Automated Syndromic Surveillance System in Los Angeles County

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OBJECTIVE

This article describes architecture, analytical method, and software applications used in automating the Los Angeles County (LAC) syndromic surveillance system.

BACKGROUND

The LAC Bioterrorism Preparedness and Response Unit has made significant progress in automating the syndromic surveillance system. The surveillance system receives electronic data on a daily basis from different hospital information systems, then standardizes and generates analytical results.

METHODS

Files of varying formats are automatically detected, transferred, transformed and loaded into the SAS database and batch files are scheduled to run at fixed intervals. SAS software is used in data cleaning, automatic classification of chief complaints into four syndromes (respiratory, gastrointestinal, neurological, and fever w/rash). The Center for Disease Control and Prevention Early Aberration Reporting System [1] is utilized for data analysis. The cumulative sum algorithm is used for calculating threshold and signal generation. Emergency department (ED) data are stratified by syndrome, hospital, age and zip code of the patient. Sat Scan [2] software is used in spatial cluster detection. Prospective space-time permutation analysis was used in calculating observed and expected values of the syndromes by zip code. Cluster location and P values are displayed by Arcview software. The main method for data transfer is the HL-7 format via a Virtual Private Network (VPN) and text file via secure FTP and e-mail. A password-protected secure web server has been established, through which syndromic data are visualized, and provides remote access to surveillance data.

RESULTS

LAC currently receives data daily from 16 emergency departments. The overall countywide coverage is approximately 30% of total ED visits. The system automatically runs once per day, receiving data 24/7 without intervention and processes, analyzes, and archives data when received**.** Analysis, reporting and uploading results to the server are automatically performed.

Compared to previous years, automation has decreased analysis time by 2 hours. Therefore, allowing more time for the analyst to review analytical results, signal and possible outbreak investigations.

Multiple syndromic surveillance analytical results including ED, Reddinet, coroner and veterinarian surveillance results are integrated and uploaded to the webserver display in a timely fashion. A daily syndromic surveillance summary is generated and e-mailed to participating hospital infection control practitioners and management staff.

Uploading surveillance results to the website has increased access and availability of analysis results, while keeping maintenance and operating cost low. Daily information exchange between the public health department and participating hospitals has improved collaboration and partnership.

CONCLUSIONS

Automation of syndromic surveillance minimizes the reporting burden on providers and decreases human error for analysts.

The main limitation of our system is the relatively low hospital coverage. Increasing hospital coverage in the future may increase ability to detect disease clusters and outbreaks. Use of e-mail as a data transport tool is less reliable and secure than a secure FTP or VPN connection.

REFERENCES

[1]. Hutwagner L, Seeman GM, Thompson WW, Treadwell T. A simulation model for assessing aberration detection methods used in public heatlh surveillance for systems with limited baselines. Statistics in Medicine 2005;24:543-550.

[2]. Kulldorff M. Prospective time-periodic geographical disease surveillance using a scan statistic. Journal of the Royal Statistical Society, A164:61-72, 2001.

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