Study uses social media, internet to forecast disease outbreaks

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When epidemiological data are scarce, social media and Internet reports can be reliable tools for forecasting infectious disease outbreaks, according to a study led by an expert in the School of Public Health at Georgia State University.

"Our study offers proof of concept that publicly available online reports released in real-time by ministries of health, local surveillance systems, the World Health Organization and authoritative media outlets are useful to identify key information on exposure and transmission patterns during epidemic emergencies," the researchers said. "Our Internet-based findings on exposure patterns are in good agreement with those derived from traditional epidemiological surveillance data, which can be available after considerable delays."

Their findings are published in the *Journal of Infectious Diseases* in the article "Elucidating Transmission Patterns From Internet Reports: Ebola and Middle East Respiratory Syndrome as Case Studies." The study's lead author is Dr. Gerardo Chowell, associate professor of epidemiology and biostatistics at Georgia State.

Mathematical models forecasting disease transmission are often used to guide public health control strategies, but they can be difficult to formulate during the early stages of an outbreak when accurate data are scarce, the researchers said.

"In the absence of detailed epidemiological information rapidly available

from traditional surveillance systems, alternative data streams are worth exploring to gain a reliable understanding of disease dynamics in the early stages of an outbreak," they said.

To test the reliability of alternative data streams, researchers tracked and analyzed reports from public health authorities and reputable media outlets posted via social media or their websites during the 2014-2015 Ebola epidemic in West Africa and the 2015 Middle East Respiratory Syndrome outbreak in South Korea. Researchers used the reports to collect data on the viruses' exposure patterns and transmission chains.

Researchers also noted the West African Ebola outbreak was a particularly interesting case study because early data were limited to basic weekly case counts at the country level. They were able to use Internet reports describing Ebola cases in the three hardest hit countries—Guinea, Sierra Leone and Liberia—to glean detailed stories about cases arising in clusters within families or through funerals or hospital exposure.

"Our analysis of the temporal variation in exposure patterns provides useful information to assess the impact of control measures and behavior changes during epidemics," they said.

Provided by Georgia State University