Exercise Demonstrates Effective Syndromic Surveillance Response Process

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OBJECTIVE

This paper describes how the Indiana State Department of Health (ISDH) Public Health Emergency Surveillance System (PHESS) staff responded to a syndromic surveillance alert related to a bioterrorism preparedness event.

BACKGROUND

Currently, Indiana monitors emergency department (ED) patient chief complaint data from 73 geographically dispersed hospitals. These data are analyzed using the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) application.

While researchers continue to improve syndromic detection methods, there is significant interest among public health practitioners regarding how to most effectively use the currently available tools. The PHESS staff have developed and refined a daily syndromic alert analysis and response process based on experiences gained since November 2004.

METHODS

The PHESS data analysis approach is to first check for spatial alerts, and then drill down to county- and hospital-level alerts. The practical significance of each alert is typically determined by noting 1) the magnitude difference from baseline (i.e., the greater the difference, the more potentially significant an alert), 2) the rarity of an alert of its type, and 3) any type of clustering (spatial, temporal, age, gender, or chief complaint).

In June 2007, the ISDH syndromic surveillance epidemiologist was conducting the daily analysis of ED data alerts in ESSENCE and noted a respiratory spatial alert comprised of 14 emergency department patients seeking care on the afternoon of the prior day (Thursday). The 14 patient residences were clustered in one ZIP code. The time series view revealed a baseline with daily patient counts ranging from 0-6 with an expected count of approximately 2-3. Further, 12 patients (10 adults and 2 children) sought emergency medical care at the same hospital within a 2-hour window. Patient respiratory chief complaints focused on cough and dry cough, shortness of breath, and flu-like symptoms.

The syndromic surveillance epidemiologist determined the alert data deserved additional follow-up, consulted with a team member for a second opinion, and the decision was made to conduct follow-up. An ISDH field epidemiologist was contacted by email, advised of the alert, provided an ESSENCE URL for the alert data, and asked to contact the relevant local health department (LHD) and hospital.

RESULTS

Upon prompt follow-up with well established contacts, the field epidemiologist learned the LHD and the hospital associated with the alert had conducted a bioterrorism preparedness exercise and used anthrax as the agent. Twelve of the 14 patient visits generating the respiratory alert were part of the exercise.

CONCLUSIONS

In the current case, follow-up was conducted only after considering the person, place, and time components of the alert, and contrasting them with what the analyst knew to be “normal”. Single spike alerts often appear and follow-up is not conducted. However, the alert discussed here was not typical. It was dramatically greater than baseline, occurred in the middle of the week (not typically high volume days), cited flu-like symptoms outside of influenza season, involved a single hospital, and occurred in a relatively compressed timeframe.

The alert response described in this abstract was a very positive test of the PHESS. The PHESS staff was not aware of the bioterrorism exercise, but detected and responded appropriately to what they believed to be a syndromic alert posing a potential threat to public health. While it was only an exercise, the alert signal generated is precisely the type that deserves a formal response.

The non-specific nature of ED chief complaint data offers an ongoing challenge to syndromic surveillance epidemiologists regarding whether or not to conduct further investigation. Assuming adequate data coverage, the experience of the PHESS indicates the two components most necessary for effective syndromic surveillance are 1) a highly functional analytic data user interface such as ESSENCE, and 2) an intimate familiarity with local daily ED data. The nearly three years of using ESSENCE to interpret ED alerts has greatly facilitated PHESS staff ability to recognize typical data trends. Continued refinement of these components will help keep false alarm response to a minimum.

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