

Evaluating the Effectiveness of Using Syndromic Surveillance to Identify a Neuro-Invasive Disease Outbreak in Los Angeles County

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OBJECTIVE

To evaluate the effectiveness of monitoring emergency room chief complaints as an indicator for a neuro-invasive disease outbreak.

BACKGROUND

In November of 2001 a syndromic surveillance system was established in Los Angeles (LA) County to analyze emergency department (ED) chief complaints in select hospitals. Chief complaints were analyzed and categorized into a syndrome (rash, respiratory, neurological, gastrointestinal), and an algorithm was developed to create a daily threshold for each category. Questions remain as to what events can be detected by the system in a timely manner. On the community level, of interest is whether an outbreak with a wide epidemiological curve would have the intensity of case visits needed to trigger a signal. On the individual level, of interest is the length of time it takes for a person with a given disease characteristic to seek medical attention, whether medical care is sought in the ED first, and how the syndromic system classifies them upon visiting the ED. To address these questions the 2004 LA County West Nile community-wide outbreak was selected for review, with a focus on the more severe neuro-invasive cases (WNV-NI) (N=137).

METHODS

The active ED syndromic surveillance data and the passive West Nile Virus case report data from the time period June 1st through November 31st 2004 were reviewed. Patient identifiers from WNV-NI case reports were linked to ED visits in the syndromic surveillance system. Chief complaints, syndromic classification, and dates of interest (onset date, ED visit date) were reviewed for cases that visited a syndromic surveillance ED. All WNV-NI records were reviewed for any mention of ED usage.

RESULTS

During the study period the syndromic surveillance system was recording about 12%ⁱ of all ED visits in LA County (5 of 77 EDs). The community wide outbreak of WNV-NI cases was geographically disperse, occurred over a 3 month period, and had a peak of 6 cases per day. The review of the 137

WNV-NI cases found that 55% had visited an ED in LA County (N=75). Six percent had visited an ED that was monitored with syndromic surveillance (n=8) and 2% had been classified into a neurological syndrome (n=3). No neurological signals were generated during the outbreak period due to a WNV-NI case. If the chief complaints from all EDs were monitored with syndromic surveillance we would expect to capture all 75 ED visits by WNV-NI cases, with less than one half of these cases (<38) classified as neurological. During the peak of the outbreak less than one half of the 6 cases per day (<3) would be categorized as neurological, and would not likely occur in the same hospital. Therefore, no signal would likely be produced in a timely manner by the syndromic surveillance system, even if all EDs in LA County were monitored. A review of the 8 WNV-NI cases that visited a syndromic ED revealed that 3 had been hospitalized and released prior to their ED visits, and that 4 cases had multiple ED visits. These 8 cases visited an ED 1 to 62 days after symptoms onset (mode = 12 days, median = 3 days).

CONCLUSION

Monitoring emergency room chief complaints in LA County would not likely serve as an effective indicator for an outbreak with characteristics like that of the WNV-NI community wide outbreak that occurred in 2004. The long duration of this outbreak would not provide the intensity of cases needed to trigger a signal. In addition, patient chief complaints were not specific enough for the system to classify more than half the cases as neurological. Increased hospital coverage would increase the number of cases captured by the system, but would not likely provide the intensity needed to produce a signal. Further review of known disease outbreaks and syndromic surveillance activity will provide a better understanding as to what types of disease outbreaks can be detected.

REFERENCE

[1] Flaherty, J., Correlation of West Nile Virus Infection with Emergency Department Chief Complaints by using a Passive Syndromic Surveillance Model - Chicago, Illinois. MMWR. Sept. 2004; (53) 237.

i – Estimate based on total syndromic ED visits in Los Angeles County for 2004 (309,000) and the Hospital Association of Southern California estimate of total emergency room visits in Los Angeles County (2.5 million) for 2003.