

Use of Syndromic Surveillance during a South Florida Mass Migration Exercise, Broward County, 2007

Aaron Kite-Powell, MS, John Livengood, MD, Mphil

Florida Dept of Health, Broward County Health Department (BCHD), Epidemiology Section

OBJECTIVE

Describe the use of the ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) system to detect unusual patterns of emergency department use during a full scale mass migration exercise in South Florida.

BACKGROUND

On March 7th and 8th of 2007 authorities from federal, state, county, and municipal jurisdictions/agencies having mass migration response responsibilities (as per the Department of Homeland Security Operation Vigilant Sentry, as well as State and Local plans) initiated the last of a series of mass migration exercise events. The mission of the exercise was to “unify” a federal, state, and local response to effectively mitigate a catastrophic mass migration incident, similar to the Mariel Boatlift (125,000+ migrants) in 1980. The exercise included volunteers who visited a few local emergency departments with specific scripts describing an acute medical condition.

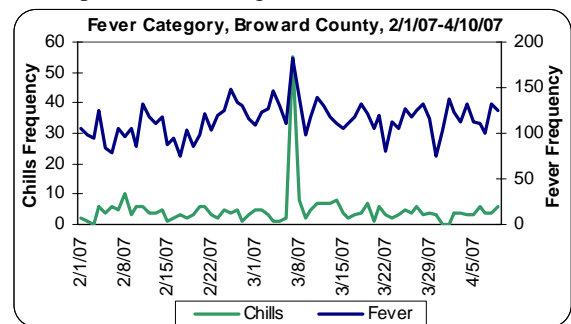
METHODS

Daily surveillance of chief complaint data from Broward County hospital emergency departments has been established since August 2005. Data transmission occurs once per day as a batch file. ESSENCE automatically codes the chief complaints into 10 syndrome categories, 102 subsyndrome categories and allows free text querying of chief complaint data. Review of the ESSENCE alerts includes visualization of the alerting category time series, spatial analysis, and review of the data details, which is a line list of patient age, gender, race (when available), resident and hospital zip code, hospital name, time of visit, and chief complaint text. If clustering of these variables is observed in the data details in combination with statistical alerts, then follow up is conducted with the hospital points of contact. The epidemiologists monitoring ESSENCE were aware of the exercise, and that “injected” patients would arrive on either the 7th or 8th of March, but did not know which day, which hospitals were involved or what chief complaints were included in the scripts.

RESULTS

At approximately 9:00am on the 8th of March, routine analysis of the major syndrome categories found that the number of patients categorized in the fever category had increased significantly (171 observed

cases/110 expected cases; one-sided p-value = 0.001) enough to produce alerts using the ESSENCE regression/EWMA algorithms. Further analysis of the more specific individual fever subcategories (bodyaches, chills, fatigue, fever, malaise, and sepsis) found that only those with “chills” included as part of the chief complaint produced an alert (49 cases observed/4 expected; one sided p-value <0.001). Comparison with the CUSUM (C1-C3) statistics corroborated the alert level for the general fever category as well as the fever/chills subcategory. A review of the data details found that 86% of the cases came from 2 distinct zip codes (all cases were seen within one hospital group), 86% of all cases in the fever/chills subcategory came to the ER in a 4 ½ hour time span on 3/7/07, and the chief complaint text was unusually uniform for all of these cases. Follow up with the hospital point of contact was initiated, and confirmation was received that the surge in patients was due to the ongoing exercise. Post-exercise we learned that the scripted chief complaints were intended to sound like they may be cases of dengue fever or malaria in migrants. The strings of text included “high fever, chills, chest pain”, “headache, fever, chills, sweating”, “fever, chills, bloody sputum and/or pain on breathing”.



CONCLUSIONS

These syndromic surveillance data suggest that the ESSENCE system in South Florida was successful in detecting a large increase in chief complaints including the terms “fever/chills” during a full scale mass migration exercise. Analysis of subsyndromes and chief complaint queries in addition to the more general syndrome categories greatly enhanced our ability to recognize the increase in cases. Including the ability to compare the performance of multiple statistical algorithms against the modeled data also assists with determining whether an actual increase exists.