

Identifying Clusters of Falls During the 2007-08 Winter Season in the BioSense System

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OBJECTIVE

The purposes of this study are to identify and characterize increases in emergency department (ED) visits for falls during the 2007-08 winter season.

BACKGROUND

Falls are the leading cause of nonfatal medically attended injuries in the United States [1] and accounted for 21% of injury-related visits to U.S. EDs in 2005 [2]. BioSense is a national system designed and operated by the Centers for Disease Control and Prevention (CDC) that receives, analyzes, and visualizes electronic health data and makes it available for public health use. During winter 2007-2008, the system received chief complaint and/or diagnosis data from 441 hospitals. Falls are one of 11 injury-related concepts currently tracked by BioSense.

METHODS

We studied chief complaints indicating a fall using time series methods and SatScan software [3]. The time series analyses included 19 metropolitan areas with ≥ 2 participating EDs during October 1, 2007-March 31, 2008. The number of fall visits per day was compared with a 28-day moving average to calculate statistical significance (increases with $p < 0.002$ are reported) and excess visits (observed-expected). A preliminary analysis using SatScan was done as follows: a separate run was done for each month; the geographic unit of analysis was the ED facility; a retrospective space-time analysis was done with the Poisson probability model; the adjustment file was used to account for differing mean rates of falls visits among facilities and, within a single facility, differing numbers of total ED visits on individual days; maximum circle radius=100 km; maximum days per cluster,=1; and number of repetitions=-9999.

RESULTS

The time series analysis of metropolitan areas showed 14 episodes of increased falls in 10 metropolitan areas; 4 areas had 2 episodes and 6 had 1 episode; 9 episodes lasted 1 day and 5 lasted 2 days. The median number of visits for falls was 52 (range 18 – 324) per day and the median number of excess visits for falls was 40

(range 10 – 233) per day. Among the 2,093 visits for falls, 33% had a diagnosis reported, and 15% of these had an ICD-9 code for fracture; 188 (9%) chief complaints mentioned the word “ice” or “snow.” Nine of the episodes occurred during Dec 6-18, 2007 and 4 on February 12, 2008, periods with winter storm activity. The preliminary SatScan analysis showed 16 spatial clusters with $p=0.0001$. These 16 clusters were centered in 6 states and 5 involved >1 state; 7 clusters occurred during Dec 6-19, 2007, 6 during Feb 9-21, 2008, and 3 at other times. The median number of facilities per cluster was 15 (range 2-31), the median cluster radius was 82 (range 9-98) km, and median excess visits for falls was 98 (range 32 – 223).

CONCLUSIONS

We identified several large increases in ED visits due to falls associated with severe weather. The increases found by time series analysis of metropolitan areas were similar in location and date to the 1-day clusters identified by SatScan; more detailed comparisons of findings by these two methods will be presented. These results are limited by BioSense’s current geographic coverage and the types of data available. Nevertheless, they illustrate the role that an automated system can play in tracking injuries and potentially assisting with prevention strategies.

REFERENCES

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