

Utility of 911 Ambulance Dispatch Data for the Syndromic Surveillance of Heat-Related Illness in Toronto, Ontario, 2002-2005

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OBJECTIVE

This paper describes the use of 911 ambulance dispatch data for the early detection of heat-related illness in Toronto, Ontario, Canada.

BACKGROUND

Although the majority of work in syndromic surveillance has been its application to bioterrorism and infectious diseases, one of the emerging priorities for its use is for the monitoring of environmental health conditions. Heat-related illness (HRI) is of growing public health importance, especially with global warming concerns and increased frequency of heat waves [1]. Ambient temperatures are responsible for significant morbidity and mortality, as was demonstrated during the 1995 heat wave in Chicago that resulted in over 700 excess deaths and 33,000 emergency room visits due to HRI [2]. A syndromic surveillance system that is able to detect early indications of excess HRI may start the public health response earlier, and thus reduce associated morbidity and mortality. The utility of 911 ambulance dispatch data for the early detection of heat-related illness was explored.

METHODS

Retrospective data for the years 2002 to 2005 were acquired through Toronto's Emergency Medical Services (TEMS). Data stored on an automated ambulance dispatch system capture calls that are categorized into predefined dispatch codes based on responses to questions to assist with triaging [3]. These codes, along with other demographic and geospatial information is then stored in a database at TEMS.

Call codes indicative of HRI were selected through a focus group of clinicians, paramedics, and epidemiologists. Numbers of calls consistent with HRI were extracted and analysed with a non-historical version of the Early Aberration Reporting System (EARS) (Centers for Disease Control and Prevention, Atlanta, Georgia). All three EARS CUSUM algorithms were considered. Anomalies were compared with start dates of heat alert periods, as called by Toronto Public Health and based on probabilities of excess mortality. This system uses a synoptic approach to determine which climatic conditions lead to increased mortality [4].

RESULTS

The 911 ambulance dispatch data consistently detected significant HRI usually one day before the start of an official heat alert period (Figure 1). Typically, all three CUSUMS generated an alert. Additionally, these data were useful in detecting event-related HRI such as at large-scale outdoor concerts.

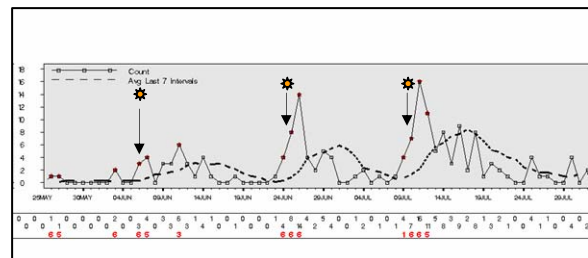


Figure 1- EARS Plot for Heat-related 911 Calls in Toronto: May 30th-July 30th, 2005 (* start of heat alert period)

CONCLUSIONS

The use of 911 ambulance dispatch data for syndromic surveillance is promising, particularly for the early detection of HRI. This work has demonstrated that monitoring 911 calls that represent HRI has the potential to be used as an equivalent to current weather-based detection systems. The implications for this are particularly important for cities that may not have a HRI warning system in place. Areas with a current heat alert system can also benefit from 911 call data by receiving information that may allow earlier public health response and warnings. Given the magnitude of the potential effect of heat on health and the fact that HRI is preventable, developing a comprehensive surveillance system to detect HRI early is of paramount importance.

REFERENCES

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