March 2013

Highlights from Clinical Nutrition Week 2013

• For healthcare, 2013 is a crossroads year. Will cost-containment strategists collide or collaborate with nutritionists (p 2)?
• With a new definition of malnutrition, its laboratory and clinical markers need to be redefined (p 3).
• A Canadian Malnutrition Task Force takes action against hospital malnutrition (p 4).
• What can we do to improve nutrition care for older people (p 6)?
• Get the latest information on nutrition practices for people with kidney disease or cancer (p 7).
• How should gastric residual volumes be used in practice today (p 8)?
• With a huge database of 44 million inpatients over 11 years, a newly published health economic report shows both health and financial benefits for use of oral nutritional supplements (p 9).
• Abbott Nutrition Night symposium highlights new findings in critical care nutrition (pp10-11).

Clinical Nutrition News is for healthcare professionals around the world. This newsletter reports new information in the areas of nutrition advocacy and education, clinical research and practice, and the basic science of nutrition, as discussed at nutrition meetings in Europe, Asia, and the Americas.

This issue of Clinical Nutrition News highlights forefront findings from Clinical Nutrition Week 2013 (CNW 2013), the premier scientific program of the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). CNW13 gathered more than 2,000 dietitians, pharmacists, physicians, and nutrition scientists from more than 50 countries. The A.S.P.E.N. meeting was held in Phoenix, Arizona, USA in February.

CNW13’s hot clinical topics included cost-containment and hospital nutrition practices; how to identify and treat disease-related malnutrition; and reasons to revisit malnutrition in geriatric populations.

Abbott Nutrition played a leading role at CNW 2013—as a meeting sponsor and in sponsored workshops and symposia. Special presentations addressed innovative learning techniques for malnutrition diagnosis, nutrition needs of people with renal disease or cancer, as well as nutritional considerations for people in hospital wards and in intensive care unit (ICU) settings.
Nutrition Awareness and Advocacy

Feast or famine: what is the future of nutrition care?

“We are at a crossroads for nutrition,” remarked Dr Tom Jaksic, A.S.P.E.N. President and Professor of Surgery at the Harvard Medical School (USA). Cost-constraints are driving healthcare reform faster than ever before—in the US and around the world. At the same time, population health is changing quickly. A baby born today has a 1 in 3 chance of celebrating 100 birthdays but also has a 1 in 3 chance of becoming overweight and experiencing health problems because of it. We are thus challenged to provide cost-effective healthcare for more people over a longer period of time, and we face the dual burdens of acute and chronic illnesses.

In his opening message at CNW13, Dr Jaksic advised, “We must be proactive to build a future for clinical nutrition. We need research data to guide evidence-based practices; we need to provide cost-effective care; and we need to advocate for our patients.”

Comprehensive US healthcare reform

In nearly every country of the world, healthcare spending is rising at a rate faster than the rate of national economic growth. Cost-containment is forefront in the US now, and cost-effective healthcare is likewise a current global issue. Dr John McDonough (USA), Professor of Public Health Practice at the Harvard School of Public Health, addressed CNW13 attendees on healthcare reform in the US. He opened, “My goal is to explain Obamacare, also known as the Affordable Care Act (ACA), in a way that will inform your work.”

The ACA will be funded by “give and take” processes. Some health reforms will cost more, but others will generate revenue. For example, hospitals with evidence of poor quality of care (i.e., high rates of preventable readmissions among people treated for conditions such as heart failure or pneumonia) can be financially penalized, while those with low rates can be rewarded. Further, rates of reimbursement to providers have been negotiated downward, but overall payments are not expected to decrease because of higher rates of coverage. Dr McDonough, a longtime advocate for patient health, concluded, “The ACA will make healthcare in the US more affordable and accessible for all people.”

- The delivery system. Extensive reforms aim to improve quality of care, increase efficiencies, lower costs, encourage innovation, and discourage fraud and abuse—especially in Medicaid programs for the poor and in Medicare programs for older people.
- Prevention, wellness, and public health. New initiatives aim to improve overall health from within the healthcare system, e.g., by mandatory coverage of prevention services such as mammography and colonoscopy.
- Health in all policies. Specific initiatives will advance public health from outside the health system, e.g., education and housing policies will prompt health improvements.

The ACA is called comprehensive because it addresses healthcare from many perspectives:

- Coverage and access. Participation in a government health plan or private insurance program is mandated for all individuals; those who do not comply will be required to pay penalties. Individuals with pre-existing health conditions cannot be denied coverage, nor can they be charged excessive premiums. Access cannot be limited by annual or lifetime “caps” on claims.
Is my patient malnourished?

Dr. Gordon Jensen (USA) began, “Inflammation and malnutrition are inter-connected.” Disease- or injury-related inflammation contributes to the development of malnutrition and often limits the effectiveness of nutrition interventions. On the other hand, the presence of malnutrition can blunt the effectiveness of medical therapies for disease or injury.

Dr. Jensen and other members of an A.S.P.E.N. and ESPEN (European Society for Clinical Nutrition and Metabolism) committee recently proposed three syndromes of malnutrition, which take into account the degree of inflammation present. These syndromes are: (1) starvation-related malnutrition, when there is chronic starvation without inflammation; (2) chronic disease-related malnutrition, when inflammation is chronic and mild-to-moderate; and (3) acute disease or injury-related malnutrition, when inflammation is acute and severe. Since recognition of malnutrition depends in part on recognizing inflammation, a next step forward was to determine how to identify and quantify inflammation. To this end, the recent differentiation between disease-related cachexia and age-related sarcopenia has helped draw attention to the need for targeted nutrition interventions.

In accord with the new definition for malnutrition, the team sought practical ways to diagnose malnutrition, especially its new inflammatory components. Diagnosis could be based on information collected in a medical/surgical history, clinical signs on physical examination, anthropometric data, laboratory indicators, dietary assessment, and functional outcomes. Certain chronic diseases—kidney disease, cancer, or rheumatoid arthritis—have inflammation as a disease component, thus increasing risk of malnutrition. Acute health crises—surgery, burn injury, or sepsis—have marked risk for inflammation and can lead to severe malnutrition. With laboratory findings, decreased albumin and prealbumin, or increased C-reactive protein (CRP), interleukin-6 (IL-6), and white blood cell (WBC) counts serve as biomarkers of inflammation, thus risk of malnutrition. On physical examination, malnutrition is suggested by loss of muscle and/or fat, and evidence of edema. In the medical patient’s history, malnutrition is suggested by recent weight loss and a decrease in usual food intake. In terms of functional outcomes, handgrip strength is newly recognized as a practical way to evaluate risk of malnutrition associated with muscle loss.

To formalize a practical definition of malnutrition, experts from A.S.P.E.N. and the Academy of Nutrition and Dietetics (AND) defined six specific criteria of malnutrition; they determined that positive evidence of at least two of these criteria establishes a malnutrition diagnosis. Criteria are: (1) reduced intake of food or calories; (2) unintended weight loss; (3) loss of muscle; (4) loss of subcutaneous fat; (5) evidence of fluid accumulation; and (6) diminished handgrip strength. A.S.P.E.N. and AND representatives also helped establish coding for malnutrition. ICD-9/ICD-10 malnutrition codes for mild-to-moderate and severe malnutrition are 263 and 262, respectively.

Dr. Jensen concluded, “Our long-term goal is to tie diagnosis and coding of malnutrition to reimbursement.”

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**Nutrition Education**

**Is my patient malnourished?**

<table>
<thead>
<tr>
<th>Practical indicator</th>
<th>How/when to measure</th>
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<tbody>
<tr>
<td>Presence of disease with chronic or acute inflammation</td>
<td>Medical history on admission</td>
</tr>
<tr>
<td>Food intake and body weight compared to usual</td>
<td>Medical history of appetite decline or weight loss</td>
</tr>
<tr>
<td>Loss of muscle and/or fat; edema</td>
<td>Physical examination</td>
</tr>
<tr>
<td>Laboratory tests for biomarkers of inflammation</td>
<td>Laboratory tests for serum albumin or prealbumin; CRP; IL-6; WBC count</td>
</tr>
<tr>
<td>Decreased function</td>
<td>Handgrip strength</td>
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</table>

**An etiology-based definition of malnutrition**

- **Inflammation present?**
  - **No**
    - Starvation-related malnutrition
e.g. chronic starvation, anorexia nervosa
  - **Yes**
    - **mild-moderate**
      - Chronic disease-related malnutrition
e.g. cancer, rheumatoid arthritis, sarcopenic obesity
    - **severe**
      - Acute disease-related malnutrition
e.g. sepsis, burn, trauma
Nutrition Awareness and Advocacy

Canadians address malnutrition in healthcare

Recognizing malnutrition as a common and costly problem in healthcare facilities, Canadian health leaders took a close look at nutrition care in Canada. To do so, they named a results-oriented Canadian Malnutrition Task Force (CMTF). Dr Heather Keller (Canada), Dietitian and Task Force spokesperson, reported, “Our primary goal is to achieve optimal nutrition for all Canadians across the continuum of care using established clinical care processes.”

The four-pronged approach of the CMTF is to:

- Aggregate data on current rates of malnutrition in Canadian healthcare centers.
- Use hospital-based research to create knowledge about best-nutrition practices.
- Develop best-practices in nutrition care—involving key stakeholders, influencers, and decision makers in the process.
- Share research knowledge to promote a culture change in nutrition care.

At CNW 2013, Dr Keller reviewed early findings on the pan-Canadian prevalence of malnutrition among patients (n=722) at 13 hospitals in 8 provinces (CMTF, unpublished data). Common primary admitting diagnoses were cardiovascular disease, gastrointestinal problems, infection, and cancer. The researchers found that 42% of screened patients were malnourished on admission to the hospital, a proportion consistent with the 20% to 50% range reported elsewhere in the world.7

Of the patients who were malnourished, 3 out of 4 had disease- or injury-related malnutrition syndrome (Subjective Global Assessment [SGA] levels B or C and C-reactive protein [CRP] ≥ 10 mg/mL); others had starvation-related malnutrition syndrome (SGA B or C and CRP < 10 mg/mL). Weight loss and lack of appetite flagged malnutrition risk; 40% of patients reported eating less than 50% of usual food and losing ≥ 5% of weight prior to admission. During hospitalization, CRP levels dropped, suggesting lessening of inflammation. However, measures of nutritional status tended to deteriorate, e.g., weight, mid-arm circumference, and calf circumference. Clearly, more attention to nutrition care during hospitalization is needed to reverse these harmful trends.

Not surprisingly, malnutrition in the CMTF survey population predicted poor patient outcomes. One of every 5 malnourished patients was readmitted to a hospital within 30 days, and malnourished individuals were 7-times more likely to die within 30 days of hospitalization than were their well-nourished counterparts.

There is much room for improvement of nutrition care in Canada, as everywhere in the world. The Canadian Task Force is taking great strides toward increasing nutrition awareness and developing information and education programs on best-practice hospital nutrition. Nutrition matters, and Canada’s Task Force is taking the lead to make this clear.

CMTF criteria for malnutrition syndromes

Disease- or injury-related malnutrition
- SGA level B or C
- CRP ≥ 10 mg/mL

Starvation-related malnutrition
- SGA level B or C
- CRP < 10 mg/mL

In a 2012 study of malnutrition in Canadian hospitals, researchers found that 42% of patients were malnourished on admission.
Clinical practice guidelines updated

“In the past 3 years, 75 new clinical trials have been published on nutrition for critically ill patients,” reported Rupinder Dhaliwal, RD (Canada). With each major literature review, Canada’s well-known Critical Care Nutrition (CCN) group updates their evidence-based guidelines. According to Ms Dhaliwal, the latest evidence provides stronger-than-ever statistical signals for many earlier recommendations. In addition, she noted new evidence, which supports practice change (see complete CCN guidelines at www.criticalcarenutrition.com).

For critically ill patients, two key messages are stronger than ever, feed enterally, and feed early. Early combination treatment with PN and EN is not recommended, and later use of combination nutrition should be considered on a case-by-case basis. There is new evidence to suggest that probiotics should be considered in critically ill patients.

Highlighted revisions from the 2012 Canadian Clinical Practice Guidelines

<table>
<thead>
<tr>
<th>Topic</th>
<th>RCTs</th>
<th>2012 Recommendation</th>
<th>Change since 2009</th>
</tr>
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<tbody>
<tr>
<td>Enteral nutrition (EN) vs parenteral nutrition (PN)</td>
<td>14</td>
<td>When considering nutrition support for critically ill patients, we strongly recommend the use of enteral nutrition over parenteral nutrition.</td>
<td>Stronger signal</td>
</tr>
<tr>
<td>Early vs delayed nutrient intake</td>
<td>16</td>
<td>We recommend early enteral nutrition (within 24-48 hours following admission to the ICU) in critically ill patients.</td>
<td>Stronger signal</td>
</tr>
<tr>
<td>Probiotics</td>
<td>23</td>
<td>The use of probiotics should be considered in critically ill patients.</td>
<td>New signal</td>
</tr>
<tr>
<td>Combination PN and EN</td>
<td>8</td>
<td>For critically ill patients starting EN, we recommend that PN not be started at the same time. In a patient who is not tolerating adequate EN, there are insufficient data to recommend when PN should be started. Practitioners will have to weigh the safety and benefits of initiating PN in patients not tolerating EN on a case-by-case basis. We recommend that PN not be started in critically ill patients until all strategies to maximize EN delivery (small bowel feeding tubes, motility agents) have been tried.</td>
<td>Stronger signal against both at startup</td>
</tr>
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</table>
Revisiting malnutrition in older adults

The Dudrick Research Award, named in honor of nutrition pioneer Dr Stanley Dudrick, is given to a researcher who shows exceptional productivity and promise. The 2012 recipient, Dr Rose Ann DiMaria-Ghalili (USA) organized this year’s symposium to highlight the widespread problem of geriatric malnutrition. Geriatric malnutrition was reviewed from social, medical, and functional perspectives.

**Social.** Dr Nadine Sahyoun (USA) began, “Patients are now leaving the hospital earlier to recover at home. In 1970, the average hospital length of stay was 13 days; in 2006 it was just 4.6 days.” On discharge, older people remain vulnerable to complications, especially if they are malnourished or at risk of malnutrition; the proof is in readmission rates. Of the 11 million Medicare beneficiaries (older people in the US) who were discharged from a hospital, almost one fifth were readmitted within 30 days—at a yearly cost of $17 billion.

Dr Sahyoun advised, “We know that nutrition contributes to recovery and rehabilitation of patients after hospitalization.” A major reason that older people do not fully recover after hospitalization is that they do not eat enough. Results of studies by Sahyoun and colleagues show that enrollment in government-run meal delivery programs in the community often falls short of need due to insufficient attention to nutrition in post-discharge planning, low rates of referral to food programs, and poor coordination and communication between hospital and community services.\(^\text{10}^\text{,} \text{11}\) It will be necessary to fill these gaps in order to improve post-discharge nutrition care for older people.

**Medical.** Dr Rose Ann DiMaria-Ghalili reviewed changes in the nutritional status of older adults hospitalized for cardiac surgery, and she discussed how these changes impact outcomes.\(^\text{12}^\text{,} \text{13}\) Older people who undergo coronary artery bypass grafting surgery are prone to post-operative weight loss, and most never return to their pre-operative weight. Notably, those who lose the greatest amount of weight have significantly higher risk for hospital readmission (within 30 days),\(^\text{13}\) and weight loss is associated with lowered ability to perform activities of daily living. Dr DiMaria-Ghalili’s newest study results show that inflammation, as marked by sustained high CRP and rising IL-6 levels, appears to drive weight loss and functional decline in older people.

**Inflammation drives weight loss and functional decline in older people recovering from surgical procedures.**

**Functional.** Why do we lose functionality as we age? Dr William Evans (USA) summarized results of his vanguard studies on the pathophysiology of functional decline. He introduced ‘usual gait speed’ as a reliable marker of functionality, and reported that low gait speeds predict risk for rehospitalization and death.\(^\text{14}\) In research studies, Dr Evans and colleagues determined that maximal oxygen consumption (VO\(_{2}\)\text{max}) during exercise was strongly associated with usual gait speed, suggesting that as aerobic capacity declines with age, the exertion associated with usual gait speed increases.\(^\text{15}\) A slowing of walking speed appears to be a response to increased perception of exertion. Individuals who walk slowest are near the maximum of their aerobic capacity—like the marathon runner at the end of the race.

**In terms of aerobic capacity, 10 days of bedrest for an older person is equivalent to 15 years of aging.**

**We must seek ways to prevent this dramatic loss of functionality during hospitalization.**

How does this observation relate to hospitalization in older people? For most, hospitalization means extended periods of bedrest, in turn causing muscle deconditioning and loss. In fact, Evans’ research team found that 10 days of bedrest led to substantial muscle loss—even in healthy older adults.\(^\text{16}\) In addition, 10 days of bedrest resulted in a 15% decline in VO\(_{2}\)\text{max}. By comparison, normal aging is associated with about a 1% decline in VO\(_{2}\)\text{max} each year. In terms of aerobic capacity, 10 days of bedrest for an older person is equivalent to 15 years of aging.

Dr Evans noted, “It’s not surprising when an older person walks into a hospital, but may not be able to walk out when discharged.” We must seek ways to prevent this dramatic loss of functionality during hospitalization.
Nutrition for a kidney patient on dialysis

Dr Refaat Hegazi (USA), Medical Director of Adult Nutrition Research and Development at Abbott Nutrition, used a case study to make his discussion of nutrition and kidney disease come alive.

**Question:** Why do kidney dialysis patients experience anorexia and weight loss?

**Case example:** A 58-year-old man has type 2 diabetes and stage 5 kidney failure; he requires hemodialysis three-times weekly. Laboratory findings showed that his albumin level fell to 3.5 g/dL last month, and the latest determination showed further decrease to 3.4 g/dL. Similarly, his prealbumin level decreased from 15 mg/dL to 12 mg/dL over the same interval. His serum bicarbonate level was low, 15 mEq/L. The patient reports poor appetite saying, “I rarely eat more than two small meals each day.” He has lost 5 kg in the last month.

**Answer:** The patient is experiencing metabolic acidosis and protein-energy wasting. As kidney function declines, urea and other waste products are retained in the blood rather than being excreted in the urine. Metabolic acidosis builds, blood pH is lowered, and plasma bicarbonate levels are reduced. Metabolic acidosis, even when mild, has consequences, including increased degradation of muscle protein (muscle wasting), reduced albumin synthesis (hypoalbuminemia), and anorexia. The dialysis procedure itself also contributes to metabolic problems. Dialysis removes amino acids from the blood, and dialysis procedures can activate inflammatory cytokines. As the amino acid pool is depleted, muscle is broken down to replete amino acids in the pool.

**Intervention:** The patient needs to be treated for metabolic acidosis and also needs nutrition intervention; oral nutritional supplements (ONS) are recommended. The patient will benefit from a high-protein, low phosphorus formulation specifically designed for people with advanced kidney disease and on dialysis. Clinicians in many countries have adopted a new treatment strategy of giving ONS with each in-center dialysis session, along with daily at-home ONS to reduce protein and calorie deficits.

For many years, clinicians have known that ONS can improve nutritional markers in dialysis patients. A new study by Lacson and colleagues showed that drinking ONS during in-center dialysis is associated with better survival. Remarkably, this research team found, per protocol analysis, that hemodialysis patients had a 34% reduced risk for one-year mortality when they consumed ONS for one year during dialysis visits.

Improving nutrition care for oncology patients

In a session on cancer nutrition, Valaree Williams (USA), Clinical Dietitian Specialist, noted, “Quality of life is an important factor for patients, and nutrition plays a large part.” She emphasized the need for routine nutrition screening and rescreening of cancer patients, especially in outpatient clinics where such screening is not mandated as it is in US hospitals.

**Drinking oral nutritional supplements (ONS) during in-center dialysis is associated with better survival. Remarkably, ONS use reduced one-year mortality by 34%.”**

Because poor nutritional status decreases a cancer patient’s ability to tolerate treatment and lowers chances of survival, it is important to recognize and treat malnutrition. Many patients with tumors experience progressively worsening cachexia and loss of physical function; malnutrition is particularly severe among head and neck cancer patients due to the tumor location and the treatments used.

Dietitian Mary Marian (USA) advised session attendees to intervene with early and ongoing nutrition therapy to prevent or delay progression of cachexia. Ms. Marian and others discussed practical strategies to achieve energy and protein goals in cancer patients:

- Use nutritional protocols to drive best-practice feeding decisions.
- Use anti-emetic medications to manage nausea.
- Minimize feeding-related discomforts by using medications for diarrhea or constipation.
- Consider early placement of a percutaneous endoscopic gastrostomy (PEG) tube for therapeutic feeding.
- For oral nutritional supplements or enteral nutrition, consider energy-dense formulas with anti-inflammatory ingredients (e.g., omega-3 fish oil).
News you can use: gastric residual volumes

Dr Martina Cartwright (USA), Abbott’s Meet-the-Expert presenter, asked the question, “Why do critically ill patients develop changes in gastric motility?” There are many reasons, e.g., the nature of the underlying critical illness, use of sedatives or vasopressors, and decreased blood flow due to shock. Gastric dysmotility was long thought to result in delayed gastric emptying, which put the patient at risk of vomiting, aspiration, and ventilator-associated pneumonia (VAP). Traditional practice was to monitor gastric residual volumes (GRV) regularly, and to “hold” enteral feeding when the volume exceeded certain limits. Experts presumed that limiting GRV would lessen risk of vomiting and VAP, so elevated GRV became a common reason to “hold” feeding.

However, many patients did not meet nutritional targets because of feeding “holds”. Based on growing evidence of feeding shortfalls, the so-called GRV threshold was cautiously increased upward from 150 mL. McClave and colleagues found that GRV thresholds up to 400 mL did not lead to greater regurgitation or aspiration, and Montejo et al found no difference in VAP when the threshold was increased to 500 mL.

According to the 2012 Canadian guidelines for critical care nutrition, data are insufficient to make a specific recommendation for GRV threshold. However, they advised a GRV threshold of either 250 or 500 mL (or somewhere in between) as a strategy to optimize delivery of enteral nutrition for critically ill patients.

Then came a 2013 surprise. Dr Cartwright noted that experts have newly questioned whether GRV is clinically meaningful at all. Regnier and colleagues conducted a study of patients in French ICUs (n=452). Among adults requiring mechanical ventilation and receiving early enteral nutrition, ‘absence of GRV monitoring’ was not inferior to ‘routine GRV monitoring’ in terms of risk for VAP. The research team thus concluded: GRV monitoring leads to unnecessary interruptions of enteral nutrition delivery with subsequent inadequate feeding, and this practice should be removed from the standard care of critically ill patients on mechanical ventilation and early enteral nutrition.

Highlighted posters

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Key findings</th>
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<tbody>
<tr>
<td>D Heyland et al. (Canada)</td>
<td>The inter-rater reliability and intra-rater reliability of bedside ultrasounds of the femoral muscle thickness</td>
<td>Patients in ICU commonly experience skeletal muscle weakness. Evidence suggests that muscle mass and muscle function may predict morbidity and length of ICU stay. Ultrasounds are a non-invasive and simple method to measure muscle thickness at the bedside. Study findings showed excellent inter- and intra-rater reliability for measurements of thickness of the femoral muscle in healthy volunteers.</td>
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<td>V Rodrigues et al. (Brazil)</td>
<td>Correlation between patient-generated subjective global assessment and prealbumin in gastric cancer patients</td>
<td>Malnutrition is very common in patients with cancers of the gastrointestinal tract. As a way to assess pre-operative nutritional status of these patients, the researchers used the patient-generated subjective global assessment (PG-SGA). Comparing patients who were moderately malnourished to those who were well nourished, malnourished patients had significantly lower mean prealbumin levels. There was a significant negative correlation between prealbumin and PG-SGA scores, i.e., lower prealbumin level correlated with worsening malnutrition.</td>
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<tr>
<td>K Mogensen (USA)</td>
<td>The association between malnutrition and mortality in critical illness</td>
<td>In a large prospective cohort study (n=7,676 patients age ≥ 18 years), researchers identified a strong association between malnutrition (identified by ICD-9 codes in patient records) and 30-day mortality (based on follow-up using US Social Security death records). Patients with mild/moderate/severe protein-calorie malnutrition were more than twice as likely to die (OR=2.08) than well-nourished patients.</td>
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Dragged kicking and screaming into the evidence-based era

After a 20-year movement toward evidence-based medical practice, the concept has reached nutrition too. Dr Dennis Bier (USA), Editor-in-Chief of the *American Journal of Clinical Nutrition*, began his 2013 A.S.P.E.N. Rhoads lecture with Mark Twain’s common-sense advice about information-gathering, “Supposing is good; finding out is better.”

He introduced an updated hierarchy of trial quality by design and conduct. From good to bad, Dr Bier listed: (1) meta-analysis of multiple trials with original data; (2) confirmed randomized, controlled trial (RCT) including meta-analysis; (3) simple RCT; (4) case series with a historical control group; (5) observational study; (6) opinions of respected authorities.

As a move toward defining ethics for clinical nutrition research, Dr Bier called for pre-defining primary and secondary endpoints for a trial, and registration of trials to ensure that researchers follow their endpoint definitions. While protocol fidelity seems an obvious standard, Dr Bier cited a recent study of research reports published in 5 journals over 6-months time. Results showed that primary endpoints were changed 37% of the time, and secondary endpoints were changed 70% of the time.

Dr Bier proposed new guidelines for publication that would require registration of all clinical trials, including pre-trial declaration of endpoints. He recommended official ways to make protocol or endpoint changes. For publication of findings, Dr Bier favors a requirement for adherence to these guidelines, as well as agreement to make data available for independent analysis.

“Supposing is good, but finding out is better.”

Words of Mark Train, as quoted by Dr Dennis Bier to emphasize the importance of well-designed, well-conducted clinical research studies to guide nutrition practice.

Health economics study shows value in nutrition intervention

While clinical researchers conduct RCTs and meta-analyses to determine whether a given intervention can improve health outcomes, health economists use real-world databases to determine whether the intervention is practical beyond the trial setting. In a recent health economics study, the results ring loud and clear—use of oral nutritional supplements during hospitalization reduces length of stay, episode cost, and 30-day readmission rate. Dr Kelly Tappenden, Editor-in-Chief of A.S.P.E.N.’s research journal *Journal of Parenteral and Enteral Nutrition*, called attention to the just-published study that reports these findings.

Led by Dr Tomas Philipson (USA), a team of health economists used a database covering 11-years (2000-2010) and 44 million adult inpatient episodes to look at the impact of oral nutritional supplements (ONS). Results showed that 1.6% of 44 million adult inpatient episodes involved ONS use. Compared to a matched sample of 1.2 million episodes, ONS patients had a shorter length of stay by 2.3 days (from 10.9 to 8.6 days) and a 21.6% lower episode cost (from $21,950 to $17,216). Considering the 862,960 episodes that involved hospital readmission, use of ONS reduced the probability of readmission (within 30 days) from 34.3% to 32.0%.

Results from a newly published health economics study showed that use of oral nutritional supplements during hospitalization reduced length of stay by more than 2 days, episode cost by nearly $5000, and 30-day readmission rate by 2.3 percentage points.
The Abbott Nutrition Night symposium this year provided new insights on nutrition in ICU care. Keynote speakers were Dr Daren Heyland (Canada), Dr Paul Marik (USA), and Dr Paul Wischmeyer (USA).

### Limiting and treating ICU-acquired weakness

Critical illnesses, such as acute respiratory distress syndrome (ARDS) and sepsis, have unpleasant legacies that may last as long as 5 years—exercise limitations and decreased physical quality of life. These conditions have been called ICU-acquired weakness, and they lead to prolonged mechanical ventilation and longer ICU stays. According to Dr Heyland, such outcomes originate in part from a “calorie debt” that develops in the ICU, particularly when the debt includes inadequate intake of protein. A person’s lean body mass, mostly skeletal muscle, is a key determinant of outcome following critical illness. Aging and bedrest contribute to decreased protein synthesis, while inflammatory cytokines released during illness or injury contribute to increased protein breakdown. Together, these conditions erode lean body mass (LBM) and result in weakness and impaired health-related quality of life. Dr Heyland and his team conducted studies that showed calorie deficit is associated with increased risk for 60-day mortality, which can be offset when the patient is fed at least 85% of target calorie-protein needs.

Optimizing nutritional intake is associated with improved function. However, when Dr Heyland’s research team conducted international surveys of ICU practices around the world, they found that 80% of patients failed to meet target energy intake during their ICU stay (unpublished results). Further, he advised that a combination of optimal nutrition and physical activity will result in the greatest preservation of LBM.

In conclusion, Dr Heyland advised ICU clinicians to “take action to reduce iatrogenic underfeeding in your ICU.” He and his Canadian colleagues advise strategies for increasing intake, which they have compiled as a protocol called PEP uP (Enhanced Protein-Energy Provision via the Enteral Route in Critically Ill Patients).
Enteral nutrition: getting it right in the ICU

Dr Paul Marik (USA) listed common “myths” that limit effective EN feeding in the ICU, and he discussed why and how clinicians need to overcome these barriers.

Starvation of ICU patients is not okay. As previously emphasized by Dr Heyland, intentional underfeeding leads to ICU-acquired weakness, prolonged mechanical ventilation, and longer ICU stays, as well as increased risk of mortality. Practice is changing for patients who are on vasopressors. EN is now considered safe for patients on vasopressors, unless the doses are escalating. In fact, ICU patients who are the sickest appear to be most likely to benefit from EN.33 EN is now considered the standard of care for patients with pancreatitis. Meta-analysis of results from 10 clinical trials support use of EN for patients with pancreatitis, despite older guidelines to “rest the pancreas.”34 Similarly, ordering “nil per os” (NPO) is more likely to lead to harmful caloric deficit than to provide benefit as bowel rest. High GRV and absence of bowel sounds are no longer considered reasons to “hold” EN. Both of these so-called indicators of intolerance have been challenged in the recent medical literature.23, 35 Further, EN is beneficial for patients on mechanical ventilation; immune modulating formulas supplemented with ingredients such as anti-inflammatory fatty acids, antioxidants, or arginine are beneficial to many critically ill patients.35 And EN is not contraindicated in patients with open abdomen; in fact, early EN was associated with (1) earlier primary abdominal closure, (2) lower fistula rate, (3) lower hospital charges.36

What do trials tell us about fish oil for ICU nutrition?

Dr Paul Wischmeyer (USA) reviewed results of studies on providing enteral fish oil for patients with acute lung injury (ALI). Fish oil, which contains very long-chain omega-3 fatty acids, has been shown to blunt inflammation and lessen complications in certain ICU patients when given as a component of enteral nutrition therapy.37-39 However, in a recent clinical trial by Rice et al using fish oil pharmaconutrition in patients with ALI, results failed to show benefit and even suggested possible harm.40 The trial by Rice et al used “bolus” delivery of pharmaconutrients, which may somehow lessen the ability of pharmaconutrients to blunt the inflammatory response. In prior trials with positive results, the pharmaconutrients were administered continuously as part of a complete enteral nutrition supplement.37, 38

Dr Wischmeyer concluded, “Studies of bolus fish oil delivery do not provide clear guidance to practice; the clearest guidance is to use enteral feeding of a nutritionally complete formula including fish oil in combination with borage oil and antioxidants.”37, 38

**MYTHS and MISCONCEPTIONS about enteral nutrition (EN) in the ICU**

1. Starvation is okay.
2. EN is contraindicated with vasopressors.
3. EN is contraindicated in patients with pancreatitis.
4. Keep patients NPO to “rest the bowel.”
5. EN is contraindicated in patients without bowel sounds.
6. EN is contraindicated when GRV is high.
7. EN is contraindicated with mechanical ventilation.
8. EN is contraindicated in patients with an open abdomen.
References


