Call for Abstracts

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1. Key Dates and Submission Site for the CNW15 Abstract Program

Original, International, Encore Abstracts – Submission: Opens July 10/Closes Sept 9, 2014, 11:59 p.m. ET; $50 submission fee; notified of acceptance by approximately Oct 31.
Late-breaking Abstracts – Submission: Opens Sept 15/Closes Oct 10, 2014, 11:59 p.m. ET; $100 submission fee; notified of acceptance by approximately Nov 15.
If an abstract is not accepted, the cost of submission will be refunded.

To submit an abstract, please visit the Abstract Submission Site or type the URL http://cnw2015.abstractcentral.com/abstract into your browser and follow the instructions provided. For questions on abstract submission, contact Carol Woodside, Research Coordinator at carolw@nutritioncare.org.

2. Abstract Submission Options

Original Abstracts - *unpublished basic or clinical research and data, practice abstracts, or case studies.* Research methodology may range from prospective, randomized trials and systematic reviews to quality improvement projects and unique case reports. Depending on review score, these abstracts may be presented in poster exchanges, oral paper sessions, or the Research Workshop and are eligible for Original Abstract Research Awards: Henry M. Vars and Promising Investigator, Research Trainee, International Abstract, Research Workshop Travel, and Abstracts of Distinction (see Abstract Research Awards section below).

Encore Abstracts - *abstracts previously presented at other meetings or previously published in a peer-reviewed journal.* These abstracts will be presented as posters and are not eligible for Original Abstract Research Awards.

Late-breaking Abstracts - *cutting-edge, original research.* Encore abstracts cannot be submitted as late-breaking abstracts. These abstracts are submitted each year after the regular abstract submission site has closed. These abstracts will be presented as posters and are not eligible for Original Abstract Research Awards, except for International Awards or Abstracts of Distinction.

International Abstracts - *Original or Late-breaking Abstracts submitted by an investigator residing in a country other than the United States will be recognized as an International Poster Presenter* once an abstract has been accepted. Original International Abstracts are eligible for Original Abstract Research Awards, including the International Abstract Research Awards. Submitters must opt-in at the time of online abstract submission to be recognized as an International Poster Presenter or to be considered for an award.

3. Abstract Topics

During the online abstract submission process, you will be asked to categorize your abstract according to A.S.P.E.N.'s six primary abstract topic areas to ensure that your abstract is reviewed appropriately. Please review **Table 1** below that summarizes these six groups of research in nutrition therapy and metabolism that A.S.P.E.N. typically accepts. You will need to select at least one, but no more than three topic areas that are most relevant to your abstract**.** The list is not all inclusive; you should select the best fit for your abstract.

Table 1. Abstract Topic Areas

Group # 1 Parenteral Nutrition Therapy	access devices acid-base chronic / degenerative disease and PN compatibility complications diabetes – glucose control disease or condition specific PN drug–nutrient interaction fluid - electrolyte funding & reimbursement	home / alternate site indications lipid formulations macro & micronutrients monitoring nutrition support teams (related to PN) quality control & improvement (related to PN) safety shortages & alternative products stability
Group # 2 Enteral Nutrition Therapy	access devices chronic / degenerative disease and EN complications diabetes – glucose control disease or condition specific EN drug- nutrient interactions formulas funding & reimbursement	home and alternate site indications macro & micronutrients monitoring nutrition support teams (related to EN) quality control & improvement (related to EN) reimbursement safety
Group # 3 Malnutrition, obesity, nutrition practice concepts and issues	bariatrics bariatric surgery and complications body composition complementary & alternative medicine chronic diseases and nutrition related to malnutrition education ethics evidence-based practice exercise physiology guidelines	malnutrition malnutrition coding metabolic syndrome nutrition and taste obesity payers and malnutrition nutrition assessment nutrition support teams related to malnutrition or obesity quality control & improvement related to malnutrition or obesity-bariatric
Group # 4 Critical care and critical health issues	burns cancer cardiac critical care immunodeficiency and immunonutrition infection inflammation intestinal failure perioperative concerns (glucose control, CHO loading)	pharmaconutrition (related to critical care and critical health issues) pulmonary sepsis trauma wounds surgery transplant
Group # 5 GI and other nutrition and metabolic–related topics	allergy basic nutrient research biotics cholestasis chronic & degenerative disease endocrine gastroenterology geriatrics gut microbiota hepatic and pancreatic disease and conditions insufficiency	IBD metabolic pathways metabolomics nutrigenomics neurological disorders osteoporosis pharmacokinetics pharmaconutrition pancreatic insufficiency (cystic fibrosis) renal short bowel
Group # 6 Pediatric / Neonatal / Pregnancy / Lactation	ketogenic diet NEC neonatal neonatal bone NICU & PICU	pediatric malnutrition pediatric short bowel PNALD pregnancy & lactation

4. Abstract Methodology Types

You will need to select the single methodology category that most closely represents your abstract.

Research Methodology	Examples
Basic Science	"Bench research" *In vitro* studies or animal research
Clinical Science	Observational or interventional clinical trials, case-controlled or case studies, registry driven analyses, qualitative studies
Education, Quality Control & Improvement	Education or quality improvement programs, non-scientific surveys, programmatic communication
Meta-analyses, Systematic Review	Meta-analysis or Systematic Review of other studies

Sample Abstracts - All CNW abstracts must present qualitative or quantitative data that are directly relevant to the topic of the abstract. Abstracts describing only methodologies, concepts, or other topics will not be accepted without accompanying data or results. Case studies are exempt from the requirement for extensive data but must be unique, providing learning points or unusual clinical presentations. Please see Appendix A or click directly on the hyperlinks below for examples of several types of previously accepted abstracts.

- randomized trial
- systematic review
- quality improvement project
- case study
- basic science

Research Agenda - In November 2013, A.S.P.E.N's Research Agenda was published. This document (Appendix B) will familiarize abstract authors with investigative priorities established by our Society. Authors are encouraged to be aware of and, when possible, submit abstracts reflecting these core research areas. Please note that this is not a requirement, but rather a statement of A.S.P.E.N.'s priority research interests.

5. Disclosure Information and Off-label Discussion

Disclosure information is required for all authors at the time of submission of the abstract. If any of the abstract authors have financial relationships with a commercial interest (a company selling or distributing products or services that are relevant to the topic of the abstract), the following needs to be submitted for EACH author:

- *Company* name (commercial interest)
- *What was received* (i.e. honorarium, financial support/grant or research funding/equipment or supplies, fee for service)
- *Role played* (such as speaker bureau, employee, consultant, PI on a supported grant, or other financially beneficial relationship)

Providing accurate disclosure information is mandatory and failure to do so will result in an inability to participate in the Clinical Nutrition Week conference programming in any capacity.

If the abstract discusses off-label uses (product applications that are not approved by the U.S. FDA) of licensed pharmaceutical or medical device products, the authors will need to identify the product and the nature of off-label use.

6. Presentation Type

You must choose one of the following options as your presentation preference:

- oral presentation
- poster presentation
- either oral or poster

The Abstract Review Committee will try to accommodate preferences, but the final presentation type will be dependent on the score the abstract received.

When submitting, please consider the following:

- Did you have to obtain approval of your abstract content from any commercial sponsor prior to submitting this abstract?
- This work was conducted under approval of all required ethical, animal, or human study boards (IRB, etc.).
- I verify that I confirmed disclosure information with each author.
- This abstract topic was inspired by a previous A.S.P.E.N. Research Workshop that I attended (live, online, or in print).

7. Abstract Writing Standards

Presenting Author - The presenting author is listed as the 1st author in the submission system and is required to attend CNW. There are no financial stipends available to cover expenses.

Abstract Character Count - A maximum of 3780 characters including spaces and punctuation is allowed. This does not include title and author/institution list (which is limited to approximately 500 words).

Accuracy, Grammar, Spelling - Submit abstract in Word or other word-processing software. If accepted, YOUR ABSTRACT WILL BE PUBLISHED AS SUBMITTED. ***You are 100% responsible for spelling, grammar, and scientific accuracy.***

Tables and Images - A maximum of 2 tables, either created within the system or converted to an image file, and 2 images /figures /charts (bmp, gif, tif, jpg) are allowed per abstract. There are no character count limits for these items. Images should be set a 300 dpi in order for clarity in print. Free graphics software include: www.irfanview.com; www.gimp.org; www.getpaint.net. **The submission site CANNOT ACCEPT PowerPoint, Word, PDF or Excel files as table or image uploads. An X in the image box at submission indicates you submitted an unusable format**! If your images are not readable by A.S.P.E.N. staff after submission, they will not accompany the published version of your abstract in *JPEN*.

Author Personal Information - When submitting an abstract, provide:

- First and last name
- Credentials (e.g. MD, PhD, RD, RN, RPh, PharmD, etc.)
- Job/position title; Institution/organization
- Business address including City, State/Province, Country, zip
- Email address
- Business telephone
- Conflict of interest disclosure information

Abstract Revisions - You may login to the Abstract Submission site or type the URL http://cnw2015.abstractcentral.com/abstract into your browser as many times as necessary to complete the submission process until the submission deadline of September 9, 2014, 11:59 p.m. ET. A.S.P.E.N. will only review your abstract if you have completed the submission process, including the payment step, by the submission deadline. Revisions will NOT be accepted after the submission deadline.

8. Abstract Acceptance Criteria

CNW abstracts must meet the following criteria for acceptance:

- Abstract submitted in English, including tables/charts and figures
- Relevance and uniqueness of the study or presentation to the field of nutrition therapy and metabolic support
- Authors are encouraged to submit abstracts that: address unique or emerging nutritional issues; contribute new information to the field; show strong applicability to or improvement of nutrition therapy practice or metabolic support
- Clarity of the introduction, hypothesis, or purpose for the study or presentation
- Quality of the research design and methodology
- If relevant, the hypothesis is clearly stated
- Methods are clear and appropriate
- Sufficient sample size to validate conclusions
- Investigators took measures to control for threats to validity and reliability
- Validity and sufficiency of the data
- Enough data or findings to form conclusions
- If relevant, statistical analysis of the data is appropriate
- Study was completed
- Relevance of the conclusions to the data
- Case studies are exempt from the requirement for extensive data; however, must be unique, providing learning points or unusual clinical presentations
- Abstract carefully reviewed for spelling, grammar and formatting
- Abstract is free of promotional material, and it is not commercial in nature
- Brand names for products or services are not mentioned in the title, but may be mentioned once in the methodology section

9. Abstract Selection Process

Review and Selection Process - The A.S.P.E.N. Abstract Review Committee conducts a rigorous peer review of all abstracts submitted. On average, A.S.P.E.N. accepts approximately 80 percent of all abstracts submitted. There will be no reconsideration of non-accepted abstracts. Abstracts are selected for poster presentation displayed at Poster Exchanges at designated times in the Exhibit Hall, oral presentations, or poster presentation at the Research Workshop. If an abstract is not accepted, the cost of submission will be refunded.

If your abstract has been accepted for presentation, but you are unable to attend CNW, Contact A.S.P.E.N.'s Research Program Coordinator, Carol Woodside as soon as possible at 301-920-9146, or carolw@nutritioncare.org. You will have two options: 1) Designate a co-author on the abstract as the new presenting author; or 2) Withdraw the abstract.

10. Abstract Publication and Copyright

All accepted abstracts are published online in the *Journal of Parenteral and Enteral Nutrition* (JPEN)

Original Research- You will be asked to transfer the abstract copyright to *JPEN*, A.S.P.E.N.'s scientific journal, for your original abstract. All authors must agree to this.

Federal Employees- Federal employees may select the box indicating there is no copyright to convey.

Encore Abstracts - Encore abstracts (previously presented at another conference or previously published) can be submitted, but will not qualify for Original Abstract Research Awards and will be presented as posters. If you are submitting an abstract that was previously presented, you will advise A.S.P.E.N. (check box). You must provide the name of the conference and date presented. If the abstract was published, the full citation is requested. In either case (published or presented), if you wish to have A.S.P.E.N. republish your work in JPEN online, we must have formal re-publication (re-print) permission from the conference organizer or Journal publisher, whoever holds the copyright for the abstract**. It is your responsibility to obtain permission to re-print** your work from the copyright owner, and to submit it to A.S.P.E.N., (carolw@nutritioncare.org). If permissions are not received by November 25, your abstract title, author list, and encore status will be published without the abstract text. If the previous conference/journal did not take copyright, there is a box indicating that you have the right to convey.

11. Submission/Registration & Travel Fees

Submission Fees- The cost of submission for Original, Encore, and International Abstracts is $50 per abstract. The cost for submitting Late-breaking Abstracts is $100. If an abstract is not accepted, the cost of submission will be refunded.

Registration & Travel Fees- Visit www.nutritioncare.org/CNW and click Attendees. A.S.P.E.N. will make every effort to notify all abstract authors of their acceptance status prior to the early-bird registration deadline. You are encouraged, however, to register for CNW when you submit your abstract. If the early-bird deadline has passed, A.S.P.E.N. may extend it for abstract authors. Individuals who have an

abstract accepted into the conference program are responsible for their own travel and conference registration expenses.

12. Original Abstract Research Awards

Each year at CNW, A.S.P.E.N. recognizes several outstanding Original Abstracts with awards. To be considered for one of these awards, applicants must check an opt-in box during the online abstract submission process. A.S.P.E.N. offers the following awards:

- **Harry M. Vars Award and Promising Investigator Award –** honors an Early Career Investigator (within 10 years of completing terminal research degree or medical residency) who has submitted a top-scoring original abstract, and demonstrates excellence via a manuscript and oral presentation at the CNW Premier Paper Session. The Promising Investigator Award is given to the runner up in the competition.
- **Research Trainee Awards –** honor investigators still in training who have submitted top-scoring original abstracts to CNW.
- **International Abstract Research Awards –** honors international investigators who have submitted top-scoring abstracts to CNW.
- **Research Workshop Travel Awards –** honors Early Career Investigators who have submitted top-scoring abstracts to CNW that align with the year's Research Workshop topic.
- **Abstracts of Distinction –** Awards given to first authors of top-scoring original and late-breaking abstracts.

For more information, visit A.S.P.E.N.'s Research Awards webpage or type the URL http://nutritioncare.org/Research/Awards/Original_Abstract_Awards/ into your browser. Encore Abstracts, are accepted for poster presentations and are ineligible for these awards. Late-breaking Abstracts are eligible only for Abstracts of Distinction.

Abstract Awards Consideration - You must opt in to be considered for Original Abstract Research Awards. There are some obligations associated with the awards, and you must certify that you acknowledge and will accept those obligation if your abstract is selected.

13. Resources

The following resources are available to assist with preparation of CNW abstracts.

- Webinar – How to Submit a Quality Abstract
- Boullata JI, Mancuso CE. A "How-To" Guide in Preparing Abstracts and Poster Presentations. *Nutr Clin Pract.* 2007; 22: 641-646.
- Bliss DS, Guenter PA, Heitkemper MM. Clinical Research: From Proposal to Publication: Are You Writing Research Right? *Nutr Clin Pract.* 2000; 15: 299-305.
- A.S.P.E.N.'s Poster instructions
- A Research Toolkit is available to A.S.P.E.N. members as a resource with information on General Research, Research Design and Methodology, Grant Writing, and more

Cycling Parenteral Nutrition from 24 to 12 hours in 1 Step is Safe in Patients Requiring Long-Term Therapy Sandra I. Austhof , Robert DeChicco , Mandy L. Corrigan , Rex A. Speerhas, Gail Cresci , Sreenija Suryadevara , Achuthan Sourianarayanane , Arthi Kumaravel , Rocio Lopez , Ezra Steiger

Abstract Body: Introduction: Cycling parenteral nutrition (PN) over 12 hours is the preferred administration method in long-term patients as it allows time off the infusion. Potential adverse events (AEs) associated with cycling PN are rebound hypoglycemia due to the rapid discontinuation of dextrose infusion associated with weaning, along with hyperglycemia and respiratory distress, due to the increase in the rate of dextrose and fluid infusion, respectively. The study aim was to test the prediction that patients without diabetes mellitus (DM) or major organ dysfunction requiring long term PN could be cycled from 24 hours to 12 hours in 1 step without increasing the risk of PN-related AEs compared to the standard 2-step process. Methods: Cleveland Clinic inpatients followed by the Nutrition Support Team (NST) who were receiving PN at goal calories infused over 24 hr without severe electrolyte or blood sugar abnormalities and awaiting discharge on PN cycled over 12 hr were consented for study participation. The study was approved by the Institutional Review Board. Patients with DM or major organ dysfunction were excluded. Patients were randomly assigned to a 1-Step “fast track” protocol (i.e., cycled from 24 to 12 hr in 1 day) or 2-Step “standard” protocol (i.e., cycled from 24 to 12 hr in 2 days). Data was collected upon study entry and daily until 1 day after a 12 hour cycle was achieved or until the patient was removed from the study. The type and prevalence of PN-related AEs were documented and graded as mild or serious. AEs were defined as hypo- or hyperglycemia, new onset or worsening dyspnea, tachycardia, tachypnea, lower extremity or sacral edema, pulmonary edema or abdominal ascites. Determination whether the AE was PN-related was made by a NST physician and an independent physician. Differences of opinion regarding the AE etiology were resolved by further review and discussion until a consensus was reached. A univariable analysis was performed to assess differences between the groups. Student’s t-tests were used to compare continuous factors (i.e., age and BMI) between subjects. Pearson’s chi-square tests were performed for categorical variables (i.e., gender). An interim analysis was done to rule out large discrepancies in AEs between the groups which would place patients at undue risk. Results: 49 patients were enrolled and data from 40 patients (1-Step N=23; 2-Step N=17) were analyzed. The mean age was 51.4 yr and 64% of subjects were male. The most prevalent AE was mild hyperglycemia (blood glucose 200-400 mg/dL) occurring in 39.1% of patients in the 1-Step and 41.2% in the 2-Step group (p=0.13). Hypoglycemia (blood glucose <70 mg/dL) occurred in 4.3% of patients in the 1-Step and 17.6% in the 2-Step group (p=0.26). No occurrences of new onset or worsening dyspnea, tachycardia, tachypnea, lower extremity or sacral edema, pulmonary edema or abdominal ascites were seen in either group. Overall, there was no significant difference in the prevalence of mild AEs between the groups (43.5% in 1-Step vs 52.9% in 2-Step, P=0.25). No serious AEs were observed in either group. Conclusions: Mild hyperglycemia was the most commonly occurring AE when cycling PN patients from 24 to 12 hr with no significant difference between a 1-Step versus 2-Step protocol. No serious AEs were observed in either group. These preliminary data suggest despite mild hyperglycemia, 1-Step cycling is as safe as 2-Step cycling in patients without DM or major organ dysfunction requiring long-term PN. Fast track cycling could potentially facilitate hospital discharge, resulting in decreased healthcare costs and improved patient satisfaction.

1522994 - **Parenteral Glutamine Supplementation in Critical Illness: A Systematic Review**

Paul E. Wischmeyer, M.D.[1]; Rupinder Dhaliwal, R.D.[2]; Michele McCall, R.D.[4]; Thomas Ziegler, M.D.[3]; Daren Heyland, MD, FRCPC[2]

[1]Anesthesiology, University of Colorado School of Medicine, Aurora, CO; [2]Medicine, Queens University, Kingston, ON, Canada; [3]Medicine, Emory University, Atlanta, GA; [4]Critical Care, St. Michael's Hospital, Toronto, ON, Canada.

Background: The potential benefit of parenteral glutamine (GLN) supplementation has been one of the most commonly studied nutritional interventions in the critical care setting. Glutamine deficiency at ICU admission has been associated with an increased risk of death. Further, a significant body of pre-clinical in vivo and in vitro has demonstrated GLN may play a vital role in mediating an optimal stress and immune response to critical illness and injury. The aim of this systematic review was to incorporate recent trials of parenteral GLN supplementation of in critical illness with previously existing data.

Methods: All prospective randomized controlled trials of parenterally administered GLN in critically ill patients conducted from 1997 to 2012 were identified. Studies of enteral GLN only or combined enteral (EN)/parenteral GLN were excluded. Methodological quality of studies was scored and data abstracted by independent reviewers. Our primary endpoint was overall mortality, which is hospital mortality but includes ICU or 28-day mortality if hospital mortality was not reported. A sensitivity analysis was conducted excluding studies of patients receiving EN as the only method of artificial nutrition (n=3).

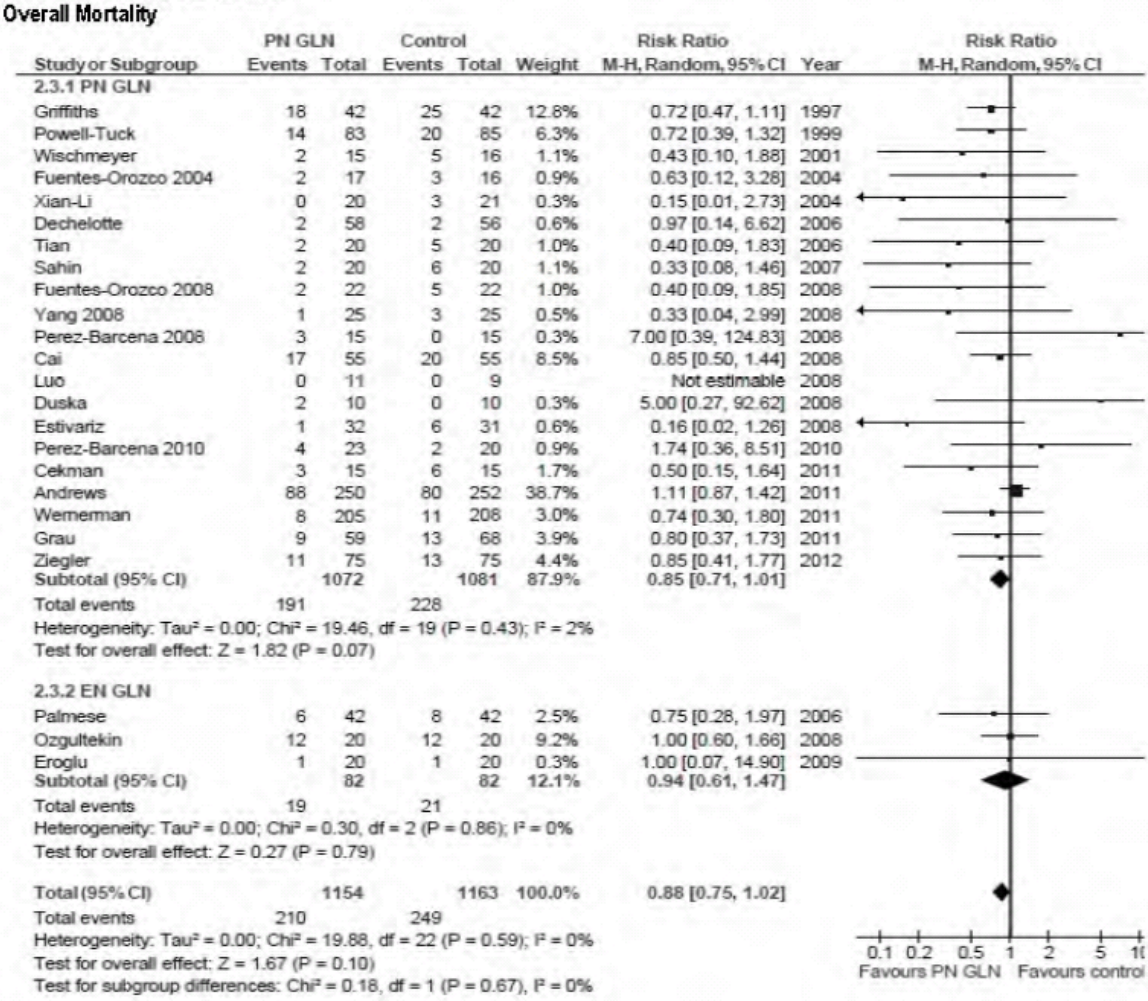
Results: 27 studies in 2317 patients examining only parenteral GLN supplementation were identified in ICU patients with diagnoses ranging from pancreatitis, trauma, burns and sepsis. In the majority of these studies, the intervention and control groups received parenteral nutrition (PN) only. As shown in Figure 1, when all the 8 level 1 and 19 level 2 studies reporting mortality were aggregated, parenteral GLN supplementation was associated with a trend towards reduction of overall mortality (RR 0.88, 95% CI 0.75, 1.02, p=0.10). In studies examining only patients receiving PN, supplementation with GLN was associated with a trend towards a reduction in overall mortality (RR 0.85, 95% CI 0.71, 1.01, p=0.07) and a significant reduction in hospital mortality (Figure 2) in the studies, which reported this endpoint (RR 0.67, 95% CI 0.51, 0.90, p=0.007). When the three studies in which patients only received EN were aggregated, GLN supplementation had no effect on overall mortality or hospital mortality. In addition, GLN-supplemented PN was found to be associated with a trend towards a reduction in infectious complications (p = 0.21), ICU length of stay (LOS) (p = 0.16) and a significant reduction in hospital LOS (p = 0.03) (Figure 2). However, significant heterogeneity was present in the LOS analyses.

Conclusions: When all recent studies of parenteral GLN-supplementation are evaluated, GLN-supplementation of PN is associated with a significant reduction in hospital mortality and a trend towards a reduction in overall mortality. GLN-supplemented PN is also associated with a trend towards reduced infectious complications and was associated with a significant reduction in ICU and hospital LOS. The role of parenteral GLN supplementation of EN, appears safe, but clinical data supporting it's use are not yet sufficient to make a recommendation. Significant heterogeneity and statistical imprecision weaken any clinical inferences that can be made from

this analysis.

Figure 1: Mortality Outcomes

Overall Mortality



Hospital Mortality

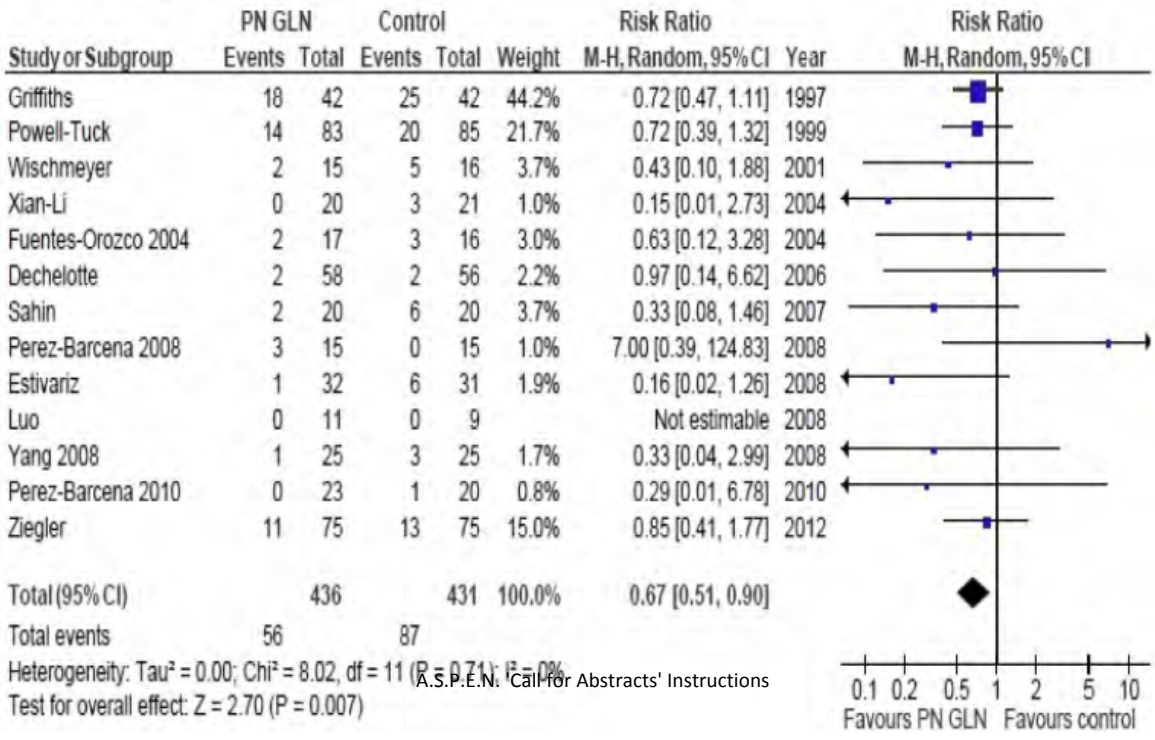
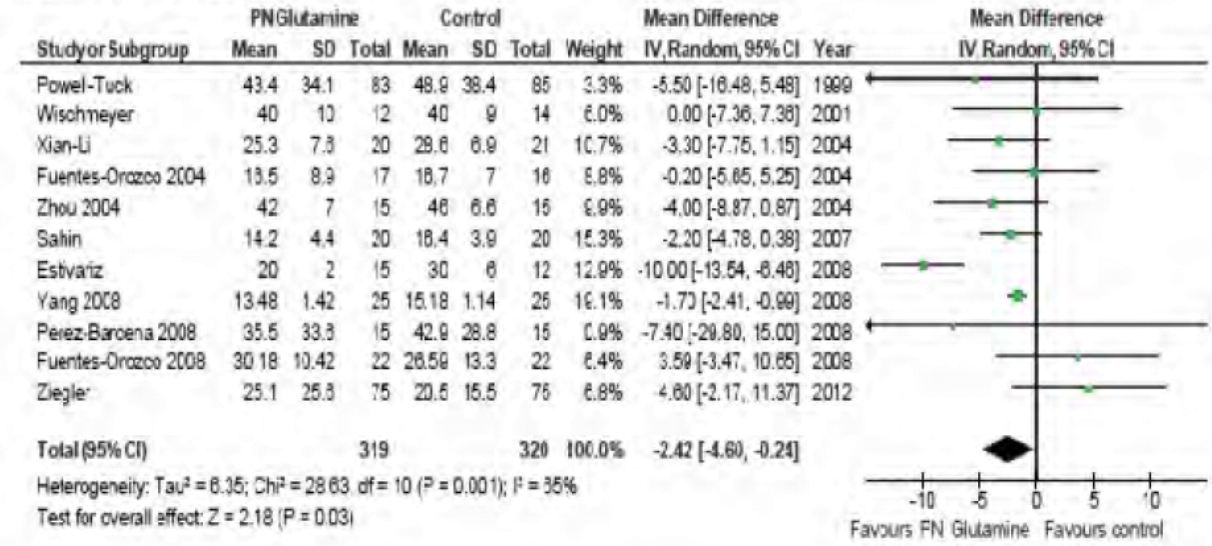
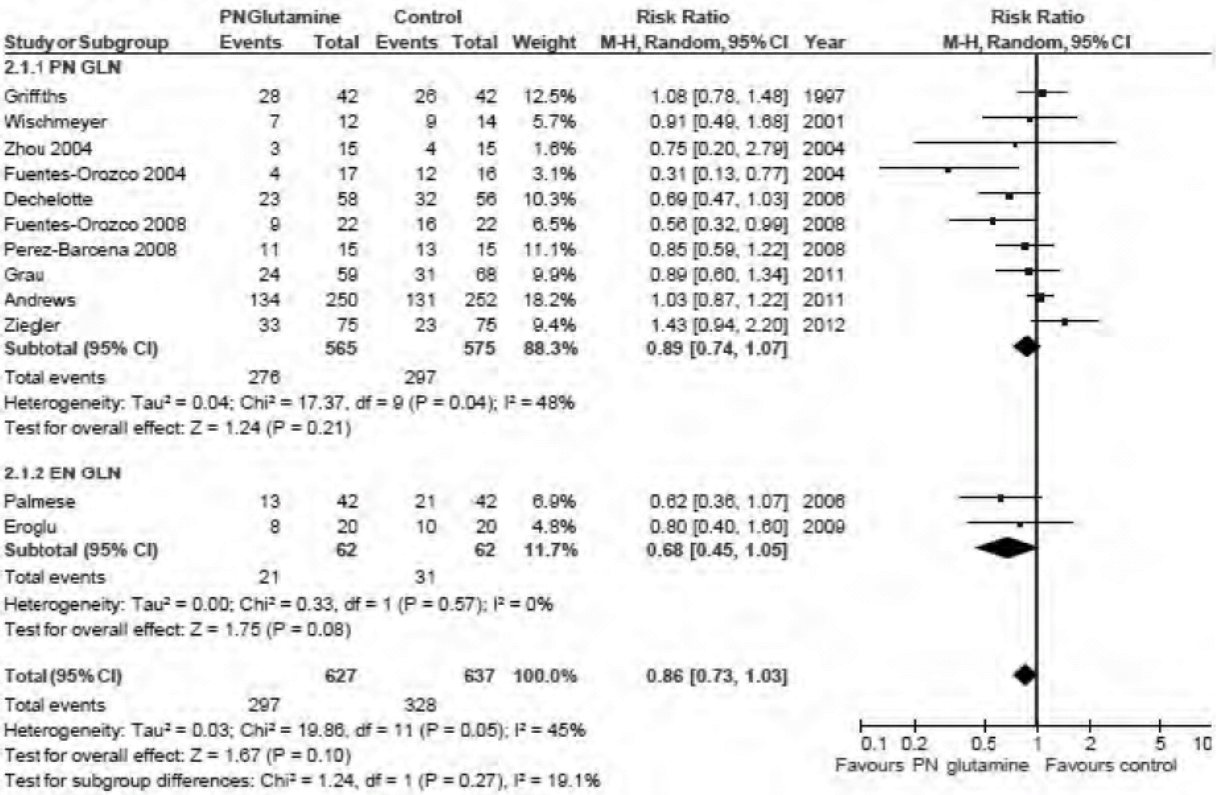


Figure 2 Overall Complications

Hospital Length of Stay



Infectious Complications



1522246 - **Feeding Outcomes Associated With Initial Gastric Versus Small-Bowel Enteral Access in Critically Ill Surgery Patients**

Erica Raymond, RD; Jennifer Wooley, MS, RD, CNSC
Patient Food and Nutrition Services, University of Michigan Health System, Ann Arbor, MI.

Background: The importance of early enteral nutrition (EN) in critical illness is well recognized. The superiority of gastric or small bowel enteral access in the surgical intensive care unit (SICU) remains controversial. The objective of this quality improvement study is to review the feeding outcomes of gastric and small bowel enteral access to determine adherence to nationally accepted standards of practice.

Methods: The registered dietitian completed early enteral access surveys for all mechanically ventilated patients admitted to the SICU from July 2011 - June 2012 who were appropriate for early EN and did not require parenteral nutrition support. A retrospective analysis of the following data was completed for a 12 month period: time in which enteral access was obtained, type of enteral access, and time until caloric goal was achieved after feeding initiation.

Results: 128 patients were included in the analysis. Appropriate enteral access was achieved within 48 hours of admission to the SICU for 125 of 128 (97%) patients surveyed. Of the 128 patients surveyed, 97 (76%) patients received initial feeding tube placement in the stomach, and 31 (24%) patients received initial feeding tube placement in the small bowel. Of the 128 patients surveyed, 78 (61%) initial feeding tubes were placed blindly at bedside, 45 (35%) initial feeding tubes were placed in the operating room, and 5 (4%) initial feeding tubes were placed in interventional radiology. 37 (29%) initial feeding tubes were nasogastric (NG)/orogastric (OG) tubes, and 84 (66%) initial feeding tubes were small-bore nasoenteric feeding tubes. 7 (5%) patients were fed via initial long-term feeding tubes. Of the 97 tubes initially placed in the stomach, 11 (11%) required repositioning into the small bowel. 9 of the 11 (82%) tubes requiring repositioning were successfully advanced at bedside. 2 of 11 (18%) tubes requiring repositioning were advanced in interventional radiology. Overall, 123 of 128 (96%) patients met caloric goal within 72 hours of feeding initiation. Of the 97 patients initially fed into the stomach, 92 (95%) achieved caloric goal within 72 hours of feeding initiation. Of the 31 patients initially fed into the small bowel, 31 (100%) achieved caloric goal within 72 hours of feeding initiation.

Conclusion: Both gastric and small bowel enteral access facilitate early EN in critically ill surgery patients. Patients fed via small-bowel feeding tubes may advance to caloric goal faster than patients with gastric feeding access. More research is needed to determine the relationship between initial feeding access, caloric delivery, and nutrition-related outcomes in critically ill patients.

1520400 - **A Case for Continuous Infusion of Parenteral Nutrition: How a Hyperemesis Gravidarum Patient Realized Euglycemia and Weight Gain Throughout Parenteral Nutrition Provision Including Transitioning to Full Oral Intake While Meeting Nutrition Needs**

Doug Scartelli, R.D., C.N.S.C., L.D.N.; Loretta Lombardo, R.Ph.; Sharon Ingros, R.N., B.S.
Walgreens Infusion Services, Chantilly, VA.

Introduction: Our intent is to report a case study of a Hyperemesis Gravidarum (HG) patient who was successfully managed and transitioned from full Parenteral Nutrition (PN) to full oral intake by a Home Nutrition Support Team (HNST) using continuous infusion of PN, weekly phone interviews, and a detailed kilocalorie count employed once the patient was eating a substantial amount of food orally.

HG can be defined as extreme, persistent nausea and vomiting that likely leads to dehydration, electrolyte imbalances, and a loss of > 5% of body weight. HG is a rare occurrence. It is estimated that between 0.5 up to 2% of all pregnancies are affected by this disorder. In the most severe cases ketonuria, vitamin deficiencies and abnormal liver enzymes may be present. In these severe cases, PN risks verses benefits should be considered. PN can be an appropriate choice as fetal growth and development are affected when nutrition intake is severely restricted for extended periods of time. Close monitoring of a HG patient on PN in the home is essential in order to minimize metabolic complications, (especially glucose and triglyceride levels) help assure appropriate weight gain, achieve positive nitrogen balance, and assist , when appropriate, in transitioning toward a complete , nutritionally balanced diet.

Description:

36 year old overweight female
Gravida 5, Para 4
Four vaginal deliveries with most recent pregnancy (child # 4) complicated by HG not treated with PN.
Admitted to hospital at 10 weeks pregnant for vomiting, weight loss and no oral intake for over one month.
PN initiated in hospital at 24 hours continuous with plan for discharge to home PN.
Through initial assessment and close weekly monitoring during twelve weeks of Home PN therapy, the HNST recommended and was granted permission from the attending physician to:
1. Increase kilocalories to goal
2. Adjust electrolytes as needed
3. Successfully wean patient from PN after performing a detailed kilocalorie count
All of this was accomplished while intentionally keeping patient on a continuous PN infusion in order to maintain euglycemia.

Results:

Glucose remained within normal range 11 out of 12 weeks (note: One abnormal glucose = 109 mg/dl)
Albumin remained in normal range 11 out of 12 weeks (note: One abnormal Albumin= 3.3 g/dl)
Triglycerides remained in normal range 4 out of 11 weeks.
Weight gain was achieved

Conclusions: HG patients may benefit from continuous infusions of PN if blood sugar levels are a concern.
The multidisciplinary team approach is critical in assisting the physician manage week to week electrolyte imbalances and transitioning to appropriate oral intake.
A detailed kcalorie count may be helpful in developing a transition regimen to maintain acceptable blood sugar levels while transitioning toward full oral intake.

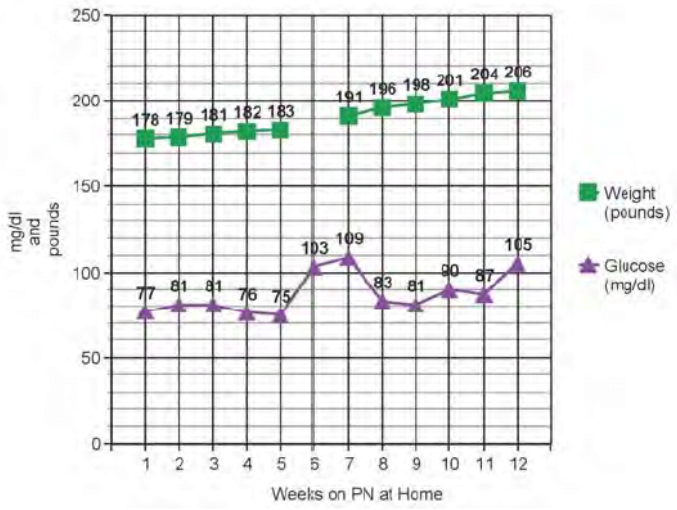


Figure 1. Results of weekly body weight and glucose values.Weight (purple line) Glucose (green line)

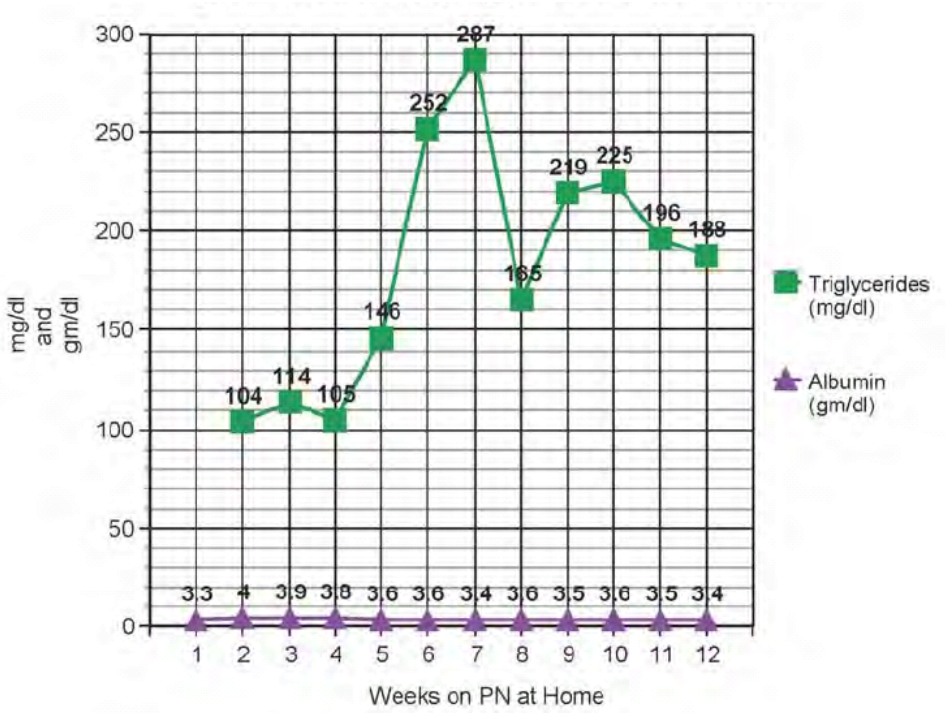


Figure 2. Results of weekly triglycerides and albumin values. Triglycerides (green line) Albumin (purple line)

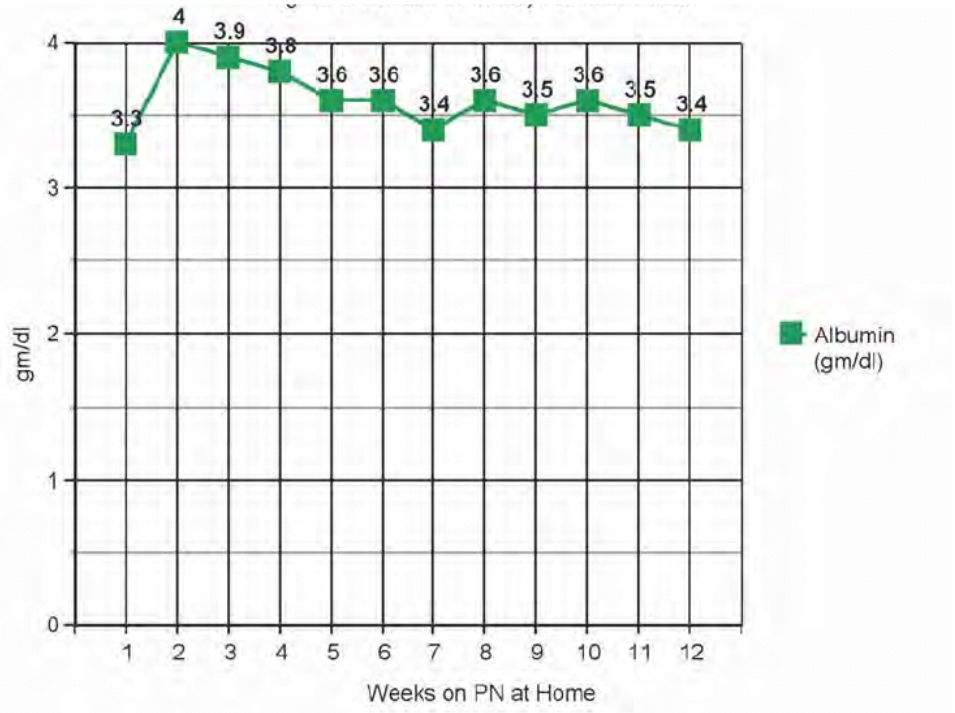


Figure 3. Results of weekly albumin values

1520100 - **Composition of Dietary Fat Source Shapes Gut Microbiota Architecture and Alters Host Inflammatory Mediators in Mouse Adipose Tissue**

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Background: A rapidly emerging area of study is the role of the commensal gut microbiota in the progression of obesity and inflammation. The use of germ-free mice has demonstrated a direct link between the consumption of a high-fat diet, the intestinal microbes, and adiposity. Studies have also shown that dietary factors dramatically alter the microbial architecture within the host. Previous work has suggested that mesenteric adipose tissue, due to its close proximity to the portal vein, possesses substantial pro-inflammatory potential. Moreover, these depots are situated adjacent to the intestine suggesting an inherent reciprocity between commensal microbes and mesenteric-derived adipokines. However, this relationship has not been well characterized. Since gut microbiota have a direct effect on host metabolism, it is of significant interest to define a precise mechanism linking diet-induced obesity, inflammation, and the gut microbiota. We sought to address two key areas of study: 1) How dietary fat consumption and fat source, particularly high saturated (SFA) and polyunsaturated (PUFA) fat, shapes the intestinal microbiota, and 2) To identify how observed perturbations in the microbiota due to dietary fat source are reflected in host adipose tissue-mediated inflammation.

Methods: Adult male C57Bl/6 mice were fed milk fat-, lard- (SFA sources), or safflower oil (PUFA)- based high fat diets for four weeks. Body mass, food consumption, and stool samples were collected throughout the study. Bacterial 16S rRNA was isolated and analyzed via T-RFLP; bacterial DNA sequencing libraries were run through massive parallel sequencing (HiSeq). In addition, mesenteric and gonadal adipose depots were excised and analyzed for both lipogenic and inflammatory gene expression via qRT-PCR.

Results: Mice fed high-fat diets gained more weight with a concomitant increase in caloric consumption relative to low-fat diet controls. Additionally, consumption of high-fat diets was associated with a dramatic shift in gut microbiota phyla architecture and stratified based on the specific source of dietary fat (Figure 1). These changes also led to significant differential

expression of inflammatory markers (e.g. MCP-1, CD192, resistin, LPL) in mesenteric and gonadal fat depots (Table 1).

Conclusions: These initial findings support the notion that dietary fat composition can both shape the dynamics of structure of gut microbiota as well as alter host adipose tissue-mediated inflammation. Germ-free studies are currently underway to define the direct and indirect roles of gut microbiota induced by specific dietary fat source. Collectively, results from this study may delineate a potential mechanism by which dietary fat, inflammation, and the commensal gut microbiota are intertwined.

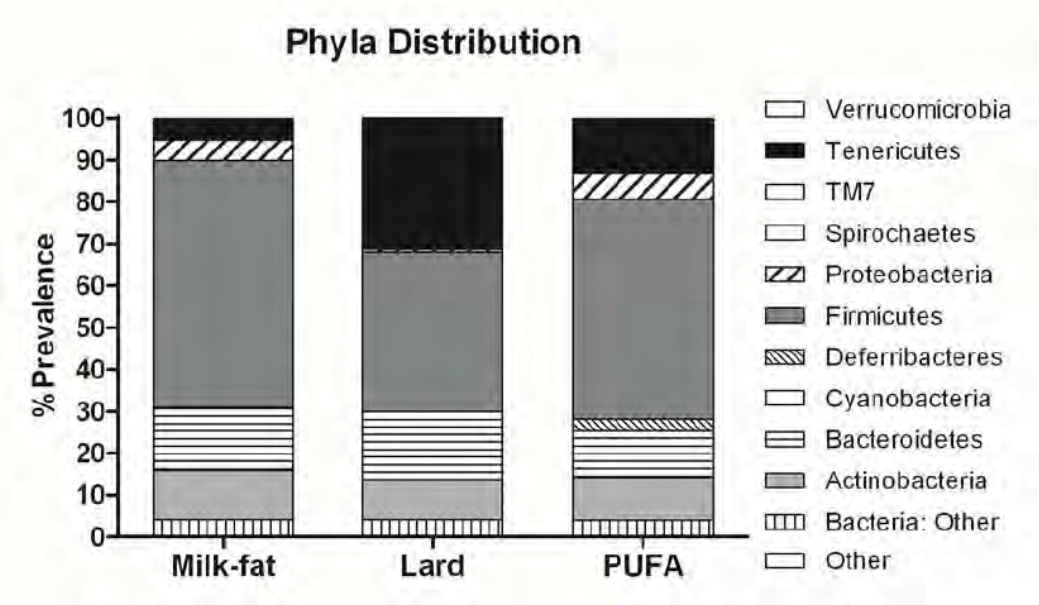

Figure 1. Average phyla distribution of microbiota after high-fat feeding.

Table 1. Gene expression levels of inflammatory markers in mesenteric and gonadal adipose tissues.

Inflammatory Gene Expression (relative to B-actin)	Tissue type	Milk-fat	Lard	PUFA	Low-fat Control	*P-value*
MCP-1	Mesenteric adipose ± SEM	5.11E-03[a] 1.10E-03	9.80E-03[b] 7.73E-04	1.12E-02[b] 7.24E-05	3.07E-03[a] 7.25E-03[a]	*P < 0.01* *P < 0.001*
	Gonadal adipose ± SEM	5.37E-04 6.20E-03[a] 5.45E-04	7.52E-03[a] 8.88E-04	1.61E-02[b] 1.52E-03	2.63E-04	
CD192	Mesenteric adipose ±	5.38E-04[a] 5.03E-05	5.22E-04[a] 3.76E-05	6.53E-04[a] 2.08E-05	2.77E-04[b] 1.95E-05	*P < 0.01*

	SEM Gonadal adipose ± SEM	7.12E-04[a] 3.50E-05	5.00E-04[a] 4.96E-05	1.29E-03[b] 1.13E-04	5.45E-04[a] 2.14E-05	*P < 0.001*
Resistin	Mesenteric adipose ± SEM Gonadal adipose ± SEM	2.80E+00[a] 3.04E-01 6.70E+00[a] 4.33E-01	1.79E+00[a] 3.79E-01 6.28E+00[a] 8.91E-01	4.36E+00[b] 4.58E-01 4.84E+00[a] 3.41E-01	1.01E+00[c] 7.74E-02 3.19E+00[b] 9.97E-02	*P < 0.05* *P < 0.001*
LPL	Mesenteric adipose ± SEM Gonadal adipose ± SEM	2.25E+00[a] 2.45E-01 5.81E+00[a] 4.84E-01	1.30E+00[a] 1.27E-01 5.42E+00[a] 8.42E-01	3.28E+00[b] 4.06E-01 3.42E+00[b] 3.02E-01	9.71E-01[a] 4.78E-02 3.27E+00[b] 7.50E-02	*P < 0.01* *P < 0.01*

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American Society for Parenteral and Enteral Nutrition Research Agenda

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outcomes research/quality; nutrition support practice; research and diseases; nutrition

Introduction

The American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) is dedicated to improving patient care by advancing the science and practice of clinical nutrition and metabolic support. Founded in 1976, A.S.P.E.N. is an interdisciplinary organization whose members are dedicated to the practice and research in clinical nutrition and nutrition support therapy, which includes parenteral nutrition (PN) and enteral nutrition (EN). With more than 5,500 members from around the world, A.S.P.E.N. is a community of dietitians, nurses, pharmacists, physicians, scientists, students, and other healthcare professionals from every facet of nutrition support, clinical practice, research, and education.

Research is the mechanism by which the science and practice of clinical nutrition and metabolic support can be refined and advanced with the ultimate goal of improving patient care. Articulation of a research agenda is an important step toward achieving this goal. A.S.P.E.N.'s research agenda is not intended to be a comprehensive review of the literature. Rather, the research agenda is aimed to help promote continuity across A.S.P.E.N.'s activities and help communicate A.S.P.E.N.'s research priorities to the larger clinical and research communities with the broader goal of advancing research and scholarly discourse in priority areas. Accordingly, the primary goal of this document is to provide patients, families, researchers, federal agencies, and other stakeholders with an assessment of key areas of nutrition and metabolic support that will benefit most from additional research efforts in the next decade.

A.S.P.E.N.'s 2013 Research Agenda was developed by A.S.P.E.N.'s Research Committee (RC). The RC provides leadership in research and research training for the organization and is responsible for developing and facilitating its research goals. A.S.P.E.N.'s Board of Directors charged the RC with defining a research agenda for the organization. Responding to this request, the RC chair worked with the members of the RC to obtain consensus on the structure and content of this document. The original ideas were drafted and circulated to the RC for comment and revision. After these revisions were incorporated into a final outline, the RC chair asked several members of the RC to write specific sections of the document based on their expertise. These sections were compiled and edited into a single document that was recirculated to the RC for review. Feedback from that review was incorporated into a revised version of this document. The document was then reviewed by a number of external reviewers who have a track record of producing influential research in the field, as well as members of A.S.P.E.N.'s Board of Directors. Their comments and suggestions were incorporated into the final version of the document which was approved by the Board.

Research Agenda

Despite significant advances in medical research and improvements in healthcare delivery systems, malnutrition remains a common healthcare issue with a particularly high prevalence among hospitalized patients. According to data collected from the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project, in 2010, protein calorie malnutrition was present in more than 773,000 hospital discharges. There is ample evidence supporting the relationship between nutrition deficits and increased morbidity and mortality. For example, studies have shown that among hospitalized patients, chronic caloric deficit, either in terms of total daily calories or protein calories, is associated with increased infectious

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complications, duration of mechanical ventilation, and length of stay in both the intensive care unit (ICU) and hospital. In various patient populations and care settings, suboptimal nutrition status is also associated with chronic complications such as failure to thrive, impaired learning and cognition, skeletal muscle wasting, falls, and functional decline. Based on this evidence, it is reasonable to assume that prevention or correction of chronic nutrition deficits can have a positive impact on patient outcomes.

Since the publication of seminal research dating from the 1960s in which beagle puppies were injected with nutrient substances and fluids, as well as subsequent work in severely malnourished patients who received PN solutions infused continuously through an indwelling central catheter, there has been growing interest and progress in the field of nutrition support therapy. Today, nutrition support is a key aspect of nutrition therapy. This component of medical treatment can include oral, enteral, and parenteral nutrition aimed at maintaining or restoring optimal nutrition status and health.

Over the past few decades, advances in enteral and parenteral access techniques, formulations of different nutrients, improved understanding of intestinal physiology, and accumulating information on optimal selection of candidates for parenteral and enteral feedings have made the provision of nutrition support accessible to virtually all patients who require it. Indeed, the proliferation of nutrition support technologies, coupled with improved knowledge regarding proper patient selection and feeding strategies, has contributed to the emergence of clinical nutrition as an independent medical and surgical specialty. Despite this progress, data concerning many aspects of nutrition support remain limited, and practice strategies in many subpopulations (eg, children, the elderly, obese, and critically ill) and care settings (eg, home health) require further refinement. For example, despite the plethora of published data examining energy requirements and nutrient provision, reliable information describing how nutrition interventions impact clinical outcomes remains limited. Inconsistent findings in the published literature may be explained in part by how malnutrition or risk for malnutrition were defined, when feeding was initiated, how different disease states and patient populations modify risk of nutrition-related complications and responses to feeding, and how measurement biases and precision impact the determination of energy requirements. As a result, future research should include both basic science-oriented investigations aimed at improving our understanding of the science of nutrient regulation in different disease states, as well as clinical and translational research to determine how the practice of nutrition support can continue to be refined and individualized to optimize clinical outcomes. With these considerations in mind, the following sections articulate A.S.P.E.N.'s priority areas for future research.

Malnutrition Assessment, Diagnosis, and Intervention in the Context of Nutrition Support Therapy

Over time, malnutrition has been defined using varied criteria in diverse patient populations. This variability has created difficulties in capturing the true prevalence of this condition. Furthermore, 4 trends have impacted nutrition support practice in ways that have resulted in the need for a more precise definition of malnutrition. First, advances in technology have enabled clinicians to respond more effectively to patients who are candidates for nutrition support. Second, data generated from evidence-based medical and nutrition care in the acute care setting have facilitated more life-sustaining interventions and improved overall short-term survival for patients who suffered from acute illnesses or injuries. However, this success has also increased the number of acutely and severely ill patients who are at risk of developing nutrition deficits. A third trend is the global obesity epidemic, which has placed nutrition support practitioners in the position of managing malnutrition and its complications in a context that was not considered by previous malnutrition assessment schemes. A fourth issue relates to challenges associated with cost containment in the U.S. healthcare environment, where nutrition support is a relatively expensive intervention that is also associated with considerable risk. These trends have converged, and resulted in the need to develop a consensus definition for malnutrition. Ideally, this definition would enable nutrition support professionals to use common language to characterize patients' nutrition needs and devise management plans that are consistent among providers. In addressing this goal, a critical gap that requires immediate attention involves identification of the most effective strategies to teach current and future clinicians standard approaches to identifying and diagnosing malnutrition.

Although a consensus definition for malnutrition will represent a meaningful step forward for the field, current definitions are directed toward undernourished and adult patients. While obese patients can theoretically be judged as malnourished using current guidelines, clarification and refinement of the approach for assessment of obese patients are necessary. More important, nutrition support clinicians often provide care to patients who are not yet malnourished but who are at high *risk* of becoming malnourished during their course of therapy. Improved understanding of the risk that these patients present may be needed to justify nutrition support resources in a cost-conscious healthcare environment. Prospective cohort studies that include the natural history of patients who are at risk of malnutrition and that aim to describe physical symptoms, clinical assessments, laboratory tests, and diagnostic tools for use in all categories of patients would be helpful to address these critical gaps.

When the consensus language and criteria in defining malnutrition are applied across diverse nutrition support settings, it is expected that the availability of information and feasibility of assessment methods, as well as prevalence of malnutrition and associated outcomes will vary. Research is needed to identify which diagnostic criteria and tools are most useful and practical in different practice settings. What are the most important clinical outcomes for patients in diverse care settings, and how are they linked to nutrition status? In the hospital setting, mortality and morbidity (eg, infections, and length of hospital stay) are commonly assessed. With new cost-containment efforts being directed toward reducing hospital readmissions, analysis should also include evaluations of how malnutrition impacts hospital readmission rates for patients who have been previously discharged to different clinical settings. Furthermore, there is a need to understand the impact of malnutrition as patients' transition in different care settings and across the continuum of care.

Once consistent definitions and identification of malnutrition are in common use, issues related to optimal implementation of nutrition support will need to be addressed. What approaches to provision of nutrition support are most effective in varied settings and populations? What approaches are most beneficial? Which are too expensive or impractical for widespread implementation? Randomized controlled trials (RCTs) are the optimal approach to answering these questions.

Diagnostics and Techniques in Nutrition Support

In addition to establishing a consistent definition and diagnostic criteria for malnutrition, an equally important research priority concerning this issue is to validate both quantitative and qualitative diagnostic approaches in malnutrition assessment. Although serum concentrations of several visceral proteins (eg, serum albumin level and transthyretin) have been used as surrogate markers of nutrition status, recent evidence has demonstrated that these measures are neither sensitive nor specific to nutrition response, especially in patients with acute inflammation or liver and renal disease. Other techniques such as skinfold thickness measurements, bioelectric impedance analysis, dual energy X-ray absorptiometry, densitometry, ultrasound and magnetic resonance imaging have been used to assess body composition. Unfortunately, many of these approaches have only been used in research involving healthy individuals or in subgroups of patients with limited or specific comorbidities. In most settings, the utility of these techniques as a prognostic indicator for malnutrition is unknown. In addition, the feasibility of applying these techniques in different patient populations, especially those who are clinically unstable or critically ill, is limited.

Once a diagnosis of malnutrition is confirmed, the major ongoing challenges are to determine the optimal nutrition support regimen and to evaluate the adequacy of, and response to the prescribed regimen. We consider indirect calorimetry the gold standard in individualizing caloric needs for patients in the clinical setting, and it should be used when the accuracy of predictive equations is in doubt. Nevertheless, the results obtained from indirect calorimetry can be limited by the patient's clinical condition, practice setting, equipment costs, and required staffing. In addition, indirect calorimetry does not assess the adequacy of specific nutrients. As a result, additional tests such as 24-hour urine analysis for nitrogen balance is often necessary to provide a more thorough evaluation of the patient's needs and to monitor the response to the nutrition support regimen. Therefore, further research is needed to help refine our ability to individualize nutrition prescription to provide a more comprehensive, yet efficient and less labor-intensive caloric assessment.

Currently, there is no well-established, sensitive marker or diagnostic test that can provide a patient-specific assessment of response to nutrition therapies. In patients receiving prepyloric enteral feeding, determining feeding intolerance and when feeding should be withheld continues to be intensely debated. Future investigation should be directed at improving the assessment of gastrointestinal function and gastric emptying in patients, especially those who are enterally fed in ICU and non-ICU settings.

At present, a rudimentary understanding exists regarding how genetic variations, epigenetic events, and the gut microbiome affect patients' nutrient requirements and responses. Furthermore, little is known about individual-level responses to nutrition support regimens, the dose–response relationships associated with specific nutrients, how these factors are affected by nutrigenomics, and what factors predicts favorable or unfavorable clinical responses or events. With advances in technology and the ability to measure patients' metabolomic and microbiome profiles, the answers to these questions may have a significant impact on patient outcomes and could reshape nutrition support practices in the future.

Clinical Trials and Outcomes Research

There is a paucity of RCTs in the field of nutrition support. As a result, clinical practice guidelines have evolved from information gathered from studies of lower methodological quality (ie, small clinical trials, observational studies, and expert opinion). RCTs are needed in essentially every setting where nutrition support practice occurs (ICU and non-ICU hospitalized patients; rehabilitation, skilled nursing facilities, and nursing homes; clinics and patients' homes). These studies should enroll the full age range where nutrition support is practiced, especially in age-specific studies (eg, neonates, infants, children, adolescents, adults, geriatric patients). Moreover, since the "best" outcomes for effective nutrition support care are not yet identified, a broad range of clinical outcomes should be investigated (eg, mortality, infection, length of stay, readmission, growth in children, weight loss in

obese subjects, muscle strength and function, successful functional discharge) and the potential modifiers for nutrition risk (eg, aging, metabolic disorders, organ dysfunction and transplantation, cancer care, and failure to thrive) should be evaluated. To facilitate understanding of the complex interplay among nutrition and inflammation, inflammatory biomarkers (eg, C-reactive protein concentrations) and indices of the acuity and severity of illness (eg, APACHE II, PIM2, SOFA score, etc) should be evaluated in these trials. Large cohort studies such as the outcome data that will result from the Sustain™ home PN registry will build a strong foundation for research questions to be answered by RCTs.

Translational Research

Translational research is currently a major focus of the National Institutes of Health (NIH) and other federal and nonfederal funding agencies. Although definitions vary, the NIH defines translational research as the process of transforming laboratory discoveries into new therapies for patients. Other examples include translation of results from clinical studies into everyday clinical practice and healthcare decision making. This can include research that translates discoveries made through clinical RCTs performed at tertiary academic medical centers to clinical research studies based in "real-world" community settings. Other types of translational research focus on effective implementation of clinical research findings and clinical pathways in all practice settings (ie, tertiary academic medical centers to small community hospitals).

One of the major criticisms of current practice in nutrition support is that common clinical practices are often based on limited scientific data or mechanistic understanding and expert opinion. Thus, there may not be a strong rationale for use of specific EN and PN products in specific patient populations or medical conditions. For example, existing data that guide the clinical management of most drug–nutrient interactions are based mostly on anecdotal experience, uncontrolled observations, and opinions, whereas the scientific foundation of our understanding of the mechanism of drug–nutrient interaction remains quite limited. There is a need to bridge this, and similar gaps between the science and practice of nutrition support through clinical/translational research.

Another example of the need for translational research involves the longstanding debate on whether continuous enteral feeding decreases the oral bioavailability of certain drugs. This could be first addressed by conducting in vitro investigations on the physicochemical interaction between the target drugs and specific nutrients, comparing the intestinal transport and metabolic profiles of these compounds using cultured cell lines and animal models, determining how nutrients and drugs alter the function and genomic expression of their target transport proteins, and designing RCTs comparing the clinical outcomes of different management approaches. Similar research is necessary in predicting drug–nutrient interactions in the parenterally fed patient with additional emphasis on physiochemical compatibility considerations.

Increasing evidence suggests that diet and nutrition have direct and indirect roles in gene expression, epigenetic regulation, protein production, and metabolic profile. To date, little nutrition-oriented research has been performed using these newer approaches. Using genomic, epigenomic, transcriptomic, proteomic, and metabolomic analysis of biological samples, the field can begin to think about application of data generated from these approaches in the design of interventional trials in nutrition support. These approaches have already been adopted in major clinical trials in pharmaceutical research and cancer treatment. The incorporation of "omic-based" research in nutrition support would help achieve the goal of prescribing personalized nutrition support to individual patients.

Safety

In addition to the science of nutrition support, it is also important to continue to evaluate the safe practice of nutrition support. This is a particularly important issue because of challenges associated with economic shortfalls in the healthcare system. Some of these research priorities have been previously addressed in A.S.P.E.N.'s Parenteral Nutrition Safety Consensus Recommendations and its 2009 Enteral Nutrition Practice Recommendations. Areas needing research include safe prescribing, order review, compounding and administration. Enteral and parenteral access-related issues including placement and reduction of access-related complications are also in need of further study. The fallout from recent contamination of both PN and EN formulas points to the need for improved approaches to best practices for PN and EN delivery systems and error reporting. The continued challenge of medication and drug shortages, especially with parenteral electrolytes and micronutrients, has reaffirmed the urgent need for research to develop alternate products, regimens, or methods of nutrient delivery that are safe and effective in preventing nutrient deficiency in patients who are dependent on nutrition support. Only with further research on process questions will practice improve and these therapies become safer.

Summary and Future Actions

A.S.P.E.N.'s RC has identified research priorities ranging from improving the definition of malnutrition to the design and implementation of RCTs in specific areas and patient populations. This document serves not only as a call to action for nutrition support investigators, but also as a guide for these investigators and sponsors in their efforts to conduct and support nutrition support research that is likely to have the greatest impact in the short term. The final section of this document provides a list of specific research topics and challenges in nutrition support that A.S.P.E.N. believes are in greatest need of immediate attention. It is also hoped that both researchers