A Step-By-Step Guide to Implementing a Malnutrition Coding Program for Adult Inpatients

Malnutrition: Making the Case for More Dietitians

A Personal Journey in Malnutrition Documentation

There’s No Denying the Expanding Involvement of Dietitians in Malnutrition Coding

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Chair's Column
A Step-By-Step Guide to Implementing a Malnutrition Coding Program for Adult Inpatients

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Abstract

Proper assessment and documentation of a malnutrition diagnosis can have a significant impact on Medicare reimbursement and the case mix index for a hospital. Multidisciplinary involvement and support is key to implementing a successful program. This article provides guidance for implementing a malnutrition coding program, including the development of an effective nutrition screening and prioritization plan, using the key steps of the Nutrition Care Process, and communicating the malnutrition diagnosis to the appropriate health care team members. It also provides guidance on how to determine the actual payment amount and the change in case mix index when the malnutrition diagnosis is the primary driver for the severity level of the Diagnosis Related Group assignment.

Introduction

“I’ve been reading about the impact malnutrition coding can have on hospital finances and the case mix index. What do we need to do here at our hospital to get us to that point?” As the clinical nutrition manager, I was thrilled to have our Chief Medical Officer (CMO) approach me after Medical Executive Committee to discuss this topic. We had already taken several steps toward implementation of this initiative, and having the CMO’s support to coordinate efforts with other health care team members and hospital departments would be invaluable. I explained the steps for an individual patient to be diagnosed, treated, and coded for malnutrition (Fig 1) to give the CMO a better understanding of the patient care workflow involved and the interdisciplinary nature of the process. I also shared the steps involved in implementing such a program, the progress we had made so far, and specific actions for which we needed support.

Patient Workflow Using the Nutrition Care Process

Nutrition Screening and Prioritization

A prioritization system can determine which patients are seen by the RDN within a specific timeframe. Not all hospitalized patients can receive a nutrition assessment and care plan from the RDN due to staffing levels. The first step in the process is usually completion of a nutrition screening tool by the registered nurse or designee during the admission process. The tool contains a predetermined list of questions to identify nutrition risk. A validated nutrition screening tool that is appropriate for the patient population served at the specific hospital is recommended. RDNs can consult the Evidence Analysis Library from the Academy of Nutrition and Dietetics for an extensive review of available validated tools to choose the most appropriate screen (1). Although not all registered dietitian nutritionists (RDNs) may be fortunate enough to be approached by the CMO, all clinicians have a responsibility to work toward implementing a comprehensive malnutrition program in their organizations. Understanding each step involved in the process is necessary to achieve a complete program. Having an overall vision increases the opportunity for the clinical nutrition team to show their value in a health care landscape driven by patient satisfaction, quality outcomes, and financial stability. Many health care facilities and systems have portions of the programs in place but may be unsure of how to implement them completely. This guide explains the process surrounding malnutrition coding and suggests a path for successful creation of an effective and inclusive malnutrition documentation and tracking program.
for the RDN to see each day based solely on the presence of a nutrition screening referral or physician consultation; others have an additional process to determine which patients would benefit from an RDN intervention, even if they do not trigger positively on the nutrition screen. Examples of additional factors that may trigger an RDN assessment include the presence of pressure injuries (pre-existing or hospital-acquired); oncology diagnoses; and gastrointestinal diseases causing obstruction, shortened length of bowel, or malabsorption of macronutrients, micronutrients, and/or fluids. Because of variations in this process among institutions, all stakeholders involved in developing a malnutrition coding program must understand the actual workflow that determines which patients are seen by the RDN, how the nutrition diagnosis is determined, and the steps necessary to ensure inclusion of the malnutrition diagnosis in the master charge (Fig. 1).

### Nutrition Assessment and Diagnosis

Patients identified at nutrition risk are referred to the RDN for more in-depth screening and potential nutrition assessment. The development of a nutrition diagnosis, of which malnutrition is one example, starts with a thorough nutrition assessment, as outlined in the Nutrition Care Process (2). Each component of a thorough nutrition assessment should be considered, including a nutrition-focused physical exam (NFPE).

Many health care providers automatically consider a patient’s body mass index (BMI), oral intake, and weight changes when considering the degree of malnutrition. Physical signs and symptoms are equally important to identify, especially for patients with normal or overweight/obese BMIs, who may not be easily identified as malnourished. Historically, approaches to evaluation, including assessment of appetite, weight loss, and laboratory tests, varied widely and were not always evidenced-based. Some of these approaches resulted in inconsistent measurement and confused communication among clinicians, with potential misdiagnoses (3). Many laboratory indicators, such as acute-phase protein values (albumin, prealbumin), are affected by the inflammatory response and do not specifically reflect nutrition status (4,5). Consequently, estimates of malnutrition prevalence vary widely from 15% to 60% of the hospitalized population (3).

To address the need for a more consistent and reliable diagnostic approach, the Academy and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) produced a consensus statement in 2012 that detailed a set of criteria important in assessing and classifying the degree of malnutrition (3). In the statement, malnutrition is defined in the setting of three basic causes: chronic versus acute injury or illness and social/environmental. Six malnutrition clinical characteristics are outlined, and four of these six are physical findings that the RDN can investigate using the NFPE.

Clinical RDNs must develop competency in the assessment and interpretation of all six clinical characteristics, with the ultimate goal of determining nutrition status with appropriate interventions. The challenges in implementing the NFPE include lack of RDN knowledge about the clinical characteristics and apprehension about conducting the physical exam due to lack of experience. An informal poll of 27 RDNs in clinical practice showed that 45% had never used physical assessment in their practices (author’s survey). The most cited reason was insufficient training and practice. A multistep approach to training can address these shortcomings. The first step is to provide background information regarding the need for a consistent, reliable diagnostic approach, followed by an overview of the Academy/A.S.P.E.N. etiology-based approach to the malnutrition diagnosis (3). Review of the consensus article itself can provide this initial information and the foundation upon which subsequent

![Figure 1. Interdisciplinary workflow to identify malnourished patients and include the malnutrition diagnosis in the master charge.](image-url)

(Continued on next page)
Table 1. International Classification of Diseases, 10th edition (ICD-10) Codes for Malnutrition

<table>
<thead>
<tr>
<th>ICD-10 Code</th>
<th>ICD-10 Title</th>
<th>Criteria/Description</th>
<th>MCC/CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>E40</td>
<td>Kwashiorkor*</td>
<td>Nutritional edema with dyspigmentation of skin and hair.</td>
<td>MCC</td>
</tr>
<tr>
<td>E42</td>
<td>Marasmic kwashiorkor *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E41</td>
<td>Nutritional marasmus *</td>
<td>Nutritional atrophy; severe malnutrition otherwise stated; severe energy deficiency.</td>
<td>MCC</td>
</tr>
<tr>
<td>E43</td>
<td>Unspecified severe protein-calorie malnutrition</td>
<td>Nutritional edema without mention of dyspigmentation of skin and hair.</td>
<td>MCC</td>
</tr>
<tr>
<td>E44</td>
<td>Moderate protein-calorie malnutrition</td>
<td>No definition given.</td>
<td>CC</td>
</tr>
<tr>
<td>E44.1</td>
<td>Mild protein-calorie malnutrition</td>
<td>No definition given.</td>
<td>CC</td>
</tr>
<tr>
<td>E45</td>
<td>Retarded development following protein-calorie malnutrition</td>
<td></td>
<td>CC</td>
</tr>
<tr>
<td>E46</td>
<td>Unspecified protein-calorie malnutrition</td>
<td>A disorder caused by a lack of proper nutrition or an inability to absorb nutrients from food. An imbalanced nutritional status resulting from insufficient intake of nutrients to meet normal physiologic requirement. Inadequate nutrition resulting from poor diet, malabsorption, or abnormal nutrient distribution. The lack of sufficient energy or protein to meet the body's metabolic demands, as a result of either an inadequate dietary intake of protein, intake of poor-quality dietary protein, increased demands due to disease, or increased nutrient losses.</td>
<td>CC</td>
</tr>
<tr>
<td>E64</td>
<td>Sequelae of protein-calorie malnutrition</td>
<td></td>
<td>CC</td>
</tr>
</tbody>
</table>

*Should rarely be used in the United States; if they are used, they require extensive documentation to justify their use.

CC=complication or comorbidity, MCC=major complication or comorbidity.

Training can be built. Next, the clinician should seek educational resources that target implementing the malnutrition diagnosis approach into daily clinical practice, including conducting the physical exam, documenting the findings, and recording the corresponding malnutrition when present. Developing a strong conceptual understanding of the malnutrition diagnosis approach gives the RDN a foundation for initiating hands-on physical assessment training.

A workshop with a skilled trainer is an effective tool for gaining experience in conducting the physical exam. Beginning with the head and working toward the lower body, the RDN conducts the physical assessment of various body areas. With the guidance of the instructor, RDNs practice palpation on partners and consider the necessary findings to identify nutrition status using the malnutrition clinical characteristics. To simulate the tactile experience of the NFPE, items with specific purposes are included in the training. A leather belt can mimic the feeling of a well-nourished temporal muscle, while a half-filled water balloon demonstrates the feeling of severe wasting of the same area. A taut water balloon simulates the normal firmness of a deltoid, and a bag of flour can mimic the shape of the deltoid from posterior to medial head. A ball of string can simulate the feel of the muscles at the base of the neck of a severely wasted patient.

The final training step involves practicing the approach at the bedside, preferably with one RDN conducting the NFPE and interpreting the findings, which are validated by an observing RDN. Subsequent discussion as well as review and interpretation of the findings are completed by RDNs in partnership. With continued consistent practice, the clinician should gain greater understanding of the differences in individuals, comprehend the implications of findings, and develop competency in conducting the physical exam as part of the nutrition assessment.

The nutrition assessment provides the information required to document a nutrition diagnosis, using standardized language in the problem-etiology-signs/symptoms (PES) format (2). The Nutrition Focused Physical Exam Pocket Guide (6) provides sample PES statements that document the degree of malnutrition, the context in which that malnutrition occurs (acute, chronic, or social/environment circumstances), and the etiology and signs/symptoms.

Nutrition Intervention, Monitoring, and Evaluation

Once the nutrition assessment has been completed and the diagnosis identified, the Nutrition Care Process steps include developing nutrition interventions targeted to address the signs and symptoms and/or etiology of the nutrition diagnosis and resolve the diagnosis if possible (2). A monitoring and evaluation plan must be developed to monitor the patient’s response to care and the achievement of care goals. Several additional steps, discussed in this article, need to be completed to develop a robust malnutrition program at a hospital. These inform the work done with individual patients and measure the impact of the malnutrition assessment, intervention, and documentation. Some steps are interrelated and can be completed simultaneously.
Defining Malnutrition
Malnutrition can be defined simply as an imbalance of nutrients to promote optimal health, but there is no universally accepted set of criteria for determining the presence of or degree of malnutrition (3). The International Classification of Diseases, 10th edition (ICD-10) includes basic definitions (Table 1) but does not provide guidance on assessment factors or signs/symptoms that a patient might exhibit (7). Recognizing this limitation, the Academy and A.S.P.E.N. developed the consensus statement for patient-specific definitions and criteria to be evaluated to determine the etiology and degree of malnutrition (3).

Because these criteria have not been officially accepted by the Centers for Medicare & Medicaid Services (CMS) and have not been validated, each hospital may use the consensus statement criteria or choose alternate criteria. RDNs should collaborate with physicians from multiple care teams, such as surgery, medicine, neurology, gastroenterology, oncology, and endocrinology, to determine the criteria that will be used to diagnose malnutrition by health care team members in that hospital. Coding documentation specialists (CDSs) read through medical charts to determine all appropriate diagnoses to add to the patient’s master charge list. Therefore, it is important to engage this department in determining the malnutrition diagnosis criteria that will be used in the hospital to limit the queries they send to physicians using unapproved alternate criteria. We recommend use of the consensus statement criteria because several studies have demonstrated negative outcomes in patients identified as malnourished using the consensus malnutrition clinical characteristics, and work is underway to validate these criteria (8–11). Consistent use can help with this effort. In most institutions, the policy summarizing the criteria requires approval by the Pharmacy and Therapeutics Committee and equivalent committees.

Although clinical judgment still can play a part in assigning the malnutrition diagnosis, the approved policy should be used as a guide to ensure consistency in the diagnosis. As an example, consider two patients admitted to the hospital at the same time. Patient A has had poor oral intake for 2 weeks due to mouth sores and poor appetite and has lost 40 lb (16% of usual body weight). The RDN documents “Severe protein-calorie malnutrition in the context of chronic disease related to mouth sores affecting ability to eat, as evidenced by patient’s report of poor intake for 2 weeks and 16% weight loss.” Patient B has a similar pattern of inadequate oral intake and unintentional weight loss but receives a diagnosis of mild malnutrition by a different (or the same) RDN. Such inconsistencies can be confusing to the physicians who are asked whether they agree with the diagnosis and can raise suspicion among auditors assigned by CMS to determine accuracy of Medicare billing.

Communicating Approved Malnutrition Diagnosis Criteria
Health care providers must be educated about the approved criteria to diagnose malnutrition, especially because they may vary slightly from one hospital to another. Education can ensure that all clinicians involved in risk identification, assessment, diagnosis, and intervention for malnutrition provide consistent, evidence-based nutrition care. Physicians, nurses, RDNs, pharmacists, speech-language pathologists, and CDSs are some of the clinicians who need to receive education.

Because the criteria list is often long and contains multiple assessment factors, physicians may have difficulty remembering the approved criteria when asked to corroborate the RDN’s malnutrition diagnosis, whether directly contacted by the RDN or queried by the CDSs. Certain strategies can facilitate this process (Table 2). Figure 2 shares an example of documentation best practices from the coding department at a Midwest hospital.

Optimizing the Electronic Medical Record to Communicate Nutrition Assessment Data and Malnutrition Diagnosis
RDNs should work with nursing and information technology staff to optimize nursing electronic medical record (EMR) workflow in documenting items that should be assessed for malnutrition, such as meal and oral nutrition supplement intake, enteral and parenteral nutrition delivery, and anthropometric measurements. Nursing staff require periodic education on how, where, and why to document relevant information to provide RDNs with adequate information to assess the patient accurately and assign the appropriate nutrition diagnosis.

Table 2. Strategies to Educate Interdisciplinary Health Care Members about Malnutrition Clinical Characteristics

| 1. | Create laminated pocket cards listing malnutrition clinical characteristics for medical students, interns, and residents. |
| 2. | Embed a link to the approved malnutrition clinical characteristics in the electronic medical record for easy reference while completing documentation. |
| 3. | Present a complicated case series for registered dietitian nutritionists, nurses, physicians, and other clinicians to discuss patients with severe protein-calorie malnutrition that illustrates common etiologies and interventions for these patients. |
| 4. | Present malnutrition clinical characteristics at physician/resident orientation or on grand rounds. |
| 5. | Use facility-specific communication and education processes such as clinical alerts or email blasts. |
| 6. | Include a link to the malnutrition clinical characteristics in queries sent by coding documentation specialists to physicians for easy reference. |
| 7. | Discuss individual patients with the health care team during rounds, care conferences, or individually. |

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The malnutrition diagnosis can only be assigned an ICD-10 code and added to the overall charge master if the physician or other primary care provider documents it as a medical diagnosis. The CMO and other physician leaders can help determine preferred communication pathways when RDNs have identified a patient with malnutrition, such as a phone call, discussion on rounds, or electronic notification through the EMR. A practice that has been very successful at multiple facilities is the Nutrition Summary, in which the RDN identifies a patient as malnourished and creates a concise note detailing criteria observed. The Summary is sent electronically through the EMR to the physician responsible for care of the patient, requesting agreement and signature. If the physician signs, indicating agreement with the RDN assessment, the CDS can enter the diagnosis into the patient record. The response rate with this process is believed to be higher than that associated with more traditional communication methods, such as verbal communication on medical rounds or leaving sticky notes in the physician’s progress note or order section.

Building a close working relationship with the CDS team can facilitate malnutrition coding of appropriate patients. CDSs need to understand malnutrition clinical characteristics and feel comfortable contacting RDNs when clarification is needed to improve the chances of diagnosing the correct, billable malnutrition type and severity. For example, a physician may diagnose a patient with “malnutrition,” which is not a codable form of the diagnosis. The CDS who has a good relationship with the RDN can raise the issue, and the RDN can work with the physician and CDS to provide the appropriate diagnosis for the patient. One suggestion is to have an identifiable field in a flowsheet where the RDN or physician can choose the correct malnutrition diagnosis from a discrete field. The coders can run a periodic report from that list, then check to see if physicians have written a medical diagnosis of malnutrition, querying them for agreement with the RDN’s nutrition diagnosis if needed.

Obtaining the data needed to determine the impact on payment and CMI can be challenging for many reasons and is often the part of the program that needs the most support from senior leaders such as the CMO. RDNs may not know the correct terminology to request the needed data, and once obtained, RDNs may not know how to interpret the data to determine if they are indeed the data needed. Data that should be obtained from the finance department for each patient are described in Table 4. Such data can be compared with examples of data in Table 3 that can be

**Table 3. Example Data Collected by the Registered Dietitian Nutritionist (RDN) for Patients Assigned a Malnutrition Diagnosis**

<table>
<thead>
<tr>
<th>Patient identifier</th>
<th>Date seen by RDN</th>
<th>Not malnourished</th>
<th>Mild malnutrition (E44.1)</th>
<th>Moderate malnutrition (E43)</th>
<th>Severe malnutrition (E44)</th>
<th>Date communicated to physician</th>
</tr>
</thead>
</table>

**Determining the Impact of Malnutrition Documentation and Coding on Payment and Case Mix Index (CMI)**

Several steps are involved in determining the impact of malnutrition documentation and coding on hospital payment and the CMI. RDNs should develop a quality assurance/performance improvement (QAPI) program to ensure that patients to whom they assign a nutrition diagnosis of malnutrition are actually given that medical diagnosis by the physician and the diagnoses are coded by the CDSs. A QAPI program also addresses patient-level data needed from the finance department.

Table 3 provides sample data that can be tracked by the RDNs as part of a malnutrition QAPI program. These data can be used to track the prevalence of malnutrition in patients seen by RDNs at the hospital, which can provide useful insight into the nutrition severity level of the patient population. The data also can be analyzed retrospectively to determine if patients are assigned the corresponding ICD-10 code upon discharge. These findings can contribute to decisions about whether a performance improvement plan should be implemented to enhance the process.
tracked by the RDNs as part of a QAPI program.

Using the patient-level data described in Table 4 to determine the actual impact of the malnutrition coding requires knowledge of the base rate for Medicare payment for the hospital for the current year. The base rate for payment is developed annually by Medicare using several factors, including but not limited to geography, resident and medical education costs, overhead costs, and average CMI from the year before (which indicates acuity level of patients cared for at that institution) (12). The patient financial services department should be able to provide the base rate for the current fiscal year for Medicare patients using the Diagnosis Related Group (DRG) payment system.

The inpatient prospective payment system through CMS established Medicare Severity-DRGs (MS-DRGs) (12). Using this system, patients with the same diagnosis and similar clinical characteristics are assigned to an MS-DRG, and the hospital receives a fixed payment amount based on the average cost of care for patients in that group. In addition to the principal diagnosis for that hospitalization, the patient may have additional conditions that increase the resources needed to care for him or her. These are known as either major complications or comorbidities (MCCs) or complications or comorbidities (CCs). The hospital receives a higher payment for MS-DRGs associated with a CC, and an even higher payment for MS-DRGs associated with MCCs. Table 1 indicates which malnutrition diagnoses are considered MCCs or CCs. This same system is used to determine the CMI, which is a description of the level of severity of patients being cared for at that hospital. Of note, only one CC or MCC is required to increase the severity level of the MS-DRG, so the malnutrition diagnosis is not always the one that makes a difference on the payment or the CMI. However, it should always be coded when appropriate.

### Calculating the Impact of Malnutrition Coding on Hospital Payment

Each MS-DRG has a relative weight (RW) assigned to it by CMS; RW tables are updated each year and can be found at www.cms.gov (13). The RW reflects the severity of illness associated with the given diagnosis. Medicare determines payment for a patient’s hospital stay by multiplying the RW of the MS-DRG assigned at discharge by the base rate for that hospital for that year. Table 5 provides sample calculations for a hospital whose base rate is $8,800.

### Calculating the Impact of Malnutrition Coding on CMI

The CMI is the average of all the RWs assigned to patients discharged from a hospital in a given time period (14), calculated by summing the RWs for all Medicare discharges and dividing that sum by the number of discharges. A higher CMI indicates that the patient population has a higher acuity (is sicker) compared with other patient populations. Similarly, when comparing two hospitals, the hospital with the higher CMI serves more complex patients.

Many hospitals adjust their statistics based on the CMI. For example, the total mortality rate is reported using both a raw score and a score that has been adjusted based on CMI. The CMI is also often used to adjust the average cost per patient for a given hospital relative to the adjusted average cost for other hospitals by dividing the average cost per patient by the hospital's calculated CMI.

The adjusted average cost per patient reflects the charges reported for the types of cases treated in that year. Table 6 offers example calculations between two hypothetical hospitals. The expenses per patient at the two hospitals are close to equal when adjusted for acuity of patients served using the CMI. Figure 3 illustrates additional examples of how hospitals use CMI to adjust performance metrics.

(Continued on next page)
Table 7 shows the CMI for patients discharged from a large academic medical center in the mid-Atlantic region in a given time period who were assigned to the four disease state DRG groups that were chosen to be studied (author’s report, previously unpublished data). The first column shows the CMI as it was actually coded, with some of the patients coded for malnutrition as a secondary diagnosis appropriately and some not coded who should have been. The second column shows what the CMI would have been if malnutrition was not coded as a secondary diagnosis on the 9 patients for which it was the primary driver for the severity level assigned to the patient. This illustrates how the CMI would have been lower if the malnutrition had not been coded. The third column keeps the CMI as it is (with the coded malnutrition) and adds in the cases that should have been coded for malnutrition. This illustrates the ideal state of all identified malnutrition being documented by the RDN and physician, the intervention occurring, and the malnutrition coded. Due to a small proportion of patients who were malnourished in each of the categories, the coding does not have a substantial impact on CMI. In this example, only four out of hundreds of possible DRG groups were examined, but the overall impact of malnutrition coding could potentially be much larger.

Table 8 uses this same data set and follows the sample calculation methods in Table 5 to determine the impact on hospital payment for the cases that were coded for malnutrition. Table 9 indicates the missed payment opportunities when malnutrition is identified by the RDN but not documented by the physician as a medical diagnosis and, therefore, not added to the master charge list with an ICD-10 code for malnutrition as a secondary diagnosis (15). It is very important to note that these totals are based on calculations using the RW tables published annually by Medicare and the hospital’s reported base rate; they may not reflect any incentives or penalties as a result of the Value-Based Purchasing program (16). Accordingly, actual payment at the end of the fiscal year to the hospital from Medicare may vary slightly.

Conclusion
Implementing a complete malnutrition program requires several steps, including approval of consensus malnutrition criteria with the hospital administrative and interdisciplinary team, proper training and practice for RDN staff, and tracking and reporting of revenue and impact on the hospital’s CMI. These pieces all are key to documenting the value and expertise of the RDN in the changing health care landscape. Undertaking the process in a step-by-step approach, finding the right stakeholders, and enlisting the assistance of the RDN team can create a powerful program.

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References

![Figure 3. Example from a mid-Atlantic hospital using the case mix index (CMI) to adjust performance factors.](image-url)

<table>
<thead>
<tr>
<th>Volumes</th>
<th>Actual</th>
<th>Budget</th>
<th>Variance</th>
<th>Variance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharges</td>
<td>18,542</td>
<td>18,883</td>
<td>(341)</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Average Length of Stay</td>
<td>5.92</td>
<td>5.40</td>
<td>0.52</td>
<td>9.6%</td>
</tr>
<tr>
<td>CMI Adjusted Average Length of Stay</td>
<td>2.91</td>
<td>2.73</td>
<td>0.18</td>
<td>6.6%</td>
</tr>
<tr>
<td>Clinic Visits</td>
<td>500,968</td>
<td>516,501</td>
<td>(9,593)</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Emergency Department Visits</td>
<td>40,056</td>
<td>39,609</td>
<td>447</td>
<td>1.1%</td>
</tr>
<tr>
<td>Main OR Surgeries</td>
<td>11,514</td>
<td>11,278</td>
<td>236</td>
<td>2.1%</td>
</tr>
<tr>
<td>OPSC Surgeries</td>
<td>7,371</td>
<td>7,707</td>
<td>(336)</td>
<td>-4.4%</td>
</tr>
<tr>
<td>All Payer CMI</td>
<td>2.03</td>
<td>1.98</td>
<td>0.05</td>
<td>2.5%</td>
</tr>
<tr>
<td>Paid FTE/Adj Discharge/All Payor CMI</td>
<td>25.00</td>
<td>24.82</td>
<td>0.18</td>
<td>0.7%</td>
</tr>
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</table>
Table 7. Impact on the Case Mix Index (CMI) of Malnutrition Coding

<table>
<thead>
<tr>
<th>DRG Group (n)</th>
<th>CMI as Coded</th>
<th>CMI if Malnutrition Had Not Been Coded</th>
<th>CMI if Opportunities Were Not Missed (IDEAL STATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD 190-192 (71)</td>
<td>0.943</td>
<td>0.943</td>
<td>0.949</td>
</tr>
<tr>
<td>CAP 193-195 (81)</td>
<td>1.089</td>
<td>1.068</td>
<td>1.118</td>
</tr>
<tr>
<td>Spinal Fusion 459-460 (193)</td>
<td>4.201</td>
<td>4.201</td>
<td>4.228</td>
</tr>
<tr>
<td>Chemotherapy 846-848 (111)</td>
<td>1.275</td>
<td>1.268</td>
<td>1.275</td>
</tr>
<tr>
<td>Overall (456)</td>
<td>2.284</td>
<td>2.278</td>
<td>2.290</td>
</tr>
</tbody>
</table>

CAP=community-acquired pneumonia, COPD=chronic obstructive pulmonary disease, DRG=Diagnosis Related Group

Table 8. Total Captured Increased Reimbursement from Malnutrition Documentation and Coding (15)

<table>
<thead>
<tr>
<th>DRG Group (n)</th>
<th>Cases with Malnutrition as Secondary Diagnosis (n)</th>
<th>Cases with Malnutrition as Primary Driver of Reimbursement (n)</th>
<th>Total Captured Increased Reimbursement</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD 190-192 (71)</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CAP 193-195 (81)</td>
<td>11</td>
<td>7</td>
<td>$28,526.21</td>
</tr>
<tr>
<td>Spinal Fusion 459-460 (193)</td>
<td>5</td>
<td>1</td>
<td>$24,197.69</td>
</tr>
<tr>
<td>Chemotherapy 846-848 (111)</td>
<td>2</td>
<td>1</td>
<td>$10,603.71</td>
</tr>
<tr>
<td>Overall (456)</td>
<td>19</td>
<td>9</td>
<td>$63,327.62</td>
</tr>
</tbody>
</table>

CAP=community-acquired pneumonia, COPD=chronic obstructive pulmonary disease

Table 9. Total Missed Reimbursement When Documentation and Coding for Malnutrition Are Absent (15)

<table>
<thead>
<tr>
<th>DRG Group</th>
<th>RDN Documentation of Malnutrition But No Secondary Diagnosis Code (n)</th>
<th>Secondary Diagnosis of Malnutrition Would Have Been Primary Driver of Reimbursement (n)</th>
<th>Total Missed Reimbursement</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD 190-192</td>
<td>5</td>
<td>1</td>
<td>$1,976.58</td>
</tr>
<tr>
<td>CAP 193-195</td>
<td>10</td>
<td>6</td>
<td>$26,128.92</td>
</tr>
<tr>
<td>Spinal Fusion 459-460</td>
<td>3</td>
<td>2</td>
<td>$48,395.38</td>
</tr>
<tr>
<td>Chemotherapy 846-848</td>
<td>20</td>
<td>9</td>
<td>$76,500.88</td>
</tr>
</tbody>
</table>

CAP=community-acquired pneumonia, COPD=chronic obstructive pulmonary disease


Malnutrition: Making the Case for More Dietitians
Bridget Drapeaux, MA, RDN, LD  Douglas Robertson, RDN, LD

The Problem
An estimated 20% to 60% of all patients currently hospitalized in the United States are malnourished (1). Malnutrition adversely affects response to therapy and can decrease survival. Increased length of stay, hospital costs, potential for readmission, risk for surgical site infections, and risk for pressure injuries and falls are associated with any degree of malnutrition (2–5).

The Impact
Malnutrition can contribute significantly to the Medicare Severity-Diagnosis Related Group (MS-DRG) assigned to the patient’s hospital stay (Fig. 1), reflecting the increased days of care and resources required to treat patients who have increasingly complex conditions. A cyclic relationship can exist between clinical documentation, billing, reimbursement, and publically reported data, with all affecting each other. Inadequate, incorrect, or absent documentation and coding of malnutrition underestimates patient complexity, thereby negatively affecting risk adjustment of publically reported data. Such underestimation ultimately reduces hospital reimbursement, sometimes by as much as thousands of dollars for a single hospital stay. Essentially, inadequate data may suggest a specific institution is caring for less sick patients and having worse outcomes when that is not the case. Therein lies the challenge presented to the Food and Nutrition Services Department at the University of Iowa Hospitals and Clinics (UIHC): How do we systematically implement a process for malnutrition assessment and documentation across a large (761-bed) inpatient environment?

The Challenge
The UIHC baseline rate of documented malnutrition in adult patients was 4.4%. One of the key factors contributing to this low rate of documented malnutrition was that assessments by registered dietitian nutritionists (RDNs), although detailed and concise, did not specify the degree of malnutrition for each patient. Physicians and other primary care providers (PCPs) were using biomarkers of inflammation as their sole indicator of malnutrition. Additionally, the admission nutrition screen was not sufficiently sensitive to detect patients presenting with malnutrition upon admission. Relying solely on RDN documentation is inadequate for coding malnutrition for billing purposes. Accordingly, educating physicians and PCPs to attain their full support was crucial to the success and longevity of implementing a malnutrition initiative. To address this challenge, we thoughtfully assembled a multidisciplinary team of physicians, nurses, RDNs, CDI (Clinical Documentation Improvement) nurses, and information technology staff to pilot a malnutrition initiative at UIHC. At our institution, CDI nurses are responsible for accurate MS-DRG coding.

The Pilot
The pilot focused on four identified key nursing units containing nutritionally high-risk patient populations. One of the pilot components was to enhance the existing admission nutrition screen to incorporate the validated Malnutrition Screening Tool (Fig. 2) to better identify patients at risk for malnutrition. We also enhanced the documentation mechanism (Fig. 3) to allow RDNs to identify the characteristics of malnutrition while making it easier for physicians and other PCPs to incorporate such documentation into their notes to satisfy the coding and billing criteria for documenting malnutrition. We also focused on provider education to increase both awareness of malnutrition and understanding of how to use the tools created to improve documentation. Among the collected data were: RDN time (the length of time used to fully assess the patient, including the Nutrition Focused Physical Exam [NFPE]), how the patient was identified by the RDN (e.g., admission nutrition screen, RDN consultation, patient rounds), the result of the NFPE (degree of malnutrition or lack thereof), and whether malnutrition was present upon admission.

During the 4-month pilot, we assessed 537 patients. Assessment involved performing a full nutrition evaluation, including the NFPE and handgrip strength, subsequent follow-up assessment when indicated, and rescreening of patients who initially were identified as having low nutrition risk on the admission nutrition screening. Of the 537 patients, 227 (42%) were found to have some degree of malnutrition, and of those 227, 74% were diagnosed with severe protein-calorie malnutrition (Fig. 4).

In addition, 81% of patients identified as malnourished in the initial assessment were...
found to be malnourished upon admission. This finding resonated with the UIHC leadership team because many of these patients had a well-established relationship with the hospital and were currently receiving outpatient care for their diagnosis or had a planned procedure.

Due to time and resource constraints as well as completion of the pilot study, we were only able to perform an independent comprehensive financial review of 352 of the 537 identified pilot patients. During the 4-month pilot on four inpatient units, the improved screening, documentation, and coding program gained the hospital 172 length-of-stay days and increased revenue by $660,000. However, because of missed clinical documentation opportunities (RDN assessment indicated malnutrition, but the physician or PCP did not agree or document accordingly), an additional 168 length-of-stay days and $625,000 in reimbursement were lost. If all of the clinical documentation had been in place at the time of discharge, the hospital would have realized a gain of 340 hospital days and been paid an additional nearly $1.2 million. That equates to approximately $3,600 every time an RDN assessed a patient for malnutrition within the cohort of 352 patients.

The Increase in RDN Numbers
Based on the pilot results, hospital leadership decided that the malnutrition documentation initiative should be rolled out throughout the institution. The first step was to determine how many additional clinical RDN full-time equivalents (FTEs) would be needed. We examined both pilot study results and hospital discharge statistics to determine the number of patients that would need to be assessed on an annual basis. Of the 537 patients in the pilot, 227 (42%) were malnourished. During fiscal year 2014, the year of the pilot study, there were slightly more than 42,000 adult discharges. Knowing that 20% to 60% of hospitalized patients are malnourished, we used a conservative goal rate of diagnosis of 30%. With those data points, we were able to calculate how many patients each RDN would need to assess to reach the goal of 30% of hospitalized patients being appropriately diagnosed with malnutrition. We chose to use 30% rather than the 42% malnutrition rate in the pilot study because that study was conducted on some of the most highly acute inpatient units, where the rate of malnutrition would be expected to be higher than in the hospital as a whole. As a reminder, an assessment is considered a new patient who receives a full initial nutrition evaluation, including the NPFE and handgrip strength assessment, and corresponding RDN clinical documentation.

(Continued on next page)
Step 1 calculation:
\[(42,000 \text{ discharges} \times 30\%) / 12 \text{ months} = 1,050 \text{ completed malnutrition assessments/month}\]

Based on our malnutrition conversion rate of 42% of assessed patients being malnourished, we determined how many total assessments each RDN would need to complete each month because not all assessed patients will receive a diagnosis of malnutrition.

Step 2 calculation:
\[1,050 \text{ malnutrition assessments} / 42\% = 2,500 \text{ total assessments/month}\]

Based on pilot data, we estimated that one RDN can perform approximately 112 new assessments per month. Accordingly, we would need approximately 22 RDNs to adequately perform malnutrition assessments and diagnoses.

Step 3 calculation:
\[2,500 \text{ total assessments/month} / 112 = 22.3 \text{ dietitian FTEs}\]

Excluding our outpatient and pediatric RDNs, we had 14 FTE inpatient RDNs at the time of the malnutrition pilot. The calculations estimated a need for approximately eight more RDN FTEs. Hospital administration approved the hiring of an additional six RDNs.

Conclusion: Lessons Learned
Convening a multidisciplinary team to examine the issue of malnutrition diagnoses was an early key to success. RDNs in our institution did not have the expertise to understand the intricacies of coding and billing for malnutrition, but CDI partners did have that knowledge. We also depended heavily on the information technology partners to enhance documentation in the electronic health record. Such enhancements helped in both RDN workflow and overall documentation and reporting. Most importantly, a strong physician champion played a critical role in educating other providers and PCPs about the benefit of accurate malnutrition documentation.

Enhancing our nutrition screen also contributed to the success of the project. Analysis of the data documented that 100% of patients received a nutrition screen upon hospital admission, but the accuracy of that finding was suspect. The screen was cumbersome for nursing staff to complete and relied heavily on the patient being able to answer questions. Discussions with nursing staff revealed that they frequently could not complete the screen accurately because the patient was unable to converse with the nurse for a variety of reasons. Using that feedback helped us to simplify the screen.

Finally, understanding what data to collect and leveraging that data to tell our story was extremely important to the success of the initiative. The successful outcomes reflected data to which all hospital administrators could relate: length of stay and reimbursement dollars. In addition, we were able to identify exactly what type of effort was required to achieve those results, and how that could scale from a four-unit pilot to an institution-wide initiative.

Bridget Drapeaux, MA, RDN, LD, is Associate Director, Clinical Operations, and Douglas Robertson, RDN, LD, is Interim Director, Food and Nutrition Services, University of Iowa Hospitals and Clinics, Iowa City, IA.

References
A Personal Journey in Malnutrition Documentation

Maria Browning, MS, RD, CNSC

Introduction
For the past 12 years, I have been working as a clinical registered dietitian nutritionist (RDN) primarily in the acute-care setting at an academic health center. I was a part of our hospital’s transplant team, a position I greatly enjoyed. I loved my team and the work we did. Today I am a Quality Expert for financial services focused on charge optimization at the same academic health center. Five years ago when I outlined my goals in a career portfolio, I did not foresee this role. However, as the leader of the malnutrition initiative for the clinical RDNs throughout our health care system, I gained a considerable amount of knowledge about clinical documentation, coding, and value-based purchasing. I found the information interesting and intriguing, and my work in malnutrition is why I now live in the world of hospital operations and finance. Since beginning my new role, I have learned even more about cost, charge, and reimbursement for the care we provide in the acute care setting. My goal for this article is to increase understanding of the value of a clinical RDN in providing appropriate documentation of the nutritional status of patients for accurate coding.

At the start of my dietetic internship I knew I wanted to be a clinical RDN. As the daughter of a statistician, I was very interested in research and felt there was no better way to get involved than to be at the bedside managing the nutritional care of the most complex patients. About 5 years into my career came the birth of the more standardized Nutrition Care Process. As many people felt when this was launched, I was skeptical of its value, but once I talked to my statistician father, I began to understand the value of standardizing language. I became quite passionate about the standardization of language and its implications for research and data collection.

Several years later, when the Consensus Statement on the Characteristics of Adult Malnutrition (Undernutrition) was published, I volunteered to lead our clinical team in adapting these recommendations into clinical practice. Very quickly I realized that standardized language would be critical to implementing a functional and efficient process of identifying and documenting malnutrition. At this point I began to ask questions and learn about coding.

When coding a medical record, trained coders look for specific words that indicate the diagnosis and level of care provided for that diagnosis. Specific language is required for a specific diagnosis. In nutrition, that translates into specifying the degree of malnutrition. Unspecified malnutrition does not explain the complexity of the issue; severe protein-calorie malnutrition (SPCM) is much more descriptive. Understanding how to diagnose and document SPCM has become an important issue in the world of clinical nutrition, and clinical RDNs need to understand the codes used for this diagnosis and how they help tell the story of the care provided to a patient.

A Short History of Coding
Two primary types of codes are used for disease and reimbursement: diagnosis related groups (DRGs) and International Classification of Diseases 10th revision (ICD-10) codes. The ICD coding system is considered the standard diagnostic tool used for epidemiologic studies, health management, and clinical practice. Classification of disease dates back as far as the 1700s, when William Cullen was trying to understand death rates for children younger than age 6 years (1). Classifications were later honed and built by medical statistician William Farr and were referred to as the International List of Causes of Death. After several revisions, experts meeting at the 5th revision meeting of the International Statistical Institute in 1938 determined that there should also be classifications of disease. In 1946, the Classification of Diseases was entrusted to the World Health Organization, which has owned and revised the classifications since. Currently, clinicians and researchers in the United States are using the 10th revision while approval for the 11th revision is well underway (1).

The United States implemented the use of ICD-10 codes long after many countries in the world. Part of the reason we were behind on transitioning to the 11th ICD revision is the DRG system, which came from Yale Business School in the early 1970s and was adopted by the Health Care Financing Administration (now Centers for Medicare & Medicaid Services (CMS)) by the early 1980s. DRGs represent a prospective payment system rather than a “risk free” reimbursement based on cost alone. The DRG is the code used to identify the primary diagnosis. Soon after implementation, the Medicare Severity-DRG (MS-DRG) groups were created to take into account major comorbid conditions that increased the level of care a patient required for a particular diagnosis. Groups of ICD codes are mapped or assigned to a specific DRG for reimbursement. Each time a new revision of ICD codes is adopted, the DRGs also need to be redefined and remapped. The United States is the only country that uses ICD codes for reimbursement, which is why other countries move forward while we stay behind (1).

Malnutrition Coding and Reimbursement
The ICD-10 code for malnutrition is mapped to a DRG (640 and 641) because it can be a primary diagnosis. However, understanding how it is used as a major complication or comorbidity (MCC) is more relevant to this discussion.

Consider DRG 001: Heart transplant or implant of heart assist system with MCC and DRG 002: Heart transplant or implant of heart assist system without MCC. Each of these DRGs is associated with a value related to expected length of stay, risk of mortality, severity of the illness, and reimbursement. There are about 50 ICD-10 codes mapped to (Continued on next page)
these DRGs. Both DRGs have the same ICD-10 codes, but DRG 001 includes an MCC. Accordingly, in addition to one of the grouped ICD-10 codes, the patient must also meet criteria for an ICD-10 code associated with an MCC. Because of the MCC, a patient encounter assigned the DRG 001 is expected to be more complex and, therefore, require increased reimbursement to cover the necessary care.

Generally, clinical nutrition services are included in the room and bed charge; clinical nutrition departments are not considered revenue-generating departments. However, one of the potential MCCs is SPCM, and the idea that clinical dietitians provide a service or information that could increase the level of reimbursement is exciting. Hospital administrations are always happy to learn about revenue opportunities, and documenting the degree of malnutrition could provide such an opportunity. Because of this, revenue generation became a primary objective in the malnutrition diagnosis initiative I was leading.

Our workgroup developed and operationalized malnutrition problem, etiology, and signs/symptoms (PES) statements aligned with the newly defined etiology-based malnutrition (2). The degree of malnutrition was the problem, the etiology was the type of disease state from which the malnutrition was derived, and the signs and symptoms included all of the clinical characteristics. Electronic selection of a problem, etiology, and symptoms was completed by the RDN, and this information formed the PES statement. This statement was populated into a discrete field within the medical record and could be moved throughout the record, even into the physician note, where it could be easily found and coded. Further, because the malnutrition diagnosis statements were stored within a discrete field in the medical record, that field could be queried in reports. We substantially increased the frequency of the malnutrition diagnosis and most importantly, the SPCM diagnosis. The result of our process was a 343% increase in the diagnosis of SPCM and a 71% increase in the diagnosis of moderate malnutrition.

Once the data existed, I was excited to track it and determine how much additional reimbursement it would generate, but this proved very difficult. No matter how many reports were run or how I asked our health information team to provide revenue information related to malnutrition, we could not nail down a true dollar amount. I became discouraged and began to wonder if we really needed to continue documenting malnutrition and tracking the frequency of SPCM codes inpatient encounters.

**Barriers to Finding Revenue**
Several systemic barriers block the ability to find revenue when documenting SPCM. First, reimbursement does not increase with the addition of multiple MCCs. As mentioned, the list of MCCs is very long and only one is required to move from a DRG without to a DRG with an MCC. More than one MCC does not affect reimbursement. Frequently, patients with SPCM are very ill and have several MCCs, so the actual diagnosis of malnutrition is not needed to “bump up” the DRG. Further, some disease states are not separated out into two separate DRGs to include MCC. For example, lung transplant is only DRG 007 regardless of an MCC, despite the obviously large number of lung transplant patients who meet criteria for malnutrition.

Second, the ability to use SPCM as an MCC varies and follows specific rules. Following are some rules used to identify an MCC (3):
- Must impact the care of the current encounter
- Cannot be an integral part of the disease process
- Must be listed in the final diagnostic statement by the provider
- Must require clinical evaluation, therapeutic treatment, or diagnostic procedures; extend the length of stay; or increase nursing care

Therefore, documenting that a patient has SPCM may or may not count as an MCC, depending on the variables that have led to the condition. In the past, hospital systems misusing codes related to malnutrition have been fined for incorrectly billing (4).

Also, documentation must indicate if the MCC was present on admission because CMS has rules on payment related to the timing of the condition. For each diagnosis coded, a “present on admission” indicator must be assigned (5). Table 1 highlights payment rules for “present on admission.”

Finally, reimbursement is not as simple as payment based on a DRG. Payment rates are often driven by CMS, but commercial payer’s case rates may differ from those of

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Diagnosis was present at time of inpatient admission.</td>
<td>Payment is made for condition when a HAC is present.</td>
</tr>
<tr>
<td>N</td>
<td>Diagnosis was not present at time of inpatient admission.</td>
<td>No payment is made for condition when a HAC is present.</td>
</tr>
<tr>
<td>U</td>
<td>Documentation insufficient to determine if condition was present at the time of inpatient admission.</td>
<td>No payment is made for condition when a HAC is present.</td>
</tr>
<tr>
<td>W</td>
<td>Clinically undetermined. Provider unable to clinically determine whether the condition was present at the time of inpatient admission.</td>
<td>Payment is made for condition when a HAC is present.</td>
</tr>
</tbody>
</table>

HAC=hospital-acquired condition.
CMS. Additionally, charges incurred for severely complex patients may surpass reasonable cost and no longer be eligible to receive reimbursement defined by the DRG. These highly complex cases are considered outliers and are paid on a percentage of total charges. Although outliers, by definition, are rare, patients with SPCM fall into this reimbursement process. Payment of outlier charges varies by payer.

When compiling all of these variables, clinicians can learn that determining the complete story of reimbursement is complicated. Even if you can determine that malnutrition was accepted as an MCC, you still need to know:
• Were other comorbid conditions present?
• Was the malnutrition present on admission?
• How was the final charge for the patient encounter reimbursed?
  – DRG vs outlier
  – CMS vs commercial payer

Because of variability within each of these steps, there is no clear query to run through the electronic medical record (EMR) that can result in a concrete value representing revenue generated by malnutrition documentation.

**Documenting Malnutrition for Reasons Beyond Reimbursement**

As disappointing as this realization was, I continued to believe in the importance and value of standardizing the process of documenting malnutrition. Even without the promise of revenue, it is possible to appeal to clinical RDNs, physicians, and administrators with a different approach.

Although there is no guarantee that malnutrition can impact a DRG, not documenting malnutrition means missing the opportunity to increase a DRG. Think of the old adage, “You can’t win if you don’t play the game.” In addition, coding contributes to more than reimbursement. As the complexity of a DRG increases, so does the expected length of stay (LOS), the severity of illness (SOI), and the risk of mortality (ROM). Accurate coding and accounting for disease states of a patient provides a better representation of patient acuity. More complex patients likely need more time for treatment or a longer LOS. The SOI and ROM are used to calculate the mortality index, a variable that identifies a patient’s expected survival. Major comorbid conditions such as SPCM drive the DRG and, therefore, the acuity in terms of SOI and ROM. A patient who has a low SOI or ROM is expected to survive, but survival expectations decrease as those scores increase. If such a patient does not survive, the medical team can be rated poorly. Missing the opportunity to document and code SPCM can lead to unrealistic survival expectations for the patient that can be communicated to the payer. When expectations of survival are not met, the hospital or provider may receive poor grades for patient outcomes and can risk their status as a provider on certain payment plans for health care consumers. The ability for a hospital to meet survival expectations is also reported to the public, and patients may not seek care from institutions whose patient survival rates are below what is expected. Accurate representation of patient acuity is essential to institution outcomes. Thus, diligence in documenting an MCC such as SPCM can move a DRG, which has the potential to affect revenue and better represents SOI, ROM, and the time required to treat the more complex patient.

Malnutrition documentation serves two other important purposes. Such documentation plays a role in Value-Based Purchasing (VBP), which pays for performance, as detailed in the Affordable Care Act. Documenting malnutrition also is important in research and epidemiology; we need to understand the patterns and the effects of malnutrition on health outcomes while learning how to treat it. Although stated separately, these two variables are not mutually exclusive.

As a part of the Affordable Care Act in 2010, CMS rolled out an incentive payment system for acute-care hospitals. VBP includes several domains for which each hospital receives a score. In very basic terms through fiscal year 2018, the domains encompass clinical process, outcomes, patient experience, efficiency, safety, and cost reduction (6). Such domains and the scoring process often are referred to as the hospital’s “score card.” Many actions in the acute-care setting today are undertaken to achieve a specific score or to improve upon the institution’s current score to obtain the highest incentive payment possible. It is widely recognized that providing premium care at the patient bedside comes at a cost, so bringing in money helps to maintain and improve upon patient care. Understanding the variables that help or prevent institutions from reaching goals outlined in VBP is crucial.

Identifying malnutrition on a hospital’s score card is not a straightforward task. Not one of the standards outlined in the CMS guidelines contains the word “malnutrition.” However, as most RDNs and health care providers know, nutritional status is a driver of disease formation and nutritional treatment is an important step in achieving desired patient outcomes. A closer look at VBP domains reveals that malnutrition is actually present in many variables of the scorecard.

Although the domains and variables within each domain are extensive, following is a list of a few upon which CMS will focus in the coming years (6):

**Safety:**
• Catheter-associated urinary tract infection (CAUTI)
• Central line-associated bloodstream infection (CLABSI)
• *Clostridium difficile* infection (Cdiff)
• Patient Safety Indicator 07: Central venous catheter-related bloodstream infection rate
• Patient Safety Indicator 13: Sepsis rate
• Patient Safety Indicator 14: Postoperative wound dehiscence
• Surgical site infection

**Outcomes:**
• 30-day mortality for (Outcome)
  • Acute myocardial infarction (AMI)
  • Heart failure
  • Pneumonia

(Continued on next page)
Other:
- Medicare spending per beneficiary (MSPB) (efficiency/cost reduction)

The Safety domain focuses primarily on infection rates (6). Infections related to catheters, lines, and surgical procedures are all problems in hospitalized patients. Immune function has long been associated with malnutrition. Whether through the phases of immune development, the microbiota, or immune activation and response, nutritional status plays a role (7). Thus, malnutrition could be assumed to play a role in the infection-related outcomes identified in the safety domain: CLABSI, CAUTI, Cdiff, bloodstream infections, and sepsis.

For the Outcomes domain, many RDNs would claim that malnutrition plays a role in the mortality rates of patients with heart failure, pneumonia, and AMI. CMS validated that theory in their 2105 Condition-Specific Measures Updates and Specifications Report (8). This report looked at hospital-level 30-day risk-standardized mortality measures, that is, which variables increased the risk of 30-day mortality. The report outlined these risks via odds ratios. For all three disease states, malnutrition was among the top five highest risk factors (Tables 2–4), with the risk of death being nearly two times higher for patients with malnutrition compared with those who did not have malnutrition. Malnutrition was identified as the highest risk variable for heart failure and, in fact, was a higher risk than cancer.

The role of malnutrition within the cost and efficiency domain is the measure related to the spending per Medicare beneficiary (6). Patients who are malnourished are more likely to have higher costs during their admission, which are related to longer LOS and higher complication rates (9). Both of these variables affect spending per beneficiary. A higher cost for patients with a diagnosis of malnutrition was also validated in the work completed at my institution (Table 5).

The Value of a Standardized Malnutrition Definition

Researchers have indirectly examined the relationship between malnutrition and the VBP domains of safety (infections and wound healing), outcomes (mortality), and hospital cost. However, the definition of malnutrition within these studies affects the findings. Before the 2012 publication of the consensus statement (2), the most commonly used criteria for malnutrition were serum concentrations of albumin or other hepatic proteins, although researchers did not use a consistent definition of malnutrition. Today's more standardized and detailed definition creates the opportunity for more valuable research to support and better understand how identifying and treating malnutrition can affect outcomes.

Querying large data sets has become significantly easier with EMRs, but if data are not put into discrete fields within the EMR, we may as well be writing in a paper chart. Using standardized language to build a malnutrition diagnosis within a patient chart allows for storage of the information in an individualized field that can be titled and queried. Medical institutions can track a malnutrition data and investigate relationships between malnutrition and outcome, treatment, or other measures of interest.

By using standardized language to define malnutrition and a specific field to hold that information, coders can easily find the appropriate information to generate a code. No matter how a specific facility decides to build a malnutrition diagnosis into the EMR,

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**Table 2. Mortality and Acute Myocardial Infarction: Adjusted Odds Ratios**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Diagnosis</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anterior myocardial infarction (ICD-9 codes 410.00-410.12)</td>
<td>2.23</td>
</tr>
<tr>
<td>2</td>
<td>Metastatic cancer, acute leukemia, and other severe cancers (CC 7-8)</td>
<td>2.02</td>
</tr>
<tr>
<td>3</td>
<td>Other location of myocardial infarction (ICD-9 codes 410.20410.62)</td>
<td>1.67</td>
</tr>
<tr>
<td>4</td>
<td>Protein-calorie malnutrition (CC 21)</td>
<td>1.66</td>
</tr>
<tr>
<td>5</td>
<td>Pneumonia (CC 111-113)</td>
<td>1.54</td>
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</tbody>
</table>


**Table 3. Mortality and Heart Failure: Adjusted Odds Ratios**

<table>
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<tr>
<th>Rank</th>
<th>Diagnosis</th>
<th>Odds Ratio</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Protein-calorie malnutrition (CC 21)</td>
<td>1.96</td>
</tr>
<tr>
<td>2</td>
<td>Metastatic cancer, acute leukemia, and other severe cancers (CC 7-8)</td>
<td>1.81</td>
</tr>
<tr>
<td>3</td>
<td>Chronic liver disease (CC 25-27)</td>
<td>1.55</td>
</tr>
<tr>
<td>4</td>
<td>Dementia or other specified brain disorders (CC 49-50)</td>
<td>1.37</td>
</tr>
<tr>
<td>5</td>
<td>Pneumonia (CC 111-113)</td>
<td>1.32</td>
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</tbody>
</table>


**Table 4. Mortality and Pneumonia: Adjusted Odds Ratio**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Diagnosis</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metastatic cancer, acute leukemia, and other severe cancers (CC 7-8)</td>
<td>3.17</td>
</tr>
<tr>
<td>2</td>
<td>Protein-calorie malnutrition (CC 21)</td>
<td>2.18</td>
</tr>
<tr>
<td>3</td>
<td>Dementia or other specified brain disorders (CC 49-50)</td>
<td>1.49</td>
</tr>
<tr>
<td>4</td>
<td>Chronic liver disease (CC 25-27)</td>
<td>1.4</td>
</tr>
<tr>
<td>5</td>
<td>Cardio-respiratory failure or shock (CC 79)</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Once it is coded, malnutrition can be queried, tracked, and studied through a much larger lens. This opens the door for collaboration among institutions and tracking of malnutrition trends throughout the country. It allows CMS and private payers to understand the impact of malnutrition on the patients to whom they provide coverage. This information could validate nutrition services and support in many different settings.

**Conclusion**

Although I could not document a clear path between coding malnutrition and revenue, I discovered many other important reasons to use the criteria in the consensus statement to document and code the degree of malnutrition. Accurate representation of patient acuity allows for accurate representation of expected outcomes. When acuity is high and providers exceed expected outcomes, patients are more likely to seek out services provided by the institution. Meeting the goals set by VBP and the Affordable Care Act can translate to millions of dollars in incentives or penalties. By providing the information to reach these goals, RDNs contribute to revenue. The ability to highlight and track how malnutrition affects VBP domains is essential when speaking to hospital administration about the value of the RDN and the nutrition team.

Finally, and by far most importantly, the better we understand malnutrition, the more effectively we can treat it, which leads to better outcomes for the patient. RDNs do not look at patients in terms of dollar signs; we see them as people whom we would like to aid in healing. If our efforts to do that lead to better numbers on our hospital’s score card, that is a bonus. Coding allows for greater collaboration among health care providers so we can deliver exceptional care and offer patients the healing they and their families desire.

Common sense indicates that poor nutrition leads to disease and unfavorable health outcomes. Now RDNs have an opportunity both to define this claim more specifically and consistently and to work more efficiently and effectively to treat malnutrition. I encourage you to view the diagnosis of malnutrition not only as a potential revenue generator for your clinical nutrition department but as a means to provide better care. For example, the time and resources devoted to looking for revenue could be spent designing a study to identify the relationship between malnutrition and *Clostridium difficile* infection, which could help patients and institutions meet desired health and financial outcomes. If RDNs continue to document and code malnutrition, the opportunities to identify these types of relationships are endless and exciting.

*Maria Browning, MS, RD, CNSC, is a Quality Expert Charge Optimization at Indiana University Health, Indianapolis, IN.*

**Table 5. The Effect of Malnutrition on Cost of Care**

<table>
<thead>
<tr>
<th>Patients with Malnutrition</th>
<th>Patients without Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>139</td>
</tr>
<tr>
<td>Total cost</td>
<td>$2,467,000</td>
</tr>
<tr>
<td>Cost per patient</td>
<td>$17,750</td>
</tr>
</tbody>
</table>


**Exciting Election Results**

Congratulations to the following Dietitians in Nutrition Support members who secured positions on the Academy Leadership Team!

**President-elect:**
Mary Russell, MS, RDN, LDN, FAND

**Accreditation Council for Education in Nutrition and Dietetics (ACEND)**
Practitioner Representative, RDN:
Debra Hook, MPH, RDN, CNSC, FAND

**Advanced Practice in Clinical Nutrition Representative (RDN-AP):**
Beth Taylor, DCN, RDN-AP, CNSC

**House of Delegates Director:**
Milton Stokes, PhD, MPH, RD, FAND
There’s No Denying the Expanding Involvement of Dietitians in Malnutrition Coding

Jennifer Sporay, RDN-AP, CSO, LDN, CNSC

Abstract
Assessing for and documenting malnutrition is a top priority for registered dietitian nutritionists (RDNs), and many have established themselves as experts in this area. RDNs are using tools such as the nutrition-focused physical examination (NFPE) and the 2012 Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) guidelines to identify adult patients and 2014 Academy/A.S.P.E.N. guidelines to identify pediatric patients at greatest risk for complications due to protein-calorie malnutrition. Documenting protein-calorie malnutrition is only the beginning of the process. RDNs have a substantial opportunity to increase their involvement in the coding and denials process. With a thorough understanding of how the protein-calorie malnutrition diagnosis affects every aspect of coding, RDNs can create powerful alliances with other members of the interdisciplinary team to ensure proper coding and full reimbursement.

Introduction
Accurate diagnosing of protein-calorie malnutrition has been at the forefront of initiatives undertaken by hospital-based nutrition professionals in recent years. RDNs have been incrementally increasing their involvement in assisting providers with awareness and documentation of malnutrition. Proper identification of protein-calorie malnutrition using the NFPE has become an essential tool in their repertoire. As clinicians, they focus on the goals of communicating findings to the medical staff and seeing that the diagnosis is appropriately documented. After that point, RDN involvement often wanes, and they assume that the malnutrition diagnosis is coded and submitted to the patient’s insurance. Sometimes they are informed about how much revenue the accurate documentation of malnutrition has generated, but this is not always the case. What happens when the third-party payer disagrees with the diagnosis and denies reimbursement? Many hospital-based clinicians may never receive any further information regarding reimbursement. Even less likely is the involvement of the nutrition clinician in the denials process.

Establishing the Malnutrition Diagnosis
Since the publication of the 2012 Academy/A.S.P.E.N. malnutrition diagnosis guidelines (1), standardized documentation of malnutrition has been emphasized for RDNs. However, this has not always been the case. A study of data from the U.S. Department of Health & Human Services’ 2010 Healthcare Cost and Utilization Project published in 2013 revealed that only 3.2% of all hospital discharges received the diagnosis of malnutrition (2). Only 1.3% of children younger than the age of 17 years had malnutrition coded during a hospital stay (3). This is a marked difference from the 15% to 60% of all patient admissions estimated to meet the criteria for a malnutrition diagnosis (1, 4). Malnutrition is associated with a host of risks for additional complications and burdens for the patient and the hospital system, including wounds, falls, infections, and increased lengths of stay (1,5–7). The presence of protein-calorie malnutrition also increases the likelihood for patients to require posthospitalization care, thus increasing the drain on health care dollars (8). For hospitals to receive adequate compensation for the additional care required for these complex patients, clinicians must be diligent in properly documenting malnutrition. Before the 2012 consensus statement from the Academy and A.S.P.E.N. defined use of inflammatory markers in nutrition, few standardized guiding definitions existed to assist providers in proper diagnosis of malnutrition.

In the past, multiple efforts have been undertaken to define malnutrition and provide proper diagnostic guidelines. As Matarese and Charney emphasize in their commentary on malnutrition diagnosis, a problematic discord exists between defining the nutrition status of a patient and aligning findings with the appropriate malnutrition diagnosis (9). In fact, some hospitals were fined by the Centers for Medicare & Medicaid Services (CMS) for improper malnutrition diagnoses. In 2012, a hospital in Baltimore, MD, settled a false claims accusation that cost the health care center almost $800,000 (10). The hospital was accused of inaccurately adding malnutrition as a secondary diagnosis in an effort to generate higher compensation for the patient care. They chose to settle the case rather than go to trial over the allegations to avoid a potentially lengthy legal process. Prior to the development and publishing of evidence-based practice guidelines for malnutrition, institutions and practitioners lacked a structured formula for diagnosing protein-calorie malnutrition. Unfortunately, for some institutions, such as the previously cited hospital, this deficit in evidentiary guidance resulted in substantial financial penalties. Insurers may also penalize health systems and facilities for a lack of coding of protein-calorie malnutrition (11). A recurring issue with coding or a specific issue that results in more than $500,000 in improper payments can be classified as a vulnerability (11). A vulnerability is categorized as a “major finding” and a corrective action plan may be enforced by CMS (11). As with false documentation for a diagnosis that does not exist in the patient, neglecting to code a diagnosis properly is also considered to be inaccurate. Because of this need for precision on both accounts, it is absolutely vital for interdisciplinary care teams to work in synchrony to ensure standardized assessment and documentation of the degree of malnutrition, including
malnutrition criteria. Also required is the implementation of proper nutrition interventions and follow-up care to allow assignment of accurate diagnostic codes.

**Involving RDNs with Payment Denials**

Unfortunately, not all coding decisions are accepted by payers, and nutrition services departments frequently do not receive information regarding denials of submitted malnutrition diagnoses. In the following two cases, malnutrition was assessed and documented, but reimbursement was denied by insurers through third-party auditors. The case studies highlight the steps taken to successfully appeal those denials and the importance of developing a malnutrition denials template for use during the appeals process.

**Case Study 1**

A 70-year-old man was admitted following a fall at home. He had a history of multiple previous admissions, most recently only 1 week before the present admission. He had a history of chronic obstructive pulmonary disease and hypothyroidism. Computed tomography (CT) scan performed on a recent prior admission had revealed both a lung and a pancreatic head mass. At the request of the patient, no further evaluation had been performed at the time. The patient was to have an outpatient follow-up with an oncologist, but before that follow-up occurred, he returned to the emergency department with rib fractures from the fall and sepsis, likely due to an unresolved prior infection.

Given the man’s low body mass index (BMI) of 17.2, the admitting physician requested a nutrition consultation to evaluate for possible malnutrition. The assessment was performed the following day, with the RDN conducting a comprehensive NFPE. The patient described his intake since discharge 1 week previously as “poor.” He explained that he drank tea and ate small amounts of toast and cereal but lacked the energy to make anything more to eat. His current intake of a regular diet was documented as less than 50%, and an untouched tray was at his bedside at the time of the assessment.

The patient complained of excessive pain when eating due to the rib fractures. A weight history was available from the most recent admission as well as another admission 13 months in the past. The patient had lost greater than 2% of his total body weight in 1 week and approximately 16% of total body weight over the prior year. Physical examination demonstrated severe muscle wasting, exemplified by significant hollowing at the temple region as well as prominence of the clavicle. He had no notable edema. The weight loss, poor intake, and severe muscle wasting supported the diagnosis of severe malnutrition in the context of acute illness.

The RDN requested initiation of an oral nutrition supplement as a part of the intervention and requested the physician to add severe malnutrition to the patient’s diagnosis. The physician agreed and documented severe malnutrition in the physician progress notes, including all of the details provided by the RDN: the significant weight changes (greater than 2% weight loss in 1 week and 16% loss over 1 year), poor intake, and clavicle and temporal wasting on examination. The patient was discharged 14 days after being admitted, and malnutrition was coded as ICD-9 code 262 and added to the primary diagnosis of septicemia as a major complication or comorbidity (MCC).

The patient’s insurer performed an audit on his case 16 months later and determined that the patient did not meet criteria for severe malnutrition. The auditor agreed that the patient’s condition put him at risk for malnutrition but stated that the evidence provided did not support criteria required to meet the diagnosis. The auditor specifically indicated that severe malnutrition is defined by a BMI of less than 16, clinically significant weight loss, and characteristic clinical signs. The audit determination letter further stated that no prealbumin measurement could be found in the record. The auditor referenced the Academy/A.S.P.E.N. 2012 consensus statement (1) as well as the 1999 World Health Organization (WHO) reference (12). The ICD-9 code was changed from 262 to 263, Malnutrition of Moderate Degree.

Given the amount of evidence provided by the RDN as well as the auditor’s use of the outdated 1999 WHO guidelines (12), the hospital decided to draft a letter of appeal. The letter outlined the supporting evidence and detailed the appropriate guidelines used to meet the criteria for diagnosis. The use of BMI and prealbumin were disqualified as outdated with supporting statements and references. The letter was presented by the representing physician in an oral review of the case with the insurer, and the change in DRG was rescinded, with the original diagnosis of severe malnutrition of the acute state (ICD-9-CM 262) reinstated. It is important to note that many large insurers, including CMS, use the services of a third party auditor. “The Medicare Recovery Audit Contractor program’s mission is to correct improper Medicare payments by identifying and collecting over- and underpayments” (13). In this case, a private company was hired to audit the record. The company was contacted to discuss their use of the WHO guidelines, but no response was received prior to this article’s publication.

**Case Study 2**

An 80-year-old woman was admitted for closure of an ileostomy. She had undergone a subtotal colectomy with formation of ileostomy due to acute *Clostridium difficile* infection 6 months prior to the present admission. Her past medical history also included cardiac problems and diabetes.

The RDN was alerted to the patient’s case via the malnutrition screen on admission. The patient stated that she had an adequate appetite and intake, but she reported a greater than 14-lb weight loss. Upon assessment, the RDN learned that the patient had lost more than 28 lb in the past 9 months, translating into a 22% loss of usual body weight. The RDN’s visit occurred on postoperative day (POD) #1. The patient was nil per os, although she stated that she felt hungry and wanted to start eating. A physical examination of the patient by the RDN revealed mixed moderate-to-severe muscle and fat loss. The patient’s orbital region had lightly darkened circles. The

*(Continued on next page)*
diagnosis. Understanding of the audit and denial process can be enhanced when RDNs establish an effective working relationship with their facility’s documentation specialists and coders. By working as a team and becoming involved in all relevant steps of the program, each specialty involved is aware of the effectiveness of the documentation. It is important for RDNs to understand the denial and appeal process to provide the nutrition therapy team an opportunity to understand why certain cases are denied financial reimbursement by insurers and reflect upon how future documentation can be improved.

Creating an appeal template can assist with review of the patient record and ensure that the necessary information is included in the response letter. A template also can expedite the process by helping the clinician in charge of creating appeals to review the case and submit a response in a timely manner. Although many facilities report few reimbursement denials, clinicians should respond to each case to assure that a diagnosis is properly documented and reimbursed. A very important aspect of the process is to note the criteria and standards used by the third party auditor to define the malnutrition diagnosis, and a policy outlining the malnutrition clinical characteristics for use at that facility should be approved by the appropriate committees and communicated to all clinicians (14). For this reason, RDNs should clearly state in their evaluations the guidelines used to make an assessment of malnutrition. Another essential part of any letter of appeal is to cite the accepted guidelines for addressing the diagnosis of malnutrition, such as the 2012 Academy/A.S.P.E.N. consensus guidelines (Figure).

**Conclusion**

Most hospital-based RDNs have fostered a strong relationship with the case management team to properly identify and code for protein-calorie malnutrition. They also have the responsibility of accurately determining the presence of malnutrition in their patient populations. RDNs are the experts trained in the NFPE and linking the patient’s medical history, diet history, and current condition to formulating the diagnosis of malnutrition. They have many important opportunities to become involved in the process, with new possibilities developing continuously. Becoming a part of the denials appeals process can add value to an RDN’s work and knowledge. They can reinforce their roles in a successful program, including an expanded skills base, validation of staffing, and a traceable fiscal benefit to the work conducted by the nutrition team. When RDNs embrace these responsibilities, they create benefits for both the health care facility and themselves in addressing malnutrition.

**References**


**Discussion**

Clinicians who are closely involved in documenting malnutrition should be familiar with the entire process, including the audit and potential denial of a documented


**Figure. Sample appeal letter for reimbursement denial.**

```plaintext
xxxx xx, 2016

XXXXXXXX

Dear Sir or Madam,

This letter is being written in regard to the denial of the diagnosis of 263.0 Malnutrition of Moderate Degree on XXXXXXX, patient account number XXXXXXXXXX for her stay 12/10/2014 through 12/15/2014 at XXXX Hospital System. In the communication received on May 31, 2016, the diagnosis of 263.0 Malnutrition of Moderate Degree was denied on the claimed basis that the patient did not meet malnutrition criteria as defined by “sudden unintentional clinically significant weight loss, a BMI <18.5, a body weight <85% of ideal, and characteristic clinical signs” according to the letter. The letter goes on to state that there is no documentation to support weight loss, a body weight below the 85% of ideal or clinical signs of malnutrition.

In reviewing the case, it was noted in the dietitian’s initial assessment on December 10, 2014 that the patient had suffered 22% loss of her usual body weight, with the majority of that loss occurring in the last nine (9) months. According to the 2012 A.S.P.E.N. Guidelines, a weight loss of >20% in one year is a qualifying marker of severe malnutrition of the chronic variety (White et al, 2012). These same guidelines do not reference the use of ideal body weight or BMI, however, within the same assessment on December 10, 2014, the dietitian also notes that the BMI is 16.9, severely below the aforementioned criteria of <18.5 as defined by your own reviewer.

As a part of the dietitian’s assessment, it was noted that the patient also exhibited physical signs of malnutrition, including mixed moderate to severe losses of fat stores and muscle. The dietitian documented a physical examination, which demonstrated slight depressions of the temples, prominent bones at the patellar region and poor definition of the calf region. The patient also showed darkened circles around the orbital region. The letter from the auditor references the 1999 WHO guidelines as well as the 2012 A.S.P.E.N. Guidelines (White et al, 2012). Clinicians are advised to no longer rely upon the outdated 1999 WHO criteria as it recommends the use of markers which may be falsely interpreted or which inaccurately reflect nutrition status due to fluid retention, inflammation, advanced age or body muscle composition. For these reasons the Nutrition Therapy clinicians at XXXXXXX System rely upon the evidence-based practice guidelines published in 2012 by A.S.P.E.N./Academy of Nutrition and Dietetics as the only current guidelines to diagnose for malnutrition in the hospital setting. These guidelines use percent of nutritional intake, weight changes within a time frame and four recognized physically assessed markers, including loss of body fat store, loss of muscle, loss of strength, and fluid accumulation. The nutrition clinicians have been trained to physically assess the patient, utilizing their expert physical evaluation of the patient, as well as any diagnostic exams made available, including CT scans and ultrasound studies.

This patient meets criteria for malnutrition based upon severe weight loss as documented by a >20% loss in one year as well as inadequate intake, documented as <75%.

I appreciate your time to review this case and reconsider the associated diagnosis of 263.0 Moderate Malnutrition. Please feel free to contact me if you would like to discuss any of the details or if I may answer any questions associated with the case or documentation of malnutrition.

Sincere Regards,

XXXXXXX, RD, LDN
Clinical Nutrition Manager
XXXXXXXX Health System
Phone: XXX-XXX-XXXX
Email: XXXXX.org

**Reference:**

Inquire Here

**Question: What evidence supports the addition of fructooligosaccharides and inulin to enteral nutrition formulas?**

Britta Brown, MS, RD, LD, CNSC

**Answer:**
Numerous gastrointestinal (GI) symptoms, including nausea, vomiting, constipation, bloating, flatulence, and diarrhea, may occur among individuals receiving enteral nutrition (EN) (1). Among healthy people, researchers have explored the potential benefits of dietary fiber on bowel regulation and immune regulation of gut-associated lymphoid tissue (2-4).

Fructooligosaccharides (FOS) and inulin are prebiotic fibers that are not hydrolyzed or absorbed in the upper part of the GI tract (4). Research findings indicate that these prebiotic fibers are fermented in the colon to produce short-chain fatty acids (SCFAs) (3, 4). In turn, SCFAs have been associated with increased absorption of water and sodium in the colon and reduced fecal pH, which may be beneficial in controlling diarrhea and reducing the growth of pathogenic bacteria (4). Researchers have hypothesized that FOS and inulin have positive immunomodulating effects by changing the gut microflora through: 1) direct contact of lactic acid bacteria with immune cells in the intestine, 2) production of SCFAs from fiber fermentation, and 3) modulation of mucin production (4). Due to these potential benefits, dietary fiber blends that include prebiotic fibers (FOS, inulin) are widely available in EN formulas (1).

Two meta-analyses have explored the clinical effects of fiber-supplemented EN formulations. One evaluated the effects of fiber-supplemented EN formula on diarrhea, infection, and length of stay (5). The authors did not find a positive association between these formulas and reduced diarrhea or infection, but hospital stay was shortened among patients who had undergone liver transplantation or major abdominal surgery (weighted mean difference of -2.85, from -3.76 to -1.93, \( P < 0.00001 \)) (5). Subgroup analyses in this review indicated that dietary fiber in EN appeared to be beneficial in addressing diarrhea among patients who were not critically ill, but the benefit was uncertain in critically ill patients, with diarrhea occurring in 20.69% of noncritically ill patients and 34.78% of critically ill patients (5).

A comprehensive review in 2008 indicated that fiber-supplemented EN had a moderating effect (decreased bowel frequency if baseline frequency was high, increased frequency if baseline frequency was low) (6). Individual studies examining the use of prebiotic fiber-supplemented EN among patients with acute pancreatitis (7), pancreatectoduodenectomy (8), and liver transplantation (9) have reported favorable outcomes in these patient populations. Karakan and colleagues (7) observed reductions in median duration of hospital stay (\( P < 0.05 \)), duration of APACHE II normalization (\( P < 0.05 \)), and duration of C-reactive protein normalization (\( P < 0.05 \)) among patients with severe pancreatitis who received EN containing mixed fibers, including prebiotic fiber supplementation. Rayes et al (9) reported statistically significant reductions in postoperative bacterial infections (\( P < 0.05 \)) and duration of antibiotic therapy (\( P < 0.05 \)) among patients who received mixed fiber EN following liver transplantation. Rayes and coworkers (8) repeated their study among patients following pylorus-preserving pancreatectoduodenectomy and had similar findings. However, in Elia’s 2008 meta-analysis, examination of aggregated data suggested that patients who are not critically ill may benefit more (diarrhea, constipation, quality of life) from fiber-supplemented EN than critically ill patients, warranting further study (6). The authors of both meta-analyses cited the need for better designed studies that more objectively define clinical endpoints such as diarrhea, constipation, and infection parameters. Furthermore, fiber types, blends, and quantities have not been standardized across studies.

Authors of several studies have suggested the FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) content of EN formulas is associated with increased flatulence, abdominal distension, and diarrhea. Common FODMAPs found in EN formulas include fructans and galactooligosaccharides derived from FOS and inulin (10-12). At sufficiently high doses (>4.0 g/day), FODMAPs have been associated with increased bloating and diarrhea among individuals with irritable bowel syndrome (10). Results from one study found the daily FODMAP content of EN formulas ranged from 10.6 to 36.5 grams of FODMAPs per recommended daily volume (10). The FODMAP content of many EN formulas may be high enough to cause GI symptoms among a wider population because they exceed the FODMAP content of typical oral diets (10). These researchers found that a hospital length of stay greater than 21 days (\( P < 0.026 \)) and receiving EN for more than 11 days (\( P < 0.021 \)) were independent risk factors for developing diarrhea (10). In contrast, use of the lowest FODMAP-containing EN formula (in which patients received 10.6 g/day of FODMAPS compared to up to 36.5 g/day for standard formula) was associated with a fivefold reduction of developing diarrhea (\( P < 0.029 \)) (10).

At this time, there is no consensus among national and international professional organizations on the role of dietary fiber in
EN formulations. The 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), guideline E4a states “that a commercial mixed fiber formula not be used routinely in the adult critically ill patient prophylactically to promote bowel regularity or prevent diarrhea” (quality of evidence: low) (13). However, guideline E4b offers an expert consensus recommendation to consider use of a commercial mixed fiber-containing formula if there is persistent diarrhea (13). Guideline F1 includes an expert consensus recommendation for patients receiving a standard nonfiber-containing enteral formula (13). It states “that a fermentable soluble fiber additive (eg, fructooligosaccharides [FOSs], inulin) be considered for routine use in all hemodynamically stable MICU/SICU patients placed on a standard enteral formulation. We suggest that 10-20 g of a fermentable soluble fiber supplement be given in divided doses over 24 hours as adjunctive therapy if there is evidence of diarrhea” (13). It is important to note that the authors recognize that among critically ill patients, the “use of a prebiotic soluble fiber supplement appears to show more consistent benefit for reducing diarrhea than commercial mixed-fiber formulas” (13). At this time, FODMAP content of typically used fermentable soluble fiber supplements is not readily available to clinicians.

A summary of previous major recommendations and guidelines has also been published (1). The 2008 position of the Academy of Nutrition and Dietetics on the health implications of dietary fiber states “research-based recommendations about which patients are good candidates for fiber-containing enteral formulas cannot be made at this time” (14). The authors of the Academy’s Evidence Analysis Library critical illness guideline have evaluated the role of EN formulas supplemented with guar gum in the reduction of diarrhea, but no guidelines address the presence or absence of FOS and inulin in EN (15).

Clinicians should be aware of the variety of sources, blends, and quantities of dietary fiber used in EN formulas. It is also imperative that clinicians evaluate all potential sources of diarrhea among enterally fed patients, including formula osmolality, Clostridium difficile infection, improper storage or handling of EN formulas, and laxative effect-inducing medications. Additional research is needed to evaluate fiber doses and blends that may have beneficial effects in specific clinical situations, preferred route of fiber supplementation (e.g., inclusion in EN formulas or provided as a separate supplement) as well as patient populations for whom the use of a fiber-containing EN formula should be approached with caution.

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References


Pearl

The wisest mind has something yet to learn.

– George Santayana
Chair’s Column

Mandy L. Corrigan, MPH, RD, CNSC, FAND

It has been an honor to serve as Chair of Dietitians in Nutrition Support (DNS) for 2016-2017.

I’d like to express my gratitude to members of the Executive Committee (EC) and the Coordinating Cabinet. I’m grateful for the service and leadership that you provide to DNS and our profession. I gain inspiration from the amazing dietitians who are part of the DNS leadership team. Thank you for your hard work and making time in your busy lives to serve the members of DNS.

Many thanks to the EC members who have completed their elected terms this year:
- Amy Berry, MS, RD, CNSC (Director of Nominations)
- Cindy Hamilton, MS, RD, FAND (DNS House of Delegates Representative)
- Jodi Wolff, MS, RD, CNSC, FAND (Treasurer)

We look forward to working with each of you in the future in roles within DNS and other professional nutrition organizations.

Additionally, we thank Mary Russell, MS, RD, FAND, for keeping DNS organized and Mya Wilson, MPH, MBA, for being our advisor and liaison to the Academy.

Now that I know the ropes of being Chair, it’s time to pass the baton to Sarah Peterson, PhD, RD, CNSC. I look forward to seeing many of you at the DNS Symposium and working with you in the future!