ASTMH](#), founded in 1903, is a worldwide organization of scientists, clinicians and program professionals whose mission is to promote global health through the prevention and control of infectious and other diseases that disproportionately afflict the global poor.

About the *American Journal of Tropical Medicine and Hygiene*

Continuously published since 1921, [AJTMH](#) is the peer-reviewed journal of the American Society of Tropical Medicine and Hygiene, and the world's leading voice in the fields of tropical medicine and global health. *AJTMH* disseminates new knowledge in fundamental, translational, clinical and public health sciences focusing on improving global health.