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# Syndromic Surveillance of Motor Vehicle Crash Related Injuries in Nebraska

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## Objective

The objective of this pilot study is to demonstrate the value of emergency department (ED) syndromic surveillance (SS) data to aid the surveillance of motor vehicle crash (MVC) related injuries in Nebraska.

## Introduction

Motor vehicle crashes (MVC) are a significant public health problem in Nebraska. These events cost Nebraska \$1.6 billion a year, are the leading cause of injury death, and the fourth leading cause of injury hospital treatment in the state. Speeding, driving under the influence, distracted driving, and adverse weather are the main causes of MVC in Nebraska. Effective prevention efforts to reduce MVC related deaths and injuries depend greatly on a surveillance system that monitors the frequency of these events so stakeholders may ascertain the MVC related causes and impact on the state. Currently, the Nebraska Department of Health and Human Services (NDHHS) Crash Outcome Data Evaluation System (CODES) monitors MVC related death and injuries by linking the following databases statewide crash data, hospital discharge data (HDD), trauma registry, emergency medical system (EMS) data and death certificate data<sup>1</sup>. Although this system has been effective in identifying the causes of MVC-related injuries and supporting community based highway safety programs, it is limited by the lack of immediate availability of data. An ED based SS system could potentially be used to enhance MVC injury surveillance by allowing the timely detection of clusters, anomalies and trends. Therefore, an ED SS system could be incorporated to support an efficient and rapid prevention response to MVC-related injuries.

## Methods

The reporting consistency of the SS ED data was assessed by comparing 2011-2012 SS ED data to ED HDD from Hospital A, located in Douglas County, NE. Syndromic surveillance ED 2011-2014 data and ED HDD 2011-2012 data were queried for ICD9-CM codes associated with MVC-related injuries (E810-E819). Pearson correlation coefficients were calculated to determine the reporting consistency between the two databases. The mean time in hours between patient visit and receipt of ED SS record at NDHHS was also calculated. Time series graphs of weekly MVC-related injury ED visits were created for years 2011-2014. Climate data was analyzed for snow depth, precipitation and severe weather. Dates corresponding to relevant climate, sports and entertainment events were identified.

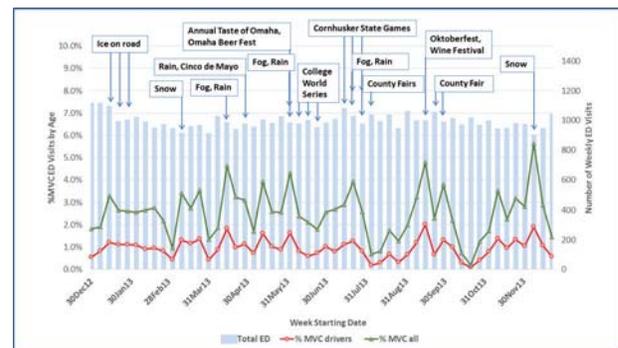
## Results

For the time period of 2011 and 2012, significant correlations ( $> 0.70$ ,  $p < 0.001$ ) were detected between SS ED data and ED HDD. The mean time of receipt of ED SS records was 12 hours. Each year, between 2011 and 2014 a spike of MVC injury related ED visits occurred during significant climate, sports, and entertainment events. The analysis of the 2011-2014 SS ED data indicates a possible temporal trend in the incidence of MVC-related injuries in NE. During

winter, MVC-related injuries were more common during weeks with higher snow depth or freezing rain. Moreover, higher proportions of MVC-related injuries were also observed during summer weeks that corresponded to relevant entertainment events. Results suggest that there is a strong correlation between weather, sports and entertainment events and spikes in MVC-related injuries.

## Conclusions

The pilot study indicates that MVC injury related ICD9-CM codes in SS ED data are highly correlated with ED HDD. Results also suggest that SS ED data can be used for the timely identification of MVC-related injuries in Nebraska. Thus allowing the rapid identification of MVC hot spots and the timely deployment of accident prevention measures.



## Keywords

syndromic surveillance; emergency department; injury; motor vehicle crash

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