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Examination of the Accuracy of Coding Hospital-Acquired Pressure Ulcer Stages

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Objective: Pressure ulcers (PU) are considered harmful conditions that are reasonably prevented if accepted standards of care are followed. They became subject to the payment adjustment for hospital-acquired conditions (HACs) beginning October 1, 2008. We examined several aspects of the accuracy of coding for pressure ulcers under the Medicare Hospital-Acquired Condition Present on Admission (HAC–POA) Program. We used the "4010" claim format as a basis of reference to show some of the issues of the old format, such as the underreporting of pressure ulcer stages on pressure ulcer claims and how the underreporting varied by hospital characteristics. We then used the rate of Stage III and IV pressure ulcer HACs reported in the Hospital Cost and Utilization Project State Inpatient Databases data to look at the sensitivity of PU HAC–POA coding to the number of diagnosis fields.

Methods: We examined Medicare claims data for FYs 2009 and 2010 to examine the degree that the presence of stage codes were underreported on pressure ulcer claims. We selected all claims with a secondary diagnosis code of pressure ulcer site (ICD-9 diagnosis codes 707.00–707.09) that were not reported as POA (POA of "N" or "U"). We then created a binary indicator for the presence of any pressure ulcer stage diagnosis code. We examine the percentage of claims with a diagnosis of a pressure ulcer site code with no accompanying pressure ulcer stage code.

Results: Our results point to underreporting of PU stages under the "4010" format and that the reporting of stage codes varied across hospital type and location. Further, our results indicate that under the "5010" format, a higher number of pressure ulcer HACs can be expected to be reported and we should expect to encounter a larger percentage of pressure ulcers incorrectly coded as POA under the new format.

Conclusions: The combination of the capture of 25 diagnosis codes under the new "5010" format and the change from ICD-9 to ICD-10 will likely alleviate the observed underreporting of pressure ulcer HACs. However, as long as coding guidelines direct that Stage III and IV pressure ulcers be coded as POA, if a lower stage pressure ulcer was POA and progressed to a higher stage pressure ulcer during the admission, the acquisition of Stage III and IV pressure ulcers in the hospital will be underreported.

Keywords: Hospital Acquired Conditions, Pressure Ulcer Coding, Health policy, politics, law, regulation, Medicare

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Introduction

The purpose of this study is to look at the accuracy of coding for pressure ulcers under the Medicare Hospital-Acquired Condition–Present on Admission (HAC–POA) Program. Accuracy of coding HACs and POA conditions is critical for accurate payment under the HAC-POA program and for evaluation of behavioral response to the implementation of the HAC–POA program. The conditions of Stage III and IV pressure ulcers became subject to the payment adjustment for hospital-acquired conditions beginning October 1, 2008 (McCall, Dalton, Bernard, Healy, & Jordan, 2010). Pressure ulcers are considered harmful conditions that are reasonably preventable if accepted standards of care are followed. Pressure ulcers are coded with both a site code (*International Classification of Diseases,* 9th revision [ICD-9] codes 707.00–707.09) and a stage code (ICD-9 codes 707.20–707.25).[1]

Beginning in January 2011, CMS was able to receive claims from all providers who were processed in the "5010" format, which allows for up to 25 diagnoses. Before this, providers submitted claims in the "4010" format, in which only eight secondary diagnoses were picked up by CMS' data systems. All providers must submit claims in the new format starting July 1, 2012. As providers transition to the 5010 format, additional diagnoses have started to become available in the published claims files (Medicare Provider Analysis and Review [MedPAR] or Standard Analytical File [SAF]).

We use the historical coding guidelines as a basis of reference to examine the underreporting of stage codes on pressure ulcer claims—that is, coding of claims with a pressure ulcer site, but no accompanying pressure ulcer stage. We then examine the underreporting of pressure ulcer stage codes by major hospital characteristics. Finally, we examine whether the rate of Stage III and IV pressure ulcer HACs is sensitive to the number of diagnosis fields, using the 2009 Hospital Cost and Utilization Project (HCUP) State Inpatient Databases (SIDs) data.

Under the "4010" format, there was no requirement that a stage code be in the first eight secondary diagnosis code fields.[2] It is possible that a site could be coded in the eighth field and a stage in the ninth field, but CMS's data systems would pick up only the site. In this scenario, the claim would not have been considered as having reported a HAC. In 2011, hospitals faced payments that were on average of $6,456 lower if the PU HAC resulted in MS-DRG reassignment (RTI, 2011). Thus, with the "4010" format, under the Centers for Medicare & Medicaid Services (CMS) HAC-POA program, hospitals had financial incentives to mischaracterize clinical conditions (e.g., Stage II rather than Stage III, if acquired during the

[1]Under ICD-10, the number of PU codes has been expanded to 150. The revised codes indicate the specific location and depth of the PU.

[2]The guidelines for POA indicator coding are set forth in Appendix I of the ICD-9-CM official guidelines for coding and reporting, effective October 1, 2008.

hospitalization, or Stage III rather than Stage II, if POA) and to reposition diagnosis codes to make a HAC-associated clinical condition one of the last listed secondary diagnoses on the hospital bill, rather than one of the first. Previous work has found that there is a significant percent (9%) of pressure ulcers incorrectly coded as POA. Further, coding guidelines direct that Stage III or IV pressure ulcers be coded as present on admission if a lower stage pressure ulcer was recognized on admission and progressed to a higher stage pressure ulcer during the admission (Snow et al., 2012). Both of these issues will persist after the change to the 5010 format.

Our results point to underreporting of pressure ulcer stages under the "4010" format and a variation in stage code reporting across hospital type and location. Further, our results indicate that under the "5010" format a higher number of reported pressure ulcer HACs can be expected. This, coupled with the findings of Snow et al. (2012), indicate that we would expect to encounter a large percentage of pressure ulcers incorrectly coded as POA under the new format.

Data and Methods

We examined Medicare claims data for FYs 2009 and 2010 to examine the degree of underreporting the presence of stage codes on pressure ulcer claims. We selected all claims with a secondary diagnosis code of pressure ulcer site (ICD-9 diagnosis codes 707.00–707.09) that were not reported as POA (POA of "N" or "U"), but excluded those with any pressure ulcer reported as POA (POA of "Y" or "W").[3] We then created a binary indicator for the presence of any pressure ulcer stage diagnosis code. As a comparison, we performed this analysis where the primary diagnosis was a pressure ulcer site. We report the percentage of claims with a secondary diagnosis of a pressure ulcer site code that had no accompanying pressure ulcer stage code and the percentage of claims with a primary diagnosis of a pressure ulcer site code that had no accompanying pressure ulcer stage code.

Current coding guidelines restrict secondary diagnoses to being listed once per claim. It is, therefore, possible that a claim can have more than one pressure ulcer site code recorded (e.g., shoulder and ankle), but only one stage code. As another approach to examining the underreporting of stage codes, we examined the counts of pressure ulcer codes recorded. Utilizing claims from FY 2009 only, we report the percentage of pressure ulcer site secondary diagnosis codes that had no accompanying pressure ulcer stage code.[4]

To examine the underreporting of pressure ulcer stage codes by major hospital characteristics, we supplemented the Medicare data with hospital characteristics available from

[3]Y–Diagnosis was present at time of inpatient admission. N–Diagnosis was not present at time of inpatient admission. U–Documentation insufficient to determine if condition was present at the time of inpatient admission. W–Clinically undetermined. Provider was unable to clinically determine whether the condition was present at the time of inpatient admission.

[4]To reduce computing resource time and costs, we restricted this analysis to a single year of MedPAR data.

the 2010 Provider of Services File (POS) and rural-urban codes from the census.[5] Information on academic medical centers (AMC) was obtained from the University Health Consortium.[6] We constructed estimates of the percentage of all secondary diagnosis pressure ulcer claims not POA that had no accompanying pressure ulcer stage code at the hospital level and then constructed unweighted mean percentages by major hospital characteristics.

Lastly, we examine whether the rate of Stage III and IV pressure ulcer HACs are sensitive to the number of diagnosis fields. To do this, we looked to pressure ulcer HAC rates from another RTI report, *Examination of Spillover Effects and Unintended Consequences* (Healy, Spain, & Cromwell, 2011), for three states that reported more secondary diagnosis fields in the HCUP data than were captured in the MedPAR file in 2009: California reported 24 secondary diagnosis fields, Florida 30, and New York 14. This allows examination of the impact of including more diagnosis fields, similar to what we would expect to see under the new "5010" format, when calculating hospital-acquired Stage III and IV pressure ulcer rates. The pressure ulcer HAC rates were calculated per 10,000 discharges using all available secondary HCUP diagnoses and also for the first eight secondary diagnoses to compare to the "4010" format of Medicare claims. We report the rates per 10,000 discharges and the ratio of the rates.

Results

Exhibit 1 displays the number of claims with a secondary diagnosis of a pressure ulcer site not POA and the percentage of claims that did not have a pressure ulcer stage code in any of the first eight secondary diagnosis fields for FYs 2009 and 2010, respectively. In FY 2009, 54% of claims with a secondary diagnosis code of a pressure ulcer site did not have a pressure ulcer stage code in the first eight secondary diagnosis fields. The percentage of claims with a pressure ulcer site without a pressure ulcer stage code was 7 percentage points higher in FY 2010 than in FY 2009.

Exhibit 1. Percentage of claims with a secondary diagnosis of pressure ulcer site not present on admission with and without a reported pressure ulcer stage code, FYs 2009 and 2010

Stage present?	Number of claims with a PU site code FY 2009	Percentage of claims without a PU stage code FY 2009	Number of claims with a PU site code FY 2010	Percentage of claims without a PU stage code FY 2010
No	6,284	54%	6,159	61%
Yes	5,365	46%	3,920	39%

NOTES. PU, pressure ulcer.
SOURCE: RTI analysis of FY 2009 and FY 2010 Medicare Provider Analysis and Review claims.

[5]Information on the construction of ownership type and urban-city classification followed Healy et al. (2011) and is available from the author.

[6]The 2012 list can be found here; a prior year's list was used in the analysis: https://www.uhc.edu/docs/003675405_UHCMembershipList.pdf

Exhibit 2 displays the percentage of claims with a pressure ulcer site recorded as a primary diagnosis that did and did not report a pressure ulcer stage code in the first eight secondary diagnosis fields in FYs 2009 and 2010. In contrast to the earlier findings, when a pressure ulcer site was recorded as the primary diagnosis, nearly 90% of the claims had a pressure ulcer stage code in the first eight secondary diagnosis fields. The percentage of claims with a pressure ulcer site code recorded as the principal or primary diagnosis that did not have a pressure ulcer stage code was constant between FYs 2009 and 2010. This difference between the coding of stages when a pressure ulcer site is a primary versus secondary diagnosis is evidence of the underreporting of pressure ulcer stages on pressure ulcer claims.

Exhibit 2. Percentage of claims with a primary diagnosis of pressure ulcer site with and without a reported pressure ulcer stage code, FYs 2009 and 2010

Stage present?	Number of claims with a PU site code FY 2009	Percent of claims without a PU stage code FY 2009	Number of claims with a PU site code FY 2010	Percent of claims without a PU stage code FY 2010
No	2,430	13%	2,139	12%
Yes	16,115	87%	15,701	88%

NOTES. PU, pressure ulcer.
SOURCE: RTI analysis of FY 2009 and FY 2010 Medicare Provider Analysis and Review claims.

Exhibit 3 displays the counts of pressure ulcer site codes reported as not POA (the frequency of the pressure ulcer diagnoses, not claim counts) and pressure ulcer stage codes recorded in the first eight secondary diagnosis fields of the claims. In FY 2009, 12,674 pressure ulcer secondary diagnosis site codes were reported and 5,797 secondary diagnosis stage codes were reported; 54% of pressure ulcer secondary diagnosis site codes did not have a corresponding stage code. This large percentage of missing stage codes may be partially due to stage codes being recorded in secondary diagnosis fields nine and beyond, and to claims with more than one site code recorded having fewer stage codes recorded. The latter would be consistent with coding guidelines that restrict secondary diagnoses to being listed once per claim.

Exhibit 3. Count of reported pressure ulcer site codes and stage codes from claims with a secondary diagnosis of pressure ulcer site reported not present on admission, FY 2009

Number of pressure ulcer site codes	Number of pressure ulcer stage codes	Percentage of pressure ulcer site codes with no stage code
12,674	5,797	54%

SOURCE: RTI analysis of FY 2009 Medicare Provider Analysis and Review claims.

The analysis of underreporting stage codes by major hospital characteristics is summarized in Exhibit 4 while pairwise comparisons and statistical significance are shown in Appendix Exhibit A–1. Of the 2,154 Inpatient Prospective Payment System (IPPS) hospitals, 100 were AMCs. Among the AMCs, on average, 58% of claims with a secondary diagnosis of pressure

ulcer site had no accompanying pressure ulcer stage code compared to only 31% of claims among non-AMCs. We also examined the average underreporting of stage codes by geographic location. Hospitals in large and small urban areas had, on average, approximately 35% of claims with a pressure ulcer site code without any stage codes, compared with 22% in rural areas.

Exhibit 4. Percentage of claims with a secondary diagnosis of pressure ulcer site not present on admission without any pressure ulcer stage code, by hospital characteristics, 2009 and 2010

Hospital characteristic	Hospital count	Average percentage of pressure ulcer claims without any stage codes
Overall	2,154	68%
AMC status		
AMC	100	58%
Not AMC	2,052	31%
Missing	2	50%
Bed size		
<100	413	19%
100–249	778	28%
250–499	649	37%
500–749	222	50%
750–999	59	49%
>1,000	31	54%
Missing	2	50%
Hospital ownership		
For profit	359	24%
Nonprofit	1,426	35%
Other government	208	33%
State or local government	159	31%
Missing	2	50%
Urban or rural status		
Large urban	893	35%
Small urban	740	36%
Rural	519	22%
Missing	2	50%

NOTES. AMC, academic medical center.
SOURCE: RTI analysis of 2009 and 2010 Medicare Provider Analysis and Review claims.

Next, we examined the underreporting of stage codes by hospital size. As the size of the hospital grows, so does the percentage of claims with a pressure ulcer site code without an accompanying stage code. Hospitals with more than 500 beds have, on average, roughly 50% of claims with a pressure ulcer site code without any stage codes, compared with 19%–37% of claims for hospitals with fewer than 500 beds. Hospital ownership may lead to different incentives for

coding practices. Our results show the percentage of pressure ulcer site claims without any stage codes was, on average, lowest in for-profit hospitals, at 24% of claims.

Lastly, Exhibit 5 displays the rates of the Stage III and IV pressure ulcer HACs per 10,000 Medicare discharges for the first eight secondary diagnoses. The ratio of Stage III and IV pressure ulcers that are hospital acquired using the first 8 secondary diagnoses versus all available diagnoses in the HCUP data ranged from 0.38 to 0.70 indicating that more HACs were identified when more diagnosis fields were used. The use of more than eight secondary diagnosis codes increases the reported rate of hospital-acquired Stage III and IV pressure ulcers. This result provides evidence indicating that we would expect to see an increase in the frequency of HACs for Stage III and IV pressure ulcers under the new "5010" format.

Exhibit 5. Medicare stage III and IV hospital-acquired pressure ulcer rates per 10,000 discharges for three states, FY 2009

State	Number of secondary diagnosis fields reported by state	Hospital-acquired pressure ulcer rate in the first eight secondary diagnosis codes only	Hospital-acquired pressure ulcer rates in all HCUP secondary diagnosis codes	Ratio of HAC rates based on the first eight secondary diagnoses to HAC rates based on all reported HCUP secondary diagnoses
California	24	2.0	2.9	0.70
Florida	30	1.3	2.8	0.47
New York	14	2.6	6.8	0.38

NOTES. Hospital acquired (HAC) pressure ulcer rates per 10,000 discharges.
SOURCE: 2009 Hospital Cost and Utilization Project state data files data for California, Florida, and New York. See tables 2.3 and 2.11 in Healy, D. A., Spain, P. C., & Cromwell, J. (2011, September). *Examination of spillover effects and unintended consequences of Medicare HAC-POA program* (CMS Contract No. HHSM-500-2005-00029I). Prepared for Centers for Medicare & Medicaid Services.

Conclusion

Pressure ulcers are considered harmful conditions that are reasonably preventable if accepted standards of care are followed. They became subject to the payment adjustment for hospital-acquired conditions beginning October 1, 2008. We examine several aspects of the accuracy of coding for pressure ulcers under the Medicare HAC–POA Program. We used the "4010" format as a basis of reference to show the some of the issues of the old format, such as the underreporting of pressure ulcer stages on pressure ulcer claims and how the underreporting varied by hospital characteristics. We then used rate of Stage III and IV pressure ulcer HACs reported in the HCUP SIDs data to look at the sensitivity of pressure ulcer HAC–POA coding to the number of diagnosis fields.

Our results point to underreporting of pressure ulcer stages under the "4010" format; 54% of claims with a secondary diagnosis code of a pressure ulcer site did not have any pressure ulcer stage code compared to nearly 90% of claims with a pressure ulcer as a primary diagnosis. Further, 54% of secondary diagnosis pressure ulcer site codes (diagnoses not claims) did not

have a corresponding stage code—a finding consistent with current coding guidelines. The accuracy of coding varied across hospital size, type, location and ownership. Hospitals that were classified as AMCs, larger, located in urban areas, and not classified as for-profit, on average had a higher occurrence of underreporting pressure ulcer stage codes.

The analysis of the HCUP SIDs data for Florida, California, and New York provided evidence that the number of pressure ulcer HACs reported under the new "5010" format can be expected to be higher than under the "4010" format. This, coupled with the findings of Snow et al. (2012), indicates that we would expect to encounter a larger percentage of pressure ulcers incorrectly coded as POA under the new format.

While it is likely that the capture of 25 diagnosis codes under the new "5010" format will alleviate or eliminate the observed underreporting of pressure ulcer HACs, some of the issues will likely persist. Specifically, pressure ulcer claims with missing stage codes will still be present if the percentage of missing stage codes is driven by the restriction in the current coding guidelines that allow secondary diagnoses to be listed only once per claim or if patients have more than 25 diagnoses. Similarly, so long as coding guidelines direct that Stage III and IV pressure ulcers be coded as POA if a lower stage pressure ulcer was POA and progressed to a higher stage pressure ulcer during the admission, the acquisition of a Stage III and IV pressure ulcer in the hospital will be underreported. Moreover, it is reasonable to expect to encounter a larger percentage of pressure ulcers incorrectly coded as POA under the new format based on the level of miscoding found by Snow et al. (2012) combined with the increase in HAC coding we find in the HCUP data. However, the change from ICD-9 to ICD-10 for billing purposes may negate some of the occurrence of miscoding of PUs on claims. Under ICD-10, the number of PU codes has been expanded to 150 and the revised codes indicate the specific location and stage of the PU. The use of ICD-10 diagnoses will help to eliminate issues related to missing stage codes as well as strategic placement of stage codes in diagnosis fields beyond those used in determining payment. Future work should continue to monitor the accuracy of coding of pressure ulcers so that future Medicare guidelines may avoid inadvertently providing incentives to be imprecise in the determination and documentation of pressure ulcers.

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Disclaimer

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Appendix

Exhibit A–1. Pairwise comparisons (Bonferroni) for hospital characteristics analysis

Group 1	Group 2	Difference in average percentage of pressure ulcer claims without any stage codes	Level of significance
AMC status			
AMC	Not AMC	0.27	0.000
Bed size			
<100	100–249	0.09	0.000
<100	250–499	0.18	0.000
<100	500–749	0.31	0.000
<100	750–999	0.30	0.000
<100	>1,000	0.35	0.000
100–249	250–499	0.09	0.000
100–249	500–749	0.21	0.000
100–249	750–999	0.21	0.000
100–249	>1,000	0.26	0.000
250–499	500–749	0.12	0.000
250–499	750–999	0.12	0.029
250–499	>1,000	0.17	0.018
500–749	750–999	–0.01	1.000
500–749	>1,000	0.04	1.000
750–999	>1,000	0.05	1.000
Hospital ownership			
For profit	Nonprofit	0.11	0.000
For profit	Other government	0.09	0.003
For profit	State or local government	0.07	0.066
Nonprofit	Other government	–0.02	1.000
Nonprofit	State or local government	–0.03	0.977
Other government	State or local government	–0.02	1.000
Urban/rural status			
Large urban	Rural	–0.13	0.000
Large urban	Small urban	0.00	1.000
Small urban	Rural	0.14	0.000

NOTES. AMC, academic medical center.

SOURCE: RTI analysis of 2009 and 2010 Medicare Provider Analysis and Review claims. Computer output: HospCharc02

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Medicare & Medicaid Research Review is a peer-reviewed, online journal reporting data and research that informs current and future directions of the Medicare, Medicaid, and Children's Health Insurance programs. The journal seeks to examine and evaluate health care coverage, quality and access to care for beneficiaries, and payment for health services.

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