

An Example of Using Present on Admission Data: CMS-Defined Hospital-Acquired Conditions in All-Payer Data

Introduction

Many statewide data organizations have begun to collect present on admission (POA) data in their all-payer hospital discharge data since the data element was added to the national hospital billing standard (Uniform Bill-04) effective October 2007. This document provides an example of how statewide data organizations might apply their POA data to their all-payer population. The example uses the Centers for Medicare and Medicaid defined healthcare acquired-conditions (HACs).

In response to the Deficit Reduction Act, the Centers for Medicare and Medicaid Services (CMS) requires the POA information on Medicare fee-for-service claims. CMS uses this information to no longer reimburse hospitals for the additional cost of certain conditions that they have identified as hospital-acquired (HAC).¹ A similar payment policy will also be implemented in the Medicaid program.² CMS included 10 categories of conditions that were selected for their HAC payment provision.³ The 10 categories utilize an ICD-9-CM based algorithm that relies on inclusion of the POA variable (See Appendix A). Although researchers have identified weaknesses in some measures in the CMS HACs⁴, the algorithm provides a current illustrative example for the use of POA. This document applies the CMS HAC algorithm to statewide discharge all-payer data that consistently collect the POA data element. The document illustrates a use of POA and presents statistics on the distribution of CMS HACs across different payers and across adult age groups.

Method

The analysis focuses on non-maternity hospital stays for adults (18 years and older). The analysis used data from the HCUP 2008 State Inpatient Databases (SID) for 15 states: Arkansas, Arizona, California, Florida, Hawaii, Kentucky, Massachusetts, Maryland, Maine, Michigan, New Jersey, Nevada, New York, Oregon, and Tennessee. The SID contains the universe of the inpatient discharge abstracts in the states, translated into a uniform format to facilitate multistate comparisons and analyses. These 15 states were selected because (a) their 2008 SID included the present-on-admission (POA) indicator, (b) they had a large percentage of hospitals that reported POA for each secondary diagnosis, and (c) they had POA information reported for at least 55 percent of the secondary diagnoses.

Within these 15 states, the analysis included community, non-rehabilitation hospitals, excluding the following: (a) hospitals that had 10 percent or more secondary diagnoses with missing POA information, (b) hospitals that only reported the POA information for Medicare patients, and (c) hospitals that reported all secondary diagnosis POA information as “Yes” or all as “No.” A total of 386 hospitals out of 1,725 (22 percent) community, non-rehabilitation hospitals in the 15 states were excluded. Thus, the analysis included 1,339 hospitals. These hospitals cared for 12,034,280 discharges in 2008, which is 30.2 percent of the 39.9 million discharges from community, non-rehabilitation hospitals in 2008.

The Present-on-Admission (POA) indicator indicates whether a diagnosis was present at the time of admission. There are five options for reporting POA diagnosis: present on admission, not

present on admission, insufficient information, clinically undetermined, and exempt from POA reporting. CMS HACs were identified using the criteria set forth in the Inpatient Prospective Payment System (IPPS) Fiscal Year 2009 Final Rule by the Centers for Medicare and Medicaid Services.⁵ The criteria includes using the POA indicator to determine whether the CMS HAC was not present on admission (i.e., acquired or detected during the hospital stay). For this analysis, if a discharge record contained one or diagnosis codes for a specific CMS HAC category, the specific CMS HAC was considered not present on admission (hospital acquired) if any of the POA indicators associated with these diagnoses were coded as not present on admission.

The CMS HAC rate was calculated by dividing the number of hospital stays with the CMS HAC by the population at risk of the CMS HAC and multiplied by 100,000. The relative rates are calculated by dividing the CMS HAC rate for the group of interest (Medicaid, private pay or older age group) by the reference group rate (Medicare or 18-44 years old age group rate). When the groups of interest have higher CMS HAC rates compared to the reference group they have a value greater than 1.0, while those with lower rates than the reference group have a value less than 1.0. A value equal to 1.0 describes similar rates for the group of interest and the reference group.

Payer is the expected payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into more general groups:

- Medicare includes fee-for-service and managed care Medicare patients.
- Medicaid includes fee-for-service and managed care Medicaid patients. Patients covered by the State Children's Health Insurance Program (SCHIP) may be included here. Because most state data do not identify SCHIP patients specifically, it is not possible to present this information separately.
- Private insurance includes Blue Cross, commercial carriers, and private HMOs and PPOs.

Up to two payers can be coded for a hospital stay in HCUP data. For the purpose of this analysis, when more than one payer is listed for a hospital discharge, the following hierarchy is used:

- If either payer is listed as Medicare, the payer is "Medicare."
- For non-Medicare stays, if either payer is listed as Medicaid, the payer is "Medicaid."
- For stays that are neither Medicare nor Medicaid, if either payer is listed as private insurance, the payer is "private insurance."

Results

Overall, the CMS HAC of vascular catheter-associated infections (blood stream infections related to a catheter in a large, central vein) were the most common among the ten reported CMS HACs in 2008 (table 1). The CMS-defined vascular catheter-associated infections comprised 49 percent of stays involving the ten CMS-defined HACs for a rate of 128 per 100,000 medical-surgical stays. The second most common CMS HAC examined was falls or trauma, which accounted for another 20 percent of stays involving CMS HACs—a rate of 52 per 100,000 medical-surgical stays. Although deep vein thrombosis (DVT)/pulmonary embolism (PE) following total knee or hip replacement comprised only 8 percent of the ten CMS HACs examined, it occurred at a rate of 649 per 100,000 total knee or hip replacement surgical stays.

Table 1. Adult discharges with a reported CMS hospital-acquired condition (HAC) in selected community hospitals in 15 states, 2008

Hospital-acquired conditions defined by Centers for Medicare and Medicaid Services	Discharges at risk ^a	Discharges with reported HAC		
		Number	Percent (%) of all HACs	Rate per 100,000 discharges at risk
All HACs	--	23,219	100.0	--
Medical-surgical patients (non-maternal)				
Vascular catheter-associated infection	8,959,419	11,435	48.7	127.6
Falls and trauma	8,959,419	4,676	19.9	52.2
Catheter-associated urinary tract infection (UTI)	8,959,419	3,128	13.3	34.9
Manifestations of poor glycemic control	8,959,419	673	2.9	7.5
Stage III and IV pressure ulcers	8,959,419	615	2.6	6.9
Air embolism	8,959,419	45	0.2	0.5
Blood incompatibility	8,959,419	36	0.2	0.4
Selected surgical patients (non-maternal)				
Deep vein thrombosis (DVT)/pulmonary embolism (PE) ^b	274,207	1,780	7.6	649.1
Surgical site infections (selected surgeries) ^c	240,701	656	2.8	272.5
Foreign object retained after surgery	3,041,774	442	1.9	14.5

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008 from the following states with POA data: AR, AZ, CA, FL, HI, KY, MA, MD, ME, MI, NJ, NV, NY, OR, and TN.

^a Population at risk are selected non-maternal adult discharges: medical-surgical stays (8,959,419); surgical stays (3,041,774); surgical stays with knee and hip replacement procedures (274,207); and surgical stays with CABG; spine, neck, shoulder, or elbow orthopedic procedures; and laparoscopic gastric bypass, gastroenterostomy, or laparoscopic gastric restrictive surgery (240,701).

^b Deep vein thrombosis (DVT)/pulmonary embolism (PE) following total knee replacement or hip replacement.

^c Includes CABG mediastinitis; surgical site infection following spine, neck, shoulder, or elbow orthopedic procedures; and surgical site infection following laparoscopic gastric bypass, gastroenterostomy, or laparoscopic gastric restrictive surgery.

CMS Hospital-acquired conditions by payer

Across all of the ten CMS HACs combined, 62 percent occurred in Medicare patients, 12 percent in Medicaid patients, and 21 percent in privately insured patients (data not shown). Table 2 highlights a subset of the CMS-defined HACs—the five most common of the medical-surgical HACs—and presents the percent distribution and population at risk by payer for each. Medicare discharges represented 53 percent of the population at risk (non-maternal, medical-surgical stays) in 2008, but a higher share of three CMS HACs: falls and trauma (75 percent), catheter-associated urinary tract infections (72 percent), and stage III and IV pressure ulcers (66 percent). Medicaid represented 12 percent of the population at risk, but 18 percent of the stage III and IV pressure ulcer and 18 percent had manifestations of poor glycemic control CMS HACs. In contrast, private insurance represented 26 percent of the population at risk, but only 10 percent of the stage III and IV pressure ulcer, 13 percent of falls and trauma, and 16 percent of the catheter-associated urinary tract infection HACs.

Table 2. Percentage of adult discharges with a selected reported CMS hospital-acquired condition by payer in selected community hospitals in 15 states, 2008

Discharges and population at risk by CMS defined hospital-acquired condition	Percent (%) distribution by payer			
	All payers	Medicare	Medicaid	Private Insurance
<i>Population at risk^a</i>	100.0%	53.2%	11.8%	25.7%
CMS defined hospital acquired conditions				
Vascular catheter-associated infection	100.0%	54.0%	15.7%	23.6%
Falls and trauma	100.0%	74.7%	6.9%	13.4%
Catheter-associated urinary tract infection (UTI)	100.0%	71.7%	8.0%	16.0%
Manifestations of poor glycemic control	100.0%	51.6%	17.5%	23.3%
Stage III and IV pressure ulcers	100.0%	65.5%	18.2%	10.2%

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008 in the following states with POA data: AR, AZ, CA, FL, HI, KY, MA, MD, ME, MI, NJ, NV, NY, OR, and TN.

^a Population at risk is non-maternal, adult medical-surgical stays (8,959,419).

Table 3 shows the distribution of CMS HACs and discharges at risk by payer for DVT/PE following knee or hip replacement and surgical site infection (selected surgeries) CMS HACs. Medicare represented 62 percent of the population at risk, but 69 percent of the stays with a DVT/PE CMS HAC. Private insurance represented 31 percent of the population at risk, but only 24 percent of the stays with a DVT/PE CMS HAC.

Medicaid represented 6 percent of the population at risk, but 13 percent of the Medicaid stays had a CMS HAC of surgical site infection following selected surgeries. Private insurance represented 44 percent of the population at risk but only 32 percent of the stays with a CMS HAC of surgical site infection following selected surgeries.

Table 3. Percentage of adult discharges with a selected reported surgery-related CMS hospital-acquired condition and population at risk by payer in selected community hospitals in 15 states, 2008

Discharges and population at risk by CMS-defined hospital-acquired condition	Percent (%) distribution by payer			
	All payers	Medicare	Medicaid	Private Insurance
<i>Population at risk^a</i>	100.0%	62.4%	3.0%	30.9%
Deep vein thrombosis (DVT)/pulmonary embolism (PE) ^a	100.0%	68.8%	3.0%	24.3%
<i>Population at risk^b</i>	100.0%	40.4%	5.6%	44.3%
Surgical site infection (selected surgeries) ^b	100.0%	40.4%	13.1%	32.0%

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Selected State Inpatient Databases, 2008 in the following states with POA data: AR, AZ, CA, FL, HI, KY, MA, MD, ME, MI, NJ, NV, NY, OR, and TN.

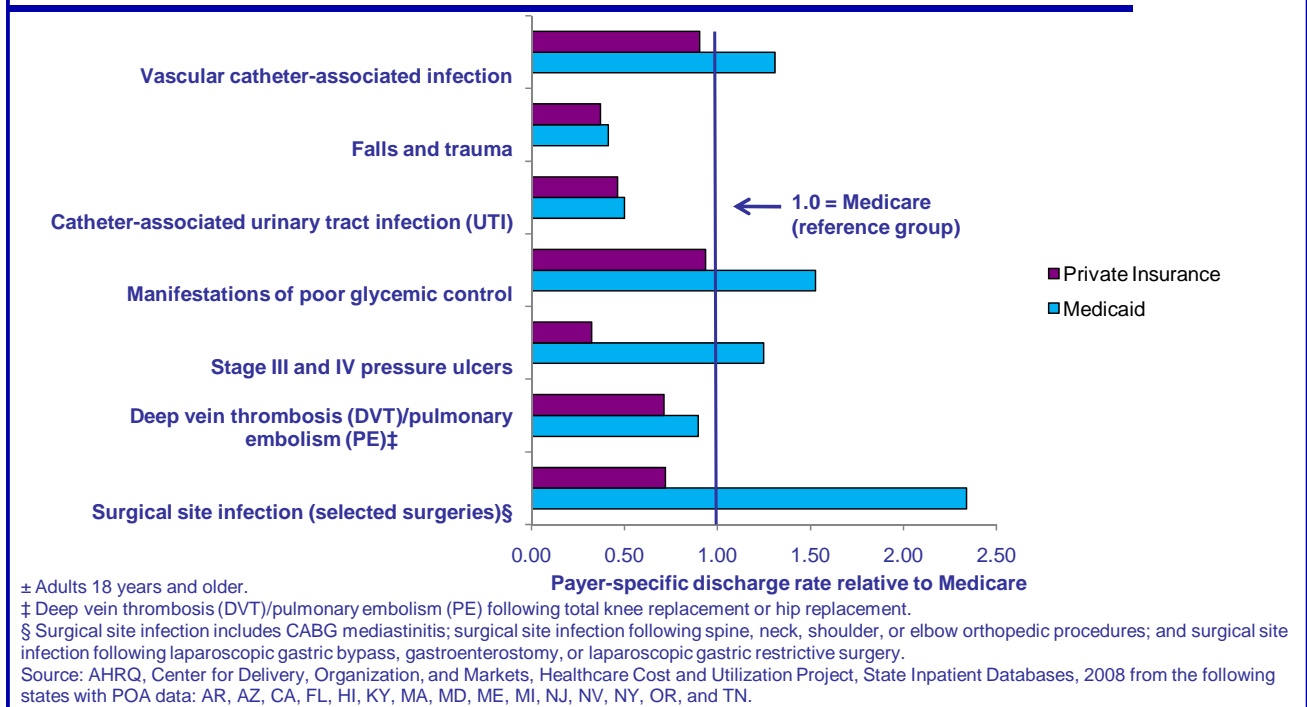
^a Surgical patients with total knee or hip replacement.

^b Selected surgical patients with CABG, orthopedic procedures of the spine, neck, shoulder, or elbow, or bariatric surgery for obesity including laparoscopic gastric bypass, gastroenterostomy, or laparoscopic gastric restrictive surgery.

Figure 1 highlights the rate of selected CMS-defined HACs for Medicare patients relative to patients insured by private insurance and Medicaid. Medicaid patients had about half the rate of CMS HACs for falls and trauma and catheter-associated urinary tract infections as compared to Medicare patients. However, Medicaid had one and a half times the rate of CMS HACs for manifestations of poor glycemic control and more than twice the rate of CMS HACs for surgical site infection as Medicare. Overall, the privately insured had lower rates of most CMS HACs compared to Medicare.



Figure 1. Rate of CMS-defined Hospital-Acquired Conditions for Medicaid and Private Payers Relative to Medicare, in Selected Community Hospitals in 15 States, 2008 *

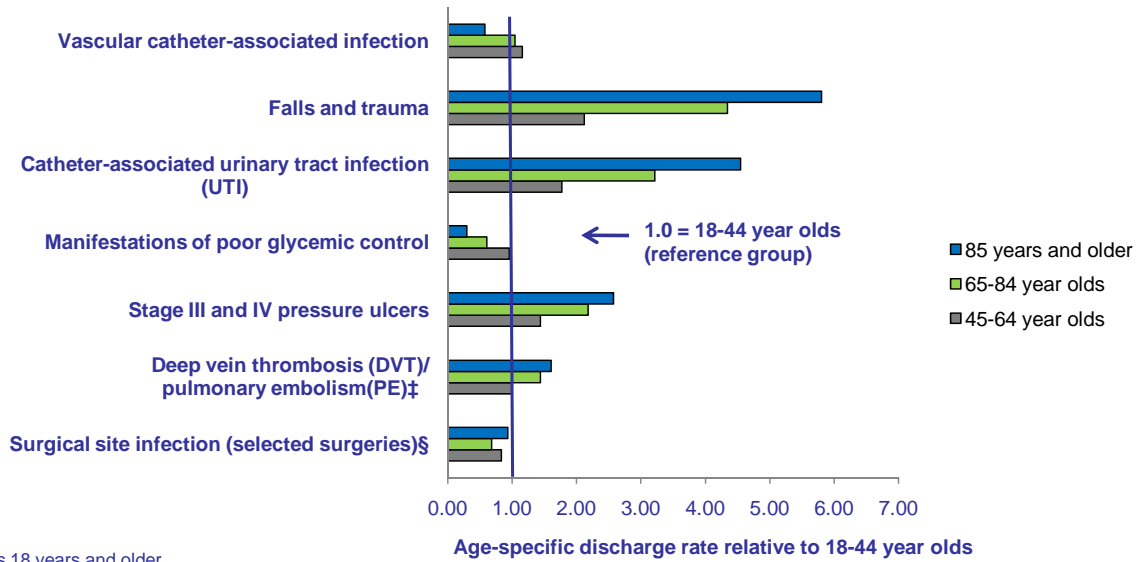


CMS Hospital-acquired conditions by age group

Across all of the ten CMS-defined HACs combined, 13 percent occurred in 18-44 year olds, 32 percent occurred in 45-64 year olds, 44 percent occurred in 65-84 year olds, and 12 percent occurred in those 85 years and older (data not shown). Figure 2 denotes the rate of selected CMS-defined HACs for three age groups relative to the rate for young adults (18-44 year olds). Relative to young adults, older adults had higher rates for the CMS HACs for stage III and IV pressure ulcers, falls and trauma, catheter-associated urinary tract infection, and deep vein thrombosis/pulmonary embolism following total knee or hip replacement. The discrepancy with young adults generally widened as the age group increased in age. For example, those 85 years and older had nearly six times the rate of CMS HACs for falls and trauma and about four and a half times the rate of CMS HACs for catheter-associated urinary tract infections relative to 18-44 year olds. However, for the CMS HACs for conditions of manifestations of poor glycemic control and vascular catheter-associated infections, the older age groups had lower CMS HAC rates than the young adults.



Figure 2. Rate of CMS-defined Hospital-Acquired Conditions for Older Age Groups Relative to Young Adults, in Selected Community Hospitals in 15 States, 2008[±]



[±] Adults 18 years and older.

[‡] Deep vein thrombosis (DVT)/pulmonary embolism (PE) following total knee replacement or hip replacement.

[§] Surgical site infection includes CABG mediastinitis; surgical site infection following spine, neck, shoulder, or elbow orthopedic procedures; and surgical site infection following laparoscopic gastric bypass, gastroenterostomy, or laparoscopic gastric restrictive surgery.

Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases, 2008 from the following states with POA data: AR, AZ, CA, FL, HI, KY, MA, MD, ME, MI, NJ, NV, NY, OR, and TN.

Endnotes

1. Effective October 1, 2008.
2. Effective July 1, 2011; Medicaid Program; Payment Adjustments for Provider-Preventable Conditions Including Healthcare-Acquired Conditions, Final Rule, 2011.
http://www.ofr.gov/OFRUpload/OFRData/2011-13819_PI.pdf
3. U.S. Centers for Medicare and Medicaid Services. Hospital-Acquired Conditions.
https://www.cms.gov/HospitalAcqCond/06_Hospital-Acquired_Conditions.asp
4. For example:
Meddings J, Saint S, McMahon LF Jr. Hospital-acquired catheter-associated urinary tract infection: documentation and coding issues may reduce financial impact of Medicare's new payment policy. *Infect Control Hosp Epidemiol*. 2010 Jun;31(6):627-33.

McNutt R, Johnson TJ, Odwazny R, Remmich Z, Skarupski K, Meurer S, Hohmann S, Harting B. Change in MS-DRG assignment and hospital reimbursement as a result of Centers for Medicare & Medicaid changes in payment for hospital-acquired conditions: is it coding or quality? *Qual Manag Health Care*. 2010 Jan-Mar;19(1):17-24.
- 5 U.S. Centers for Medicare and Medicaid Services, Inpatient Prospective Payment System (IPPS) Fiscal Year 2009 Final Rule. <http://edocket.access.gpo.gov/2008/pdf/E8-17914.pdf>

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Tennessee Hospital Association
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Utah Department of Health
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Appendix A: Definitions of CMS Hospital-Acquired Conditions

The ICD-9-CM diagnosis codes for the CMS hospital-acquired conditions are as follows:

The ICD-9-CM codes defining Foreign Object retained after surgery are:

- 998.4, foreign body left during a procedure not elsewhere classified.
- 998.7, acute reaction to foreign body left during a procedure not elsewhere classified

The ICD-9-CM code defining Air Embolism is:

- 999.1, air embolism as complication of medical care not elsewhere classified

The ICD-9-CM code defining Blood Incompatibility is:

- 999.6, ABO incompatibility reaction not elsewhere classified, incompatible blood transfusion

The ICD-9-CM codes defining Stage III and IV Pressure Ulcers are:

- 707.23, pressure ulcer, stage III
- 707.24, pressure ulcer, stage IV

The ICD-9-CM codes defining Falls and Trauma include diagnosis codes in the following range:

- 800-829.99, fractures
- 830-839.99, dislocation
- 850-854.99, intracranial injury
- 925-929.99, crushing injury
- 940-949.99, burn
- 991-994.99, electric shock

The ICD-9-CM codes defining Manifestations of Poor Glycemic Control are:

- 250.10, diabetes mellitus with ketoacidosis type II or unspecified type
- 250.11, diabetes mellitus with ketoacidosis type I not stated as uncontrolled
- 250.12, diabetes mellitus with ketoacidosis type II or unspecified type uncontrolled
- 250.13, diabetes mellitus with ketoacidosis type I or uncontrolled
- 250.20, diabetes mellitus with hyperosmolarity type II not stated as uncontrolled
- 250.21, diabetes mellitus with hyperosmolarity type I not stated as uncontrolled
- 250.22, diabetes mellitus with hyperosmolarity type II or unspecified type uncontrolled

- 250.23, diabetes mellitus with hyperosmolarity type I uncontrolled
- 251.0, hypoglycemic coma
- 249.10, secondary DM with ketoacidosis, not stated as uncontrolled or unspecified
- 249.11, secondary DM with ketoacidosis, uncontrolled
- 249.20, secondary DM with hyperosmolarity, not stated as uncontrolled, unspecified
- 249.21, secondary DM with hyperosmolarity, uncontrolled

The ICD-9-CM code defining Catheter-Associated Urinary Tract Infection (CA-UTI) is:

- 996.64, infection and inflammatory reaction due to indwelling urinary catheter

The ICD-9-CM code defining Vascular Catheter-Associated Infection is:

- 999.31, infection due to central venous catheter

The ICD-9-CM code defining Surgical Site Infection: Mediastinitis following Coronary Artery Bypass Graft (CABG) is:

- 519.2, mediastinitis

The ICD-9-CM code defining Surgical Site Infection Following Orthopedic Procedures is:

- 998.59, post-procedural fever
- 996.67, infection and inflammatory reaction due to other internal orthopedic device implant and graft

The ICD-9-CM codes defining Surgical Site Infection Following Bariatric Surgery for Obesity are:

- 278.01, morbid obesity (Principal Diagnosis)
- 998.59, post-procedural fever

The ICD-9-CM codes defining Deep Vein Thrombosis/Pulmonary Embolism are:

- 415.11, iatrogenic pulmonary embolism and infarction
- 415.19, other pulmonary embolism and infarction
- 453.40, acute venous embolism and thrombosis of unspecified deep vessels of lower extremity
- 453.41, acute venous embolism and thrombosis of deep vessels of proximal lower extremity
- 453.42, acute venous embolism and thrombosis of deep vessels of distal lower extremity