

# Comparison of Three Critical Syndrome Classifications: Louisiana vs. BioSense

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## Objective

To compare the results of BioSense and Louisiana syndrome classifications for influenza-like-illness, gastrointestinal, and upper respiratory infections applied to Louisiana emergency department data.

## Introduction

The Louisiana Office of Public Health (OPH) Infectious Disease Epidemiology Section (IDEpi) conducts emergency department (ED) syndromic surveillance using the Louisiana Early Event Detection System (LEEDS). IDEpi has the capability to define and change syndrome definitions in LEEDS based on surveillance needs and quality assurance activities. IDEpi submits all of the ED data to BioSense, which uses different syndrome definitions than LEEDS. Both BioSense and LEEDS use text and ICD code searches in any available chief complaint, admit reason and diagnosis data. The results of LEEDS and BioSense syndrome classifications for influenza-like-illness (ILI), gastrointestinal (GI), and upper respiratory infections (URI) applied to Louisiana's ED data were compared to examine if the different syndrome definitions yield similar results when applied to the same data.

## Methods

Daily electronic ED data is imported to both the LEEDS and BioSense databases and processed for syndrome classification. IDEpi queried the LEEDS database and the BioSense front-end application to pull weekly visits classified as influenza-like-illness, gastrointestinal, and upper respiratory infections for the period of CDC week 1327 through week 1426 (6/30/13-6/28/14). The syndrome percentage means of BioSense and LEEDS syndrome pairs were compared with paired t-tests. The linear relationship between BioSense and LEEDS syndrome pairs were measured with Pearson correlation coefficients. The syndrome results were also split into the age groups used by the BioSense front-end application and Pearson correlation coefficients were calculated for each syndrome age group pair. The Early Aberration Reporting System (EARS) C2 method was applied to all syndrome results to examine if alerts were generated during corresponding weeks for each syndrome pair. Weekly data were exported from LEEDS and BioSense and analyzed in R statistics package.

## Results

The syndrome percentage means of BioSense ILI and LEEDS ILI were significantly different (paired t-test,  $p < 0.000$ ). The correlation coefficient for BioSense ILI and LEEDS ILI was 0.98 and age group correlation coefficients ranged from 0.83 to 0.99 (Pearson's correlation,  $p < 0.000$ ). C2 generated eleven alarms for BioSense ILI and twelve for LEEDS ILI, of which nine occurred on corresponding weeks.

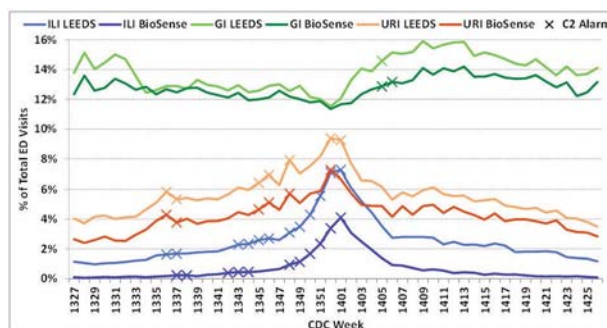
The syndrome percentage means of BioSense GI and LEEDS GI were significantly different (paired t-test,  $p < 0.000$ ). The correlation coefficient for BioSense GI and LEEDS GI was 0.90 and age group correlation coefficients ranged from 0.69 to 0.96 (Pearson's

correlation,  $p < 0.000$ ). C2 generated two alarms for BioSense GI and one for LEEDS GI, of which one occurred on a corresponding week.

The syndrome percentage means of BioSense URI and LEEDS URI were significantly different (paired t-test,  $p < 0.000$ ). The correlation coefficient for BioSense URI and LEEDS URI was 0.96 and age group correlation coefficients ranged from 0.81 to 0.97 (Pearson's correlation,  $p < 0.000$ ). C2 generated six alarms for BioSense URI and seven for LEEDS URI, of which six occurred on corresponding weeks.

## Conclusions

The results of BioSense and LEEDS syndrome classifications for influenza-like-illness, gastrointestinal, and upper respiratory infections applied to Louisiana emergency department syndromic surveillance data were highly correlated for each syndrome however the syndrome percentage means were significantly different for each syndrome pair. Therefore, while percentages of total visits attributed to a syndrome as a measurement of syndrome burden may not be comparable, trends over time are comparable. In addition, the majority of C2 alerts were generated on corresponding weeks for each syndrome pair, providing confidence in the use of C2 applied to current syndrome definition results as a means of aberration detection. As public health jurisdictions work towards developing common syndrome classifications to increase data comparability across jurisdictions, this analysis provides evidence that the current differences in syndrome definitions between jurisdictions may not hinder comparability of trends over time.



## Keywords

syndromic surveillance; syndrome classification; syndrome definition; BioSense

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