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Evaluating the Ability of a Syndromic Surveillance System to Detect Heat-Related Illnesses in Houston, TX, 2009-2012

Nathan Wang*, Biru Yang, Wesley McNeely, Salma Khuwaja and Raouf Arafat

Houston Department of Health and Human Services, Houston, TX, USA

Objective

To evaluate the ability of a syndromic surveillance system to detect heat-related illnesses during a heat wave in Houston and to identify areas in Houston that requires additional resources to prevent heat-related illnesses.

Introduction

Extreme heat events over the past 30 years have resulted in unprecedented increase in the numbers of heat-related morbidity and mortality across the world (1-3). During the same time frame, Houston residents has experienced three of the hottest summers on record since 1889, with 2011 being the hottest summer on record (4). Therefore, preparing for extreme heat events and monitoring their effects on public health is a vital role for the Houston Department of Health and Human Services (HDHHS). Since heat-related illnesses are not a reportable condition in the state of Texas, HDHHS authorities rely on other sources to provide information on the impact of heat on the population. HDHHS is currently able to monitor emergency departments (ED) visits across the Houston metropolitan area, Harris County, and the surrounding jurisdictions by using a syndromic surveillance system called Real-time Outbreak Disease Surveillance (RODS). The RODS system collects de-identified patient data that consists of their chief complaint and basic demographics (e.g. age, sex, zip code). This study is aimed at evaluating the ability of RODS to detect heat-related illnesses during heat event of the years 2009-2012 as well as identifying the areas of Houston that had the highest incidence of heat-related morbidity.

Methods

Heat –related mortality data was provided by the Harris County Medical Examiner's Office. Heat-related illness data was collected by RODS, an electronic syndromic surveillance database consisting of about 36 EDs in metropolitan Houston. A case of heat-related illness was defined as having one of the following terms in their chief complaint: heat stroke, heat exhaustion, or heat cramps. RODS v.4.2 was used as the syndromic surveillance system. Oracle SQL Developer v.3.2 was used to extract data from the RODS system. ArcGIS v.10.1 was used for geo-coding and geographic analysis layers. SatScan v.9.1.1 was used to perform cluster analysis.

Results

In the record-setting summer of 2011, RODS recorded a 300% increase of heat-related ED visits in the month of August. During 2009-2012, there were two age groups that had the highest annual incidence rates: 50-59 year olds (12.8 visits/100,000 persons) and 40-49 year olds (12.6 cases/100,000 persons). In 2012, five zip codes in the greater Houston metropolitan area were identified as having the highest incidence rates for heat-related ED visits, thus paving the way for intervention efforts. Cluster analysis results are pending the completion of the analysis of heat surveillance data.

Conclusions

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Keywords

syndromic surveillance; heat-related illness; geographic analysis

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*Nathan Wang
E-mail: nathan.wang@houstontx.gov