

# Comparison of Influenza-like Illness Syndrome Classification Between Two Syndromic Surveillance Systems

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## Objective:

To compare detection of a community outbreak of influenza-like illness using two syndromic surveillance (SS) systems, one using a clinician's classification of reason for visit and the other using an automated chief complaint parsing algorithm.

## Background:

In 2004, the BioDefend (BD) SS system was implemented in Duval County hospitals (Jacksonville, FL). Daily emergency department chief complaints are manually classified and entered into the BD system by triage personnel [1]. As part of a statewide implementation, the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) began collecting data in the Jacksonville area during the winter of 2007-08. ESSENCE uses an automated data collection, chief complaint parsing and analysis process for data management and analysis. The use of two systems during the same period of time in one area provided a unique opportunity to retrospectively analyze characteristics of the BD and ESSENCE systems.

## Methods:

Chief complaint data from one large hospital's emergency room, categorized into the respective systems' ILI syndrome, was analyzed for November 4, 2007 – June 1, 2008. Proportional morbidities [(# of ILI cases / daily ER census)\*100] were calculated and their distributions were compared to Duval County sentinel provider influenza surveillance data. The timing of statistical alerts between the systems was compared in relation to when sentinel influenza reporting trends began increasing. Correlations among data sources were calculated using Pearson's correlation. Timeliness of detecting ILI season was investigated by calculating for each of the syndromes the time lag that maximized the Pearson correlation coefficient with the ILI sentinel surveillance data (as a reference).

## Results:

ILI syndrome trends appeared similar between both systems (Figure 1). BD and ESSENCE produced temporally similar statistical signals in the two weeks preceding the seasonal increase in reports from sentinel influenza providers. While

these signals occurred simultaneously, continuity of signals was maintained within the ESSENCE syndrome as it generated signals on five subsequent days. Overall correlation between BD or ESSENCE and the sentinel data was  $R^2=0.72$  and  $R^2=0.84$ , respectively. Analysis of timeliness demonstrated that both systems correlated highest when lagged one week to sentinel data;  $R^2(\text{BD})=0.80$ ,  $R^2(\text{ESSENCE})=0.85$ .

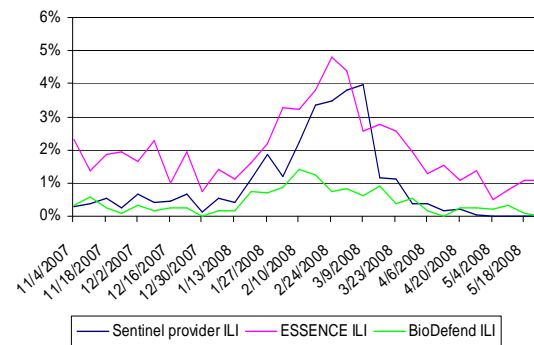


Figure 1 - ILI Syndrome System Comparison with NE FL Sentinel Provider Surveillance & Influenza Test Performed; (% Provider ILI visits (blue), % BD ILI (green), % ESSENCE ILI (red)).

## Conclusions:

While both SS systems generated temporally related signals corresponding to sentinel provider data, ESSENCE displayed a higher correlation than BD. Both systems' signals preceded sentinel activity by one week. Overall, both systems demonstrated the ability to monitor ILI trends; however, manual data input remains labor-intensive and requires round-the-clock staffing [3]. Automated systems allow for flexibility while diminishing the burden on health care workers.

## References:

- [1] Center for Biological Defense, University of South Florida. BioDefend Surveillance Booklet. Available at: <<http://www.bt.usf.edu/files/SurveillancePacket%20Draft.pdf>>. Accessed June 25, 2008.
- [2] Lombardo J, Burkom H, Elbert E, et al. A systems overview of the electronic surveillance system for the early notification of community-based epidemics (ESSENCE II). *J Urban Health*. 2003;80(suppl 1):I32-42.
- [3] Tsui F-C, Espino JU, Dato VM, Gesteland PH, Hutman J, Wagner MM. Technical description of RODS: a real-time public health surveillance system. *J Am Med Inform Assoc*. 2003;10:399-408.