

## CDC Tracks Cell Phone Location Data to Halt Ebola

By Aliya Sternstein

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The Centers for Disease Control and Prevention is tracking the approximate locations of cell phone users in West Africa who dial emergency call centers in an effort to predict the onset and spread of Ebola outbreaks.

“The data is just the number of calls by cell tower, but from that you can get a rough idea of the area that the calls are coming in from, and then derive census, neighborhood data from that,” CDC spokeswoman Kristen Nordlund told *Nextgov* on Thursday.

It’s one of the high-tech approaches the U.S. government is piloting to stop the spread of the disease.

There is deep cell phone penetration in many parts of West Africa, where land lines sometimes are nonexistent.

By collecting tower data from telecommunications providers, CDC officials can visualize the beginnings of an outbreak, explained Este Geraghty, chief medical officer at software mapping provider Esri. She’s working with the agency on response efforts.

In Liberia, special call centers and a “4455” hotline number were set up for residents to ask Ebola-related questions and report cases.

The Liberia Ministry of Health and telecom companies, with CDC support, “looked at the cell tower locations and tower traffic -- in other words, which tower the call came in through,” Geraghty said.

“It isn’t an exact location of the population with questions, but it does give them an idea of which part of the community questions are coming from -- and presumably populations of need that may not be identified through formal case investigations,” she said.

A spike in the number of calls could suggest a crisis.

### ‘Tower Dumping Sometimes Controversial’

In different circumstances, such “tower dumps” have sparked outcries over invasive surveillance. The New York Police Department recently was lambasted for examining all the calls made near the Brooklyn Bridge around the time miscreants replaced the American flags atop the landmark.

Nordlund, the CDC spokeswoman, said officials can only see that a call was made to the “4455” Ebola response number and the location of the tower it came through. No personal information is collected, she added – “just total calls per time period by tower.”

Using Esri mapping software, public health officials intend to layer the call data over census information, such as population densities and hospital locations.

"When you have a dense urban setting where the health system is struggling to cope with an outbreak like this," such geography tools "become crucial to help guide the limited health care resources," Geraghty said.

Responders need to understand the potential scope of the contagion so they can position mobile diagnostic labs, beds and health care workers accordingly. CDC has said if 70 percent of Ebola patients are under care by late December, the outbreak could end by late January 2015.

The pandemic so far has claimed about 3,865 lives, primarily in Liberia, Sierra Leone and Guinea, according to the World Health Organization. A patient in Texas became the first U.S. casualty yesterday. There are more than 8,033 cases of the illness.

### **Researchers Use Mobile Networks to Follow Virus' Spread**

A Sept. 29 [article](#) in the online medical journal "PLOS Currents" outlined the potential of mobile network data to restrain Ebola.

Researchers mapped transportation hubs against aggregated call patterns of a million anonymous phone users on the Orange Telecom network in Cote d'Ivoire, Senegal.

Each communication was pinpointed by identifying the geographic coordinates of the transmitting tower and the associated cell phone.

"Understanding the potential routes of spread of the virus within a country are critical to national containment policies, and will strongly influence more regional spread across borders," the researchers wrote.

However, there are limitations to this method that can muddy predictions, such as data confidentiality protections and data precision.

The information amassed can contain competitive information on a network operator's designs and customer base, plus information about the customers' travels and locations.

Privacy constraints can be overcome during epidemics if companies provide aggregated, anonymous data sets, rather than tower dumps, the researchers suggested.

"You get a rough area of geography based on the cell tower location," CDC's Nordlund said.

Cell tower flow charts are but one of the graphing techniques federal health officials are employing to contain the virus.

### **Pentagon Repurposes WMD Tracker**

The Defense Department has rejiggered a system geared for identifying weapons of mass destruction to instead flag the onset of Ebola outbreaks.

The WMD biosurveillance prototype, dubbed Constellation, harvests, synthesizes and visualizes data of interest across the military and intelligence communities, according to Pentagon officials.

Through Constellation, "information gathered from WMD threat reduction activities, when integrated with other relevant U.S. government and international partner information, will provide decision-makers and operational personnel a holistic view of the WMD landscape," Andrew Weber, assistant secretary of defense for nuclear, chemical and biological defense programs, told a House Armed Services [panel](#) this spring.

Weber said Tuesday the Pentagon has built on the original concept to create an online portal, which will be used by nongovernmental organizations and governments "most affected by the Ebola outbreak" as well as Defense

Department laboratories involved in the response.

Many of these mapping exercises are aimed at "contact tracing," or the process of finding everyone who has come in direct contact with a sick Ebola patient.

But such data points can be hard to compile because of Africa's terrain.

One of the challenges is "continuing to gain and grow situational understanding over time," Gen. David Rodriguez, commander of U.S. Africa Command, said Tuesday. "Isolated places" create even more problems, he added.

Satellites can help by offering a very high-level view of the threat.

A sudden Ebola outbreak could be indicated, for instance, by an unusually crowded hospital parking lot as viewed from space, *Nextgov's* sister publication *Defense One* reported last month.

Just as satellite imagery showed Russian forces massing along the Ukrainian border, high-resolution images from low Earth orbit can offer a glimpse of where and when more sick people are seeking treatment.

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<http://www.nextgov.com/mobile/2014/10/cdc-tracks-cell-phone-location-data-halt-ebola/96239/>