

Assessing an Expanded Definition for Injuries in Hospital Discharge Data Systems



Report from the Injury Surveillance Workgroup (ISW6)



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State and Territorial Injury Prevention Directors Association

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Background

The Fifth Injury Surveillance Workgroup ISW5 produced the report *Consensus Recommendations for Injury Surveillance in State Health Departments* in September 2007 (STIPDA, 2007). In a section entitled “New Challenges in Injury Surveillance”, it was recommended that states with statewide hospital emergency department (ED) data systems implement a broader definition of an injury than the 2003 hospital inpatient discharge-based definition of “a first-listed injury diagnosis based on the Barell matrix definition of an injury” (STIPDA, 2003). *The Statewide Emergency Department Data Definition is recommended to include:*

Initial visits to an ED for an injury episode with either:

- 1) A diagnosis based on the Barell matrix definition of an injury (Barell, 2002) found in the first diagnosis field, regardless of any mention of an external cause-of-injury code; or*
- 2) A first-listed valid external cause-of-injury code (see <http://www.cdc.gov/ncipc/osp/matrix2.htm>), based on the recommended framework for external causes of injury.*

Cases coded with complications of medical and surgical care and/or adverse effects are to be excluded from both the cases identified by diagnosis codes as well as the cases identified by external cause codes because both the Barell matrix and the external cause of injury matrix, which are used internationally to categorize injury diagnoses and mechanisms of injury, also exclude complications of care and/or adverse effects. It has been generally accepted that these conditions are not amenable to the traditional work of state injury and violence prevention programs (CDC, 1997).

The report also recommended that: ***Further state-based analyses of the effects of expanding the injury definition in the STIPDA 2003 report to include external cause of injury data be conducted in hospital discharge data (HDD) systems.***

The Workgroup decided to conduct a preliminary investigation to determine the impact of expanding the STIPDA 2003 definition for HDD to match the newly recommended definition to be used with Emergency Department data. The focus of the investigation was to determine if the predictive value of the additional cases identified by the expanded injury case definition warranted their inclusion. This preliminary investigation became the work of the ISW6 Workgroup.

Methods

Three states agreed to conduct medical records abstraction for two selected definitions to confirm the presence of injury and whether or not the injury was the cause of the hospitalization. Colorado, Oregon, and Florida selected a random sample of at least 50 discharge records from their 2006 statewide hospital discharge database according to the following criteria:

- Stratum 1) did not have an injury diagnosis code in the first diagnosis field but did have an injury diagnosis code (based on the Barell matrix definition) in subsequent diagnosis fields (2nd –20th diagnosis code) AND had a valid E-code in the electronic record
- Stratum 2) did not have an injury diagnosis code in any of the diagnoses fields but did have a valid E-code present

A data abstraction form was developed and used by state injury directors or senior injury-related epidemiologists who served as abstractors. Following review of the medical record, abstractors were asked to determine the *primary* reason the person was hospitalized, within the following criteria:

- 1) For an injury event in which the person sustained an anatomic injury.
- 2) For an injury event, but the person did not sustain an anatomic injury (Example: The patient was admitted for observation after a motor vehicle crash, but no anatomic injury was identified).
- 3) For a late effect from a previous injury (*Example 1*: A patient with an existing spinal cord injury was admitted for treatment of a decubitus ulcer or a urinary tract infection. *Example 2*: The patient was admitted for removal of hardware from a previously treated fracture/open reduction internal fixation).
- 4) For a medical condition or as a consequence of a medical condition (*Example 1*: The patient had a syncopal episode and fell, sustaining a minor bruise or laceration. The hospitalization was for work-up of the syncope, not for the injury that was sustained. *Example 2*: The patient had a seizure and was involved in a motor vehicle crash. Injuries were minor. The primary reason for the hospitalization was for work-up of the seizure. *Example 3*: The patient had a pathologic fracture resulting from osteoporosis, cancer, bone abnormality or steroid use. *Example 4*: The patient had an intracranial bleed that was not related to head trauma. *Example 5*: The patient had an intracranial tumor resulting in brainstem compression. *Example 6*: The patient was intoxicated and “found down” with a broken arm [a condition that in and of itself would not result in hospitalization]. Admission was for acute alcohol withdrawal.)
- 5) For a psychiatric condition (*Example*: The patient attempted suicide by drug overdose or cutting. Anatomic injuries were minor. The primary reason for admission was for a mental health hold or for treatment of schizophrenia/depression).

- 6) Medical conditions and injury were equally important as reasons for admission.
- 7) Psychiatric conditions and injury were equally important as reasons for admission.
- 8) Other (Describe).
- 9) It is unclear what the primary reason for this person's hospitalization is.

Finally, the abstractors coded whether the patient (1) sustained an injury prior to or after hospital admission, (2) did not sustain an injury, or (3) it was unclear if an injury occurred.

Results

A total of 212 charts were reviewed (Table 1); nearly two-thirds of the records reviewed were from stratum 1. Fifty percent of the sampled patients were male; 2% were under five years of years of age, 9% were 5-24 years, 20% were 25-44 years, 26% were 45-64 years, and 42% were 65 years and older. Sixteen percent were hospitalized less than two days, 48% 2-4 days, 17% 5-7 days, and 20% 8 or more days.

Table 1. Distribution of sampled cases by state and stratum.

State	Stratum 1 No.	Stratum 2 No.	Total (%)
COLORADO	19	30	49 (23.11)
FLORIDA	71	19	90 (42.45)
OREGON	47	26	73 (34.43)
Total (%)	137 (64.62)	75 (35.38)	212 (100.00)

Primary Reason for Hospitalization

Physical injury was coded as the primary reason for hospitalization in less than 10% of cases in both strata (Table 2). For another 8% and 5% of cases, respectively, the abstractor indicated that a medical or psychiatric condition along with an injury were equally responsible for the hospitalization; late effects of a previous injury accounted for 12% and 1%, respectively, as did psychiatric conditions alone. Medical conditions or consequences of medical conditions were coded as the primary reason for hospitalization in 52% of Stratum 1 cases and 77% of Stratum 2 cases.

Table 2. Primary Reason for Hospitalization by Stratum.

Coded Primary Reason for Hospitalization		
	Stratum 1 No. (%)	Stratum 2 No. (%)
(1) Physical injury during event	10 (7.3)	6 (8.0)
(2) No physical injury during event	3 (2.2)	2 (2.7)
(3) Late effect from previous injury	17 (12.4)	1 (1.3)
(4) Medical condition/consequence	71 (51.8)	58 (77.3)
(5) Psychiatric condition	17 (12.4)	1 (1.3)
(6) Medical conditions and injury	7 (5.1)	4 (5.3)
(7) Psychiatric conditions and injury	4 (2.9)	0 (0.0)
(8) Other	5 (3.7)	1 (1.3)
(9) Unclear	3 (2.2)	2 (2.7)
Total	137 (100)	75 (100)

Among all Stratum 1 records (i.e., an injury diagnostic code was listed, but not in the primary diagnostic field), 72% indicated that the coded injury/injuries occurred prior to admission, 4% occurred after admission, and for 10% the timing of injury was coded unknown; 14% were coded that there was no injury. Data available upon request.

Limitations

Although examples were given regarding coding of the primary reason for hospitalization, the coding was subjective. However, well-trained, experienced injury surveillance personnel conducted the reviews. Additionally, the pilot study did not assess inter-rater reliability. Finally, the pilot study involved a relatively small sample size among only three states. Even with these possible limitations the results were independently consistent across the three states, suggesting the results are valid.

Conclusions

The study found the positive predictive value of 1) Cases with an external cause-of-injury code which had an injury diagnostic code located in any of the non-primary field positions was 7.3%, and 2) Cases with an external cause-of-injury code which had **no** injury diagnostic code listed anywhere on the record was 8.0%.

Based on these study findings, the Workgroup concluded the current definition of a *first-listed injury diagnosis based on the Barell matrix definition* should not be expanded in hospital discharge data.

References

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