Malnutrition Alert!
A Model to Reduce Iatrogenic Malnutrition

Management of Neurological Disorders for the Primary Care Provider
Portland, Oregon
November 12, 2015

Terese M Scollard MBA RDN LD FAND
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 health care costs.

The views expressed herein are those of the presenter and do not necessarily represent Providence Health and Services. The material herein is accurate as of the date it was presented, and is for educational purposes only and not intended as a substitute for medical or coding advice.

Presenter has no conflict of interest.
Learning Objectives

1. Describe the 2012 Academy/ASPEN international consensus and characteristics for adult disease related malnutrition and their application in acute and ambulatory care settings

2. Examine updates on the relationship of inflammation, serum albumin and relationship to adult disease-related malnutrition.

3. Demonstrate how interdisciplinary care is critical to identification, screening, documentation, treatment and avoidance of harmful consequences for adults with disease-related malnutrition
# Table 1. Malnutrition Prevalence in a Variety of Conditions

<table>
<thead>
<tr>
<th>Disease or Condition</th>
<th>Rate of Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreatic cancer</td>
<td>85%</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>13%-50%\textsuperscript{a}</td>
</tr>
<tr>
<td>Head and neck cancer</td>
<td>24%-88%\textsuperscript{a}</td>
</tr>
<tr>
<td>Gastrointestinal cancer</td>
<td>55%-80%\textsuperscript{a}</td>
</tr>
<tr>
<td>Cerebrovascular accident (stroke)\textsuperscript{12,13}</td>
<td>16%-49%\textsuperscript{a}</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease\textsuperscript{14}</td>
<td>25%</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Varies depending on specific population studied and advancement of disease.
Admitted, NG TF start x 4 days
DC w/o TF “eating well”
Met w OP RD, average 300cal/d
PEG gravity feed started

Chemo & Rad Onc completed 8/7

PEG recommended by OP RD

Initial wt end of ~June 214#, Oct (4 months later) 174 # ~18% weight loss 39 lbs
Shaking, weakness, no appetite, nausea
ED MD: “well developed, well nourished”
Onc MD changed assessment to malnourished
**FIGURE 4-2** Development of clinical nutritional deficiency with corresponding dietary, biochemical, and clinical evaluations.
Words that Describe Malnutrition

- Nutritional Anasarca
- Athrepsia
- Atrepsy
- Nutritional Atrophy
- Severe Calorie Deficiency
- Protein Deficiency
- Multiple Deficiency Syndrome
- Protein Deprivation
- Arrested Development due to Malnutrition
- Wasting Disease
- Nutritional Dwarfism
- Famine Edema
- Inanition Edema
- Starvation Edema
- Emaciation
- Nutritional Hydrops
- Hypoproteinosis
- Inanition with edema
- Inanition due to malnutrition
- Malnutrition degree, 1st, 2nd, 3rd, mild, moderate, severe
- Protein Calorie Malnutrition NEC
- Protein Calorie Severe NEC
- Protein Calorie due to specified underlying condition
- Pediatrophia
- Pluricarential syndrome of infancy
- Plurideficiency syndrome of infancy
- Polycarential syndrome of infancy
- Prekwashiorkor
- Growth retardation due to malnutrition
- Physical retardation due to malnutrition
- Kwashiorkor
- Marasmus
- Adult Kwashiorkor
- Hypoalbuminemic Malnutrition
- Hypoproteinemic malnutrition
- Combined Malnutrition
Etiology – based approach that incorporates understanding of the inflammatory response.

https://www.nutritioncare.org/Professional_Resources/Guidelines_and_Standards/Guidelines/2010__Adult_St arvation_and_Disease-Related_Malnutrition/
Disease-related Malnutrition

“...decline in lean body mass with the potential for functional impairment at multiple levels—ie, molecular, physiologic, and/or gross motor.”


“Historic definitions for malnutrition syndromes have promoted widespread confusion and misdiagnosis. They also do not encompass a modern understanding of the role of inflammatory response,”

Gordon Jensen, MD, PhD, Past-President A.S.P.E.N., Professor and Head, Department of Nutritional Sciences, the Penn State University  2010
Etiology Based Malnutrition Definitions

Nutritional Risk Identified
Compromised intake or loss of body mass.

Inflammation present? No / Yes

No

Yes

Mild to Moderate Degree

Starvation Related Malnutrition
(pure chronic starvation, anorexia nervosa)

Chronic Disease – Related Malnutrition
(organ failure, pancreatic cancer, rheumatoid arthritis, sarcopenic obesity)

Yes

Marked Inflammatory Response

Acute Disease or Injury-Related Malnutrition
(major infection, burns, trauma, closed head injury)

Jensen GL. JPEN 2009;33:710
Nutrition Risk Screening

• Determines at-risk patients

• In all settings of care, or targeted patient populations

• Multiple validated tools are available

• Many facilities have not updated to validated tools; (tools tested in EHR?)

• Compliance with Joint Commission and CMS admission screening to hospital

predict the probability of a better or worse outcome due to nutritional factors and whether nutritional treatment is likely to influence this. Outcome from treatment may be assessed in a number of ways: Improvement or at least prevention of deterioration in mental and physical function. Reduced number or severity of complications of disease or its treatment. Accelerated recovery from disease and shortened convalescence. Reduced consumption of resources, eg, LOS and other prescriptions.


Measuring nutritional risk in hospitals Henrik H Rasmussen,
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Starvation-Related Malnutrition in Adults

(Malnutrition of social or environmental circumstances)

http://www.epi.umn.edu/cvdepi/video.asp?id=4047
Hypothetical relationship – Starvation Related Malnutrition w & w/o Nutritional Support

SRM = Starvation Related Malnutrition; NS = Nutritional Support
PSRM = Partial Starvation Related Malnutrition

Figure 1. Hypothetical relationship of Starvation-related Malnutrition (top graph) and Disease-related Malnutrition (bottom graph) assuming the inflammatory condition is relatively constant with changes in lean body mass. Jensen G L et al. JPEN J Parenter Enteral Nutr 2010;34:156-159
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Chronic Disease-Related Malnutrition
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&

Acute Disease or Injury-Related Malnutrition
(major infection, burns, trauma, closed head injury)

• Immune changes, especially cellular immunity

• Muscle and organ changes-reduction in mass and function

• GI changes
  • Gut damaged by
    • Decrease in mesenteric blood flow-operations, procedures
    • Altered mucous
    • Altered acid and bile secretion
    • Altered gut motility
    • Damaged villi
    • Enzyme decrease
Figure 1. Hypothetical relationship of Starvation-related Malnutrition (top graph) and Disease-related Malnutrition (bottom graph) assuming the inflammatory condition is relatively constant with changes in lean body mass. Jensen G L et al. JPEN J Parenter Enteral Nutr 2010;34:156-159
Fright-Flight “Stress Response” “Autodestruction”

No adaptive responses activated
Increase Metabolic Rate 35–40 kcal/kg/d
Increase glucose production in excess of need
Increase use of protein for fuel (glucose)
Inefficient use of fat for energy

Energy Depot
Fat 30% used
Fatty acid 70% recycled

38°C Body heat

Gluconeogenesis
To tissues
Glucose
Micronutrients

Liver
Oxygen

To liver
Amino acids

To tissues
To wound

Alanine
Glutamine

Wound

Gluatmine Depletion
Antioxidant Depletion
Micronutrient Depletion

Lean Mass
Rapid Erosion (Catabolism) of Muscle Protein
Visceral protein for glucose production

Energy Production
Mainly from glucose and amino acid

Source: ePlasty © 2009 Open Science Co. LLC.
Inflammation

Promotes:
- Metabolic dysregulation
- Hyperglycemia
- Decreased visceral proteins
- Muscle catabolism
- Edema
- Anorexia
- Malaise / deconditioning

Can Blunt:
Favorable responses to nutrition intervention
Why not serum albumin/visceral proteins?

- Inflammatory disease / illness / injury elicit a cytokine-mediated acute phase response
  - Alters hormone secretion and target organ function
  - Favors a catabolic state that results in metabolic alterations
    - Over the short run the acute phase metabolic response with resulting catabolism is likely an appropriate adaptive response.
    - If the underlying stressor is severe, protracted or repeated, then adverse outcomes will result.

Inflammation can blunt favorable responses to nutrition intervention.

Nutrition alone is ineffective in preventing muscle loss in inflammation.

Gordon Jensen, MD, PhD
Complications relative to loss of lean body mass*

<table>
<thead>
<tr>
<th>Lean body mass (% loss of total)*</th>
<th>Complications (related to lost lean mass)</th>
<th>Associated, mortality, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Impaired immunity, increased infection</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>Decreased healing, weakness, infection, thinning of skin</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>Too weak to sit, pressure sores develop pneumonia, no healing</td>
<td>50</td>
</tr>
<tr>
<td>40</td>
<td>Death, usually from pneumonia</td>
<td>100</td>
</tr>
</tbody>
</table>

*Assuming no preexisting loss.

This table assumes no preexisting involuntary weight loss.\[17,18\] Someone with PEM will always have a preexisting loss, which needs to be added as part of total. One can assume that with any stress-induced PEM, LBM loss is about half of the involuntary weight loss. The relationship between LBM and wound healing is based on the manner of utilization of available protein for either the wound or maintaining the overall LBM compartment (Fig 3).
Muscle loss in Aging:
Protein and Exercise Needed

74 year old sedentary man

70 year old tri-athlete
Priority for Protein Intake vs % Loss of Lean Tissue

Figure 3.
Muscle Mass and Function in Malnutrition

• **Reduction in Muscle Mass**

• **Reduction in Muscle Function**
  - Muscle function is sensitive to reduction in nutritional intake even before any change in muscle mass occurs
  - Heart
  - Respiratory muscle
  - Hand grip strength

Stratton, Elia *Disease-Related Malnutrition: an Evidence-Based Approach to Treatment* p 116
Fig 2. Muscle loss in hospitalized elders. After 3 days of hospitalization, elderly inpatients lost approximately the same amount of lean leg muscle mass as healthy older subjects experienced in 10 days of inactivity—approximately three-fold greater loss of lean leg muscle mass than a younger cohort confined to bed for 28 days.$^{24}$

Rationale for Developing Academy/A.S.P.E.N Malnutrition Diagnoses/Markers

• No standardization
• Multiple Definitions
• Multiple Diagnostic (ICD-9) Codes
• Multiple characteristics used to diagnose
• Limited evidence base
• Emerging role of inflammation
  – Influence on Assessment Parameters
  – Influence on Response to Nutrition intervention
  – Anti-inflammatory Interventions / Nutrition interventions outcomes divergence
Consensus Statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition)

Jane V. White, PhD, RD, FADA; Peggi Guenter, PhD, RN; Gordon Jensen, MD, PhD, FASPEN; Ainsley Malone, MS, RD, CNSC; Marsha Schofield, MS, RD; the Academy Malnutrition Work Group; the A.S.P.E.N. Malnutrition Task Force; and the A.S.P.E.N. Board of Directors

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

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2212-2672/$36.00
doi: 10.1016/j.jand.2012.03.012
A Bridge to a Unified System

**Consensus Statement:**
Characteristics Recommended for the Identification and Documentation of Adult Malnutrition**

**Adult Malnutrition**
- Clinical presentation
- Will change
- Altered Metabolic Status
- Treatment specific to pre-disposing factors:
  - Starvation
  - Chronic disease
  - Acute disease or injury

**Tool to Bridge**
- Academy & ASPEN Consensus
- Reasonable & reliable literature and research-based criteria at this time
- Will change with further clinical understanding
- NOT the “be-all end-all’ criteria for adult malnutrition

**ICD Classification** *
- A system to categorize and communicate adult malnutrition
- Allows for benchmarking prevalence

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* 2012 ICD-9-CM Physician Volumes 1 and 2. American Medical Association
From Theory to Practice: Optimizing Recognition and Documentation of Adult Malnutrition. Academy of Nutrition and Dietetics 5/23/2012
ICD-9 Codes* – Two Levels of Severity:

262 - Other Severe Protein Calorie Malnutrition
263.0 – Malnutrition of a Moderate Degree

Three Typical Etiologies:

Acute Illness/Injury – severe acute inflammation
Chronic Illness – mild to moderate chronic inflammation
Social/Environmental Circumstances – without inflammation

Six Characteristics:

Weight Loss
Insufficient Energy Intake
Loss of Subcutaneous Fat
Loss of Muscle Mass
Localize or Generalized Fluid Accumulation
Diminished Functional Status - measured by hand grip strength

*2015 ICD-9-CM. American Medical Association
# Severe Malnutrition in Adults

For Example:
ICD-9 Code 262*

<table>
<thead>
<tr>
<th></th>
<th>Acute Illness/Injury</th>
<th>Chronic Illness</th>
<th>Social/Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Loss</td>
<td>&gt;2%/1 week&lt;br&gt; &gt;5%/1 month&lt;br&gt; &gt;7.5%/3 months</td>
<td>&gt;5%/1 month&lt;br&gt; &gt;7.5%/3 months&lt;br&gt; &gt;10%/6 months&lt;br&gt; &gt; 20%/1 year</td>
<td>&gt;5%/1 month&lt;br&gt; &gt;7.5%/3 months&lt;br&gt; &gt;10%/6 months&lt;br&gt; &gt; 20%/1 year</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>Severe</td>
</tr>
<tr>
<td>Hand Grip Strength</td>
<td>Not Recommended in ICU</td>
<td>Reduced for Age/Gender</td>
<td>Reduced for Age/Gender</td>
</tr>
</tbody>
</table>

* 2015 ICD-9-CM American Medical Association

From Theory to Practice: Optimizing Recognition and Documentation of Adult Malnutrition. Academy of Nutrition and Dietetics 5/23/2012
<table>
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<th><strong>Chronic Illness</strong></th>
<th><strong>Social/Environmental</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight Loss</strong></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></td>
<td>20%/1 year</td>
<td>20%/1 year</td>
</tr>
<tr>
<td><strong>Energy Intake</strong></td>
<td>&lt; 75% for &gt; 7 days</td>
<td>&lt; 75% for &gt; 1 month</td>
<td>&lt; 75% for &gt; 3 months</td>
</tr>
<tr>
<td><strong>Body Fat</strong></td>
<td>Mild Depletion</td>
<td>Mild Depletion</td>
<td>Mild Depletion</td>
</tr>
<tr>
<td><strong>Muscle Mass</strong></td>
<td>Mild Depletion</td>
<td>Mild Depletion</td>
<td>Mild Depletion</td>
</tr>
<tr>
<td><strong>Fluid Accumulation</strong></td>
<td>Mild</td>
<td>Mild</td>
<td>Mild</td>
</tr>
<tr>
<td><strong>Hand Grip Strength</strong></td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

* 2015 ICD-9-CM American Medical Association

*From Theory to Practice: Optimizing Recognition and Documentation of Adult Malnutrition. Academy of Nutrition and Dietetics 5/23/2012*
Review

Hand grip strength: Outcome predictor and marker of nutritional status

Kristina Norman a, *, Nicole Stobäus c, M. Cristina Gonzalez b, Jörg-Dieter Schulzke c, Matthias Pirlich a, d

a Department of Gastroenterology, Hepatology and Endocrinology, Charité – University Medicine Berlin, Berlin, Germany
b Post Graduation Program in Health and Behaviour – Catholic University of Pelotas, Pelotas, Brazil
c Department of General Medicine, Charité – University Medicine Berlin, Berlin, Germany
d Abteilung für Innere Medizin, Evangelische Elisabeth Klinik, Berlin, Germany

SUMMARY

Background & aims: Among all muscle function tests, measurement of hand grip strength has gained attention as a simple, non-invasive marker of muscle strength of upper extremities. This review outlines the prognostic relevance of grip strength in clinical use.

Handgrip Dynamometer

Functional Assessment

2 sd below the mean for age and sex

Other Dynamometers are available, Check Contracts with rehab services
**Documentation Advice**

No single piece of information means a patient is malnourished—use critical thinking and look at the whole situation, patient nutrition history, weight history, intake history, metabolism, etc.

Assessment of malnutrition occurs at this point in time, regardless of the prognosis.

Your documentation does not replace communications, questions and observations with other team members.

Clarify nutrition diagnosis and time ‘Prior To Hospitalization’ and ‘During Hospitalization’.

Patient may have more than one type of malnutrition in a sequence of events and over time. Document history of past types and connect to present condition.
Quality Documentation

- Describe objective evidence, time frame and details supporting malnutrition criteria and characteristics.

- “Well nourished, well developed” ??? use in malnourished patients confounds auditors.

- Subjective information is important: Describe with associations to under nutrition.

- Include terms “protein-calorie malnutrition” in notes and discharge plan.

- Quantify data
  - Time frames of deficits, actual weight change and percentages over time
  - Actual Intake percentages and estimates of intake compared to short term and long term targets (especially calories and protein)

- Include nutrition physical assessment descriptions such as muscle mass and fat stores

- Describe ongoing nutritional needs and nutrient targets to stabilize or improve nutritional status in the future. Handoff’s and care transitions critical.
Thank you!

Questions?