

# Google Flu Trends® versus ED Syndromic Surveillance, Wisconsin 2009

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## OBJECTIVE

We compared Google Flu Trends® with an emergency department (ED) syndromic surveillance system during the recent epidemic of 2009 influenza A (H1N1) virus infections in Wisconsin.

## BACKGROUND

State and local health departments are increasingly using syndromic surveillance systems to track influenza-like illness (ILI) [1]. Since January 2008, the Wisconsin Division of Public Health has monitored influenza activity using electronic emergency department (ED) data from the Wisconsin Health Information Exchange (WHIE), a repository of data from 14 acute-care hospitals in six counties in southeastern Wisconsin.

Google Flu Trends® is based on the premise that internet search engine queries can be used to estimate levels of health-seeking behavior [2]. Using a formula that identifies common internet search terms, Google Flu Trends estimates weekly national and state-specific ILI percentages. Citing close correlations between this estimate and the historical outpatient ILI trends observed in CDC's ILINet system, Ginsberg, et al concluded that Google Flu Trends might enable early detection of influenza epidemics in areas with large numbers of persons using internet search engines.

We compared Wisconsin-specific Google Flu Trends® ILI percentage estimates during the spring 2009 influenza A (H1N1) virus epidemic with WHIE ED visit patterns and reported H1N1 case counts.

## METHODS

ED visits at 11 WHIE hospitals were categorized into syndromes based on patient's chief complaint using a SAS algorithm developed at the New York City Department of Health. The weekly number of ED visits for "fever/flu" syndrome was calculated for the period January 1, 2008–August 1, 2009. Google Flu Trends® weekly ILI percentage estimates for Wisconsin were downloaded for this same period from [www.google.org/flutrends](http://www.google.org/flutrends). The number of confirmed and probable novel H1N1 cases reported to Wisconsin DPH by week of illness onset served as a gold standard. Confirmed cases were defined as laboratory-confirmed 2009 influenza A (H1N1) virus infections in Wisconsin residents. Probable cases were

defined as fever  $\geq 100$  degrees, plus cough or sore throat, in a Wisconsin resident with influenza A infection that was unsubtypeable (i.e., not human H1 or H3). Data were plotted and compared with ILI percentages as estimated by Google Flu Trends® and WHIE.

## RESULTS

In Wisconsin, an epidemic of over 6,000 reported confirmed and probable H1N1 cases began on April 25 and peaked during the first week of June, 2009 (Figure). During this time period, data from the WHIE indicated an overall increase in ILI activity in Wisconsin, while Google Flu Trends® showed a sustained decrease in ILI percentage estimates.

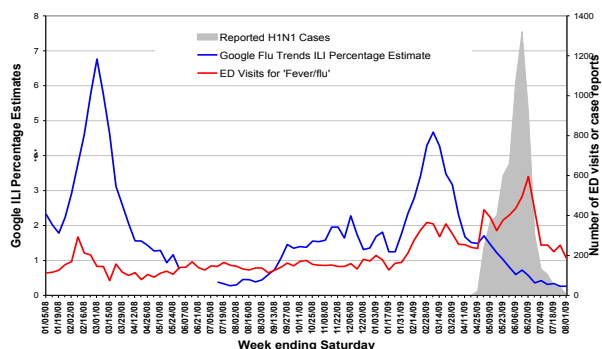


Figure – Weekly Wisconsin-specific ILI percentage estimates from Google Flu Trends®, emergency department visits for "fever/flu" syndrome from the Wisconsin Health Information Exchange, and reported influenza A (H1N1) cases in Wisconsin, January 2008–August 1, 2009.

## CONCLUSIONS

The ED syndromic surveillance system correlated with Wisconsin's 2009 H1N1 epidemic, but Wisconsin-specific Google Flu Trends® estimates did not. Reasons for this discrepancy are unclear, since Google Flu Trends® patterns for Wisconsin correlated relatively closely with the state's 2008–2009 seasonal influenza season. Additional analyses are needed to assess Google Flu Trends® ability to accurately estimate influenza activity at the local level.

## REFERENCES

- [1] Buehler JW, Sonricker A, Paladini M, Soper P, Mostashari F. Syndromic surveillance practice in the United States: findings from a survey of state, territorial, and selected local health departments. *Advances in Disease Surveillance* 6, 3 (2008).
- [2] Ginsberg J, Mohebbi M, Patel R, Brammer L, Smolinski M, Brilliant L. Detecting influenza epidemics using search engine query data. *Nature* 457, 1012-1014 (19 February 2009)