

Journal of Parenteral and Enteral Nutrition

<http://pen.sagepub.com/>

Consensus Statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition : Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition)

Jane V. White, Peggi Guenter, Gordon Jensen, Ainsley Malone, Marsha Schofield, Academy Malnutrition Work Group, A.S.P.E.N. Malnutrition Task Force and and the A.S.P.E.N. Board of Directors

JPEN J Parenter Enteral Nutr 2012 36: 275

DOI: 10.1177/0148607112440285

The online version of this article can be found at:

<http://pen.sagepub.com/content/36/3/275>

Published by:



<http://www.sagepublications.com>

On behalf of:



American Society for Parenteral
and Enteral Nutrition

The American Society for Parenteral & Enteral Nutrition

Additional services and information for *Journal of Parenteral and Enteral Nutrition* can be found at:

Email Alerts: <http://pen.sagepub.com/cgi/alerts>

Subscriptions: <http://pen.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Apr 24, 2012

[What is This?](#)

Consensus Statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition)

Journal of Parenteral and Enteral Nutrition
 Volume 36 Number 3
 May 2012 275-283
 © 2012 American Society for Parenteral and Enteral Nutrition and the Academy of Nutrition and Dietetics
 DOI: 10.1177/0148607112440285
<http://jpen.sagepub.com>
 hosted at
<http://online.sagepub.com>


Jane V. White, PhD, RD, FADA¹; Peggi Guenter, PhD, RN²;
 Gordon Jensen, MD, PhD, FASPEN³; Ainsley Malone, MS, RD, CNSC⁴;
 Marsha Schofield, MS, RD⁵; the Academy Malnutrition Work Group;
 the A.S.P.E.N. Malnutrition Task Force; and the A.S.P.E.N. Board of Directors

Abstract

The Academy of Nutrition and Dietetics (Academy) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) recommend that a standardized set of diagnostic characteristics be used to identify and document adult malnutrition in routine clinical practice. An etiologically based diagnostic nomenclature that incorporates a current understanding of the role of the inflammatory response on malnutrition's incidence, progression, and resolution is proposed. Universal use of a single set of diagnostic characteristics will facilitate malnutrition's recognition, contribute to more valid estimates of its prevalence and incidence, guide interventions, and influence expected outcomes. This standardized approach will also help to more accurately predict the human and financial burdens and costs associated with malnutrition's prevention and treatment and further ensure the provision of high-quality, cost-effective nutrition care. (*JPEN J Parenter Enteral Nutr.* 2012;36:275-283)

Keywords

adult; inflammation; nutrition assessment

Malnutrition is most simply defined as any nutrition imbalance.¹ People suffer from overnutrition when they consume too many calories. Although the focus of this consensus statement is adult undernutrition, we cannot fail to recognize the enormous impact that obesity has on both personal and national health and rising healthcare costs.² Even overweight or obese adults who develop a severe acute illness or experience a major traumatic event are at risk for malnutrition and frequently need and benefit from intensive nutrition intervention.³⁻⁶

Those adults who lack adequate calories, protein, or other nutrients needed for tissue maintenance and repair experience undernutrition. In acute, chronic, and transitional care settings, recognition and treatment of adult undernutrition are a primary concern.^{3,7-10} For the purposes of this discussion, therefore, the term adult *malnutrition* shall be synonymous with adult *undernutrition*.

Adult undernutrition typically occurs along a continuum of inadequate intake and/or increased requirements, impaired absorption, altered transport, and altered nutrient utilization. Weight loss can and frequently does occur at multiple points along this continuum. Individuals may also present with inflammatory, hypermetabolic, and/or hypercatabolic conditions. Inflammation is increasingly identified as an important underlying factor that increases the risk for malnutrition and may contribute to suboptimal response to nutrition intervention and increased risk of mortality.⁷⁻⁹ As such, individuals may exhibit a wide range of characteristics from "severe malnutrition" to those with nonsevere (mild to moderate) malnutrition that, if

left unrecognized and unaddressed, is likely to progress to a severely malnourished state.³⁻¹¹ Although various laboratory tests and physical signs or symptoms have been suggested as potential markers for inflammation, and some are briefly mentioned in passing in this document, the Academy of Nutrition and Dietetics (Academy) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) *do not* propose any specific inflammatory markers for diagnostic purposes at this time.

Malnutrition is a major contributor to increased morbidity and mortality, decreased function and quality of life, increased frequency and length of hospital stay, and higher healthcare

From the ¹University of Tennessee, Knoxville, Tennessee; ²A.S.P.E.N., Silver Spring, MD; ³The Pennsylvania State University, University Park, Pennsylvania; ⁴Mt. Carmel West Hospital, Columbus, Ohio; and ⁵Academy of Nutrition and Dietetics, Chicago, Illinois.

Financial disclosure: none declared.

This article is simultaneously published in the May 2012 issues of the *Journal of Parenteral and Enteral Nutrition* and the *Journal of the Academy of Nutrition and Dietetics*.¹

Corresponding Author: Jane V. White, PhD, RD, FADA, Department of Family Medicine, 1924 Alcoa Hwy, Knoxville TN 37920; e-mail: jwhite13@uthsc.edu.

Listen to the podcast for this article and other JPEN podcasts at <http://pen.sagepub.com/site/misc/Index/Podcasts.xhtml>

costs.^{2,7-11} Jensen et al⁸ propose an overarching definition of malnutrition as “decline in lean body mass with the potential for functional impairment” at multiple levels (ie, molecular, physiologic, and/or gross motor). The diagnosis of malnutrition in a patient is an undeniably complicating condition that in many cases significantly increases resource utilization in the acute care setting beyond that experienced by the patient in nutrition health.⁷⁻¹¹

Our purpose is to define malnutrition for adults in all settings. In the absence of data showing that malnutrition should be defined differently in different settings, the Academy and A.S.P.E.N. have adopted patient-specific definitions based on etiologies including social and environmental circumstances, chronic illness, and acute illness. The distinction between acute and chronic illness is based on time (the National Center for Health Statistics [NCHS] defines *chronic* as a disease or condition that lasts 3 months or longer).¹² The Academy and A.S.P.E.N. propose etiologic-based definitions that consider time and degree of inflammatory response in categorizing an illness or injury as acute vs chronic.⁷⁻⁹

Need to Standardize Characteristics to Diagnose and Document Adult Malnutrition

Adult malnutrition is a common but frequently unrecognized problem whose incidence and prevalence are difficult to determine.⁸ In 1996, The Joint Commission mandated that nutrition screening be accomplished within 24 hours of admission.¹⁰ This resulted in the identification of multiple criteria and the development of a number of different approaches to the identification of malnutrition in hospitalized patients that were not always evidence based.¹³⁻²¹ Thus, there is currently no single, universally accepted approach to the diagnosis and documentation of adult malnutrition. Current estimates of the prevalence of adult malnutrition range from 15%–60% depending on the patient population and criteria used to identify its occurrence.¹³ Diagnostic elements in malnutrition screening protocols vary widely and range from a simple assessment of appetite and unintentional weight loss¹⁴ to more complex protocols that include measurement of a variety of anthropometric and laboratory parameters.¹⁵⁻²¹

A number of the more complex protocols that have been developed to detect malnutrition in adults rely on changes in acute phase proteins such as serum albumin and prealbumin as primary diagnostic indicators of adult malnutrition.¹⁵⁻²⁰ The Academy of Nutrition and Dietetics Evidence Analysis Library (EAL) analyzed reduction and/or change in serum albumin and prealbumin with weight loss in prolonged protein energy restriction, anorexia nervosa, non-malabsorptive gastric partitioning bariatric surgery, calorie-restricted diets, starvation, low-calorie diets, and nitrogen balance.²²⁻²⁴ The analysis indicated that these acute phase proteins do not consistently or predictably change with weight loss, calorie restriction, or nitrogen balance.²²⁻²⁴ They appear to better

reflect severity of the inflammatory response rather than poor nutrition status.⁷⁻⁹ These laboratory tests, although probable indicators of inflammation, do not specifically indicate malnutrition and do not typically respond to feeding interventions in the setting of active inflammatory response.⁷⁻⁹ Thus, the relevance of laboratory tests of acute phase protein levels, as indicators of malnutrition, is limited.

In 2007, the Centers for Medicare & Medicaid Services (CMS) resequenced its prospective payment system (the Diagnostic-Related Groups) into a hierarchical system called the Medicare Severity–Diagnostic-Related Groups (MS-DRGs) that reflects the presence or absence of complications and/or comorbidities.²⁵ The MS-DRGs are payment groups designed for the Medicare population. Patients with similar clinical characteristics and similar costs are assigned to an MS-DRG that is linked to a fixed payment amount based on the average cost of care for patients in the group. Since the designation of “malnutrition” as an MS-DRG, CMS has voiced concern about the inappropriate use of certain malnutrition codes and the wide variation in the prevalence/incidence of malnutrition within the same geographic area and/or populations with similar demographics.²⁶ In September 2010 and March 2011, the NCHS requested and received commentary from the Academy/A.S.P.E.N. on the appropriateness of the existing malnutrition codes descriptors and use. Proposed revisions to the existing code structure and language were made at the *International Classification of Disease, 9th Revision (ICD-9)* Coordination and Maintenance Committee hearings but were not accepted. The code sets listed in the *ICD-9-CM (Clinical Modification)*—262 Other Severe, Protein-Calorie Malnutrition and 263 (263–263.09) Other and Unspecified Protein-Calorie Malnutrition—and additional code sets, also listed in the Endocrine, Nutritional and Metabolic, Immunity Section that relate to specific micronutrient deficits, may continue to be used in documenting observed adult nutrition deficits.²⁷

According to most recent data available (2009), only 3% of patients admitted to acute care settings in the United States are diagnosed with malnutrition, and the primary *ICD-9* code being used is 263.9 Protein-Calorie Malnutrition, NOS (not otherwise specified).²⁸ Discussions regarding revisions to the current language, to make it consistent with an etiologically based malnutrition diagnostic nomenclature, are ongoing. The CMS has also questioned the use of acute phase serum proteins as primary diagnostic criteria for malnutrition because studies²²⁻²⁴ increasingly suggest limited correlation of these proteins with nutrition status.

The Academy and A.S.P.E.N. Collaborate to Standardize the Diagnosis of Adult Malnutrition

In 2009, the Academy and A.S.P.E.N. recognized the need to standardize the approach to the diagnosis of malnutrition in

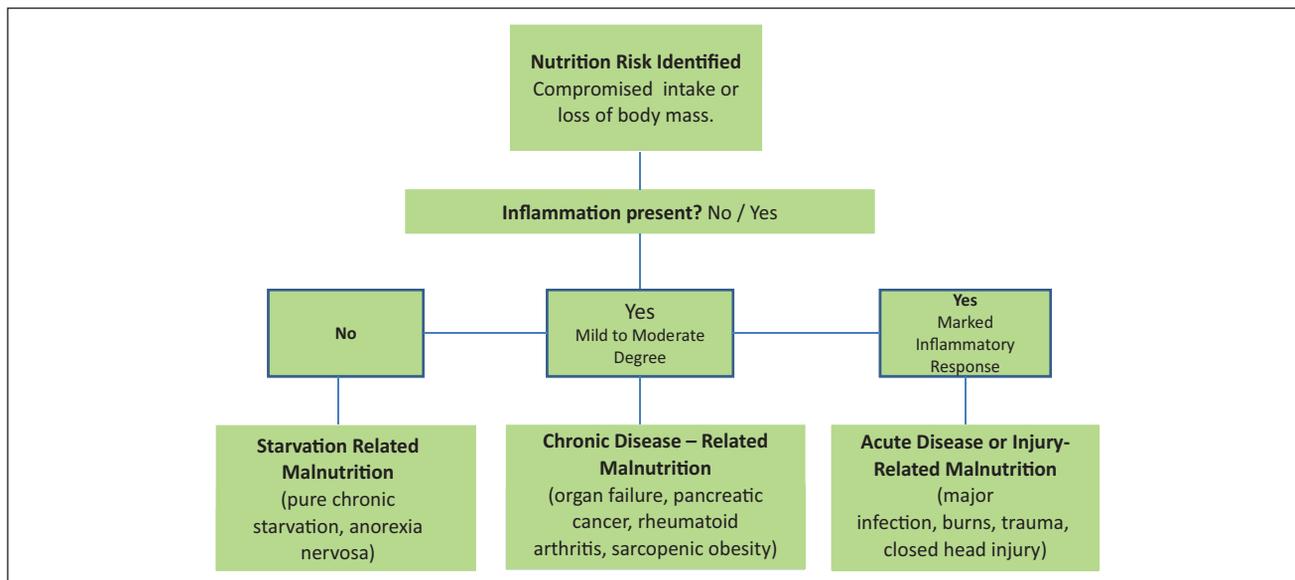


Figure 1. Etiology-based malnutrition definitions. Adapted with permission from Jensen GL, Bistrian B, Roubenoff R, Heimburger DC. Malnutrition syndromes: a conundrum vs continuum. *JPEN J Parenter Enteral Nutr.* 2009;33:710.

adults and to coordinate these efforts among their respective organizations. Current approaches to the diagnosis of malnutrition vary widely, specifically with regard to the diagnostic criteria used, and there is generally poor specificity, sensitivity, and interobserver reliability among the current protocols in use.⁷⁻⁹ This lack of national standardization of diagnostic characteristics results in widespread confusion and potential misdiagnosis. Also, many current screening and assessment protocols fail to appreciate the role of the inflammatory response on acute phase proteins that are often used as primary indicators of nutrition status.^{8,29} The presence of inflammation can blunt a favorable response to nutrition intervention and increase the level and magnitude of human and financial resources needed to restore the patient to optimal health.⁷

In 2009, A.S.P.E.N. and the European Society for Clinical Nutrition and Metabolism (ESPEN) convened an International Consensus Guideline Committee to develop an etiology-based approach to the diagnosis of adult malnutrition in clinical settings (see Figure 1).⁸ The recommended approach was then endorsed by A.S.P.E.N. and ESPEN. The Academy accepted these definitions developed to describe adult malnutrition in the context of acute illness or injury, chronic diseases or conditions, and starvation-related malnutrition.

Characteristics Recommended for the Diagnosis of Adult Malnutrition

In late 2009, the Academy appointed a workgroup with A.S.P.E.N. representation to identify and standardize markers or characteristics that reflect nutrition status vs the inflammatory response that is associated with various diseases and/or

conditions. The group agreed that characteristics to detect and diagnose malnutrition should have the following attributes: be few in number (basic hallmarks), support a *nutrition* diagnosis, characterize severity, change as nutrition status changes, be evidence based when possible or consensus derived, and may change over time as evidence of validity accrues. Because no single parameter is definitive for adult malnutrition, the identification of 2 or more of the following 6 characteristics is recommended for diagnosis (see Table 1):

- Insufficient energy intake³⁰⁻³²
- Weight loss³³⁻³⁶
- Loss of muscle mass^{36,37}
- Loss of subcutaneous fat^{36,37}
- Localized or generalized fluid accumulation^{36,37} that may sometimes mask weight loss
- Diminished functional status as measured by hand-grip strength^{3,36,38-42}

The characteristics, as listed in Table 1, distinguish between severe and nonsevere malnutrition. The characteristics listed are continuous rather than discrete variables. There is insufficient evidence regarding their application in clinical settings to allow for further distinction to be made between mild and moderate forms of malnutrition at this time.

The characteristics listed in Table 1 should be routinely assessed on admission and at frequent intervals throughout the patient's stay in an acute, chronic, or transitional care setting. Data obtained by clinicians should be shared with all members of the healthcare team and considered in the physician's formulation and documentation of a diagnosis of malnutrition.

Table 1. Academy/A.S.P.E.N. Clinical Characteristics That the Clinician Can Obtain and Document to Support a Diagnosis of Malnutrition

Clinical Characteristic	Malnutrition in the Context of Acute Illness or Injury		Malnutrition in the Context of Chronic Illness		Malnutrition in the Context of Social or Environmental Circumstances			
	Nonsevere (Moderate) Malnutrition	Severe Malnutrition	Nonsevere (Moderate) Malnutrition	Severe Malnutrition	Nonsevere (Moderate) Malnutrition	Severe Malnutrition		
(1) Energy intake¹ Malnutrition is the result of inadequate food and nutrient intake or assimilation; thus, recent intake compared with estimated requirements is a primary criterion defining malnutrition. The clinician may obtain or review the food and nutrition history, estimate optimum energy needs, compare them with estimates of energy consumed, and report inadequate intake as a percentage of estimated energy requirements over time.	<75% of estimated energy requirement for >7 days	≤50% of estimated energy requirement for ≥5 days	<75% of estimated energy requirement for ≥1 month	≤75% of estimated energy requirement for ≥1 month	<75% of estimated energy requirement for ≥3 months	≤50% of estimated energy requirement for ≥1 month		
(2) Interpretation of weight loss²⁻⁵ The clinician may evaluate weight in light of other clinical findings, including the presence of under- or overhydration. The clinician may assess weight change over time reported as a percentage of weight lost from baseline.	% 1–2 5 7.5	Time 1 wk 1 mo 3 mo	% >2 >5 >7.5	Time 1 wk 1 mo 3 mo	% 5 7.5 10 20	Time 1 mo 3 mo 6 mo 1 y	% >5 >7.5 >10 >20	Time 1 mo 3 mo 6 mo 1 y
Physical Findings^{5,6} Malnutrition typically results in changes to the physical exam. The clinician may perform a physical exam and document any one of the physical exam findings below as an indicator of malnutrition.								
(3) Body fat Loss of subcutaneous fat (eg, orbital, triceps, fat overlying the ribs)	Mild	Moderate	Mild	Severe	Mild	Severe		
(4) Muscle mass Muscle loss (eg, wasting of the temples [temporalis muscle], clavicles [pectoralis and deltoids], shoulders [deltoids], interosseous muscles, scapula [latissimus dorsi, trapezius, deltoids], thigh [quadriceps], and calf [gastrocnemius])	Mild	Moderate	Mild	Severe	Mild	Severe		
(5) Fluid accumulation The clinician may evaluate generalized or localized fluid accumulation evident on exam (extremities, vulvar/scrotal edema, or ascites). Weight loss is often masked by generalized fluid retention (edema), and weight gain may be observed.	Mild	Moderate to severe	Mild	Severe	Mild	Severe		

(continued)

Table 1. (continued)

Clinical Characteristic	Malnutrition in the Context of Acute Illness or Injury		Malnutrition in the Context of Chronic Illness		Malnutrition in the Context of Social or Environmental Circumstances	
	Nonsevere (Moderate) Malnutrition	Severe Malnutrition	Nonsevere (Moderate) Malnutrition	Severe Malnutrition	Nonsevere (Moderate) Malnutrition	Severe Malnutrition
(6) Reduced grip strength⁷ Consult normative standards supplied by the manufacturer of the measurement device	NA	Measurably reduced	NA	Measurably reduced	NA	Measurably reduced

A minimum of 2 of the 6 characteristics above is recommended for diagnosis of either severe or nonsevere malnutrition. NA, not applicable.

Notes:

Height and weight should be measured rather than estimated to determine body mass index (BMI).

Usual weight should be obtained to determine the percentage and to interpret the significance of weight loss.

Basic indicators of nutrition status such as body weight, weight change, and appetite may substantively improve with refeeding in the absence of inflammation. Refeeding and/or nutrition support may stabilize but not significantly improve nutrition parameters in the presence of inflammation.

The National Center for Health Statistics defines *chronic* as a disease/condition lasting 3 months or longer.⁸

Serum proteins such as serum albumin and prealbumin are not included as defining characteristics of malnutrition because recent evidence analysis shows that serum levels of these proteins do not change in response to changes in nutrient intake.⁹⁻¹²

Table 1. References

- Kondrup J. Can food intake in hospitals be improved? *Clin Nutr.* 2001;20:153-160.
- Blackburn GL, Bistrian BR, Maini BS, Schlamm HT, Smith MF. Nutritional and metabolic assessment of the hospitalized patient. *JPEN J Parenter Enteral Nutr.* 1977;1:11-22.
- Klein S, Kinney J, Jeejeebhoy K, et al. Nutrition support in clinical practice: review of published data and recommendations for future research directions. National Institutes of Health, American Society for Parenteral and Enteral Nutrition, and American Society for Clinical Nutrition. *JPEN J Parenter Enteral Nutr.* 1977;21:133-156.
- Rosenbaum K, Wang J, Pierson RN, Kotler DP. Time-dependent variation in weight and body composition in healthy adults. *JPEN J Parenter Enteral Nutr.* 2000;24:52-55.
- Keys A. Chronic undernutrition and starvation with notes on protein deficiency. *JAMA.* 1948;138:500-511.
- Sacks GS, Dearman K, Replogle WH, Cora VL, Meeks M, Canada T. Use of subjective global assessment to identify nutrition-associated complications and death in long-term care facility residents. *J Am Coll Nutr.* 2000;19:570-577.
- Norman K, Stobaus N, Gonzalez MC, Schulzke J-D, Pirlich M. Hand grip strength: outcome predictor and marker of nutritional status. *Clin Nutr.* 2011;30:135-142.
- Hagan JC. Acute and chronic diseases. In: Mulner RM, ed. *Encyclopedia of Health Services Research.* Vol 1. Thousand Oaks, CA: Sage; 2009:25.
- American Dietetic Association Evidence Analysis Library. Does serum prealbumin correlate with weight loss in four models of prolonged protein-energy restriction: anorexia nervosa, non-malabsorptive gastric partitioning bariatric surgery, calorie-restricted diets or starvation. http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251313&highlight=prealbumin&home=1. Accessed August 1, 2011.
- American Dietetic Association Evidence Analysis Library. Does serum prealbumin correlate with nitrogen balance? http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251315&highlight=prealbumin&home=1. Accessed August 1, 2011.
- American Dietetic Association Evidence Analysis Library. Does serum albumin correlate with weight loss in four models of prolonged protein-energy restriction: anorexia nervosa, non-malabsorptive gastric partitioning bariatric surgery, calorie-restricted diets or starvation. http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251263&highlight=albumin&home=1. Accessed August 1, 2011.
- American Dietetic Association Evidence Analysis Library. Does serum albumin correlate with nitrogen balance? http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251265&highlight=albumin&home=1. Accessed August 1, 2011.

This table was developed by Annalynn Skipper PhD, RD, FADA. The content was developed by an Academy workgroup composed of Jane White, PhD, RD, FADA, LDN, Chair; Maree Ferguson, MBA, PhD, RD; Sherri Jones, MS, MBA, RD, LDN; Ainsley Malone, MS, RD, LD, CNSD; Louise Merriman, MS, RD, CDN; Terese Scollard, MBA, RD; Annalynn Skipper, PhD, RD, FADA; and Academy staff member Pam Michael, MBA, RD. Content was approved by an A.S.P.E.N. committee consisting of Gordon L. Jensen, MD, PhD, Co-Chair; Ainsley Malone, MS, RD, CNSD, Co-Chair; Rose Ann Dimaria, PhD, RN, CNSN; Christine M. Framson, RD, PHD, CSND; Nilesh Mehta, MD, DCH; Steve Plogsted, PharmD, RPh, BCNSP; Annalynn Skipper, PhD, RD, FADA; Jennifer Wooley, MS, RD, CNSD; Jay Mirtallo, RPh, BCNSP, Board Liaison; and A.S.P.E.N. staff member Peggi Guenter, PhD, RN. Subsequently, it was approved by the A.S.P.E.N. Board of Directors. The information in the table is current as of February 1, 2012. Changes are anticipated as new research becomes available. Adapted from Skipper A. Malnutrition coding. In: Skipper A, ed. *Nutrition Care Manual.* Chicago, IL: Academy of Nutrition and Dietetics; 2012.

The development of care plans for nutrition intervention and transitional care on discharge should include monitoring of the characteristics at office or clinic visits following discharge.

If malnutrition is suspected in patients seen in ambulatory care settings, the physician, ideally in concert with a qualified nutrition professional, should assess the characteristics. A plan to address observed nutrition deficits should be developed, implemented, and the characteristics monitored at frequent intervals followed by plan revision until nutrition status is optimized.

The characteristics that have been identified are parameters that many practitioners already measure as part of the nutrition care process (NCP). They are not meant to replace all aspects of the NCP but are to be used to standardize the clinician's approach to the diagnosis and documentation of the presence or absence of adult malnutrition.

Considerations in the Application of the Characteristics in Clinical Settings

Each of the characteristics used in the diagnosis of malnutrition may sometimes be seen in patients for whom malnutrition is not necessarily an appropriate diagnosis (eg, the 80- to 90-year-old patient who habitually consumes "less than recommended calories" and maintains a stable, lower than recommended body weight but is "healthy" and able to function well in the home/community environment; the weight loss experienced by patients with spinal cord injury or those with various forms of muscular dystrophy secondary to de-innervation and disuse but who are consuming adequate nutrients). Also problematic is the patient who is or, in a matter of a few days, may become severely malnourished, despite our best efforts, but in whom the criteria to diagnose malnutrition may be difficult to document (eg, the young to middle-aged adult who is acutely, critically ill or who has suffered major trauma).

Individuals who are ill or in pain are not always able to provide coherent answers to questions asked by healthcare professionals. In acute and/or other healthcare settings, the clinician may not always have access to the patient's medical record and must rely on recalled or historical information provided by the patient, or others who accompany the patient, to assess nutrition parameters such as caloric intake and/or unintended weight loss.

People with severe acute illness or severe trauma often experience extreme metabolic stress. Although "on admission" they often present without a prior history of malnutrition, the presence of the massive inflammatory response seen in such conditions limits the effectiveness of nutrition interventions and can contribute to the rapid development of malnutrition.^{8,9,43} Periods of interrupted feeding, imposed to accommodate the variety of medical-surgical interventions needed to stabilize these patients, also contribute to the development of malnutrition despite the clinician's best efforts to provide adequate calories and other nutrients. The resultant malnutrition

often blunts the effectiveness of medical therapies prescribed and thus a vicious cycle ensues.^{7-9,43} Therefore, essentially "on admission," many critically ill patients, especially the elderly, already are or may be at significant risk of developing malnutrition and its related complications even though the recommended characteristics for diagnosis of malnutrition may be difficult to discern early in the hospital course. As such, inability to eat (ie, compromised intake immediately prior to admission), repeated/extended cessation of feeding regimens (long periods spent NPO), frequent interruptions in oral/enteral nutrition therapies, and unintended weight change may be parameters of particular significance for people in this category. Frequent, intensive monitoring of the critically ill patient to determine the actual level of nutrients provided is needed to ensure that patient needs are appropriately addressed.⁴³

When developing a differential diagnosis of malnutrition, the clinician should also recognize that the degree of inflammatory response which a patient may experience during the course of an illness or condition often changes as the acuity level of the illness or condition changes (acute vs chronic or as new conditions or complications are superimposed on the patient's current state). The acuity level of the patient's nutrition status may also shift as his or her health status changes over time. Therefore, assessment of malnourished patients or of those at increased risk of malnutrition should be incorporated into the NCP or standard of care of the medical, nursing, and/or pharmacy professions.

Incorporation of the Assessment of the Recommended Characteristics Into Clinical Care

Incorporation of the assessment and documentation of the characteristics into standard clinical practice is highlighted as follows:

- History and clinical diagnosis^{3,7,13,32}
 - The chief complaint and past medical history can be helpful in raising suspicion for increased risk of malnutrition and the presence or absence of inflammation (see Figure 1).
- Physical exam/clinical signs^{3,7-9,29}
 - Physical examination can reveal the presence of several of the diagnostic characteristics of malnutrition such as weight loss or gain, fluid retention, loss of muscle or fat, and other signs of specific macro- and/or micronutrient deficiencies.
 - Clinical signs of inflammation may be revealed, including fever or hypothermia as well as other nonspecific signs of systemic inflammatory response such as tachycardia and hyperglycemia that may facilitate an etiologically based diagnosis (Figure 1).

- Anthropometric data³³⁻³⁶
 - Unintended weight loss is a well-validated indicator of malnutrition. Weight should be measured on admission to any clinical setting and monitored frequently throughout the length of stay.
 - Height should be measured, when possible, or estimated using validated algorithms.⁴⁴
 - Although malnutrition can occur at any body mass index (BMI), individuals at either extreme of BMI may be at increased risk of poor nutrition status.
- Laboratory data^{3,7-9,22-24,29}
 - Indicators of inflammatory response traditionally used as indicators of malnutrition (ie, serum albumin, prealbumin) should be interpreted with caution as previously noted.
 - Other laboratory indicators of inflammation can include elevated C-reactive protein (CRP), white blood cell count, and blood glucose levels and may aid in the determination of an etiologic-based diagnosis (Figure 1).
 - Negative nitrogen balance and elevated resting energy expenditure may sometimes be used to support the presence of systemic inflammatory response and further facilitate identification of the etiologic basis for the diagnosis of malnutrition (see Figure 1).^{8,9}
- Food/nutrient intake³⁰⁻³²
 - Information regarding food and nutrient intake may be obtained from the patient and/or caregiver. A modified diet history, 24-hour recall, “calorie counts” (either observed intake/estimated post-meal plate waste), and/or prior documentation of periods of inadequate food intake in the patient’s medical record may be used as “evidence” of inadequate intake.
- Functional assessment^{3,36,38-42}
 - Handgrip strength should be used to document a decline in physical function, as appropriate to patient circumstances. As the use of additional performance measures is more widely accepted and/or validated in the general or select populations of adults, characteristics used to measure functional status may expand.^{45,46}

Thus, a careful review of the patient’s chief complaint; review of systems; medical, nutrition, and psychosocial histories; physical exam; laboratory markers of inflammation; anthropometric parameters; food intake; and functional status should be performed by relevant members of the healthcare team when making the initial diagnosis, determining and implementing a plan of care, monitoring progress, and adjusting the plan of care to facilitate the patient’s attainment and maintenance of optimal, achievable nutrition health.⁴⁷⁻⁵⁰ Sound clinical judgment and expertise are required to integrate nutrition

assessment findings into the daily delivery of patient care. Findings must be included in the medical record to identify and document a diagnosis of malnutrition that will withstand the scrutiny of those whose job it is to ensure that fair and equitable reimbursement is provided when appropriate diagnoses are made and corresponding healthcare services delivered.

Call to Action: Next Steps

Short Term

It is important that all clinicians recognize the need to use the recommended diagnostic characteristics to assess and document nutrition status in adults. Clinicians and healthcare team members should begin to consider how to implement use of the recommended characteristics by bringing key members of the healthcare team (physicians, dietitians, nurses, pharmacists, coders, etc) together to develop an implementation strategy compatible with institutional practices and needs. A standardized format for data collection regarding the utility of assessing the recommended characteristics is needed to validate and establish those characteristics that are the most or least reliable in malnutrition’s identification and ultimately its treatment. Uniform data collection could occur across facilities, at the local or regional level, so that feasibility testing on a broader scale could eventually be accomplished. The Academy and A.S.P.E.N are collaborating to develop a standardized data collection protocol to capture these data. The characteristics will be reviewed and revised at regular intervals to reflect evidence of efficacy. The financial impact of the use of the recommended characteristics pre- and postimplementation should be determined in the areas of resource expenditure, revenue generation, and staff required to adequately address the needs of this highly vulnerable and costly segment of our population.

Systems need to be developed to track the diseases or conditions that contribute to or are highly associated with malnutrition. A systematic assessment of the relevance of characteristics used in malnutrition’s diagnosis and the routine documentation of malnutrition’s negative impact on health outcomes must also occur. The Academy and A.S.P.E.N are working to develop a registry for this purpose. A recent study by Fry et al⁵¹ showed that preexisting “malnutrition and/or weight loss” was a positive predictive variable for all 8 major surgery-associated “never events” (inexcusable outcomes in a healthcare setting), with odds ratios ranging from 2.8 for postoperative pneumonia to 16.4 for intravascular device infection. The widespread, standardized collection and reporting of practice-based data will further support the demand for etiology-based definitions of malnutrition and help validate the use of a standardized set of characteristics to document its diagnosis.

The education and training needs of the nutrition and medical communities should be determined and appropriate tools should be provided to remediate identified deficits. Both the Academy and A.S.P.E.N. have recognized member needs for

additional training in assessment techniques and in the synthesis and formulation of a diagnosis, and they have offered and will continue to offer educational opportunities in multiple venues as needs are identified.

Many Academy and A.S.P.E.N. members have requested the provision of a similar coding and diagnostic construct for the pediatric population. The Academy, A.S.P.E.N., and American Academy of Pediatrics are collaborating to address the identification and standardization of malnutrition (undernutrition) definitions and diagnostic characteristics in the pediatric age group.

Long Term

The malnutrition and inflammatory markers most useful in the documentation of disease, condition, or acuity of injury need to be identified. A standardized approach to diagnosis and greater uniformity in the selection of diagnostic descriptors (codes) to document the presence of malnutrition in adults should facilitate better correlation between best practices related to intervention and treatment, as well as to predicted outcomes and therapeutic efficacy, and serve as a foundation for advocacy in the public policy, regulatory, and legislative arenas. Transitional and discharge planning protocols must be developed to provide the resources needed to successfully maintain and nourish patients upon return to their communities and should help to reduce hospital readmission rates.

Summary

The "Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition)" is a dynamic work in progress. Clinicians should expect to see changes in the recommended characteristics used to identify and document malnutrition based on an accumulation of evidence as data on their use are systematically collected, analyzed, and disseminated. Periodic revision as evidence accumulates will ensure that the health and well-being of the public are optimized and healthcare resources used with maximum efficiency.

Acknowledgments

The authors acknowledge the following individuals for their efforts in the development of the Characteristics and Markers tool. The Academy Malnutrition Work Group: Maree Ferguson, MBA, PhD, RD; Sherri Jones, MS, MBA, RD, LDN; Louise Merriman, MS, CDN, RD; Pam Michael, MBA, RD; Marsha Schofield, MS, RD, LD; Terese Scollard, MBA, RD, LD; Annalynn Skipper, PHD, FADA, RD; Jane V. White, PhD, RD, FADA; and the A.S.P.E.N. Malnutrition Task Force members: Rose Ann Dimaria-Ghalili, PhD, RN; Peggy Guenter, PhD, RN, CNSN; Gordon Jensen, MD, PhD, FASPEN; Ainsley Malone, RD, CNSC; Nilesh Mehta, MD, DCH; Steve Plogsted, PharmD, RPh, BCNSP; Annalynn Skipper, PhD, RD, FADA; and Jennifer Wooley, MS, RD, CNSD.

Note

1. This version of this article, simultaneously published in the *Journal of the Academy of Nutrition and Dietetics*, has been edited to conform to A.S.P.E.N. style.

References

1. *Dorland's Illustrated Medical Dictionary*. 32nd ed. New York: Elsevier Health Sciences; 2011.
2. National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition Health and Physical Activity. *Obesity at a Glance: Halting the Epidemic by Making Health Easier*. Atlanta, GA: Centers for Disease Control; 2011. <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity.htm>. Accessed January 4, 2012.
3. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, et al. Sarcopenia: consensus on definition and diagnosis. Report of the European Working Group on Sarcopenia in Older People. *Age Aging*. 2010;39:412-423.
4. Jensen GL, Hsiao PY. Obesity in older adults: relationship to functional limitation. *Curr Opin Clin Nutr Metab Care*. 2010;13:46-51.
5. Han TS, Tajar A, Lena MF. Obesity and weight management in the elderly. *Br Med Bull*. 2011;97:169-196.
6. Benton MJ, Whyte MD, Dval BW. Sarcopenic obesity: strategies for management. *Am J Nurs*. 2011;111(12):38-46.
7. National Alliance for Infusion Therapy and the American Society for Parenteral and Enteral Nutrition Public Policy Committee and Board of Directors. Disease-related malnutrition and enteral nutrition therapy: a significant problem with a cost-effective solution. *Nutr Clin Pract*. 2010;25:548-554.
8. Jensen GL, Bistrrian B, Roubenoff R, Heimburger DC. Malnutrition syndromes: a conundrum vs continuum. *JPEN J Parenter Enteral Nutr*. 2009;33:710-716.
9. Jensen GL, Mirtallo J, Compher C, et al. Adult starvation and disease-related malnutrition: a rational approach for etiology-based diagnosis in the clinical practice setting from the International Consensus Guideline Committee. *JPEN J Parenter Enteral Nutr*. 2010;34:156-159.
10. Centers for Medicare & Medicaid Services. Acute Inpatient Prospective Payment System, DRG resources. <http://www.cms.hhs.gov/AcuteInpatientPPS/>
11. Jensen GL. Inflammation as the key interface of the medical and nutrition universes: a proactive examination of the future of clinical nutrition and medicine. *JPEN J Parenter Enteral Nutr*. 2006;30:453-463.
12. Hagan JC. Acute and chronic diseases. In: Mulner RM, ed. *Encyclopedia of Health Services Research*. Vol 1. Thousand Oaks, CA: Sage; 2009:25.
13. Mueller C, Compher C, Druyan ME; the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors. A.S.P.E.N. clinical guidelines: nutrition screening, assessment, and intervention. *JPEN J Parenter Enteral Nutr*. 2011;35:16-24.
14. Ferguson M, Capra S, Bauer J, Banks M. Development of a valid and reliable malnutrition screening tool for adult acute hospital patients. *Nutrition*. 1999;14:458-464.
15. The Veterans Affairs Total Parenteral Nutrition Cooperative Study Group. Perioperative total parenteral nutrition in surgical patients. *N Engl J Med*. 1991;325:525-532.
16. Ingenbleek Y, Carpentier YA. A prognostic inflammatory and nutritional index scoring critically ill patients. *Int J Vitam Nutr Res*. 1985;55:91-101.
17. Buzby GP, Mullen JL, Matthews DC, Hobbs CL, Rosato EF. Prognostic nutritional index in gastrointestinal surgery. *Am J Surg*. 1980;139:160-167.
18. Laporte M, Villalon L, Thibodeau J, Payette H. Validity and reliability of simple nutrition screening tools adapted to the elderly population in health care facilities. *J Nutr Health Aging*. 2001;5:292-294.
19. Nutrition Screening Initiative. *Nutrition Interventions Manual for Professionals Caring for Older Americans*. Washington, DC: Nutrition Screening Initiative; 1992.

20. Kaiser MJ, Bauer JM, Ramsch C, et al. Frequency of malnutrition in older adults: a multinational perspective using the Mini Nutritional Assessment. *J Am Geriatr Soc*. 2010;58:1734-1738.
21. van Venrooij LM, van Leeuwen PA, Hopmans W, Borgmeijer-Hoelen MM, de Vos R, De Mol BA. Accuracy of quick and easy undernutrition screening tools—short nutritional assessment questionnaire, malnutrition universal screening tool and modified malnutrition universal screening tool—in patients undergoing cardiac surgery. *J Am Diet Assoc*. 2011;111:1924-1930.
22. American Dietetic Association Evidence Analysis Library. Does serum albumin correlate with weight loss in four models of prolonged protein-energy restriction: anorexia nervosa, non-malabsorptive gastric partitioning bariatric surgery, calorie-restricted diets or starvation. http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251263&highlight=albumin&home=1. Accessed January 2, 2012.
23. American Dietetic Association Evidence Analysis Library. Does serum prealbumin correlate with weight loss in four models of prolonged protein-energy restriction: anorexia nervosa, non-malabsorptive gastric partitioning bariatric surgery, calorie-restricted diets or starvation. http://www.adaevidencelibrary.com/conclusion.cfm?conclusion_statement_id=251313&highlight=prealbumin&home=1. Accessed January 2, 2012.
24. Skipper A, Ferguson M, Thompson K, Castellanos V, Porcari J. Nutrition screening tools: an analysis of the evidence. *JPEN J Parenter Enteral Nutr*. 2012;36:292-298.
25. U.S. Department of Health and Human Services, Center for Medicare & Medicaid Services. MS-DRG summary table: summary of the changes to the MS-DRGs for FY 2008. [www.cms.gov/Medicare/Acute Inpatient PPS](http://www.cms.gov/Medicare/Acute%20Inpatient%20PPS)
26. Bentley DV. Diagnosis coding confusion discussed at ICD-9-CM Coordination & Maintenance Meeting. Just Coding. March 29, 2011. www.justcoding.com. Accessed January 4, 2012.
27. Buck CJ. *International Classification of Disease, 9th Revision; Clinical Modification (ICD-9-CM), for Physicians*. Vols 1 and 2. Burlington, MA: Elsevier; 2011.
28. U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality. Statistics on hospital stays, 2009. <http://hcupnet.ahrq.gov/HCUPnet.jsp>. Accessed September 2011.
29. Soeters PB, Schols AMWJ. Advances in understanding and assessing malnutrition. *Curr Opin Clin Nutr Metab Care*. 2009;12:487-494.
30. Kondrup J. Can food intake in hospitals be improved? *Clin Nutr*. 2001;20(suppl 10):153-160.
31. Bankhead R, Boullata J, Brantley S, et al; A.S.P.E.N. Board of Directors. Enteral nutrition practice recommendations. *JPEN J Parenter Enteral Nutr*. 2009;33(2):122-167.
32. American Dietetic Association Evidence Analysis Library. Critical illness (CI) evidence-based nutrition practice guideline: critical illness nutrition practice recommendations. <http://www.adaevidencelibrary.com/topic.cfm?cat=3016>. Accessed July 12, 2010.
33. Blackburn GL, Bistrian BR, Maini BS, Schlamm HT, Smith MF. Nutritional and metabolic assessment of the hospitalized patient. *JPEN J Parenter Enteral Nutr*. 1977;1(1):11-22.
34. Klein S, Kinney J, Jeejeebhoy K, et al. Nutrition support in clinical practice: review of published data and recommendations for future research directions. National Institutes of Health, American Society for Parenteral and Enteral Nutrition, and American Society for Clinical Nutrition. *JPEN J Parenter Enteral Nutr*. 1997;21(3):133-156.
35. Rosenbaum K, Wang J, Pierson RN Jr, Kotler DP. Time-dependent variation in weight and body composition in healthy adults. *JPEN J Parenter Enteral Nutr*. 2000;24:52-55.
36. Keys A. Chronic undernutrition and starvation with notes on protein deficiency. *JAMA*. 1948;138(7):500-511.
37. Sacks GS, Dearman K, Replogle WH, Cora VL, Meeks M, Canada T. Use of subjective global assessment to identify nutrition-associated complications and death in long-term care facility residents. *J Am Coll Nutr*. 2000;19(5):570-577.
38. Soeters PB, Reijnen PLM, van Bokhorst-de van der Schueren MAE, et al. A rational approach to nutritional assessment. *Clin Nutr*. 2008;27:706-716.
39. Matos LC, Tavares MM, Amaral TF. Handgrip strength as a hospital admission nutritional risk screening method. *Eur J Clin Nutr*. 2007;61:1128-1135.
40. Windsor JA, Hill GA. Grip strength: a measure of the proportion of protein loss in surgical patients. *Br J Surg*. 2005;75:880-882.
41. Schlüssel MM, dos Anjos LA, de Vasconcellos MTL, Kac G. Reference values of handgrip dynamometry of healthy adults: A population-based study. *Clin Nutr*. 2008;27:601-607.
42. Norman K, Stobaus N, Gonzalez MC, Schulzke J-D, Pirlich M. Hand grip strength: outcome predictor and marker of nutritional status. *Clin Nutr*. 2011;30:135-142.
43. Jensen GL, Wheeler D. A new approach to defining and diagnosing malnutrition in adult critical illness. *Curr Opin Crit Care*. 2012 Feb 8. [Epub ahead of print]
44. Estimating height in bedridden adults. http://www.rxkinetics.com/height_estimate.html. Accessed January 11, 2012.
45. Guralnik JM, Simonsick EM, Ferrucci L, et al. A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. *J Gerontol Med Sci*. 1994;49(2):M85-M94.
46. Curb JD, Ceria-Ulep CD, Rodriguez BL, et al. Performance-based measures of physical function for high-function populations. *J Am Geriatr Soc*. 2006;54:737-742.
47. Hake-Smith N, Lewis NM. A standardized nutrition care process and language are essential components of a conceptual model to guide and document nutrition care and patient outcomes. *J Am Diet Assoc*. 2004;104:1878-1884.
48. Hake-Smith N, Lewis NM, Eskridge KM. Orientation to nutrition care process standards improves nutrition documentation by nutrition practitioners. *J Am Diet Assoc*. 2005;105:1533-1540.
49. Nutrition Care Process/Standardized Language Committee. Nutrition care process and model part I: the 2008 update. *J Am Diet Assoc*. 2008;108:1113-1117.
50. Nutrition Care Process/Standardized Language Committee. Nutrition care process part II: using the International Dietetics and Nutrition terminology to document the nutrition care process. *J Am Diet Assoc*. 2008;108:1287-1293.
51. Fry DE, Pine M, Jones BL, Meimban RJ. Patient characteristics and the occurrence of never events. *Arch Surg*. 2010;145:148-151.