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Use of ICD-9-CM Codes to Identify Inpatient Fall-Related Injuries

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Abstract

OBJECTIVES—CMS currently uses ICD-9-CM codes to determine whether an inpatient fall-related injury may warrant reduction in hospital payment. The purpose of our study was to compare falls and fall-related injuries identified by a fall evaluator or hospital incident report with injuries identified by discharge ICD-9-CM codes for the same set of inpatient episodes of care.

DESIGN—Prospective, descriptive study.

SETTING—Sixteen adult general medical and surgical units in an urban, major teaching hospital.

PARTICIPANTS—All adult patients who sustained a fall with injury during a five-year period (380 falls with injury).

MEASUREMENT—Falls identified by a fall evaluator or hospital incident report were classified according to their injury severity. Discharge abstracts provided diagnoses codes (ICD-9-CM) for the discharge, including fall-related injury codes.

RESULTS—The majority of inpatient falls with injury (n=343; 90.2 %) resulted in temporary harm to the patient; the remaining 37 falls (9.8 %) resulted in more serious harm. We found that 16 of the 37 falls with injury extending hospitalization or resulting in death, or less than one-half, were identified using the CMS-targeted injury code ranges combined with the present on

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admission (POA) indicators. Among the 21 falls with injury that were not identified, nine (42.9 %) lacked documentation of any injury and seven (33.3 %) identified other injuries outside the CMS-targeted injury code ranges.

CONCLUSION—The CMS-targeted ICD-9-CM codes used to identify fall-related injuries in claims data do not always detect the most serious falls.

Keywords

Inpatient falls; fall-related injuries; ICD-9-CM codes; hospital-acquired conditions

INTRODUCTION

Between 3 and 4 % of hospitalized patients experience an adverse event, and research suggests that up to 70 % of these events were preventable.^{1–7} Millions of dollars have been devoted to patient safety research and error reporting systems. The Centers for Medicare and Medicaid Services (CMS) have now implemented a payment policy denying incremental payment to hospitals for care associated with certain ‘hospital acquired conditions’ (HACs).⁸

A critical component in improving quality of care and patient safety is accurate measurement of adverse events. Unfortunately, there is strong evidence to suggest that widely used, current detection approaches may not identify a significant proportion of these events. One recent study found that patient safety indicators (using discharge data, primarily ICD9-CM codes) may miss as many 90 % of adverse events.⁹ Another study focusing on catheter-associated urinary tract infections, found that claims data documented rates inconsistent with previous epidemiologic data.¹⁰

Hospital inpatient falls have become a safety priority for many providers and policymakers. Accidental falls are among the most common incidents reported in hospitals.¹¹ In fact, they represent the single largest category of HACs targeted by the CMS nonpayment rule, by far.⁸ Up to 25% of hospital falls result in some level of injury, and 2 % of falls result in complications serious enough to extend a hospital stay.^{11–13} Because of the potentially large costs associated with a fall,^{14,15} a great deal of attention has been devoted to event tracking and prevention. Many of the larger tracking studies^{14,16,17} and the new CMS reimbursement policy rely on ICD9-CM codes to identify falls with injury. The purpose of our study was to compare falls and fall-related injuries identified by a fall evaluator or hospital incident report with fall-related injuries identified by discharge ICD-9-CM codes for the same set of inpatient episodes of care at one large hospital during a 5-year period (hereafter referred to as ‘code-identified fall-related injuries’). We also perform a ‘root cause analysis’ as to why discharge ICD-9-CM codes did not always capture relevant clinical events.

METHODS

Setting and Participants

Data on falls were collected at Methodist Healthcare-University Hospital (MH-UH), an urban, major teaching hospital in Memphis, Tennessee. We abstracted falls information for patients receiving care on 16 medical-surgical nursing units at MH-UH between January 1, 2007 and December 31, 2011. These units contained 349 beds and provided a total of 99,705 inpatient stays (478,952 patient days) for 80,312 patients during the study period. We include all patients in our analyses because the policy issues highlighted here are widely applicable. Although the original HAC nonpayment policy applied only to Medicare

admissions, the policy now covers Medicaid admissions (July 2012), and other payers may soon follow suit.

Identification of Falls and Falls with Injury

A fall was defined as a sudden, unintentional change in position coming to rest on the ground or other lower level.¹⁸ If a patient was found on the floor by staff, this event was also classified as a fall. Falls were identified through fall evaluators as well as hospital incident reports. Between 9/9/05 and 9/30/07, MH-UH participated in an NIH-sponsored study examining the efficacy of bed alarms for prevention of inpatient falls; this study supported fall evaluators (nurse managers, nurse supervisors or study personnel) in the hospital to provide round-the-clock coverage for assessment of falls. When a possible fall event occurred, unit staff paged the fall evaluation service to assess the event using a standardized data collection tool and populate a falls database.¹⁹ After 9/30/07, falls were identified through the hospital's incident reporting system. Under this reporting system, risk managers were notified of the event and given up to a week to conduct a medical record review, ascertain event details and resulting injuries, complete their report and close the event file. If risk managers were subsequently notified of additional information regarding the event (e.g. by the clinical director of the floor), they could reopen and update the file.

MH-UH uses the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index for categorizing falls and fall related injuries.²⁰ While the primary purpose of the NCC MERP index is to facilitate examination and evaluation of causes of medication errors, MH-UH, like other organizations,²¹ has found the framework useful for looking at other adverse events and has adapted it for that purpose. An overview of the classification system, as adapted by MH-UH, is contained in our appendix (see Figure 1) and a summary is provided in Table 1. Falls data maintained by MH-UH contained information on all unassisted and assisted falls classified as Category C (error occurred that reached patient, no harm occurred) or above. For the purposes of this paper, all falls classified as Category E (temporary harm) or above were considered falls with injury.

ICD-9-CM Identification of Inpatient Fall-Related Injuries

Discharge ICD-9-CM codes for each patient stay on the 16 study floors (N=99,705) were reviewed to flag fall-related injuries: fracture (800–829), dislocation (830–839), intracranial injury (850–854), crushing injury (925–929), burn (940–949), and electric shock (991–994). In combination with a present on admission (POA) indicator, these code ranges are used by the CMS to identify (fall-related) HACs that may affect reimbursement. Fall events were also flagged in these discharge codes using e-codes (e.g. E888.9: Fall NOS).

Data Analysis

Falls data were classified according to level of harm to the patient (NCC MERP Index, Categories C – I). For falls with injury (Category E and above), we examined the CMS HAC ICD-9-CM code ranges and present on admission (POA) flags associated with the same episode of care to detect code-identified fall-related injuries that might affect reimbursement. Finally, for Category F falls or higher (temporary harm to patient that required initial or prolonged hospitalization) where a code-identified fall-related injury did not appear in the discharge data, we conducted an in-depth investigation to determine if:

- discharge diagnoses identified another inpatient injury (outside the current code ranges used by CMS) that could be attributed to the fall;
- available chart documentation supported coding of an injury within the current code ranges used by CMS (i.e. coding oversight);

- available chart documentation supported coding of another inpatient injury code (outside the current code ranges used by CMS);
- nursing notes or other documentation not available to coders was the only source of information on patient injury;
- timing/availability of documentation limited coders ability to capture injury; or
- there was no documentation of injury in the patient medical record.

RESULTS

Table 1 provides a summary of inpatient falls identified by the fall evaluators and incident reports over our five-year study period. Our falls data confirm that inpatient falls are a relatively common occurrence; approximately 2.4% of stays had an inpatient fall (2,406 falls; 2,171 unique fallers in 99,705 patient stays). Many of these falls, however, did not result in harm to the patient (Categories C and D, n=2,026, 84.2%). Of the falls that did result in injury to the patient (n=380, 15.8%), the majority of injuries resulted in temporary harm (Category E, n=343, 90.2 % of falls with injury) and no prolonged length of stay or death. Approximately 9.8 % of falls with injury (1.5 % of all falls) were serious enough to warrant prolonged length of stay or result in death (Categories F, G, H, or I). Arguably, fall-related injuries are found among these more serious falls; thus, the events that CMS seeks to identify were relatively rare, representing something less than 1.5 % of all falls, and occurring in less than 0.04 % of all admissions.

Table 2 provides a summary of the code-identified fall-related injuries found in the discharge data for the 380 falls with injury during the study period. To identify these events, we looked for fractures, dislocations, intracranial injuries, crush injuries, burns and electric shocks that were not classified as Present on Admission (POA).

Our review of the ICD-9-CM codes associated with injurious inpatient falls indicated that the targeted code ranges detected very few minor injuries (Category E), which is probably desirable because these injuries, by definition, are often unlikely to be clinically important. The targeted ICD-9-CM codes did detect many, but not all, of the more serious injuries (Categories F – I). Specifically, we found that 16 of the 37 more serious falls with injury (43.2%) were identified by the CMS-specified ICD-9-CM code ranges (and lack of POA flag). Generally speaking, the more serious falls (categories G, H, and I) were more likely to be detected. Table 3 outlines the results of our in-depth investigation for cases where the fall evaluator or incident report indicated a category F or higher fall, but discharge diagnoses contained no record of a (code-identified) fall-related injury (21 of 37; 56.8 % of cases). We found that for one-third of these cases (n=7), the discharge diagnoses contained another inpatient injury outside of the CMS-specified code ranges used to identify fall-related injury. These (other) injuries included: intracerebral hemorrhage (431), intracranial hemorrhage NES (432.9), epistaxis/nosebleed (784.7), open wound of the forehead (873.42), open wound of the head NEC (873.8), and injury site NOS (959.9). In another 9.5 % of cases (n=2), the patient record contained documentation that supported coding of an inpatient injury outside the CMS code ranges (back injury, head laceration).

No documentation of injury in the medical record was also extremely common (42.9 %; n=9). In one case, documentation of the injury was only found in the nursing notes, and in one other case, the documentation necessary to establish the injury was not available at the time the discharge diagnoses were coded. In only two cases (9.5 %) does it appear that the coder missed the available chart documentation that supported an inpatient injury within the CMS code ranges.

DISCUSSION

Falls are a serious health risk, especially to the elderly, and a patient safety target for Medicare. While falls are very common in inpatient settings, the types of falls targeted by CMS – those resulting in injuries that complicate the care of an existing medical condition – are much more rare, and, therefore, more difficult to detect. Depending on your perspective, our data suggest that the cup is half-full, or half-empty. Using our data, the ICD-9-CM code ranges adopted by CMS to detect more serious falls with injury were on-target about 43 % of the time.

There are a number of possible explanations for why this number is not 100 %. Numerous studies have documented the problems with ICD-9-CM coding, ranging from lack of clinical evidence in the medical record to support coding,²² lack of sensitivity of coding in identification of patient populations or events,²³ and lack of accuracy of present-on-admission indicators.^{24,25} Our own analysis highlights these explanations plus a few more.

Our review of records suggests that lack of documentation in the patient record may be the single biggest factor driving the discrepancy between events and coding. While we were only able to review records from one hospital, our findings of incomplete documentation echo results from other studies.^{26–29} Unfortunately, use of electronic health records may actually exacerbate poor documentation.^{26,30} CMS is well aware of these documentation deficiencies and, in 2010, instituted retrospective patient record review to ensure appropriate documentation for billed procedures.³¹ Other educational efforts aimed at improving physician documentation may be warranted.

Other inpatient injuries outside the CMS code ranges for fall-related HACs may also account for a significant portion of the discrepant cases. We found that 33 % of our discrepant cases contained other ICD-9-CM documented injuries and another 9.5 % contained chart-supported injuries (not documented in the discharge diagnoses codes). These injuries (intracerebral/intracranial hemorrhage, nosebleed, lacerations/open wounds, back injury) seem as serious as those identified by the CMS code ranges. Policymakers may wish to consider expanding the set of codes considered for identifying fall-related HACs.

Some studies have suggested that coding of CMS HACs would be more accurate if coders could also rely on information found in nursing notes.³² According to the Uniform Hospital Discharge Data Set (UHDDS) reporting system, ICD-9-CM discharge diagnosis codes must be supported by physician documentation, rather than nurse documentation. When diagnoses are stated in other medical record documentation (nursing notes and other ancillary reports), the attending physician must be queried for confirmation of the condition.³³ Our results suggest that nursing notes may not provide a significant new source of information for fall-related HACs.

Many authors have expressed concern that the limited number of ICD-9-CM codes reported in administrative data may also compromise administrative data, especially for medically complex patients or those with multiple procedures.^{23,34} For example, institutional claims (paper UB-04s, electronic 837s) at the time of this study limited coders to 18 ICD-9-CM codes. None of the 21 cases we examined had 18 ICD-9-CM codes, so it does not appear that the cap led to any of discrepancies we observed. We would also note that, according to the UHDDS reporting system, the 18 ICD-9-CM codes included in institutional claims should only include conditions that affected the current episode of hospital care (i.e. the patient's clinical evaluation, therapeutic treatment, need for increased nursing, monitoring, or treatment). This implies that hospitals should be quite careful to report fractures, dislocations, intracranial and crush injuries, burns, or electric shocks in the 18 ICD-9-CM codes reported on their institutional claim (in fact, they should be reported in the top 10

codes, because these are used by the DRG Grouper software). Other injury codes, however, may be viewed as far less important to report.

Our analysis is limited by the fact that the data come from a single provider. Gaining access to these types of data is challenging and requires tradeoffs. To the extent that falls or falls coding differ at this hospital compared to others across the country, our results cannot be generalized. However, we note that the rates of falls and falls with injury at this hospital were reasonably consistent with rates documented at hospitals across the country (15% of falls were injurious compared to 25 % national rate; 1.5 % of falls were length of stay-extending compared to 2 % national rate). The hospital in this study is larger than the average US hospital, nonprofit, and affiliated with a medical school. Some might argue that this could lead to more complete ICD-9-CM reporting and/or undercoding of present on admission indicators, due to increased emphasis on quality of care and, perhaps, decreased emphasis (relative to for-profits) on revenue. If this is true, our results would underestimate the error introduced by the HAC reporting.

Second, our data on falls are collected through two different sources: fall evaluators and hospital incident reports. Previous research has demonstrated that incident reports alone may underestimate falls and falls with injury by as much as 30%.^{19,35,36} Unfortunately, the use of fall evaluators is a difficult expense to justify outside of a research setting. Our comparison of code-identified fall-related injuries in the nine months covered by fall evaluators (1/1/07 – 9/30/07) with the subsequent nine month period covered by hospital incident reports but prior to implementation of the CMS non-payment rule (10/1/07 – 6/30/08) do not reveal any significant effect of the changing data source on coding patterns, although the small sample sizes for these periods limit our ability to make any strong statements.

We would also note that like many hospitals during this time period, MH-UH was very concerned about inpatient falls and supported quality improvement efforts to reduce incidence of falls and falls with injury. One of the most significant changes during the 5-year time period covered by our data was the updating of the falls risk assessment to better identify those at risk for fall and fall injury. This update occurred in mid-2008 and consisted of adding the Tinetti ‘Get Up and Go’ functional mobility test to the existing falls assessment scoring system (modified Morse).^{11,18,37} It is possible that this greater attention to falls was associated with better documentation of falls and fall-related injuries; if this is true, our results underestimate undetected fall-related injuries.

Finally, while more fall-related injuries were identified through fall evaluators and hospital incident reports than through discharge data diagnosis codes, other studies suggest that we may have still missed up to 25 % of events.^{19,38} It is not clear whether our failure to capture these events introduces any systematic bias.

Using data from a large, urban, major teaching hospital for a 5-year period, we estimate that the approach adopted by CMS for detecting falls with injury detects about 43 % of the actual events. Incomplete detection appears to be due primarily to lack of documented medical injuries in the medical record and the presence of injuries not captured by the CMS injury code ranges.

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that examines hospital responses to the CMS' payment rule change through quantitative and qualitative data analyses.

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Figure 1.
Categorization of Falls and Fall-Related Injuries.

Table 1

Summary of Inpatient Falls (Incident Reported)

Fall Type	Total Falls	% of Total
Category C – error but no harm	339	14.1%
Category D – error required monitoring to confirm no harm, intervention to preclude harm	1,687	70.0%
Category E – error may have contributed to or resulted in temporary harm, required intervention	343	14.3%
Category F – error may have contributed to or resulted in temporary harm, & required initial or prolonged hospitalization	28	1.2%
Category G – error may have contributed to or resulted in permanent harm	6	0.3%
Category H – error occurred that required intervention necessary to sustain life	2	0.1%
Category I – error occurred that may have contributed to or resulted in death	1	0.0%
Total Falls	2,406	100 %

Table 2

ICD-9-CM Coding of HACs for Injurious Inpatient Falls

Category of Falls	N	ICD – 9 – CM Coded Hospital Acquired Condition ¹		% of Falls with Coded HAC ²
		Fracture	Intracranial Injury	
E: error may have contributed to or resulted in temporary harm, required intervention	343	4	4	2.3 %
F: error may have contributed to or resulted in temporary harm, & required initial or prolonged hospitalization	28	9	1	35.7 %
G: error may have contributed to or resulted in permanent harm	6	3	1	66.7 %
H: error occurred that required intervention necessary to sustain life	2	0	1	50.0 %
I: error occurred that may have contributed to or resulted in death	1	0	1	100.0 %
Total Falls with Injury	380	16	8	6.3 %
Falls with Injury Requiring Hospitalization or Resulting in Death	37	12	4	43.2 %

¹ No dislocations, crush injuries, burns, or electric shocks documented in ICD-9-CM codes

² ICD-9-CM codes not flagged as present on admission (POA).

Table 3
Falls with injury Prolonging LOS or Resulting in Death with No ICD-9-CM Coded Hospital Acquired Condition¹

Results of Investigation:	Falls with injury Prolonging LOS or Resulting in Death ²				
	Temporary Harm & Prolonged LOS (F)	Permanent Harm & Prolonged LOS (G)	Lifesaving Measure Required (H)	Unexpected Death (I)	Total (% of Total)
Dx codes identified other inpatient injury ³	6	0	1	0	7 (33.3 %)
Available chart documentation supported injury within CMS code ranges	2	0	0	0	2 (9.5 %)
Available chart documentation supported other inpatient injury code	2	0	0	0	2 (9.5 %)
Injury only supported by nursing notes or other documentation not available to coders	1	0	0	0	1 (4.8 %)
Timing/availability of documentation prevented capture of injury in dx codes	0	1	0	0	1 (4.8 %)
No documentation of injury in medical record	8	1	0	0	9 (42.9 %)
Totals	18	2	1	0	21

¹No fracture (800–829), dislocation (830–839), intracranial injury (850–854), crushing injury (925–929), burn (940–949), or electric shock (991–994) coded as ‘hospital acquired’ (i.e. not coded as present on admission)

²See Figure 1 for more complete description of categories

³Intracerebral hemorrhage (431), intracranial hemorrhage NES (432.9), epistaxis/ nosebleed (784.7), open wound of the forehead (873.42), open wound of the head NEC (873.8), or injury site NOS (959.9).