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Medical Information Technology

Google and the Flu:
CAN THE WEB CHANGE THE WAY WE DO EPIDEMIOLOGY?

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Every year physicians in the U.S. are challenged to recognize and treat Influenza, a highly contagious respiratory illness. More than 200,000 people are hospitalized from flu complications and about 36,000 people die from flu. Some people, such as older people, young children, and people with certain health conditions, are at high risk for serious flu complications and death.

Healthcare professionals are also encouraged to participate as influenza sentinel providers to conduct surveillance for Influenza-like illness *(ILI)* in collaboration with the Florida State Health Department Bureau of Epidemiology and the Centers for Disease Control and Prevention *(CDC)*. Data reported by sentinel providers, in combination with other influenza surveillance data, provides a national picture of influenza virus and ILI activity in the U.S. and Florida. Sentinel providers report the number of patient visits each week and number of patient visits for ILI by age group *(0-4 years, 5-24 years, 25-64 years, and 65+ years)* year round. These data are transmitted once a week via the Internet or via fax to a central database to CDC. Data from sentinel providers are critical for monitoring the impact of influenza. In combination with other influenza surveillance data, they can be used to guide prevention and control activities, vaccine strain selection, and patient care. The published CDC regarding the seasonal influenza activity reports are often delayed because they rely on data collected and compiled from thousands of health care providers, labs and other sources. This may then also delay the response to a potential outbreak and may increase the mortality and morbidity of the disease.

"The earlier the warning, the earlier prevention and control measures can be put in place, and this could prevent cases of influenza," said Dr. Lyn Finelli, lead for surveillance at the influenza division of the CDC, in a recent interview.

Google may now offer a new early-warning system to identify and monitor flu outbreaks by recruiting the activity of Internet users on its search engine. How does it work? Each week, millions of users around the world search for online health information. As you might expect, there are more flu related searches during flu season and more allergy related searches during allergy season. Google found a close relationship between how many people search for flu-related topics and how many people actually have flu symptoms. Of course, not every person who searches for "flu" is actually sick, but a pattern emerges when all the flu-related search queries from each state and region are added together. Google compared the query counts with data from a surveillance system managed by the U.S. Centers for Disease Control and Prevention *(CDC)* and found that some search queries tend to be popular exactly when flu season is happening. By counting how often these search queries occur, one can estimate how much flu is circulating in various regions of the United States. Initial review of the aggregated search queries indicates a close relationship between those searches and the actual reported flu activity itself. Compared to traditional flu surveillance systems, which take 1-2 weeks to collect and release surveillance data, Google search queries can be automatically counted very quickly. By making those flu estimates available each day, Google Flu Trends may provide an early-warning system for outbreaks of influenza. The premise behind Google Flu Trends has been validated by an unrelated study indicating that the data collected by Yahoo, Google's main rival in Internet search, can also help with early detection of the flu. If Google provided health officials with details of the system's workings so that it could be validated scientifically, the data could serve as an additional, free way to detect influenza. A paper on the methodology of Google Flu Trends is expected to be published in the journal Nature.

Researchers have long said that the material published on the Web amounts to a form of "collective intelligence" that can be used to spot trends and make predictions. For that purpose Google began opening its search data trove through Google Trends, a tool that allows anyone to track the relative popularity of search terms. Google also offers more sophisticated search traffic tools that marketers can use to fine-tune ad campaigns. Physicians and healthcare organizations should start using these and other online tools to track and research our patients demands and needs and model their healthcare delivery accordingly.

I believe that the new web enabled technologies can, if used properly, enhance the practice of medicine. To avoid privacy pitfalls we should rely only on aggregated data that cannot be traced to individual searchers or users.

Stay tuned for more exciting news regarding this and other topics.