

Use of Epidemiological Knowledge to Create Syndromic Surveillance Reports

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OBJECTIVE

To describe how epidemiological principles are utilized to distinguish a real alert from statistically significant alerts in order to monitor and create daily reports in the Miami-Dade County Health Department (MDCHD) using Electronic Surveillance System for the Early Notification of Community Based Epidemics (ESSENCE)

BACKGROUND

Syndromic surveillance is an investigational approach used to monitor trends of illness in communities. It relies on pre-diagnostic health data rather than laboratory-confirmed clinical diagnoses. Its primary purpose is to detect disease outbreaks, incidents and unusual public health events earlier than possible with traditional public health surveillance methods.

METHODS

On a daily basis, 14 Miami-Dade County hospitals automatically transmit de-identified electronic emergency department chief complaint data to the MDCHD. Once chief complaints are organized into syndromes, the system generates alerts which are divided into two categories: outbreak-associated and bioterrorism-associated. Outbreak-associated alerts are investigated by detecting potential disease clusters by age, gender, race/ethnicity, resident zip code, hospital, time of visit and chief complaint whereas bioterrorism-associated alerts are carefully reviewed on a case-by-case basis. ArcGIS and SAS 9.1.3 have been used for additional data analysis and special reports are created for suspicious outbreaks when deemed necessary. In addition, the epidemiologist analyzing ESSENCE also monitors the county's 911 Call Center and school absenteeism data in order to get a broader picture of the daily events which may be useful in understanding the geographic trends of where illnesses may occur.

RESULTS

A statistically significant increase may not reflect a real unusual public health event. To analyze the distribution and determinants of non-specific health indicators, the epidemiologist must take into consideration in demographic and geographic clustering combined with activities around the community after first reviewing the disease trends and statistical p-value. The epidemiologist must use

this knowledge to determine whether or not the alert warrants further investigation or if they are false alarms due to an increase in unrelated cases or changes in reporting procedures among the various hospitals. Once findings are discussed with other staff members, the report is emailed to all hospital Infection Control Practitioners (ICPs) and MDCHD staff. If clustering is unusual or suspicious, decision-makers will take whatever steps are necessary to prevent further cases.

CONCLUSIONS

Certain alerts are expected and when detected are of less concern, particularly when public health response is well established (e.g., the beginning of the influenza season). Experienced users who are familiar with the demographic and geographic features of the county must follow a step-by-step evaluation strategy to ensure that system findings are validated. This will ensure that the appropriate actions are taken for statistical anomalies versus true public health events.

HEALTH Miami-Dade County Health Department
 Syndromic Surveillance Alerts Based on data Received 03/05/2007, Countywide and by Hospital

Syndromic Surveillance Overview

On a daily basis, 13 Miami-Dade County hospitals automatically transmit de-identified electronic emergency department chief complaint data to the Miami-Dade County Health Department. Data elements in the data file include patient age, sex, chief complaint, time of visit, race/ethnicity, discharge disposition (e.g. admitted, discharged, etc), zip code, and hospital name. Each chief complaint is then placed into one of 10 syndrome categories using The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), a data management/analysis system developed by Johns Hopkins University in conjunction with the Department of Homeland Security. The syndrome categories include respiratory, gastrointestinal, hemorrhagic, influenza-like, shock/coma, neurologic, fever, febrile, rash, botulism-like, and other. ESSENCE performs automatic data analysis, establishing a baseline with a 28-day average. Daily case data is then analyzed against this baseline to identify statistically significant increases. A yellow flag indicates a mid alert and a red flag indicates a high alert. Each day, an MDCHD analyst evaluates all alerts and develops a summary report. This report includes information on any epidemiologic clustering by zip code, hospital, race/ethnicity, or chief complaint.

Syndrome	Age Group	Count	Flag Color	Flagged Yesterday?	Clustering By Zip Code?	Clustering By Chief Complaint?	Clustering By Hospital?	Clustering By Race/Ethnicity?
Rash	All	43		No	No	Yes	No	Yes
ILI	All	54		No	No	Yes	No	Yes
Neur. all	65+	1		No	No	No	No	No
Neuro	5 to 17	16		No	No	No	No	Yes
ILI	5 to 17	19		No	No	Yes	No	Yes
Fever	5 to 17	34		No	No	Yes	No	Yes
Rash	18 - 64	15		No	No	Yes	No	Yes
Fever	0 to 4	91		No	No	Yes	No	Yes
GI	0 to 4	105		No	No	Yes	No	Yes

Observations: (Data based on 13/13 hospitals)

There were 9 alerts for Sunday, March 4th.

Rash (ALL) This was an alert in which there was clustering by chief complaint (rash) and by race (Hispanic). This is the 3rd alert in this category since December. Patients were seen in 10 of the 13 hospitals and all were discharged. Although there was not clustering by zipcode, there seems to have been more cases in the Southwest area.

Influenza-like illness (ALL) This was an alert in which there was clustering by chief complaint (fever and cough) and by race (Hispanic). This is the 10th alert of this kind since January. All of the patients were discharged and they were seen in 8 of the 13 hospitals.