

Increasing the return-on-investment from syndromic surveillance: putting the systems to work for routine local health department activities

Shandy Dearth, MPH, Joseph Gibson, PhD
Marion County Health Department, Indiana

Objective

This paper describes how a syndromic surveillance system based on emergency department data may be leveraged for other public health uses.

Background

Since October 2004, the Indiana State Health Department (ISDH) and the Marion County Health Department (MCHD) have been developing and using a syndromic surveillance system based on emergency department admission data. The system currently receives standards-based HL7 emergency department (ED) visit data, including free-text chief complaints from 72 hospitals throughout the state. Fourteen of these hospitals are in Marion County, which serves the Indianapolis metropolitan region (population 865,000).

Methods

The MCHD monitors the ED data using two methods: 1) the ESSENCE (Electronic Surveillance System for the Early Notification of Community-Based Epidemics) system, and 2) a custom ISDH query. ESSENCE is used to detect unexpected elevations within eight predefined syndromes. Since patients often present at the ED with chief complaints that would not trigger an alert in ESSENCE, the MCHD also uses user-defined queries in ESSENCE and an ISDH custom query to look for other events of public health significance. In the ISDH query, keywords yield chief complaints related to notifiable diseases and other "chief complaints of interest". The MCHD has access to the query through a secure online portal. The following sections demonstrate the successful application of these tools.

Rabies prophylaxis

Rabies prophylaxis is delivered through a local emergency department, and is monitored using the ISDH query. This has allowed public health nurses to verify that a patient has returned for all five of the recommended prophylaxis treatments, thereby reducing the need for the public health nurse to conduct follow-up with a hospital nurse.

Carbon monoxide exposure

When MCHD notes carbon monoxide exposures in the ISDH query, an indoor air specialist contacts the patient to inquire about the source of the exposure. If the exposure occurred inside a residence as a result of improper heating methods due to a discontinuation of utility services, the specialist educates the resident about heat safety and works with utility companies to arrange payment for proper heating.

Weather related visits

Using custom queries in ESSENCE, MCHD looks for ED visits related to extreme temperatures in both the winter and summer months. ED staff assist by including key words in weather-related chief complaints. Information is shared with the Indianapolis Emergency Management Agency (EMA) to assist in deciding to open emergency shelters for the homeless when temperatures are extremely cold or to open community-cooling centers when the temperatures are extremely warm.

Community notification

When MCHD sends letters home with school aged children notifying parents of outbreaks of head lice, scabies, or Shigella, cases are often seeing in the ED with chief complaints such as "Exposure to scabies." Although this is not the best use of an ED, it is an indicator that parents are receiving the notifications as directed by the health department. Efforts are underway in the community to educate the public about proper uses of the ED's.

Possible Bioterrorism

Late on a Friday afternoon before a large public gathering at a local motor speedway, a patient presented to a local ED with a chief complaint of mustard gas. Investigation showed that the patient had erroneously mixed various cleaners and created a toxic gaseous mixture, resulting in the need for medical care. Mustard gas was not used and it was unclear why the patient chose to use this set of terms to describe what had happened. This was an appropriate exercise to test public health response to events requiring immediate attention.

Conclusion

Syndromic surveillance activities and the related data streams may be modified to serve various public health functions, without requiring notable increases in personnel time. Expanding the usefulness of these systems for routine public health functions may increase their value to the point where more health departments engage in this surveillance. The result may be increased skill and capacity for monitoring the population for events of public health significance.

References

Lombardo JS, Burkom H, Pavlin J, ESSENCE II and the Framework for Evaluating Syndromic Surveillance Systems. *MMWR*. 2004;53:159-165.