Accurate Coding Impacts the Geometric Length of Stay for Malnourished Inpatients

CHANGES IN HEALTH CARE, such as rising costs and revised reimbursement practices like the hospital Value Based Purchasing program, have resulted in a heightened focus on quality of care. Hospital performance, measured by patient outcomes such as hospital acquired conditions and readmission rates, has affected reimbursement rates since 2012 and is publicly reported. Good patient outcomes also have the benefit of reducing a hospital’s average length of stay (LOS), thus lowering the cost of care. The focus of this article is to review previously published concepts that affect医保 bundled payments for hospital care and demonstrate the importance of accurately coding for malnutrition to ensure expected LOS is determined accurately, using an example from a community hospital.

MEDICARE REIMBURSEMENT PROCESS
Medicare determines expected LOS and reimbursement rates for hospitals using the Inpatient Prospective Payment System, and some commercial insurance companies follow their lead. This means that hospitals are usually not paid using a fee-for-service model where individual expenses, such as medications, procedures, laboratory measurements, or tests, are reimbursed. Rather, they are paid one lump sum for each patient’s hospital stay based on the Centers for Medicare and Medicaid Services’ (CMS) complex analysis of the average cost of care to treat patients with the same or similar principal and secondary diagnoses.

At discharge, based upon provider documentation in the electronic health record for that particular episode of care, the principal and all secondary diagnoses that impact the care required for each patient must be documented on the Medicare claim form using codes from the International Classification of Disease, 10th edition, Clinical Modification (ICD-10-CM). Cases are then assigned to diagnosis-related groups (DRGs), the CMS classification system that groups similar diagnoses together (Figure 1). The DRG assignment is determined by the patient’s principal diagnosis, up to 24 secondary diagnoses, and up to 25 procedures performed during the stay.

To further refine payment to better account for severity of illness and resource consumption for Medicare patients, CMS modified the DRG classifications by designing the Medicare Severity (MS)-DRG system. There are three levels of severity in this system based on secondary diagnoses and procedures, as documented using ICD-10-CM codes. A designation of Major Complications/Comorbidities (MCC) reflects the highest level of severity, with Complications/Comorbidities (CC) indicating the next level of severity. Secondary diagnoses that CMS has determined do not significantly affect severity of illness and resource use are classified as Non-CC. CMS has designated different malnutrition diagnoses as MCCs, CCs, or Non-CCs for use in the MS-DRG system.

Only one MS-DRG is assigned per discharge; because there are 754 different MS-DRGs available (as of fiscal year 2018), and because most patients have several secondary diagnoses and procedures, hospitals use coding software with algorithms to determine the proper MS-DRG assignment. Because this can be a complicated system to comprehend, Figure 2 uses a simplified example patient to demonstrate the steps necessary to determine the MS-DRG.

A weight is assigned to each MS-DRG that reflects the average cost to provide care for inpatients with that diagnosis, relative to the average cost to provide care for all Medicare patients; this is known as the relative weight (RW). Although also influenced by several other factors, multiplying the RW of the assigned MS-DRG by the hospital’s base payment rate can provide an estimate of the Medicare payment the hospital will receive for that case.

CMS completes an annual analysis using billing and quality data submitted by hospitals to continually refine the MS-DRG system to ensure that each diagnosis group includes cases with clinically similar conditions that consume comparable amounts of resources. They also assess secondary diagnoses and may reassign them to a different level of severity (MCC, CC, or Non-CC). In addition, CMS may reassign diagnoses and procedures to a different diagnostic category, create a new DRG, or modify the RW or expected LOS. Updated DRG tables must be obtained from the CMS website each federal fiscal year (October 1 through September 30 of the following year) to ensure that data analysis is accurate.

LENGTH OF STAY
The MS-DRG RW table referenced in Figure 1 includes the expected LOS for each MS-DRG, differentiated as the arithmetic mean LOS and geometric mean LOS. The arithmetic mean LOS does not account for outliers, such as patients who are in the hospital for a significantly longer or shorter time than expected for the assigned MS-DRG. The geometric mean LOS does account for these stays, reducing the effect of these outliers on the expected LOS. The geometric mean LOS is one of the components that Medicare considers when determining the RW and
Therefore the reimbursement for each MS-DRG. Because hospitals do not receive extra reimbursement for additional hospital days (except for extreme outlier cases), the goal is often to discharge patients before they exceed the expected geometric mean LOS for the assigned MS-DRG. Likewise, it is important to ensure all secondary diagnoses are properly coded to maximize the assigned MS-DRG to increase the expected geometric mean LOS.

Hospitals can compare their actual average LOS to the expected geometric mean LOS for each MS-DRG to gauge their performance and identify areas for improvement. For example, if the actual average LOS for a particular MS-DRG exceeds the expected geometric mean LOS, the hospital may wish to develop a performance improvement project to reduce the average LOS for that particular demographic.

Because CCs and MCCs influence LOS, an analysis of coding practices is also important when assessing a hospital's average LOS. For instance, if malnutrition is not coded as a CC or MCC (depending on severity level) and no other CCs or MCCs are identified, the stay may be assigned to an MS-DRG with a lower RW than it should be, missing the opportunity for a higher payment and longer expected geometric mean LOS.

Table 5 provides instructions on how to calculate the difference in expected geometric mean LOS if the malnutrition diagnosis is coded properly.

<table>
<thead>
<tr>
<th>MS-DRG</th>
<th>FY 2017 Final Post-Acute DRG</th>
<th>FY 2017 Final Special Pay DRG</th>
<th>MDC</th>
<th>TYPE</th>
<th>MS-DRG Title</th>
<th>Weights</th>
<th>Geometric mean LOS</th>
<th>Arithmetic mean LOS</th>
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<tr>
<td>286</td>
<td>No</td>
<td>No</td>
<td>05</td>
<td>MED</td>
<td>CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W MCC</td>
<td>2.0207</td>
<td>5.2</td>
<td>7.0</td>
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<tr>
<td>287</td>
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<td>No</td>
<td>05</td>
<td>MED</td>
<td>CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W/O MCC</td>
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<td>288</td>
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<td>No</td>
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<td>MED</td>
<td>ACUTE &amp; SUBACUTE ENDOCARDITIS W MCC</td>
<td>2.7773</td>
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<td>9.7</td>
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<td>289</td>
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<td>No</td>
<td>05</td>
<td>MED</td>
<td>ACUTE &amp; SUBACUTE ENDOCARDITIS W CC</td>
<td>1.5523</td>
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<tr>
<td>290</td>
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<td>No</td>
<td>05</td>
<td>MED</td>
<td>ACUTE &amp; SUBACUTE ENDOCARDITIS W CC/MCC</td>
<td>1.2695</td>
<td>4.5</td>
<td>5.5</td>
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<td>291</td>
<td>Yes</td>
<td>No</td>
<td>05</td>
<td>MED</td>
<td>HEART FAILURE &amp; SHOCK W MCC</td>
<td>1.4796</td>
<td>4.6</td>
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<td>0.9574</td>
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<td>293</td>
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<td>0.6608</td>
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<td>294</td>
<td>No</td>
<td>No</td>
<td>05</td>
<td>MED</td>
<td>DEEP VEIN THROMBOPHLEBITIS W CC/MCC</td>
<td>1.1154</td>
<td>3.8</td>
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<td>295</td>
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<td>MED</td>
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<td>296</td>
<td>No</td>
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<td>MED</td>
<td>CARDIAC ARREST, UNEXPLAINED W MCC</td>
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<td>1.9</td>
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<td>297</td>
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<td>MED</td>
<td>CARDIAC ARREST, UNEXPLAINED W CC</td>
<td>0.5925</td>
<td>1.3</td>
<td>1.6</td>
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<td>298</td>
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<td>MED</td>
<td>CARDIAC ARREST, UNEXPLAINED W/O CC/MCC</td>
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<td>1.2</td>
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<td>MED</td>
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<td>4.1</td>
<td>5.4</td>
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<tr>
<td>300</td>
<td>Yes</td>
<td>No</td>
<td>05</td>
<td>MED</td>
<td>PERIPHERAL VASCULAR DISORDERS W CC</td>
<td>1.0077</td>
<td>3.5</td>
<td>4.3</td>
</tr>
<tr>
<td>301</td>
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<td>No</td>
<td>05</td>
<td>MED</td>
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<td>0.7237</td>
<td>2.6</td>
<td>3.1</td>
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<td>302</td>
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<td>No</td>
<td>05</td>
<td>MED</td>
<td>ATHEROSCLEROSIS W MCC</td>
<td>1.0408</td>
<td>2.8</td>
<td>3.8</td>
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<tr>
<td>303</td>
<td>No</td>
<td>No</td>
<td>05</td>
<td>MED</td>
<td>ATHEROSCLEROSIS W/O MCC</td>
<td>0.6429</td>
<td>1.2</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Figure 1. Screen shot of a section of Medicare’s Table 5 for Fiscal Year 2017—List of Medicare Severity Diagnosis-Related Groups, Relative Weighting Factors, and Geometric and Arithmetic Mean Length of Stay.2
many studies examined only very specific groups of patients (ie, cerebrovascular accident); elective surgery; elective ear, nose, and throat surgery; appendectomy within 24 hours of admission; or intensive care unit patients ≥65 years of age. Other key differences specifically related to the malnutrition diagnosis were also noted. Many researchers described their subjects as malnourished; however, the only methods used to determine nutritional status were nutrition screening tools such as the Malnutrition Screening Tool (MST) or Nutrition Risk Screening-2002 (NRS-2002). These tools are intended to identify malnutrition risk, not actually diagnose malnutrition. Some studies did diagnose malnutrition using assessment methods such as the Subjective Global Assessment; however, the nutrition assessment was not completed by an RDN (or the assessor was not reported). Lastly, none of the identified studies used the Academy of Nutrition and Dietetics (Academy) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) proposed malnutrition definitions published in 2012.

To our knowledge, this is the first study examining the effect of malnutrition coding on expected geometric mean LOS in which the Academy and A.S.P.E.N. malnutrition criteria for adult patients were used by RDNs to diagnose malnutrition. Furthermore, all patients admitted to the hospital, not just specific patient populations, were screened and referred to the RDN for a full nutrition assessment if they were positively identified as at nutrition risk.

**MALNUTRITION AND LENGTH OF STAY IN A COMMUNITY HOSPITAL**

In a community hospital with an average census of 185 and average LOS of 4.5 days, patients are screened by the nurse for nutritional risk within 24 hours of admission, the results of which are documented in the electronic health record. An RDN consult is generated automatically if the patient triggers positively as at nutrition risk, and the RDN assesses the patient within 24 to 48 hours. The RDNs use criteria suggested by the Academy and A.S.P.E.N. to diagnose malnutrition and record malnourished inpatients’ names and account numbers (inpatients under observation status are excluded). Reports on all malnourished patients are generated monthly by the hospital’s financial analysts and include the admission and discharge dates, assigned MS-DRGs, and CCs or MCCs and their associated ICD-10-CM codes.

Between March 2015 and June 2017, the RDNs identified 1,817 malnourished adult patients. Of these, 1,171 (64.4%) were not coded for malnutrition. Of the patients not coded for malnutrition, the assigned MS-DRGs, including secondary diagnoses coded as CCs and MCCs, were assessed to see if a malnutrition code would have made an impact on the MS-DRG and, therefore, the RW and expected geometric mean LOS. If the RDN diagnosed severe malnutrition, this was correlated with severe protein calorie malnutrition (E43), an MCC; similarly, an RDN diagnosis of nonsevere malnutrition correlated with either moderate protein-calorie malnutrition (E44.0), mild protein-calorie malnutrition (E44.1), or unspecified protein-calorie malnutrition (E46), all CCs.

If the patient was diagnosed with malnutrition but not coded as such, the expected geometric mean LOS would not have increased appropriately due to the missing MCC or CC.

Of the 1,171 malnourished patients that were not coded for malnutrition, 475 (40.6%) would have benefited from proper coding to change the MS-DRG and increase the RW and expected geometric mean LOS. The actual average LOS for this group was 5.3 days, and the Medicare expected geometric mean LOS based on the assigned MS-DRGs was 3.5 days (see the Table). If the malnutrition had been coded appropriately, the potential expected geometric mean LOS

<table>
<thead>
<tr>
<th>MS-DRG Assignment Process</th>
<th>Example Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1.</strong> Assign 1 of 25 MDC based on principal diagnosis causing that hospitalization</td>
<td>Principal diagnosis (reason admitted to the hospital): Perforation of esophagus (ICD-10-CM code K22.3)</td>
</tr>
<tr>
<td><strong>Step 2.</strong> Assign DRG within that MDC based on the principal diagnosis</td>
<td>Step 1. Assigned to MDC 06: Diseases and Disorders of the Digestive System.</td>
</tr>
<tr>
<td><strong>Step 3.</strong> Assign severity level within that DRG based on secondary diagnoses impacting the hospitalization and procedures furnished during the stay</td>
<td>Step 2. Assigned to DRG, Major Esophageal Disorder based on principal diagnosis.</td>
</tr>
<tr>
<td></td>
<td>Step 3. Identified secondary diagnosis: MCC Severe protein-calorie malnutrition (ICD-10-CM code E43)</td>
</tr>
<tr>
<td></td>
<td>Final: Assigned to MS-DRG 368, Major Esophageal Disorder with MCC based on principal and secondary diagnoses.</td>
</tr>
</tbody>
</table>

*aMS-DRG = Medicare Severity Diagnosis-Related Group.  
*bMDC = major diagnostic categories.  
*cMCC = Major Complications/Comorbidities.  

**Figure 2.** Steps to determine Medicare Severity Diagnosis-Related Group assigned to the patient’s hospital stay.
would have been 5.2 days. This correlates closely with the actual average LOS of 5.3 days. Comparison of the actual expected geometric mean LOS (3.5 days) and the potential expected geometric mean LOS (5.2 days) showed a difference of 1.7 days.

These data have several implications. Consistent with previous reports, malnourished patients are not being properly coded for malnutrition, which negatively affects MS-DRG assignment and therefore reimbursement and comparison benchmarks such as expected geometric mean LOS. Required care for the malnourished patient in this hospital, at least in terms of LOS, is consistent with the expected norms, as the potential expected geometric mean LOS was essentially the same as the actual average LOS.

The hospital’s actual average LOS for malnourished patients is 5.3 days, which is longer than the expected geometric mean LOS of 3.5 days based on the MS-DRGs assigned at discharge, indicating that there is an opportunity to improve the claims submitted to CMS to better reflect the acuity level of patients served and amount of care provided. Accurately identifying and coding for malnutrition is one way to improve this process to ensure the proper MS-DRG is assigned to the patient case upon discharge.

**CONCLUSION**

Accurate coding for malnutrition can impact the assigned MS-DRG, appropriately bringing greater reimbursement for the hospital stay and

### Table. Comparison of actual LOS\(^a\) to expected gmLOS\(^b\) in malnourished patients that were not coded for malnutrition (n=475)

<table>
<thead>
<tr>
<th>Actual average LOS</th>
<th>Actual expected gmLOS</th>
<th>Potential expected gmLOS if malnutrition had been coded</th>
<th>Difference between actual and potential gmLOS (“Missed Opportunity”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3 days</td>
<td>3.5 days</td>
<td>5.2 days</td>
<td>1.7 days</td>
</tr>
</tbody>
</table>

\(^a\)LOS= length of stay.
\(^b\)gmLOS= geometric mean length of stay.
establishing appropriate comparison benchmarks such as expected geometric mean LOS. Accurate coding will also inform CMS’s ongoing efforts to refine the MS-DRG system. Consistent use of standardized criteria, such as that published by the Academy and A.S.P.E.N., to determine the presence of severe and nonsevere malnutrition aids ongoing efforts to predict financial costs and outcomes associated with the prevention and treatment of malnutrition. Future research should concentrate on efforts to determine which interventions, provided by which health care providers at which point in the care continuum, are the most effective in preventing or treating malnutrition.

References
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