

Emergency Department Syndromic Surveillance and Population-Based Health Monitoring in Los Angeles County

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OBJECTIVE

To describe enhanced surveillance provided by the Los Angeles County (LAC) Department of Public Health's syndromic surveillance system for monitoring health events in 2006.

BACKGROUND

The Bioterrorism Surveillance Unit of the LAC Department of Public Health, Acute Communicable Disease Control (ACDC) program analyzes Emergency Department (ED) data daily. Currently capturing over 40% of the ED visits in LAC, the system categorizes visits into syndrome groups and analyzes the data for aberrations in count and spatial distribution. Typical usage of the system may be extended for various enhanced surveillance activities by creating additional syndrome categories tailored to specific illnesses or conditions. This report describes how ED data was utilized for enhanced surveillance regarding: (1) a sustained heat wave in California that broke temperature and duration records, (2) a 30,000 gallon raw sewage spill that prompted the closure of two miles of beach, and (3) an alert to ACDC of a high school student who attended school while symptomatic for meningitis.

METHODS

Using SAS 9.1, patient chief complaints (CCs) were searched for key words most closely associated with each situation. Temporal trends and spatial clustering of potential cases were assessed using the Centers for Disease Control and Prevention's Early Aberration Reporting System and Martin Kulldorf's SatScan™ statistics, respectively.

ED surveillance data were assessed for heat-related morbidity from June 1, 2006 to July 23, 2006. Visits with CCs containing key words such as: "heat exhaustion", and "sun stroke" were classified as heat-related. Heat-related visits were analyzed for correlation with daily average temperatures in the LAC metro area obtained from the weather.com website. Regarding surveillance for morbidity related to the sewage spill, in addition to the gastrointestinal syndrome, CCs such as "otitis", and "ear pain", were classified into an ear-related illness category, while CCs such as "conjunctivitis", and "pink eye" were classified as eye-related. Surveillance for additional meningitis cases in the potential school meningitis outbreak entailed defining neurological syndrome

visits as potential meningitis cases if CCs contained key words such as: "fever," "headache," or "meningitis."

RESULTS

Heat

The average number of heat-related visits per day substantially increased from 6.6 in June, to 8.3 in July ($p=0.04$). Seven-day averages of heat-related ED visit counts were strongly correlated with temperature trends ($r=0.67$, $p<0.0001$).

Sewage Spill

There did not appear to be any increasing trend in ear-related, eye-related, or gastrointestinal ED visits subsequent to the sewage spill.

Meningitis

Subsequent to receiving the alert regarding the index case, a neurological signal was detected at one ED in the school's vicinity. SatScan™ also detected a six zip code cluster of neurological syndrome visits also in the vicinity of the high school on the same day ($p=0.001$). Further surveillance efforts were guided by the detection of two additional neurological syndrome clusters. While public health officials administered mass prophylaxis, temporal and spatial statistics returned to normal on subsequent days, providing affirmation that a meningitis outbreak was successfully averted.

CONCLUSIONS

The potential meningitis outbreak and heat wave examples illustrate how the syndromic surveillance system can monitor the impact and progression of both infectious and non-infectious health events. The validation of a non-event is also a valuable tool as shown in the enhanced surveillance following the sewage spill, for which a large increase in ED visits was unlikely given the dilution of the sewage and instability of viruses in the ocean environment. The syndromic surveillance database is useful for quickly assessing the health status of a population in near-real time, enabling automated and population-based surveillance of health indicators that would otherwise be difficult if not impossible for both hospitals and ACDC staff.

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