

## **Can Social Media Help Public Health Officials Monitor Disease Outbreaks?**

### **Study Examines the “Intelligent Use” of Electronic Data to Enhance Public Health Surveillance**

*Analysis helps health policy decision makers incorporate new surveillance methods into established systems*

New York, New York, March 6, 2014—Recent disease outbreaks in the last decade such as severe acute respiratory syndrome coronavirus (SARs-CoV) in Asia and the pandemic H1N1/09 influenza virus worldwide have prompted infectious disease scientists to investigate new ways to improve public health surveillance, monitoring the incidence of infectious diseases to understand and minimize their impact. The exchange of health information on the Internet and social media is an obvious opportunity to gain insight into emerging disease events. Now, more than ever, use of electronic data, including new and popular initiatives such as Google Flu Trends, ProMed-mail and HealthMap, are being used to enhance public health preparedness. But how useful are these initiatives for public health practitioners who are trying to detect emerging diseases in their own regions?

Now, a new [study](#) published in *The Milbank Quarterly*, focuses on the challenges facing practitioners as they consider ways to integrate social media and Internet data into the detection and management of disease outbreaks. Led by Edward Velasco, PhD, Senior Scientist, and others at the Robert Koch Institute in Berlin, this systemic review, “Social Media and Internet-Based Data in Global Systems for Public Health Surveillance,” looks at 20 years of published studies about event-based surveillance systems.

Members of a national public health institute, the authors’ aim “was to help health policy decision makers decide whether to incorporate new methods into comprehensive programs of surveillance....”

While “Internet-based bio-surveillance” or “digital disease detection,” as it is known, has been described and analyzed in the literature, systemic reviews of the field have been few,” writes David M. Hartley, PhD, MPH, Associate Professor of Microbiology and Immunology at Georgetown University Medical Center, who provides [commentary](#) on the article in the *Quarterly*. “It is this intellectual gap that makes the article... so valuable and timely”—and provides “much-needed perspective.”

### **Older systems, new information**

The researchers looked at two main types of public health surveillance— indicator-based and event-based surveillance. Indicator-based, the oldest and most common, is widely used by regional, national and international public health agencies. These systems are designed to collect and analyze structured data based on protocols tailored to each disease, including calculating the incidence, seasonality and burden of disease. The goal of these systems is to find increased numbers or clusters that might indicate a threat. There is generally a time lag between the

occurrence of an event and the indicator-based surveillance— and these systems lack the ability to detect potential threats more quickly. In addition, these systems are not equipped to detect new or unexpected disease occurrences— because they only collect predefined epidemiological attributes for each disease. That’s why the first cases of SARS and H1N1, which were new strains of viral infections, were not detected. After the SARS epidemic, health agencies began to seriously consider new ways to monitor symptoms in order to provide faster detection.

Instead of relying on official reports, event-based surveillance information is obtained directly from witnesses of real-time events or indirectly from a variety of communication channels, including social media and established alert systems, and information channels, including the news media, public health networks and nongovernmental organizations. Because it occurs in “real time,” event-based surveillance can identify events faster than indicator-based surveillance as well as new events not picked up at all by indicator-based surveillance. Health information monitored via the Internet and social media is an important part of this event-based surveillance—and is most often the focus of existing event-based surveillance systems. Research has shown that event-based surveillance identifies trends comparable to those found using established indicator-based surveillance methods. But in practice event-based surveillance systems have not been widely accepted and integrated into mainstream use by national and international health authorities mainly because they have not yet been systematically evaluated within a public health agency.

Event-based surveillance can be used with established indicator-based methods, enhancing the ability to combat high threat diseases. Other researchers in the field have referred to the combined activity of indicator-based and event-based surveillance as “epidemic intelligence.”

### **Attributes of 13 event-based systems**

The study identified 13 event-based surveillance systems that are currently used, including the type of data they collect and how they are used. Each system was then classified as a news aggregator (the collection of real time news feeds, such as Google News, and in which each article is then examined individually), automatic system (news aggregators that also include a few steps of analysis), and moderated system (in which information is processed by human analysts ). The systems also differed in their goals, disease information collected, level of access and data acquisition method.

### **Factors that might influence integration into official systems**

The study looks at factors that might influence the integration of these new surveillance systems into official existing systems. The researchers found four limitations associated with event-based surveillance systems:

- Information is not always moderated by professionals or interpreted for relevance before it is disseminated to epidemiologists
- There is no standardized system for updates, often resulting in too much information
- Algorithms and statistical baselines are not well developed
- New information about health events is not disseminated in the most efficient way.

## **Challenges of integrating event-based surveillance**

Velasco and coauthors found that no event-based surveillance systems are currently part of national programs for surveillance, although they are used intermittently and as complementary sources of information. The authors surmise that event-based surveillance could improve surveillance activities, but systematic evaluation within a public health agency is needed before this can happen.

“This study shows that social media and the Internet are changing event-based surveillance as we know it and hold promise for the future. However, it appears that this promise remains unrealized—and that the exchange of health information on the Internet cannot yet be fully relied upon for this important public health function,” says Howard Markel, MD, PhD, Editor-in-Chief of *The Milbank Quarterly* and the George E. Wantz Distinguished Professor of the History of Medicine, Center for the History of Medicine, University of Michigan.

### ***The Milbank Quarterly***

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