The recognition of malnutrition in adult hospitalized patients has existed for almost 40 years. Beginning with the classic 1974 article “The Skeleton in the Hospital Closet” by Dr Charles Butterworth and subsequent work by Drs George Blackburn and Bruce Bistrian, nutrition clinicians have continued to recognize the importance of assessing hospitalized patients for malnutrition risk and document the presence of malnutrition.1,2 The 1977 publication by Blackburn and Bistrian offered a well-defined methodology for malnutrition assessment based on the prevailing understanding of disease pathophysiology and nutrient metabolism.2

In 2007, the Centers for Medicare and Medicaid Services (CMS) altered its reimbursement processes to incorporate a disease severity component of which malnutrition was included.3 Based on an individual patient’s diagnosis(s), the addition of malnutrition as a comorbid condition provides an opportunity for increased reimbursement reflecting a higher cost for delivery of care. As a result of this process change, multiple queries from members of both the Academy of Nutrition and Dietetics (the Academy) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) as well as from CMS regarding specific malnutrition criteria prompted the creation of an Academy/A.S.P.E.N. Malnutrition Workgroup. This workgroup was charged with developing a standardized approach to diagnosing malnutrition in the adult hospitalized patient.

In 2012, the Academy/A.S.P.E.N. Malnutrition Workgroup culminated their work with the publication of the Consensus Statement: Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition).4 This paper provided a framework for diagnosing malnutrition using the construct developed by the International Guidelines Group.5 The use of an etiology basis for malnutrition diagnosis is coupled with the delineation of specific criteria or characteristics to define malnutrition (Table 1 outlines these general characteristics). The authors of this consensus statement outlined a short term “call to action” for clinicians to consider how to begin implementing the recommended characteristics within their practice setting. The purpose of this article is to provide practical strategies for criteria implementation and to describe one institution’s experience in implementing a broad based “malnutrition program” within its healthcare system. (Nutr Clin Pract. 2013;28:639-650)

Keywords
nutrition assessment; malnutrition; nutritional status
Malnutrition Assessment

Nutrition Risk

As outlined by the consensus document, the first step in assessing patients for malnutrition is to identify those patients considered at “risk.” For patients newly admitted to the hospital, this is best accomplished through nutrition screening, a process adopted by the Joint Commission in 1996 as a required practice.6 How hospitals implement this requirement is quite variable with some developing their own “screening tool” and others using validated screening tools such as the Malnutrition Screening Tool or the Nutrition Risk Screening 2002.7 Several organizations including A.S.P.E.N. recommend the use of a valid nutrition screening tool to identify those high risk patients who are likely to be malnourished.8 For a more thorough review of applicable nutrition screening tools, please see Skipper et al.9 Other “screening” processes to identify patients “at malnutrition risk” during the course of their hospitalization are of importance since it is well documented that malnutrition can develop while in the hospital despite being normally nourished upon admission.10 Such processes are often institution specific and are developed based on hospital demographics, service entities, and/or average length of stay. Processes used for ongoing risk assessment have not been studied or well described. Examples of specific components to monitor for malnutrition risk may include diet order, length of time with suboptimal nutrient intake, oral diet intake, and participation in multidisciplinary rounds.

Inflammation

Once nutrition risk has been identified, using an etiology approach to describing malnutrition will involve assessing the patient for the presence of inflammation. It is now well understood that inflammation is a potent contributor to disease related malnutrition and is not a valid marker of nutrition status.11 Initially the inflammatory response is a desired response to a host “insult” and is generally self limiting.12 It is when the response becomes exaggerated and prolonged that its effects on nutrition status can be profound.11 While there is no one “parameter” to verify the presence of inflammation, a constellation of measures including those from the laboratory as well those demonstrated clinically by the patient may be useful in delineating the presence of inflammation. Table 2 outlines these potential parameters.

The influence of inflammation on visceral protein levels is now well established and as such these “negative acute phase proteins” may be considered to reflect the presence of inflammation.11 While the specific level of a particular visceral protein cannot in of itself specify the severity of the inflammatory response, it can be evaluated in the context of the patient’s overall clinical picture. Congruent to this understanding is the potential for “positive acute phase proteins” such as C-reactive protein (CRP),11 to assist in identifying inflammation. In response to infection or tissue inflammation, CRP production is stimulated by several cytokines, particularly, interleukin-6, interleukin-1, and tumor necrosis factor-alpha. Like many acute phase proteins, CRP increases rapidly and dramatically in response to a variety of infectious or inflammatory conditions.12,13 Significantly elevated CRP levels have been demonstrated in the presence of infection and sepsis,13 while lower levels are more common in low-lying inflammatory states such as obesity, malignancies, and chronic organ failure.14-17 Table 3 outlines various acute and chronic disease entities where inflammation is likely to be present. Once inflammation along with its severity has been identified, the patient will be further assessed. If malnutrition is identified based on the specific criteria, the etiology of that patients malnutrition will be determined using the algorithm outlined in Figure 1.

Malnutrition Characteristics

The Academy/A.S.P.E.N. Malnutrition workgroup identified 6 characteristics to assess for the presence of malnutrition. If a patient demonstrates 2 or more characteristics, malnutrition can be diagnosed with its severity further defined via specific thresholds and/or descriptives. Tables 4 and 5 outline the 6

Table 1. General Characteristics for the Diagnosis of Malnutrition.4

- Weight loss
- Inadequate energy intake
- Loss of muscle mass
- Loss of subcutaneous fat
- Fluid accumulation
- Hand grip strength

Table 2. Parameters Useful to Assess for Inflammation.4

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased serum albumin</td>
<td>Fever</td>
</tr>
<tr>
<td>Decreased serum transferrin</td>
<td>Hypothermia</td>
</tr>
<tr>
<td>Decreased serum prealbumin</td>
<td>Presence of infection</td>
</tr>
<tr>
<td>Elevated C-reactive protein</td>
<td>Urinary tract infection</td>
</tr>
<tr>
<td>Elevated blood glucose</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>Decreased or increased white blood cell count</td>
<td>Blood stream infection</td>
</tr>
<tr>
<td>Increased percentage of neutrophils in the cell differential</td>
<td>Wound or incisional infection</td>
</tr>
<tr>
<td>Decreased platelet count</td>
<td>Abscess</td>
</tr>
</tbody>
</table>

Table 3. Malnutrition Characteristics

- Inadequate energy intake
- Loss of muscle mass
- Loss of subcutaneous fat
- Fluid accumulation
- Hand grip strength
- Hand grip strength
Table 3. Association of Acute and Chronic Conditions Associated With the Inflammatory Response.20

<table>
<thead>
<tr>
<th>Acute Disease—Severe Inflammatory Response</th>
<th>Chronic Disease—Mild to Moderate Inflammatory Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult respiratory distress syndrome</td>
<td>Cardiovascular disease</td>
</tr>
<tr>
<td>Closed head injury</td>
<td>Celiac disease</td>
</tr>
<tr>
<td>Critical illness</td>
<td>Chronic pancreatitis</td>
</tr>
<tr>
<td>Major abdominal surgery</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>Major infection/sepsis</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Multitrauma</td>
<td>Cystic fibrosis</td>
</tr>
<tr>
<td>Systemic inflammatory response syndrome</td>
<td>Dementia</td>
</tr>
<tr>
<td>Severe burns</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>Severe acute pancreatitis</td>
<td>Inflammatory bowel disease</td>
</tr>
<tr>
<td></td>
<td>Hematologic malignancies</td>
</tr>
<tr>
<td></td>
<td>Metabolic syndrome</td>
</tr>
<tr>
<td></td>
<td>Neuromuscular disease</td>
</tr>
<tr>
<td></td>
<td>Obesity</td>
</tr>
<tr>
<td></td>
<td>Organ failure/transplant (kidney, liver, heart, lung, or gut)</td>
</tr>
<tr>
<td></td>
<td>Pressure wounds</td>
</tr>
<tr>
<td></td>
<td>Rheumatoid arthritis</td>
</tr>
<tr>
<td></td>
<td>Solid tumors</td>
</tr>
</tbody>
</table>

Adapted from A.S.P.E.N. Adult Nutrition Support Core Curriculum, 2nd ed.

Figure 1. Etiology approach to the diagnosis of malnutrition.
Based on Jensen et al.11
characteristics and their respective thresholds for both severe and nonsevere (moderate) malnutrition. Gathering the respective data to determine if malnutrition is present requires a systematic approach beginning with review of the patient’s medical record, verbal discussion with the patient and/or caregiver coupled with physical assessment. The following information will highlight each of the 6 malnutrition characteristics and offer further detail specific to their use.

Weight Loss
Assessing weight loss in a specific patient requires the ability to obtain the patient’s usual or previous body weight along with his or her current weight. Admission weight is frequently obtained by the admitting clinician as either an actual or reported measurement. Caution must be exercised in evaluating admission weights in those patients who have been fluid resuscitated or who are demonstrating signs of dehydration. In these settings, it will require further assessment by the clinician to ascertain the patient’s “dry” weight for evaluation. When interviewing the patient and/or caregiver, the clinician must identify the patient’s “usual” body weight and at what point in time the patient demonstrated that weight. This can be difficult for the patient and/or caregiver to remember. Often times it may coincide with a recent surgical procedure or before the patient was diagnosed with his or her current disease entity.

Insufficient Energy Intake
Identifying how well a newly admitted patient has been able to consume nutrients is best achieved through verbal questioning of the patient and/or caregiver. In those who have been hospitalized, reviewing meal intake data, assessing “calorie counts,” and/or reviewing enteral/parenteral intake via intake and output records will provide data for assessment. It should be noted that “calorie counts” can be problematic in providing adequate

Table 4. Characteristics to Diagnose Severe Malnutrition.4

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acute Illness or Injury Related Malnutrition</th>
<th>Chronic Disease Related Malnutrition</th>
<th>Social or Environmental Related Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>&gt;2%/1 week</td>
<td>&gt;5%/1 month</td>
<td>&gt;5%/1 month</td>
</tr>
<tr>
<td></td>
<td>&gt;5%/1 month</td>
<td>&gt;7.5%/3 months</td>
<td>&gt;7.5%/3 months</td>
</tr>
<tr>
<td></td>
<td>&gt;7.5%/3 months</td>
<td>&gt;10%/6 months</td>
<td>&gt;10%/6 months</td>
</tr>
<tr>
<td></td>
<td>&gt; 20%/1 year</td>
<td>&gt; 20%/1 year</td>
<td></td>
</tr>
<tr>
<td>Energy intake</td>
<td>≤50% for ≥5 days</td>
<td>≤75% for ≥1 month</td>
<td>≤50% for ≥1 month</td>
</tr>
<tr>
<td>Body fat</td>
<td>Moderate depletion</td>
<td>Severe depletion</td>
<td>Severe depletion</td>
</tr>
<tr>
<td>Muscle mass</td>
<td>Moderate depletion</td>
<td>Severe depletion</td>
<td>Severe depletion</td>
</tr>
<tr>
<td>Fluid accumulation</td>
<td>Moderate → severe</td>
<td>Severe</td>
<td></td>
</tr>
<tr>
<td>Grip strength</td>
<td>Not recommended in intensive care unit</td>
<td>Reduced for age/gender</td>
<td>Reduced for age/gender</td>
</tr>
</tbody>
</table>

Table 5. Characteristics to Diagnose Nonsevere (Moderate) Malnutrition.4

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acute Illness or Injury Related Malnutrition</th>
<th>Chronic Disease Related Malnutrition</th>
<th>Social or Environmental Related Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>1%-2%/1 week</td>
<td>5%/1 month</td>
<td>5%/1 month</td>
</tr>
<tr>
<td></td>
<td>5%/1 month</td>
<td>7.5%/3 months</td>
<td>7.5%/3 months</td>
</tr>
<tr>
<td></td>
<td>7.5%/3 months</td>
<td>10%/6 months</td>
<td>10%/6 months</td>
</tr>
<tr>
<td></td>
<td>&gt; 20%/1 year</td>
<td>&gt; 20%/1 year</td>
<td></td>
</tr>
<tr>
<td>Energy intake</td>
<td>&lt;75% for &gt;7 days</td>
<td>&lt;75% for ≥1 month</td>
<td>&lt;75% for ≥3 months</td>
</tr>
<tr>
<td>Body fat</td>
<td>Mild depletion</td>
<td>Mild depletion</td>
<td>Mild depletion</td>
</tr>
<tr>
<td>Muscle mass</td>
<td>Mild depletion</td>
<td>Mild depletion</td>
<td>Mild depletion</td>
</tr>
<tr>
<td>Fluid accumulation</td>
<td>Mild</td>
<td>Mild</td>
<td>Mild</td>
</tr>
<tr>
<td>Grip strength</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Table 6. Specific Areas to Assess for Subcutaneous Fat Loss.

<table>
<thead>
<tr>
<th>Exam Areas</th>
<th>Tips</th>
<th>Severe Malnutrition</th>
<th>Mild-Moderate Malnutrition</th>
<th>Well Nourished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbital Region – Surrounding the Eye</td>
<td>View patient when standing directly in front of them, touch above the cheekbone</td>
<td>Hollow look, depressions, dark circles, loose skin</td>
<td>Slightly dark circles, somewhat hollow look</td>
<td>Slightly bulged fat pads. Fluid retention may mask loss</td>
</tr>
<tr>
<td>Upper Arm Region: Triceps/biceps</td>
<td>Arm bent, roll skin between fingers, do not include muscle in pinch</td>
<td>Very little space between folds, fingers touch</td>
<td>Some depth pit, but not ample</td>
<td>Ample fat tissue obvious between folds of skin</td>
</tr>
<tr>
<td>Thoracic and Lumbar Regions: Ribs, Lower back, Midaxillary line</td>
<td>Have patient press hands hard against a solid object</td>
<td>Depression between ribs very apparent. Iliac Crest very prominent</td>
<td>Ribs apparent, depressions between them less pronounced. Iliac Crest somewhat prominent</td>
<td>Chest is full; ribs do not show. Slight to no protrusion of the Iliac Crest</td>
</tr>
</tbody>
</table>

Reprinted with permission from White JA. *Nutrition Care Manual*. Academy of Nutrition and Dietetics; 2013.

data for evaluation. For those newly admitted patients who have been able to consume oral foods, information should be obtained from the patient and/or caregiver as to the patient’s general meal intake over a specific period.20-21 In those who have been previously or are currently hospitalized, identifying periods of inadequate intake will assist in delineating the overall percentage of a patient’s energy intake he or she has been able to achieve.

The objective data obtained from medical record review and/or patient/caregiver interview will be compared to the patient’s estimated energy requirements. This will then determine the specific percentage of requirements the patient has achieved and therefore which severity level is demonstrated for this characteristic. Requirements can be measured via indirect calorimetry, for example in the critically ill patient, or can be estimated with prediction equations such as Mifflin St-Jeor or Penn State.22-23

Physical Assessment Components

Three of the 6 malnutrition criteria are those that must be determined through performance of a nutrition focused physical exam. This aspect of physical assessment is an important contribution by the registered dietitian (RD) as when coupled with the patient interview it can provide sufficient data to diagnose the presence of malnutrition. Nutrition-focused physical assessment will assist in identifying the presence of muscle and/or subcutaneous fat loss, the presence of fluid accumulation, along with the severity of these characteristics. Tables 6 and 7 outline specific areas of the body to assess for fat and muscle loss along with details for delineating severity of the loss, if applicable.

Nutrition-focused physical exam is a component of the nutrition care process and is an important competency for all RDs. This component of dietetic practice is included in the Academy of Nutrition and Dietetics: Revised 2012 Standards of Practice in Nutrition Care and Standards of Professional Performance for Registered Dietitians.24 In the Nutrition Assessment Standard 1.3, “each RD shall assess nutrition focused physical findings including those, among others, muscle and subcutaneous fat wasting and signs of edema.”24 In addition, the Accreditation Council for Education in Nutrition and Dietetics has included nutrition-focused physical assessment as a competency for supervised practice program participants. Performing nutrition focused physical assessment is increasing among RDs. Compared to the 1995 and 2000 Dietetics Practice Audits, Mackle and colleagues in 2003 demonstrated greater use of physical assessment parameters by RDs.25

The presence of fluid accumulation is accessed via physical exam evaluating both the presence of local and/or generalized accumulation.4 It is important to first evaluate overall fluid status to help determine other etiologies for any fluid accumulation. Areas useful to assess include the lower and upper extremities, face and eyes, the scrotal area and ascites. In those patients with underlying disease states such as congestive heart failure or chronic kidney disease, discerning fluid accumulation due to malnutrition will be difficult. Table 8 outlines 1 method for assessment of edema.

Hand Grip Strength

Hand grip strength has been validated as a proxy for lean body mass and as such was chosen by the workgroup as an important functional parameter in assessing for malnutrition.4,26 Assessment of grip strength is performed via a dynamometer by those experienced/trained in its use. Abnormal grip strength measurements will be based on the specified dynamometer utilized. Diseases and/or conditions that limit the patient’s ability to perform a valid hand grip strength measurement must be considered including, among others, rheumatoid arthritis, cerebrovascular accident, neuromuscular disease, and dementia. In addition, patients who are heavily sedated and/
Some practitioners have chosen not to utilize hand grip strength in assessing for malnutrition. Other parameters that could be considered for functional assessment include general performance status, ability to perform activities of daily living, ability to tolerate physical therapy, and ability to wean from mechanical ventilation. Validity and usability testing of additional functional parameters will shed light on alternate parameters that may be useful in addition to grip strength.

### General Considerations in Applying the Malnutrition Characteristics

When evaluating a patient’s specific malnutrition criteria the possible etiologies for malnutrition may not always be clear. It may be that the patient’s characteristics fit within >1 etiology, for example, in both acute illness and chronic disease related malnutrition. The malnutrition etiology can change as clinical course evolves which is why characteristics should be routinely assessed at frequent intervals. Some degree of 1 or more...
characteristics may be present in patients without malnutrition. Conversely, characteristics may not be present in patients at high risk for malnutrition. These patients are likely those who are well nourished prior to admission and due to the nature of their illness are considered “high risk,” that is, the burn or multiple trauma patient. Close and frequent monitoring of these patients will be essential as nutrition status may certainly change as clinical condition changes.4,19

In addition, it is important to point out that the use of an etiology approach in the diagnosis and documentation of malnutrition in a specific patient should lead to collaborative efforts between the RD and the physician. Confirmation of the RD’s findings and malnutrition nutrition diagnosis can result in accurate documentation in the medical record and most importantly timely and appropriate nutrition intervention.

The following 2 patient cases highlight the application of the malnutrition characteristics in assessing for malnutrition. These were patients presented to this author’s facility, a 450-bed teaching institution.

Patient Case 1

Admission History
A 24-year-old female was admitted directly from her physician’s office for “malnutrition” secondary to gastroparesis. She had been referred to this surgeon for evaluation of gastric pacer placement. Her chief complaints involved early satiety, nausea, and vomiting over 6 months. The severity of her symptoms had worsened over the past month.

Past Medical History
This was unremarkable other than for admitting diagnosis.

Nutrition Risk Assessment
Admission nutrition screen: Malnutrition Screening Tool Score of 5—referral to RD. RD completed nutrition assessment in next 24 hours.

Clinical Presentation

Anthropometrics. Height: 62 inches
Current weight: 68 pounds
Weight 1 year ago: 110 pounds
Weight 3 months ago: 90 pounds
Weight 1 month ago: 80 pounds

Diet history. Complained of early satiety after taking minimal amounts of liquids and foods. Was drinking 4 ounces of a high-calorie oral nutrition supplement and taking small amounts of soft foods twice per day over past 3 months. Intake over recent month averaged only 8 ounces of a high-calorie oral nutrition supplement per day.

Physical assessment. Head/face: severe temporal wasting
Shoulders/torso: Prominent scapula and clavicle; severe rib prominence
Arms: severe loss of subcutaneous fat in triceps area
Lower extremities: prominent knee bone with noted loss of quadriceps muscle
No evidence of fluid accumulation in upper or lower extremities

Clinical data. White blood cells: normal
Temperature: 98.4°F
Serum albumin level: 4.3 g/dL
Prealbumin: 15.6 mg/dL

Functional status. Patient was unable to perform her activities of daily living (ADLs) and was living with her parents who were assisting in her care.

What Is This Patient’s Nutrition Status?
Severe malnutrition related to social/environmental circumstances.
She meets several criteria for this diagnosis:

Weight loss
• 1 year: 38%
• 3 months: 24%
• 1 month: 15%

Energy intake
• Over last month: 360 kcal/day
• Estimated over last 3 months: 600 kcal/day
• <50% of estimated energy requirements (1225 kcal/day)

Physical assessment
• Severe loss of both muscle and subcutaneous fat in multiple areas

Functional assessment
• Unable to perform ADLs—severe impairment

This patient achieved 4 of the 6 defined criteria along with functional impairment. The RD collaborated with the patient’s physician and determined that enteral feeding initiation would be the most appropriate nutrition intervention to begin nutrition repletion.

Patient Case 2

Admission History
A 59-year-old male was admitted from the Emergency Department with acute rectal bleeding. Colonoscopy on hospital day (HD) 3 revealed a partially obstructing midrectal mass

...
suspicious for malignancy. On HD 6, the patient underwent a lower anterior resection (colon) with anastomosis.

**Past Medical History**
Cholecystectomy due to cholelithiasis; status post endoscopic retrograde cholangiopancreatography 9 months prior to admission.
- Diabetes mellitus—type 2

**Nutrition Risk Assessment**
Admission nutrition screen: Malnutrition Screening Tool Score: 0
RD monitored patient during admission and completed further assessment on HD 7 due to NPO status.

**Clinical Presentation**

*Anthropometrics.* Height: 66 inches
- Current weight: 263 pounds
- Admission weight: 268 pounds
- Weight 3 months ago: 290 pounds (per patient interview by RD)

*Diet history.* NPO since admission
Anorexia and reduced oral intake over last 3 months—patient reported eating about half of his normal meal intake during same time period.

*Physical assessment.* No evidence of subcutaneous fat or muscle loss
- Bilateral lower extremities: pitting edema: 2+

*Clinical data.* White blood cells: 16 K
- Temperature: 99.9°F
- Serum albumin level: 1.8 g/dL
- Prealbumin: 7.8 mg/dL

*Functional status.* Physical therapy evaluation: generalized weakness on admission

**What Is This Patient’s Nutrition Status?**
**Severe malnutrition related to acute illness/injury**
He meets several criteria and demonstrates significant inflammation:

- **Weight loss**
  - 3 months: 9%

- **Energy intake**
  - No nutrient intake since hospital admission (7 days)

- **Physical assessment**
  - Moderate edema

*Functional assessment*
- Generalized weakness—not part of current criteria

This patient achieved 3 of the 6 defined criteria along with mild functional impairment. Upon discussion with the patient’s physician, the need to initiate nutrition intervention was recognized. Due to the patient’s ongoing prolonged ileus, it was determined parenteral nutrition (PN) support would be the most appropriate nutrition intervention.

It is important to note that the nutrition assessment process for both patients required approximately 45-60 minutes by the RD to complete. This included time for the electronic medical record (EMR) review, patient visit, performance of physical assessment, EMR documentation and for physician collaboration.

**Implementation of a Malnutrition Program**

Implementation of the consensus criteria is a process that is best accomplished through a collaborative approach within the healthcare institution. To be successful in achieving the full spectrum of evaluating, diagnosing, documenting, and receiving reimbursement for malnourished patients requires collaboration between several healthcare professionals. While the dietician, physician, and nurse function at the patient bedside, other “behind-the-scenes” healthcare personnel also contribute to the full implementation of these activities. This generally includes those from the health information management department (HIM) (clinical documentation, coding, reimbursement, medical records), finance department, information technology, and hospital administration. We describe the implementation of a malnutrition program incorporating the consensus criteria in collaboration with all healthcare personnel as described above at the Cleveland Clinic, a large healthcare system comprising a main campus hospital and 8 regional hospitals.

**Establishing Support**

The consensus statement is an evidence-based document that provides a purpose and rationale for hospital clinicians to develop a consistent approach to the identification and documentation of malnutrition in healthcare institutions. The consensus statement was developed collaboratively by 2 of the country’s most credible professional nutrition societies, the Academy and A.S.P.E.N., and therefore was used to establish our malnutrition program. Support for the program was first gained from our physician nutrition director. Patient care treatment plans and decisions are directed by physicians (or authorized providers) so establishing a physician-champion was important. Additional support was also gained from an executive healthcare administrator. Apprising him of the anticipated effect of increased hospital reimbursement by identifying malnourished patients was positively received. To promote institutional success of our
malnutrition will be identified with the ICD-9 codes usage for malnutrition with the expectation that severe and non-severe nutrition. Our intention is to gather data annually on code patients admitted to acute care settings are diagnosed with malnutrition as established in the consensus statement. The current version of ICD codes is the 9th version. The consensus statement recommends ICD-9 code 262 for the diagnosis of severe protein-calorie malnutrition and ICD-9 code 263.0 for moderate (nonsevere) malnutrition. These ICD-9 codes have definitions that best match the malnutrition criteria for severe and moderate (nonsevere) malnutrition.

Table 9. ICD-9 Codes for Nutrition Deficiencies (Applicable to Adult Malnutrition),

<table>
<thead>
<tr>
<th>Term</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kwashiorkor</td>
<td>260</td>
</tr>
<tr>
<td>Marasmus</td>
<td>261</td>
</tr>
<tr>
<td>Other, severe protein-calorie malnutrition</td>
<td>262a</td>
</tr>
<tr>
<td>Other and unspecified protein-calorie malnutrition</td>
<td>263</td>
</tr>
<tr>
<td>Moderate malnutrition</td>
<td>263.0b</td>
</tr>
<tr>
<td>Mild malnutrition</td>
<td>263.1</td>
</tr>
<tr>
<td>Other protein-calorie malnutrition</td>
<td>263.8</td>
</tr>
<tr>
<td>Unspecified protein-calorie malnutrition</td>
<td>263.9</td>
</tr>
</tbody>
</table>

aRecommended for diagnosis of severe malnutrition.
bRecommended for diagnosis of nonsevere (moderate) malnutrition.

The physician-champion actively engaged in communicating and collaborating with other physicians and administrators. Upon establishing institution support, a Malnutrition Task Force was formed comprising dietitians and dietetic technicians from the main campus and regional hospitals. The committee met on a regular basis to design and implement the various components of our program as described below. The completion of the initial program aspects took approximately 18 months.

Benchmarking Malnutrition Data

Baseline data were gathered on our health system’s current usage of the International Classification of Diseases (ICD) codes for malnutrition (Table 9) prior to implementing the program. The current version of ICD codes is the 9th version. The finance department provided this data for in-patient hospital stays for each hospital. The consensus statement recommends ICD-9 code 262 for the diagnosis of severe protein-calorie malnutrition and ICD-9 code 263.0 for moderate (nonsevere) malnutrition. These ICD-9 codes have definitions that best match the malnutrition criteria for severe and moderate (nonsevere) malnutrition as established in the consensus statement. The ICD-9 codes 262 and 263.0 are included in the CMS Medical Severity-Diagnosis-Related Group classification with 262 as a major comorbid condition/complication and 263.0 as a less severe comorbid condition/complication. The application of one of these malnutrition codes to the DRG may increase reimbursement. In addition, the overall rate of patients diagnosed with malnutrition at each hospital was determined based on the number of hospital discharges. Research studies indicate the rate of malnutrition of hospitalized patients ranges from 15% to 60%, depending on the patient population and clinical criteria used. However, U.S. statistical reports indicate that only 3% of patients admitted to acute care settings are diagnosed with malnutrition. Our intention is to gather data annually on code usage for malnutrition with the expectation that severe and non-severe malnutrition will be identified with the ICD-9 codes 262 and 263.0, respectively. We also will investigate actual received reimbursement for malnutrition. A recent report indicated significant reimbursement was received by a small hospital (100+/daily census) when malnutrition was identified by the dietitian and subsequently documented by the physician in the EMR.

Health Information Management and Reimbursement Specialists

The HIM department and reimbursement specialists were contacted early during our program development. These professionals are responsible for reviewing the patient medical record and assuring the correct ICD-9 code assignment. Patient health information must be fully documented, be accurate, and meet the definition of the ICD-9 code, otherwise reimbursement for services may not be obtained. We presented the consensus criteria and goals of our malnutrition program to the department. This was exceptionally well received, and they appreciated the evidence-based criteria and documentation that would appear in the EMR to substantiate the malnutrition diagnosis. They noted it as being particularly helpful when collaborating with physicians/providers during review of the patient medical record since most health information, including malnutrition documentation, can be gathered only from the authorized provider’s documentation for reimbursement.

Dietitian Training for Diagnosing Malnutrition

One of the most important aspects of the malnutrition program was to educate and train the dietitians from our health system hospitals (approximately 95 dietitians). The Cleveland Clinic promotes standardization of clinical policies across our health system; standardizing our malnutrition diagnosis and documentation process provided an opportunity to continue our standardization efforts.

We designed a 2-part education program for dietitian training. Dietitians and dietetic interns were first required to attend a half-day didactic program (2 dates were available) which included the following lectures:

- etiology based definition of malnutrition
- clinical characteristics (consensus paper)
- nutrition assessment
- inflammation
- physical exam
- coding and documentation
- case studies (interactive)

All references and lecture materials were made available to the dietitians and dietetic interns via a share-point website. The lectures were videotaped and also made available on the share-point website and subsequently are viewed by new hires.
The second part of our education program was to train the dietitians and dietetic interns on performing a nutrition-focused physical examination (NFPE). Several half-day training sessions were scheduled at the Cleveland Clinic main campus Simulation Center. The Simulation Center provided equipment, including mannequins, examination rooms, classrooms, and videotaping capabilities. It took approximately 8 months to train all dietitians and interns due to the limited training space. Dietitians and dietetic interns rotated through 3 hands-on workshops for muscle and fat examination, edema examination and micronutrient examination. While micronutrient deficiencies are not currently one of the consensus characteristics, our Malnutrition Task Force felt they provided supportive evidence for signs of malnutrition. The micronutrient workshop included examination of hair, skin, eyes, oral cavity, and nails for deficiencies.

Following the workshops we utilized the objective structured clinical exam (OSCE) method to assess the skills of RDs utilizing the consensus criteria and performing a NFPE. The OSCE method has been successful in training a variety of skills to healthcare professionals. It was first developed for use with medical students to objectively assess clinical competencies such as history-taking, physical examination, communication skills, and data interpretation. Students participate by moving through a series of timed stations, with each station devoted to a particular area of a predetermined competency. Each station uses a standardized patient (trained to portray a medical condition) and an observer. The observer provides feedback to the student at the end of each station. The OSCE has been used to assess multiple dietetic student clinical skills including communication skills and interviewing patients, interpretation and food knowledge skills, performing a nutrition assessment, planning a nutrition intervention, and calculating and planning an enteral feeding regimen. We developed malnutrition scenarios for use with the OSCE exercises and used our own nutrition department members (dietitians, dietetic technicians, managers, clerical support staff) as standardized patients and observers (dietitian only). Training of the standardized patients was provided by the Simulation Center manager. Dietitians rotated through the scenarios in 15-minute intervals including interviewing the patient, performing a NFPE and identifying the presence and degree of malnutrition. The observer provided feedback to the dietitian on his/her performance. Dietitians were provided with laminated pocket cards of the Academy’s clinical characteristics table (Tables 4 and 5) for use during the OSCE and subsequently for clinical practice.

Evaluations of the workshops and OSCE sessions were collected from the participating dietitians. In all, 98% rated the overall experience as good to excellent and 97% rated the OSCE as a good to excellent experience.

Documentation

The Malnutrition Task Force created a standard template for documentation of malnutrition in the EMR and is used by the dietitians at all the hospitals. The template includes all 6 clinical characteristics of the consensus paper, including specific physical parameters and a final malnutrition diagnosis section to indicate severe protein-calorie malnutrition, moderate (nonsevere) malnutrition or no malnutrition identified. A drop-down selection format is used for all characteristics and for ease of moving through the documentation template quickly. The development and implementation of the EMR template required collaboration with a clinical informatic technology specialist.

Provider Education and Communication

We designed a malnutrition presentation (PowerPoint) to be used by the dietitians to educate providers (physicians, nurse practitioners, physicians assistants). Key components of the presentation included dietitian documentation of malnutrition in the EMR and the specific documentation steps required for the provider. In addition, the importance of collaboration between the dietitian and the provider when determining the presence and degree of malnutrition and the subsequent care plan was emphasized. Dietitians use the presentation for provider staff meetings and in-services. This was a first-step communication process with providers, but we expect to explore potential future communication methods, especially for new hires.

Next Steps

As we move into our malnutrition program’s second year, we will review malnutrition coding practices and reimbursement data. We are continuing our training process including hands-on workshops for NFPE and the OSCE method at our Simulation Center for new dietitians and dietetic interns. To ensure quality of dietitian practices, we are developing a continuous process improvement monitor for malnutrition documentation and a competency for the NFPE.

Summary

The consensus-based malnutrition criteria offers a standardized approach to the assessment, diagnosis, and documentation of malnutrition in the adult hospitalized patient. Assessing nutrition risk followed by identifying the presence of inflammation will delineate the patient’s malnutrition etiology. Identifying a patient’s specific malnutrition characteristics requires in-depth data gathering and patient assessment. Usability and validity data is generated and reported, including identification of specific patient population criteria such as for the critically ill or obese, the malnutrition criteria will be reevaluated, updated, and revised accordingly.

Developing an institution based malnutrition program will most likely be directed by the Clinical Nutrition Department. Identifying, treating, and documenting malnutrition is a collaborative effort between the bedside clinicians including the
Table 10. Areas to Include When Developing a Malnutrition-Identification Program.

- Establish a physician-champion
- Collaborates with other physicians
- Addresses hospital medical executive council
- Solicit hospital administration support
- Allocation of resources
- Benchmark institutional data
- Collaborate with finance department
- Assess current use of ICD-9 codes for malnutrition
- Determine rate of overall malnutrition
- Collaborate with health information management department (reimbursement, medical records, coding)
- Review consensus criteria
- Determine documentation methods of malnutrition as it applies to ICD-9 codes
- Train dietitian staff
- 6 consensus criteria and etiology
- Physical assessment skills for muscle, fat, fluid accumulation, and functional status
- Develop documentation template
- Include etiology and consensus criteria
- Collaborate with informatic technology (clinical support) department for implementation into electronic medical record
- Ensure nursing screening process
- Utilize nutrition screening tool for assessment of risk and to consult the dietitian
- Develop sustainable provider education
- Utilize methods such as presentations at department staff meetings, electronic communication, online education modules, bedside rounds

References


