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A Roadmap : The Use of ER Narrative Text and Coded Data to Capture Non-Fatal Injuries

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Introduction



Non-fatal Injuries

Significant shift from fatal to non-fatal injuries (e.g. burden of injury)

Accounted for almost **31M** injuries of people treated and released from the emergency room in 2015



Difficult to quantify the impact of injury

Minimal literature to support a current comparability matrix that links data between National Electronic Surveillance System (NEISS) injury-coded data and ICD-10CM

Why is this important?

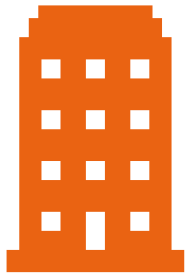
► Injury Pyramid



Aim

- ▶ Implement a comparability tool that maps ICD-10 CM external cause codes (“V”, “W”, “X” and “Y”) to the National Electronic Injury Surveillance System (NEISS)- coded non-fatal injuries.

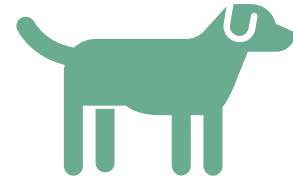
Methods



Setting: Independent federal agency



Participants: The sample was made up of 613,422 NEISS- injury coded cases from 2015



Scope: The scope of the project was narrowed to the mechanism - of-injury category, dog bites.

Interventions

- Design of matrix was heavily dependent on the use of regular expression (PRXMATCH) within Statistical Analysis System (SAS)
- An agile methodology was applied to develop and build SAS algorithms for the mechanisms of injury, dog bite

Excerpt of the Dog Bite Algorithm

```
/'(?<OR)B(I|O)TE?(TEN)?|(BI)T?(E|I)N(G)|(DOG?\SBITE)/"
```

Measures

- ▶ **A posttest only design was used to map NEISS-coded injury narrative to the appropriate ICD-10 CM external cause code:**
- At least 90% of NEISS- coded injury (16; dog bite) cases accurately mapped to ICD-10 CM external cause codes
- Accuracy of the mapping tool was at least 90% when compared with Web-based Injury Statistics Query and Reporting System (WISQARS)

Results

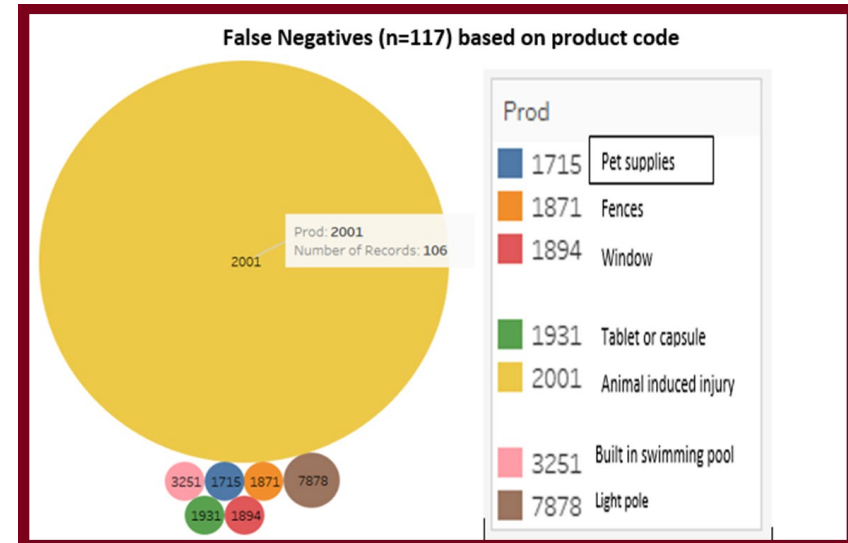
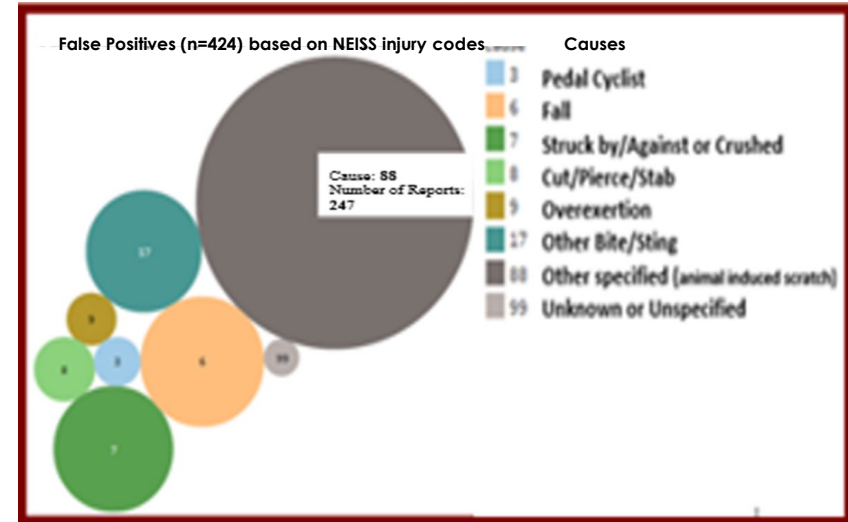
- 96.8% of all dog bites were identified and associated to injury narratives with ICD-10 CM external cause code, W54.0, using NEISS cause code, 16.
- >92% accuracy in mapping text algorithm to WISQARS

Results cont.

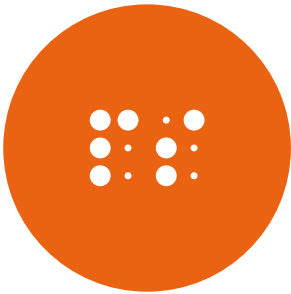
- ▶ 424 false positive cases and 117 false negative cases.
- The text algorithm predicted true negatives at a specificity of 0.99.
- The mapping tool captured dog bite narrative cases with the precision of 0.93

		True Class		
		Dog Bite	No Dog Bite	
Predicted Class	Dog Bite	TP= 5694	FP= 424	PPV or Precision = 0.93%
	No Dog Bite	FN= 117	TN=607,494	
		TPR (Sensitivity) or Recall= 0.98	TNR or Specificity= .99	NPV= 0.99%

Table 1: A Confusion Matrix to describe the performance of a text algorithm for dog bites
 TP= True Positive, FP= False Positive, FN= False Negative, TN= True Negative, and TPR= True Positive Rate, TNR= True Negative Rate, PPV= Positive Predictive Value, and NPV= Negative Predictive Value



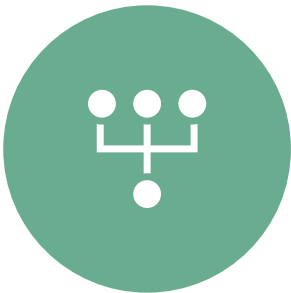
Discussion



Supplemental coding rules were only applied to NEISS codes.



A validation process may reduce user error related to the selection of external cause codes within NEISS



The NEISS classification system only allows for two injuries to be assigned to one case



Previous studies demonstrated the coding challenges of creating a comparability tool between NEISS and ICD-9 CM

Conclusion

- Free text data offers detail and qualitative value to accurately identify the mechanism of injury
- A solely automated review process of NEISS coded narratives would be premature at this time.
- The text algorithm was useful in identifying subtleties of external cause code abstractions.
- Incorporating the text algorithm into the monthly review of sample cases saves time and improves the analysis of coding practices

Reference

- ▶ Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2017a). WISQARS leading causes of death reports, national and regional, 1999 – 2016. Retrieved from: <https://www.cdc.gov/injury/wisqars/LeadingCauses.html>.
- ▶ Harrison, J.E. (n.d.) Australian Injury Morbidity and Mortality Data: Issues for comparability [Transcript]. Retrieved from: <http://www.cdc.gov/nchs/data/ice/ice95v1/c04.pdf>

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