

The Association Between Temperature and 911 Calls for Heat-Related Illness: Potential for Syndromic Surveillance

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OBJECTIVE

This paper describes the association between 911 medical dispatch calls for heat-related illness and maximum temperature in Toronto, Ontario during the summer of 2005.

BACKGROUND

One of the emerging priorities for the use of syndromic surveillance is for the monitoring of environmental health conditions. Heat-related illness (HRI) is of growing public health importance, particularly with climate change and anticipated increased frequency of heat waves [1, 2]. High ambient temperatures are responsible for significant morbidity and mortality, as was demonstrated during the 2003 heat waves in Europe that resulted in an estimated 45,000 excess deaths [3]. 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. Our research group is exploring the potential use of 911 medical dispatch data for the surveillance of HRI in Toronto. An important step in this assessment is exploring the association between temperature and 911 dispatch calls for HRI.

METHODS

All of the 911 medical dispatch calls, that were made in Toronto between June 1 and August 31, 2005, were obtained from Toronto Emergency Medical Services. Calls with codes that represented heat exposure were selected from these data according to their Medical Priority Dispatch Code (six code categories). The proportion of calls for HRI to all emergency calls was calculated for each day. Values for maximum temperature (°C) were obtained from Environment Canada for each day. Zero inflated Poisson regression analysis was performed to determine the association between calls for HRI and daily maximum temperature.

RESULTS

In 2005, there were 201 calls to 911 for HRI (Figure 1). On average, for every one degree increase in temperature there was a 29% increase in 911 calls for HRI ($p < 0.001$).

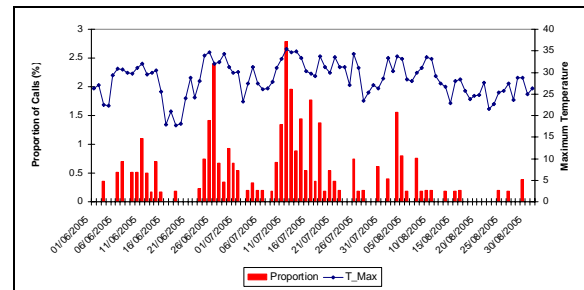


Figure 1- Daily 911 Calls for HRI as a Proportion of Total Calls June 1-August 31, 2005

CONCLUSIONS

This is the first study to present an association between 911 calls specifically for HRI and maximum temperature. Other than very limited work on EMS dispatches and health information lines, there has been very limited morbidity data available for HRI. The 911 medical dispatch data captures morbidity, and also records it at the location the individual becomes ill. This differs from more traditional data sources that rely on residential address information, which does not necessarily reflect the location that interventions should be targeted. These findings suggest that 911 medical dispatch data for HRI is associated with maximum temperature and therefore likely to be reflecting illness in the community, though a labeling phenomena cannot be excluded. Working with proportions of calls adjusts for daily population flows in and out of urban areas and for day effects associated with work and recreational patterns. The use of 911 data for syndromic surveillance system of HRI should be further explored given the increasing health concerns with climate change.

REFERENCES

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