

# Evaluation of ESSENCE Syndromic Definitions for ED Visits Related to Falls in Icy Weather

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## Objective

This project evaluated and compared two ESSENCE syndromic surveillance definitions for emergency department (ED) visits related to injuries associated with falls in icy weather using 2016-2017 data from two hospitals in Douglas County, Nebraska. The project determined the validity of the syndromic surveillance definition as applied to chief complaint and triage notes and compared the chief complaint data alone to chief complaint plus triage notes definitions to find the most reliable definition for ED visits resulting from fall-related injuries.

## Introduction

Icy weather events increase the risk for injury from falls on untreated or inadequately treated surfaces. These events often result in ED visits, which represents a significant public health and economic impact [1]. The goal of this project was to start the process toward an evaluation of the public health impact and the economic impact of falls associated to icy weather in Douglas County, NE for the ultimate purpose of designing and implementing injury prevention related public health protection measures. Additionally, the validated definition will be used by NE DHHS Occupational Health Surveillance Program to identify work related ice-related fall injuries that were covered by workers compensation. To achieve the goal, the first step was to identify a valid and reliable syndromic surveillance. Specifically, this project looked at the applicability of the ESSENCE syndromic surveillance definitions related to injuries associated with falls. Two syndromic surveillance definitions were compared, one that includes triage note and chief complaint search terms, and another that only includes chief complaint. The hypothesis was that the ESSENCE syndromic surveillance definition that includes triage note and chief complaint search terms, rather than the syndromic surveillance definition that only includes chief complaint, would be more effective at identifying ED visits resulting from fall-related injuries.

## Methods

This project included 751 EDs visits from two hospitals located in Douglas County Nebraska, during ice events on December 16-18, 2016, January 10-12, 2017, and January 15-18, 2017. Two ESSENCE syndromic surveillance definitions, “Chief Complaint or Triage Note” and “Chief Complaint Only,” were used to identify fall-related ED visits from two participating EDs in Douglas County, NE. In the chief complaint and the triage note fields, the keywords selected were: fall, fell, or slip. In that the ESSENCE time series analysis indicated the increase in the number of falls were associated with ice events from baseline, an assumption was made that the increase was a result of the weather. Then, the Syndromic Surveillance Event Detection of Nebraska database was used to find the patient and visit identification numbers. These two identification numbers were used to identify the EHRs needed for a gold standard review. Chart data was used to evaluate the reliability and validity of the two syndromic surveillance definitions for the detection of falls on the study dates. This analysis was used to find the sensitivity, specificity and predictive value.

## Results

The sensitivity, specificity and positive predictive value for the “Chief Complaint Only” definition yielded 71.7%, 100%, and 100% respectively. The “Chief Complaint or Triage Note” definition results were 90.9%, 98.8%, and 95.5% for these analyses. Negative predictive value for both definitions was 97.5%.

## Conclusions

The sensitivity indicates both definitions are unlikely to give false positives, and the positive predictive value indicates both definitions successfully identify most of the true positives found in the visits. However, the “Chief Complaint Only” definition resulted in a minimally higher specificity and positive predictive value. Therefore, the results indicate that although both definitions have similar specificity and positive predictive value, the “Chief Complaint or Triage Note” definition is more likely than the “Chief Complaint Only” definition to correctly identify ED visits related to falls in icy weather.



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## References

1. Beynon C, Wyke S, Jarman I, Robinson M, Mason J, et al. 2011. The cost of emergency hospital admissions for falls on snow and ice in England during winter 2009/10: a cross sectional analysis. *Environ Health*. 10(60). [PubMed](#)

## Number of falls detected by the ESSENCE “Chief Complaint Only” Falls Definition and the Gold Standard Chart Review

Detected by ESSENCE	Fall related visits	Non-fall related visits	Total
Yes	38	0	38
No	15	579	594
Total	53	579	632

## Number of falls detected by the ESSENCE “Chief Complaint or Triage Note” Falls Definition and the Gold Standard Chart Review

Detected by ESSENCE	Fall related visits	Non-fall related visits	Total
Yes	150	7	157
No	15	579	594
Total	165	586	751



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