

# Educational Opportunities in Nutrition: An Integrated Needs Assessment

Prepared and Submitted By:



Submitted to:

Abbot Nutrition

11/3/2010

**Contents**

**Introduction ..... 2**

**Methodology..... 5**

**Neonatal Intensive Care Unit..... 11**

Interviews..... 11

Survey Instrument..... 11

Implications of NICU Data ..... 24

**Critical Care Unit ..... 27**

Interviews..... 27

Survey Instrument..... 27

Implications Of Critical Care Unit Data ..... 38

**Primary Care..... 41**

Interviews..... 41

Survey Instrument..... 41

Implications of Primary Care Data ..... 49

**Conclusions ..... 52**

**Appendix 1: NICU Survey ..... 53**

**Appendix 2: NICU Survey Results..... 57**

**Appendix 3: CCU Survey ..... 67**

**Appendix 4: CCU Survey Results ..... 72**

**Appendix 5: Primary Care Survey ..... 84**

**Appendix 6: Primary Care Survey Results ..... 88**

**Appendix 7: Bibliography ..... 99**

**Appendix 8: References ..... 101**

## Introduction

When designing education for individuals who manage nutrition, an in-depth needs assessment is crucial to identify and analyze educational needs, practice barriers, and the best practices to reach treatment goals. The following needs assessment utilizes data from a variety of sources obtained in a stepwise approach; findings from an in-depth analysis of each component were used to inform development and direction of subsequent steps. Final conclusions, pearls, and implications for CE were created through the analysis of data sources separately and collectively.

The three topics investigated were nutrition for preterm infants in the neonatal intensive care unit (NICU), nutrition for adult patients in the critical care unit (CCU), and the outpatient treatment of adults who require supplemental nutrition due to one or more chronic conditions. Each topic was assessed independently using standardized methodology.

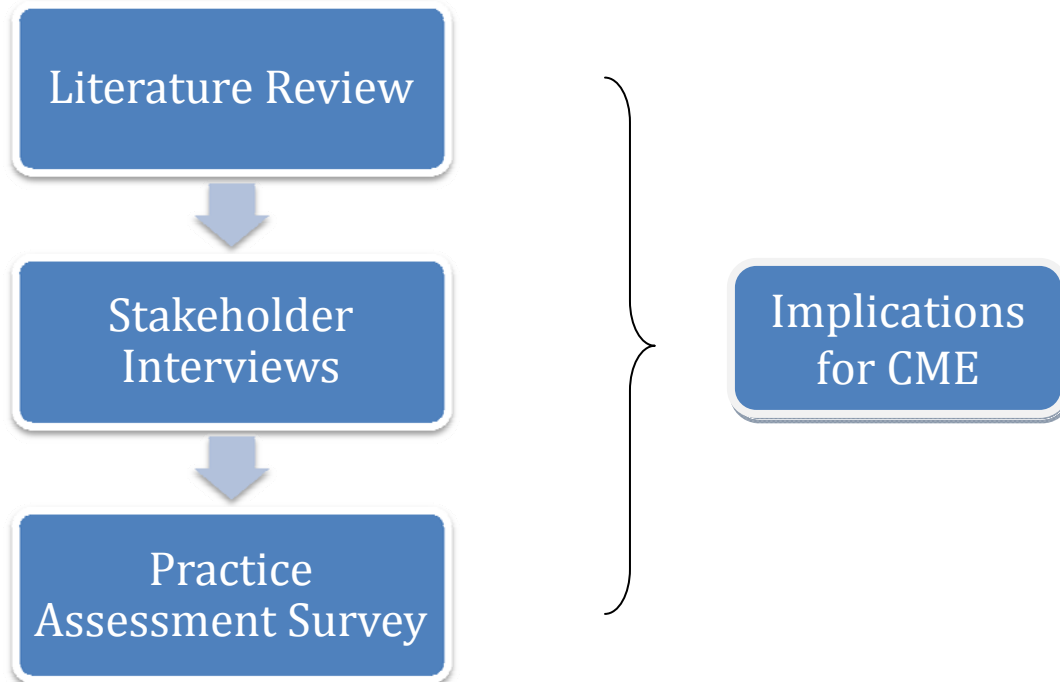
A **survey of clinical literature** examined clinical literature and guideline recommendations relating to nutrition management. Key topics included causes of nutrition deficits, nutrition screening and assessment, management strategies, follow-up, feeding intolerance, choice of formulation, and care of special populations.

Drawing from nutrition literature and clinical guideline data, we formulated a set of questions for **stakeholder interviews**, which we conducted with physicians, nurses, and dietitians. Interviews identified key issues and influences on clinical behavior and practice management that impact therapeutic decision-making.

Data from the clinical literature and stakeholder interviews were evaluated to develop three **practice assessment surveys** disseminated to health care practitioners. Each survey was comprised of six sections:

- Demographics
- Competency assessment
- Attitude toward change
- Barriers to optimal care
- Knowledge and practice assessment

An aggregate analysis of the responses from each survey summarized results from the study population as a whole. A list of detailed conclusions about clinician knowledge, attitudes, practices, and gaps to care surrounding nutrition management were developed based on examination of data from the practice assessment survey. These findings, together with data from the literature and stakeholder interviews, informed a set of **implications for future continuing medical education**.



This needs assessment project was funded by an independent educational grant from Abbott Nutrition Health Institute. The needs assessment was developed in compliance with ACCME standards.

The plan and materials for this project were submitted to the University of Wisconsin-Madison Health Sciences Institutional Review Board (IRB). An initial review determined that the project was of minimal risk; it was consequently granted exemption from further review.

The partners involved in the design, implementation, analysis, and reporting of the nutrition needs assessments were chosen based on their principled commitment to developing and providing quality continuing medical education.

### **University of Wisconsin Office of Continuing Professional Development (OCPD)**

The University of Wisconsin-Madison is considered to be one of the world's premier public research universities and the School of Medicine and Public Health is well known for its numerous excellent clinical programs and academic departments.

The University of Wisconsin is also home to the largest academic CME unit in the country. With over 20 employees, the University of Wisconsin Office of Continuing Professional Development in Medicine and Public Health (UW-OCPD) has established itself as an innovative unit that embraces continuous quality improvement and a scholarly approach to its educational offerings. In 2009, the school's CME program delivered 275 activities to over 30,000 learners. Further, UW-OCPD has a proven track record of managing complex partnerships that focus on strategic CME initiatives.

In 2006, the University's CME program was awarded the status of Accreditation with Commendation for the third consecutive time (1994, 2000, and 2006) and received seven findings of exemplary compliance from the Accreditation Council for Continuing Medical Education (ACCME).

The school is a pioneer in the development and implementation of performance improvement initiatives that go well beyond the traditional approach to CME. Indeed, UW-OCPD initiatives incorporate innovative educational formats, program development, adult education, organizational and systems thinking, and interventions that facilitate change in clinical practice and behavior. UW-OCPD is known for programs based largely on the recently adopted core physician competencies in lifelong learning, self-assessment, self-directed learning, and documented improvement.

### **Healthcare Performance Consulting (HPC)**

Healthcare Performance Consulting develops and implements strategies to drive behavior change in clinicians, patients and others within healthcare systems in order to attain specific and measurable quality and cost outcomes for clients.

The core competency of HPC is its ability to assess the current performance of physicians and other healthcare practitioners, analyze forces and barriers that influence performance, and develop strategic approaches that will change the behavior, where it is ethical and medically appropriate to do so. This is accomplished by taking a *systems approach* to changing behavior.

The HPC consultants each have over 25 years of experience in the healthcare system and have presented their expertise at national meetings of CME educators and researchers of physician behavior change. Clients have included large employers, managed care organizations, and CME providers. HPC has consulted on projects in a variety of clinical areas. HPC experience and core competencies include: needs analysis and outcomes measurement, medical education, training and education, organizational development, management and quality improvement.

### **Interstate Postgraduate Medical Association (IPMA)**

Since its foundation in 1916, Interstate Postgraduate Medical Association of North America has continuously maintained its original goal of physician education that positively impacts patient care. As a not-for-profit 501(c)(3) educational association, IPMA's stated mission is the dissemination of medical knowledge and the improvement of physicians' ability to prevent, detect, and treat disease. A diverse array of educational activities and initiatives apply evidence-based adult learning strategies to transform practice, ultimately improving patient health.

Throughout its 94-year history, IPMA has been guided by some of medicine's great teachers: William J. Mayo, MD; Charles H. Mayo, MD; Frank H. Lahey, MD; Charles W. Mayo, MD; Alton Ochsner, MD; Robert M. Zollinger, MD; Morris Fishbein, MD; and John L. Ochsner, MD. This tradition of excellence

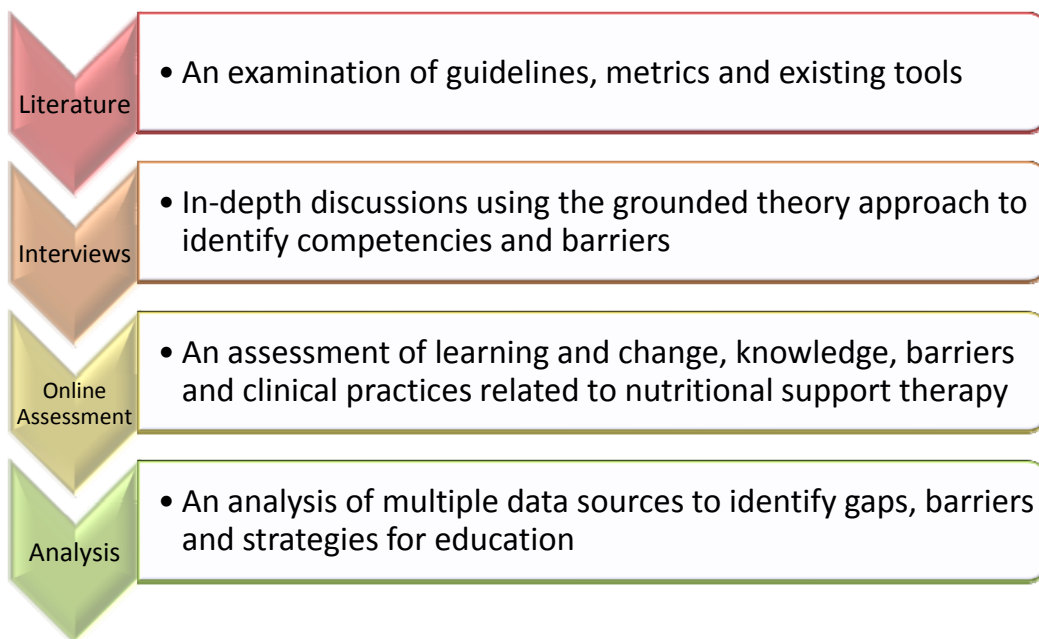
continues today in education that incorporates thorough needs assessment, quality faculty, relevant topics, and in-depth outcomes measurement, all targeted at improving physician performance and patient care.

A number of initiatives exemplify IPMA's commitment to excellence in education. The Primary Care Update, IPMA's annual international conference, targets identified educational needs of primary care providers. National performance improvement initiatives are executed in collaboration with the AMA Physician Consortium for Performance Improvement Advisory Committee, the Iowa Foundation for Medical Care, and the American Academy of Family Physicians. In addition, IPMA is a member of Cease Smoking Today (CS2day), an education partnership that was awarded ACME's Award for Collaboration in CME in 2009. Finally, a series of comprehensive, in-depth needs assessments detail the educational needs of health care providers in a number of clinical areas, including overactive bladder, nutrition, and chronic pain.

IPMA received accreditation with commendation from the ACCME in 2007.

## Methodology

Data on best practices, current practices, educational and practice gaps, and knowledge were collected via a variety of methods, including literature review, expert faculty input, in-depth stakeholder interviews, and quantitative surveys. The needs assessment process was executed for each of the three nutrition topic areas.



## **LITERATURE ASSESSMENT**

Principal literature sources in each clinical area were identified through PubMed searches and additional research in key peer-reviewed journals. Relevant clinical guideline documents were located through searches on PubMed, the National Guideline Clearinghouse, and Google. In addition, expert faculty suggested other literature sources commonly utilized by healthcare professionals. A list of key sources is presented in Appendix 7 (pg 99).

A summary of literature findings and guideline recommendations defined an evidence-based standard of care, informed interview content, and directed foundational portions of the survey assessment tool.

## **COMPETENCY DEVELOPMENT**

Project partners referenced clinical literature and guidelines to create a series of clinical competencies for each therapy area. They were validated by clinical experts, then refined throughout the course of the stakeholder interviews. The competencies represented the standard against which we compared current clinical performance, thereby identifying practice gaps. Each of the three target learner groups — NICU, CCU, and primary care — had competencies specific to their clinical practice.

## **INTERVIEWS**

To better understand the needs of the learner, in-depth qualitative interviews were conducted with stakeholders who currently practice in the NICU, CCU, or primary care settings. Recruitment for interviews was completed through an email invitation, broadcast through Medscape to the appropriate learner groups. Forty-nine stakeholder interviews were completed, targeting physicians (33), nurses (10), dietitians (4) and pharmacists (2). The interviews lasted 45 to 60 minutes; initial interviews for each stakeholder group were completed in person, while remaining sessions were conducted by telephone. The interviewees compensated for their participation. The purpose of the interviews was to identify key issues and influences on clinical behavior and practice management. The interviews identified touch points in the assessment and management of nutrition, thereby informing survey development.

Specialist	Number interviewed
<b>NICU</b>	
Neonatologists	11
NICU nurses	5
NICU dietitians	2
Pharmacists	2
<b>CCU</b>	
Hospitalists/internists	11
CCU nurses	3
CCU dietitians	2
<b>Primary Care</b>	
Primary care physicians	11

The interview methodology was based on a grounded theory approach.<sup>1</sup> The interview guide was constructed with open-ended questions designed to solicit clinical and practice issues most important to the target learner. The interviews allowed the respondents to identify problems in nutritional support, potential solutions to these problems, and barriers to best practice. Physicians' current practices were compared with clinical practice guideline recommendations. Changes in nutritional support practices were explored at the end of the interviews. Findings from these interviews along with current guidelines, practice standards, and expert assistance were used to develop and refine items included in the Practice Assessment Survey, as well as to help interpret results.

## ASSESSMENT TOOL

The clinical literature, interviews, and expert input informed the development of three surveys designed to assess the following five themes:

- Demographics
- Competency assessment
- Attitude toward change
- Barriers to optimal care
- Knowledge and practice assessment

Independent measures of each of these dimensions are critical to understanding the current state of clinical care and the most valuable practice improvement strategies. The individual assessment sections are representative of the broader concepts underlying varied dimensions of practice influence and are not meant to be a comprehensive measure of those dimensions.

The assessment tool was distributed and completed on-line. The full survey instruments can be found in Appendices 1 (NICU), 3 (CCU), and 5 (Primary Care). The specific development and content of each of the five themes are detailed below.

### ***Demographics***

The demographic section of the survey collected basic data on survey participants, their training and practice setting. Participant responses during stakeholder interviews initially indicated that practice setting may affect clinical practices. Therefore, demographic data in this area was collected in order to later analyze results.

### ***Competency Assessment***

The tool measured clinicians' perceived needs with respect to clinical competencies, which were written by clinical experts based on current guidelines and well-accepted standards, then validated with practicing physicians during the interview process to ensure clarity and relevance. Each of the three target learner groups — NICU, CCU and primary care — had competencies specific to their clinical practice. The design of this instrument is based on the Theory of Learning and Change in Physicians formulated by Fox and colleagues.<sup>2</sup>

Respondents were asked to rate their present and desired levels of ability on a 1-5 scale (1- low, 5- high) for each competency. The difference between the present and desired ability represents the perceived practice gap for each item.

### ***Attitude Toward Change***

Respondents were asked to rate their agreement with 3 statements related to their attitude about current practices and the need for change. The same standard questions were included in each of the three assessment tools:

- The way I practice in this clinical area is acceptable to me.
- I may need to change one or more of my clinical practices in this area.
- I plan to change the way I practice in this area in the near future.

In clinical areas where gaps have been identified, respondents would ideally report low satisfaction with current practices and high ratings on the need and plan to change statements.

## ***Barriers to Optimal Care***

The interviews with healthcare providers focused, in part, on problems that clinicians encounter in their daily practice. As part of a comprehensive needs assessment, it was important to identify these barriers in order to address them in educational offerings and strategies for improving care. Barriers specific to each of the three learner groups were chosen to assess the degree to which clinicians perceive barriers to optimal care.

Barriers are real or perceived issues that prevent clinicians from utilizing best practices. Understanding the nature and magnitude of these barriers allows educational designers to address them through interventions, thereby producing changes in competence and clinical performance as well as acquisition of knowledge.<sup>3</sup>

## ***Knowledge and Practice Assessment***

This tool assessed physician knowledge surrounding practice strategies and systemic issues; questions were based on literature findings, guideline recommendations and interview findings. The questions and responses were developed by experts in the area of nutritional support.

## ***Assessment Tool Dissemination***

An email invitation from the University of Wisconsin School of Medicine and Public Health, including a link to the on-line assessment, was sent to clinicians matching the target learner group for the needs assessment. This email was disseminated through Direct Medical Data and Medscape. Email recipients were informed that for each survey completed, a donation of \$15 would be made to a charitable organization. The sample of clinicians sent the email included:

- Neonatologists and hospital-based pediatricians – 2000
- Critical care physicians (including hospitalists, intensivists, pulmonary specialists) – 2000
- Family medicine physicians – 2000
- General internal medicine physicians – 2000
- Neonatal, CCU registered dietitians – 4000
- Neonatal, CCU registered nurses – 4000

A total of 586 clinicians representing the target learner groups completed the assessments. The demographics of the participant sample are believed to approximate the demographics of practicing physicians in the target specialties. One limitation of e-mailed surveys is spam interception, so steps were taken to maximize the number of emails that are actually received by the target group. However, the percentage of emails actually opened by clinicians is fairly low.

## **DATA ANALYSIS**

The data were analyzed using SPSS v18. Evaluation of the results focused on identifying gaps between perceived and ideal practice, gauging readiness for change, and understanding educational needs. Frequencies and mean statistics were examined for the overall samples as well as for professional groups within the samples (e.g., MD, RN, RD). Follow-up analyses included examination of cross

tabulations to identify patterns within the data. These quantitative data were compared to qualitative data gathered in the stakeholder interviews in order to gauge consistency in findings across the two methods.

Following data analysis, project partners met in person to review the findings. Through detailed discussion, they reviewed the obtained qualitative and quantitative data, analyzed them collectively, and completed a comprehensive list of pertinent findings. These findings subsequently informed a list of implications and recommendations for future continuing medical education.

## **EXPERT FACULTY**

The following expert faculty assisted with content development and review. Further, each aided in analysis of the data and development of educational recommendations.

- Frank R. Greer, MD (uncompensated)
- Gail Underbakke, RD, MS
- Kenneth A. Kudsk, MD

# Neonatal Intensive Care Unit

## INTERVIEWS

Twenty physicians, nurses, dietitians, and pharmacists who work with preterm infants were interviewed about their attitudes and practices in the neonatal intensive care unit (NICU) setting. A number of themes were identified:

➤ **Problems in practice**

- A lack of evidence for nutritional goals and specific nutrient requirements
- Issues with breastfeeding mothers
- Poor hygiene when expressing milk
- Difficulties in tolerance and advancement of feedings
- Poor growth and what to do about it
- Necrotizing enterocolitis
- Issues with total parenteral nutrition (TPN), including:
  - Infusion site
  - Unstable glucose levels
  - Side effects of long-term use
  - Difficulty starting at night or weekend

➤ **Variances in practice**

- Use of probiotics
- The timing of enteral nutrition initiation (trophic feeding)
- Whether and how much to fortify breast milk
- Advancement amount
- Expertise of nutrition team members

➤ **Barriers to best care**

- Parent education on feeding
- Nursing staff “buy in” to protocols and philosophy
- Agreement to protocols by staff (specialists and nurses)
- Lack of evidence on best approach
- Formulary restriction
- Cost of formulas

## SURVEY INSTRUMENT

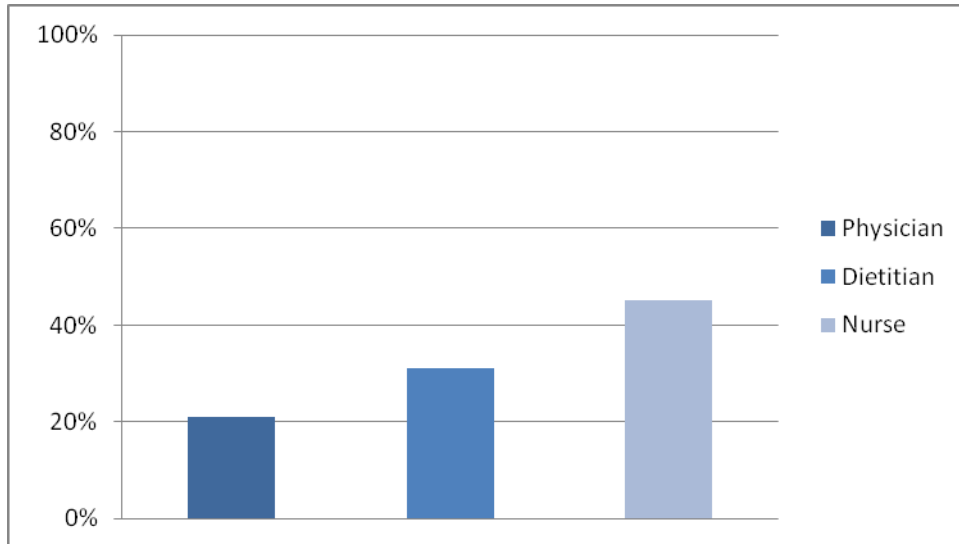
Findings from the stakeholder interviews, supplemented by data from clinical literature and guidelines, informed the creation of a NICU survey document to assess clinician practices, attitudes, and barriers.

One hundred eighty-two practicing clinicians completed the survey. The complete assessment tool is reproduced in Appendix 1 (pg 53).

Selected survey results are discussed in this section, while complete results are presented in Appendix 4 (pg 72).

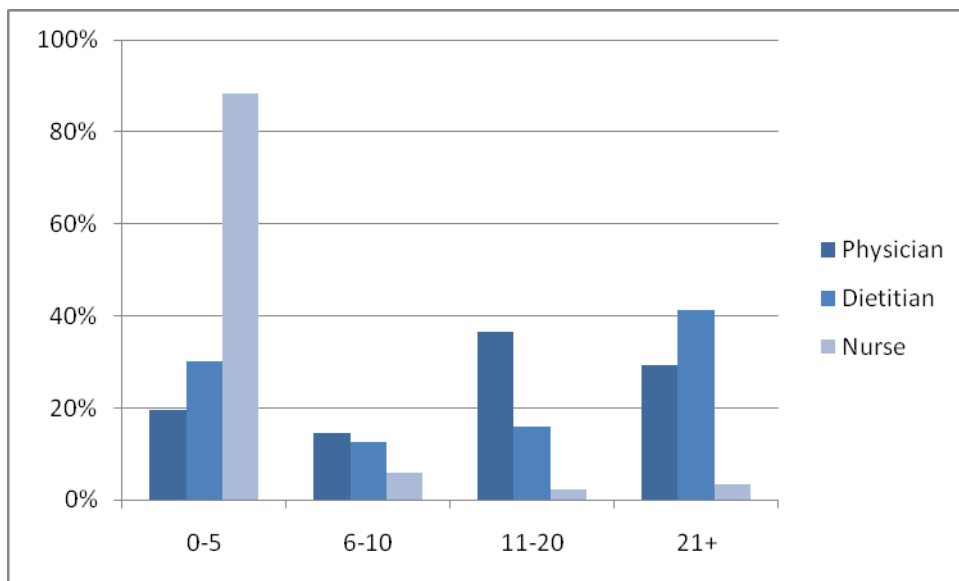
## Demographics

**Please select your degree/certification:**



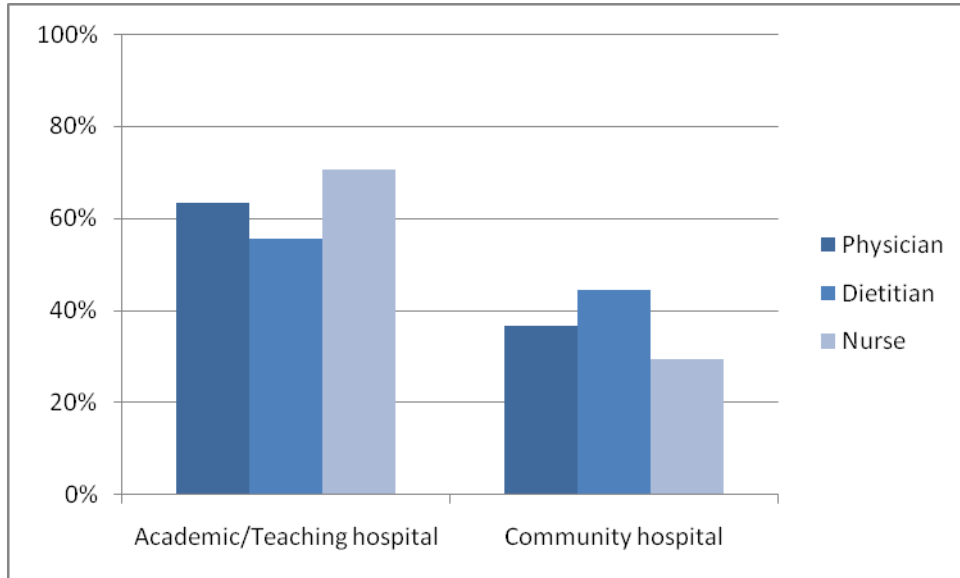
One hundred eighty-two currently practicing clinicians completed this survey (40 MDs/DOs/NPs, 58 dietitians, and 84 nurses). The MD/DO/NP group is hereafter referred to as *physicians*.

**On an average day, how many pre-term infants are under your care?**



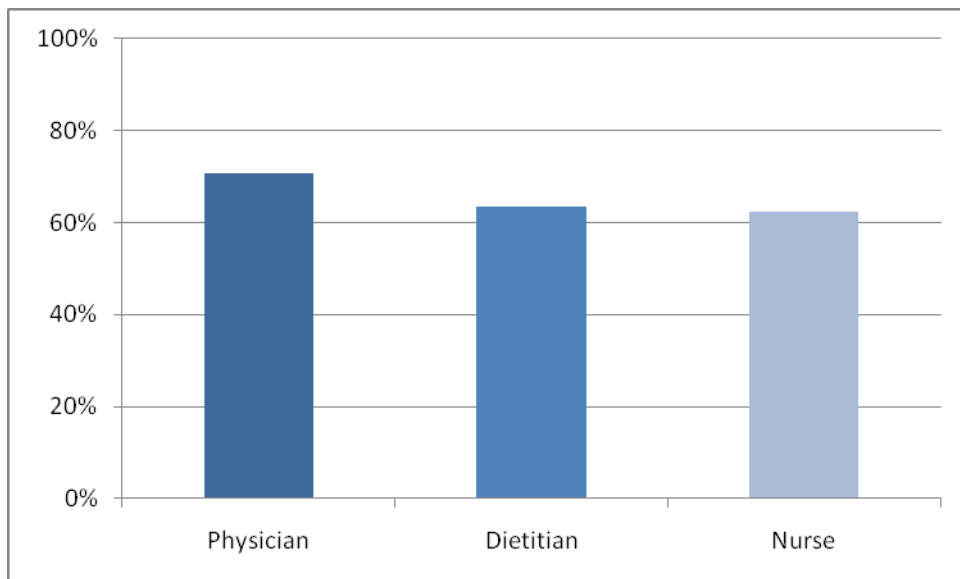
Responses to this question differed considerably between stakeholder groups. Nurses cared for fewer patients on average, with 88% of respondents caring for fewer than six preterm infants on an average day. On the other hand, 57% of dietitians and 65% of physicians cared for eleven or more patients on an average day.

***Which of the following best describes the setting where you provide most of your care to pre-term infants?***



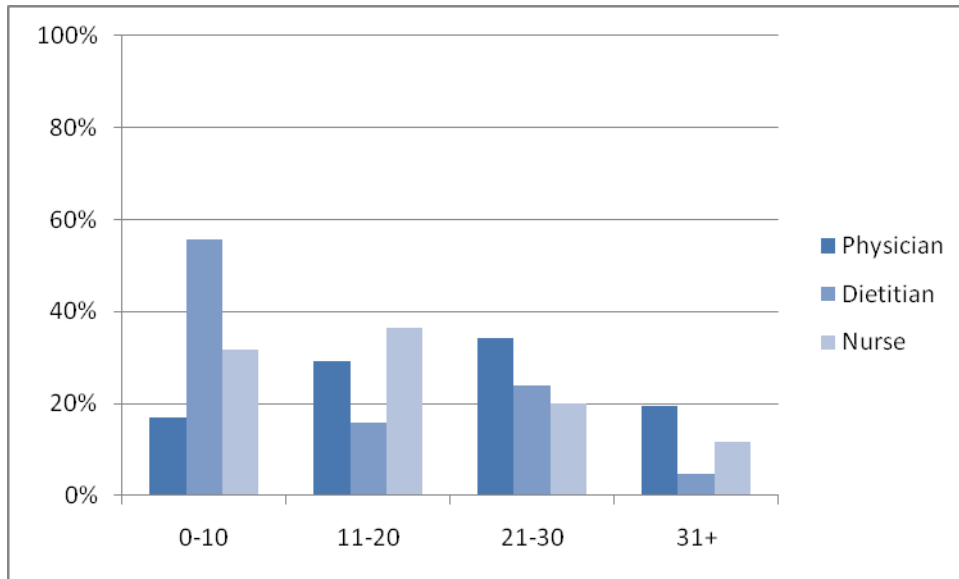
Physicians, dietitians, and nurses were all more likely to practice in an academic or teaching hospital setting. This tendency was most pronounced among the nursing group of respondents.

***Do you have access to, or are you part of, a nutrition team in your institution?***



Seventy-one percent of physicians, 63% of dietitians, and 62% of nurses reported having access to or being part of a nutrition team. The definition of “nutrition team” was left open to the respondent’s interpretation.

***Please indicate how many years you have been in practice (since residency/training).***



Survey participants were asked how many years they had been in practice, a variable that often – although not always – correlates with age. The most common response was 21-30 years. The majority of dietitians had been in practice for fewer than ten years, while nurses and physicians had more years of experience.

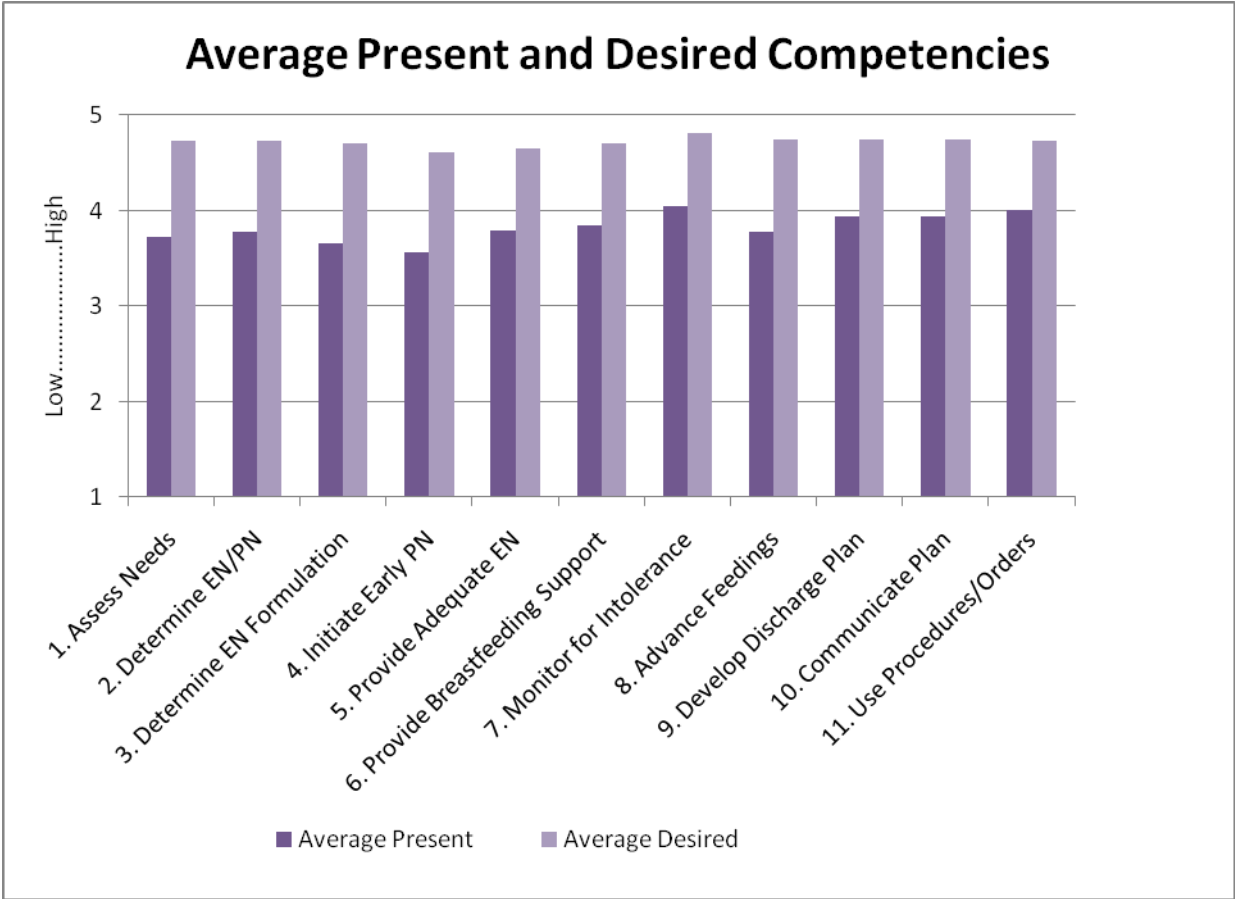
### ***Competency Assessment***

For the list of competencies, respondents were asked to rate both their present and desired levels of ability on a one-to-five scale (1-low, 5-high). The competencies, listed roughly in order of their appearance in the patient encounter process, were as follows:

1. Assess the nutritional needs of the pre-term infant, including nutrients, fluid and energy needs.
2. Determine the type of nutrition (parenteral or enteral) warranted.
3. Determine the appropriate enteral formulation, including human milk and nutrient levels for the infant’s needs.
4. Initiate early parenteral feeding at the appropriate levels of macronutrients (protein, lipid, carbohydrate).
5. Provide adequate enteral nutrition, including trophic feedings, for the pre-term infant.

6. Provide the infant’s mother with breastfeeding support, encouragement, and education.
7. Monitor for feeding intolerance including necrotizing enterocolitis.
8. Advance feedings while managing intolerance issues.
9. Develop a discharge plan to promote growth, including the use of human milk and post-discharge formula.
10. Effectively communicate a discharge plan with parents and the primary care physician.
11. Utilize written procedures/orders when managing nutrition for pre-term infants.

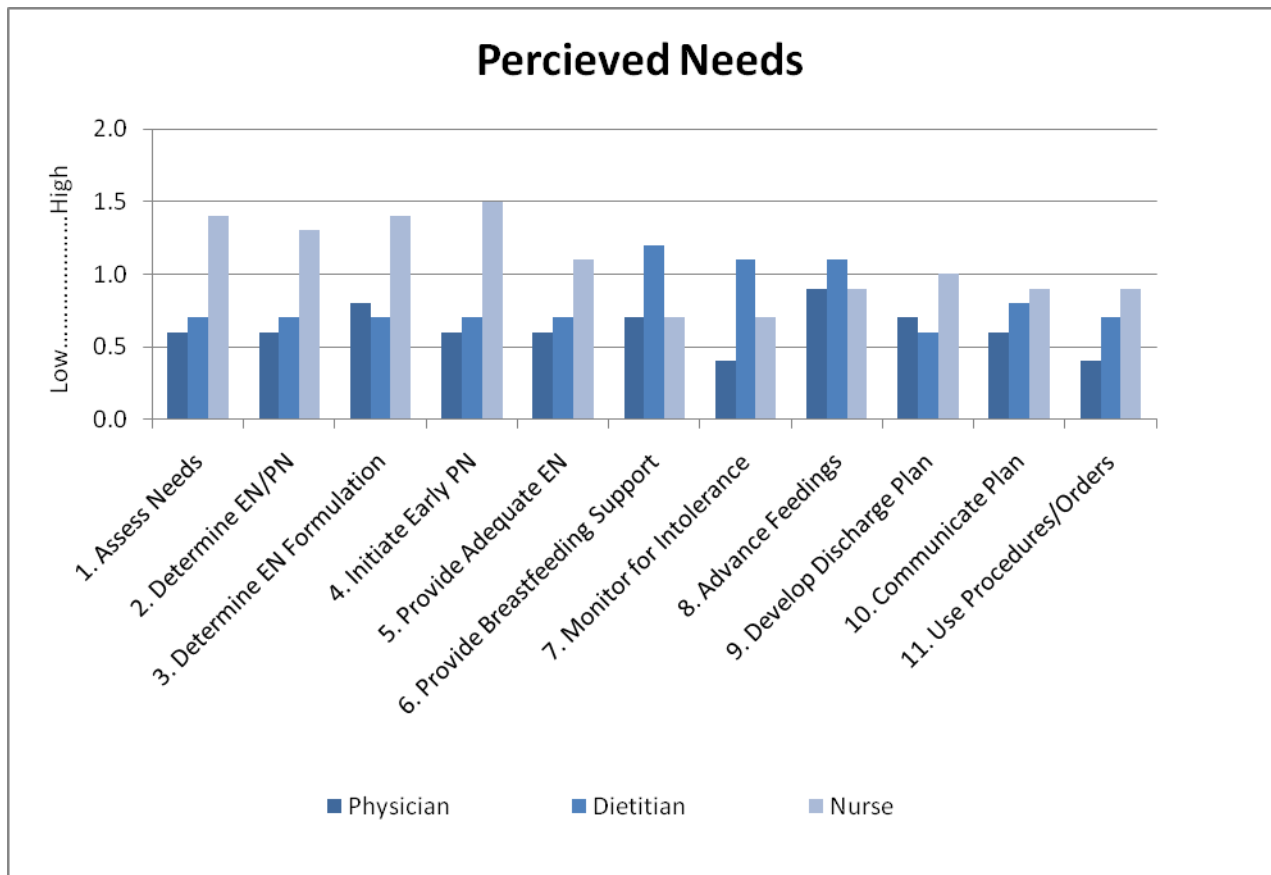
The following graph details the average perceived present and desired competencies for all respondents.



The left-hand bars (dark purple) indicate respondents’ present levels of perceived ability. These items revealed some variability. The lowest-rated competencies include: *determine the appropriate enteral formulation*; *provide breastfeeding support, encouragement, and education*; and *advance feedings while managing intolerance issues*. The highest-rated competency was *monitor for feeding intolerance*.

The right-hand bars (light purple) indicate respondents' desired levels of ability. These desired competencies were rated very high for all items; in fact, all physician respondents rated competency seven, *monitor for feeding intolerance including necrotizing enterocolitis*, as 5.0 — an unprecedented desired competency level in our researchers' experience. These high ratings indicate that clinicians believe that each of these competencies is an essential skill in the NICU setting.

The following graph represents the perceived competency gap between respondents' present and desired abilities. This gap between the perception of "what is" and "what ought to be" corresponds to physicians' perceived needs or motivation to learn and change. A gap of 0.5 or higher is considered to be meaningful, while a gap of 1.0-2.0 is ideal for clinician education.



On average, physicians reported the lowest competency gaps; the majority lie between 0.5 and 1.0. Although *monitor for intolerance* was rated the highest desired competency, it also rated highly as a current competency; as a result, it is one of the lowest gaps for physicians, together with *utilize written procedures and orders*. Physicians' highest competency gap was *advance feedings while managing intolerance issues*.

In eight of the eleven clinical competencies, nurses' gaps were highest. The first four competencies (*assess nutritional needs, determine the type of nutrition warranted, determine appropriate enteral*

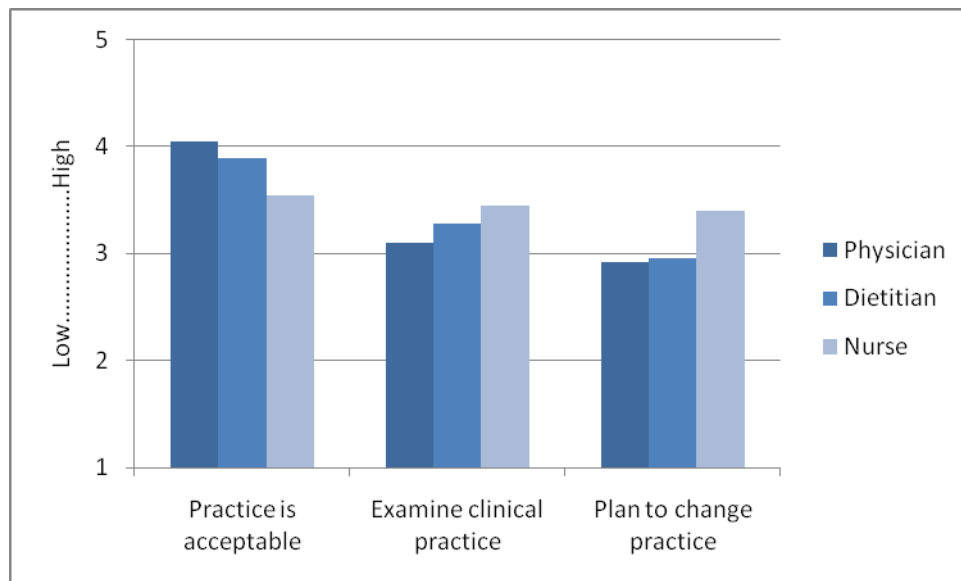
*formulation, and initiate early parenteral feeding*) had the highest clinical gap for nurses. However, in many care units these duties are the responsibility of physicians or dietitians, rather than the nursing staff; therefore, high competency gaps in these areas invite further research.

Similarly, the highest competency gap for dietitians was provide *breastfeeding support, encouragement, and education*, which in many cases is the responsibility of a lactation consultant or nurse rather than the dietitian. However, it should be noted that this competency was also dietitians' lowest desired competency, indicating that although the gap appears high, dietitians recognize that this area is not necessarily their responsibility.

### **Attitude Toward Change**

In this section, respondents were asked to rate their agreement with the following statements related to attitude toward change:

- The way I practice in this clinical area is acceptable to me.
- I may need to change one or more of my clinical practices in this area.
- I plan to change the way I practice in this area in the near future.



In clinical areas with moderate practice gaps, the expected response pattern would look like a downward-sloping stair-step pattern. Physician respondents most closely approximated the traditional pattern; of the three stakeholder groups, they were the most content with current practices and least likely to report planning to change their practice in the near future. Nurses, on the other hand, rated their current practice as less acceptable, and were more likely to plan to change their practice. Dietitian responses fell between the two other groups.

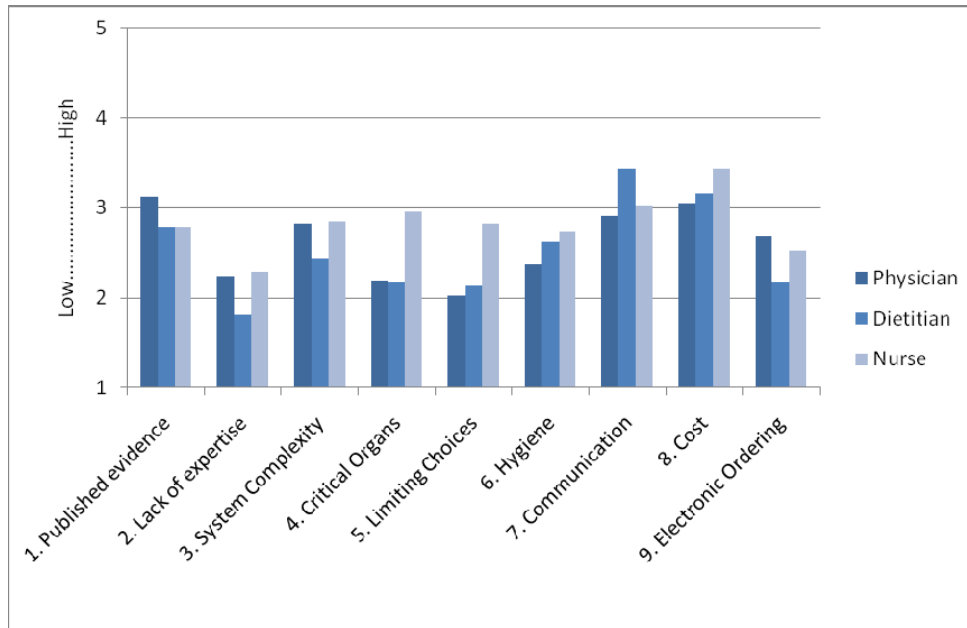
It is notable that the average responses for *I plan to change my practice in the near future* are relatively high compared to the expected response. This suggests that NICU clinicians are open to change surrounding their practices in nutrition.

### ***Barriers to Best Practice***

In order to assess the impact of barriers to best practice, respondents were asked to rate their agreement with the following statements:

1. Published evidence does not provide enough guidance in nutrition management.
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.
4. The need to manage critical organ systems limits my ability to focus on nutrition.
5. Formulary restrictions limiting choices in formula hinder optimal management.
6. Hygiene in mixing formulas and by mothers expressing breast milk is an issue.
7. Communication with practicing pediatricians is insufficient to ensure optimal feeding occurs once the infant leaves the hospital.
8. The cost of specialized formula causes parents to switch therapy too quickly.
9. Electronic ordering for nutrition is cumbersome.

The following graph details respondents' agreement with these barrier statements. Higher ratings represent more burdensome barriers to best practice.



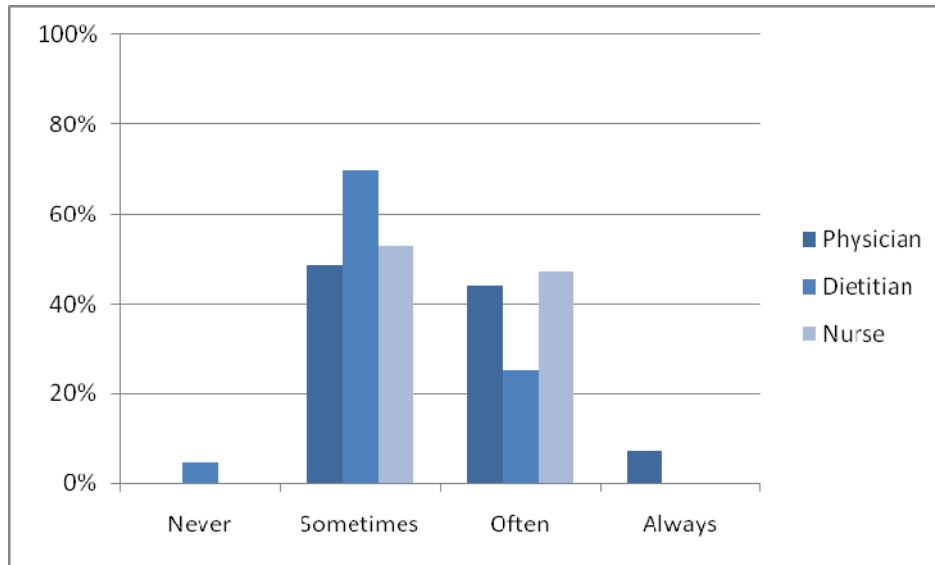
Although none of the listed barriers were rated overwhelmingly high, several averaged at or above the midpoint (3). On average, nurses reported the highest barriers. Particular practice challenges include communication with pediatricians after discharge, the cost of specialized formula, and a lack of nutrition management guidance in published evidence. The last item likely reflects that there are topics in which clinicians are unfamiliar with literature and possibly areas in which evidence is lacking.

In many cases, it is revealing to determine what percentage of respondents rated barriers as high (4 or 5 on a 5-point scale). For example, twenty percent of respondents rating a barrier as high translates to one out of five clinicians who view this item as a significant challenge in their practice.

Barriers	% rating high (4 or 5)		
	Physician	nurse	dietitian
1. Published evidence does not provide enough guidance in nutrition management.	45	19	24
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.	22	18	10
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.	34	29	21
4. The need to manage critical organ systems limits my ability to focus on nutrition.	22	36	22
5. Formulary restrictions limiting choices in formula hinder optimal management.	9	33	17
6. Hygiene in mixing formulas and by mothers expressing breast milk is an issue.	17	32	22
7. Communication with practicing pediatricians is insufficient to ensure optimal feeding occurs once the infant leaves the hospital.	39	39	51
8. The cost of specialized formula causes parents to switch therapy too quickly.	40	52	41
9. Electronic ordering for nutrition is cumbersome.	27	20	13

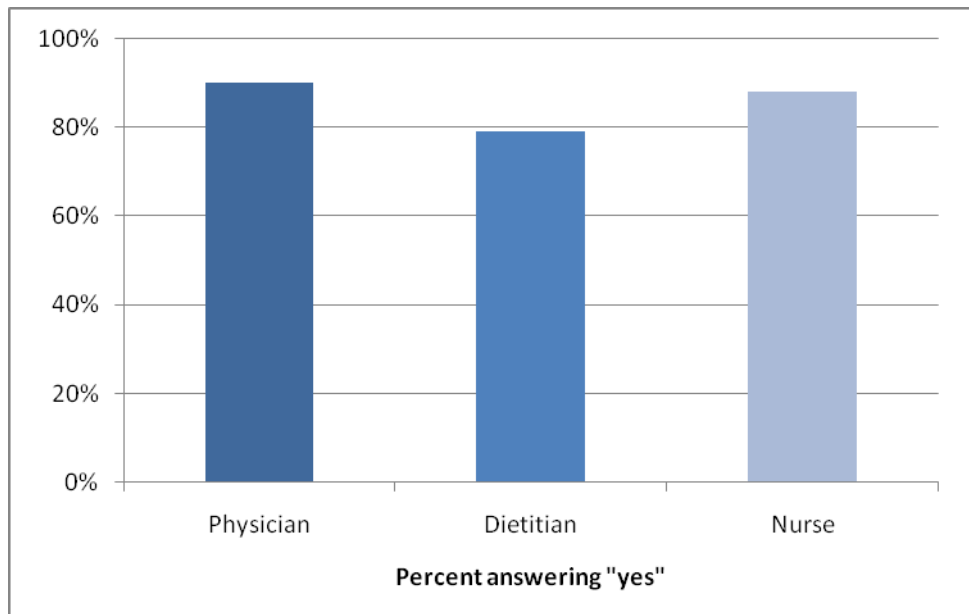
## Knowledge and Practice Assessment

*At your site, how often do pre-term infants experience difficulty tolerating formula?*



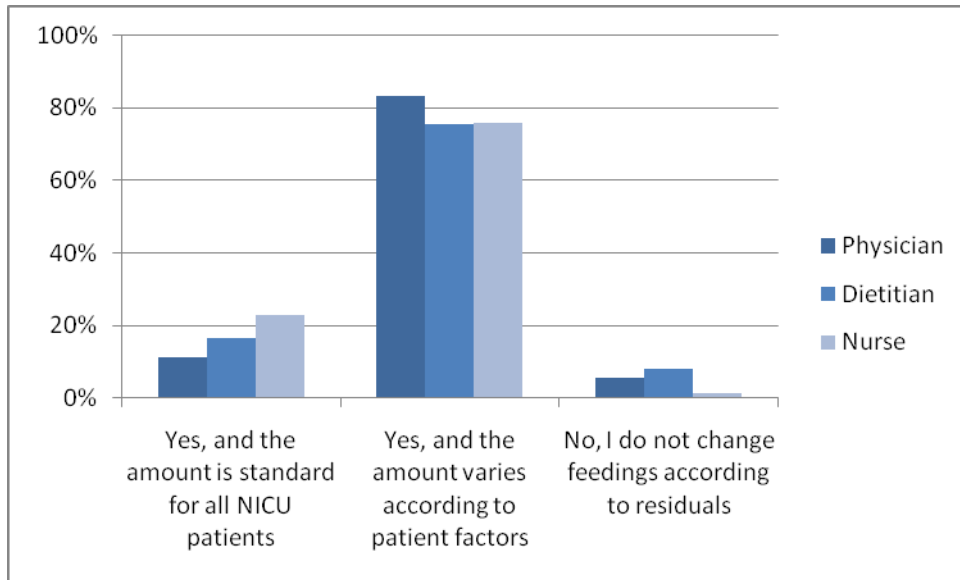
Almost all respondents reported experiencing difficulties in tolerance in their practice. Dietitians, on average, did not experience this problem as often as physicians and nurses.

*Do you measure residuals after feedings for pre-term infants at your site?*



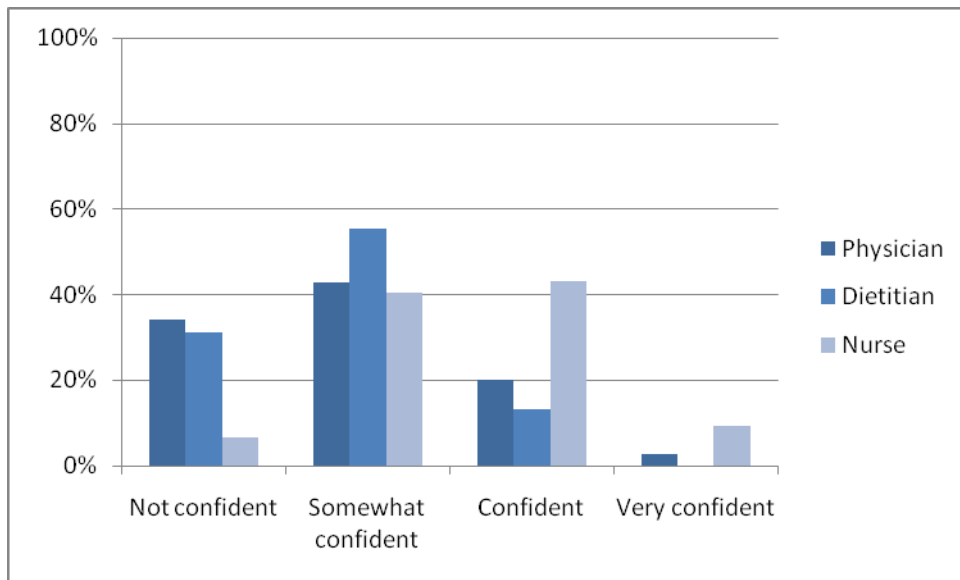
The vast majority of physician, dietitian, and nurse respondents reported measuring residuals after feeding preterm infants.

***Is there a residual amount that causes an alteration in feedings?***



The majority of participants indicated that they alter feedings due to residual amounts on a case-to-case basis according to patient factors. A small number of respondents adjusted feedings on a standardized basis or did not adjust them at all.

***(For respondents who answered “Yes” to the previous question) How confident are you that this residual is the correct amount to be considered too much?***

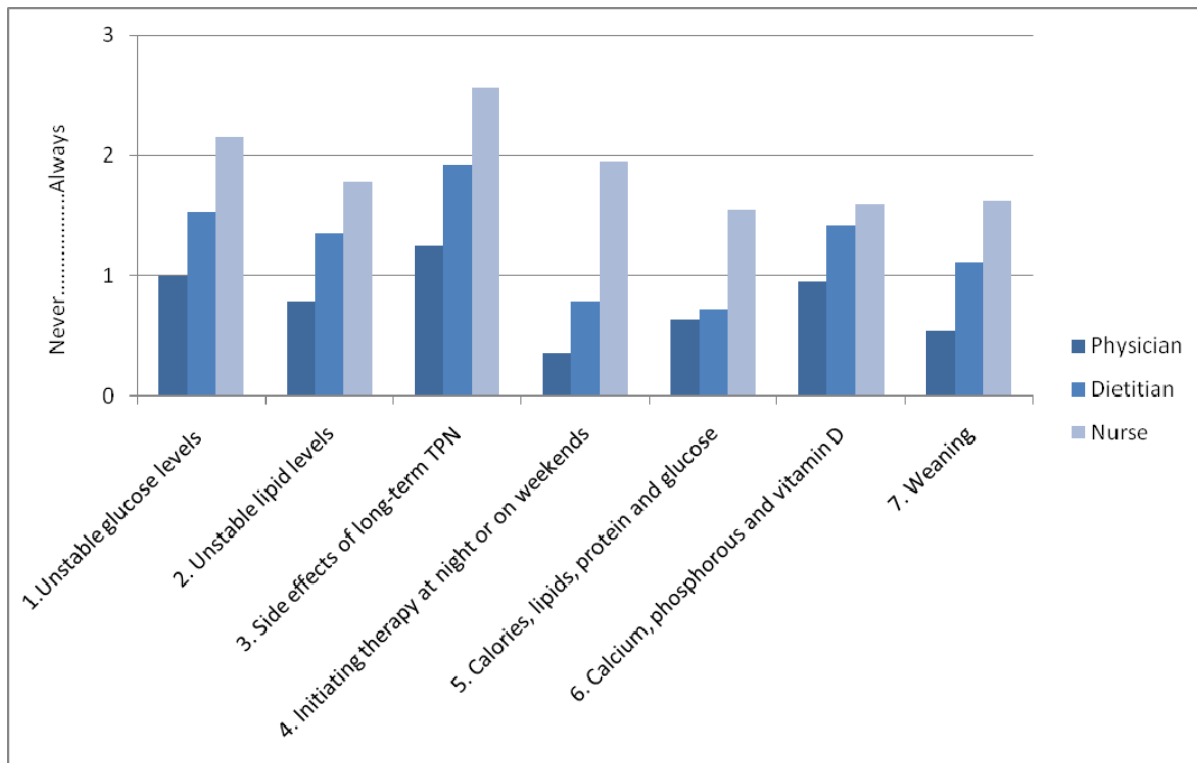


Clinicians who altered feedings on an individualized or standardized basis as a result of feeding residuals reported varying levels of confidence that the residual amount was correct. Physicians and dietitians were less likely to be confident in their practices than nurses, and very few clinicians from any

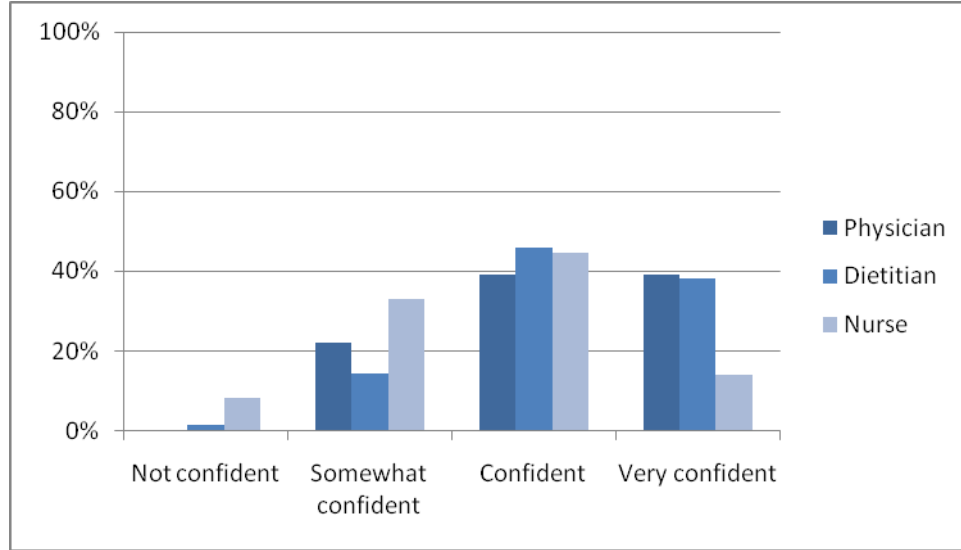
stakeholder group reported feeling “very confident”.

**With respect to TPN, how problematic is each of the following at your site?**

- Unstable glucose levels
- Unstable lipid levels
- Side effects of long-term TPN
- Initiating therapy at night or on weekends
- Determining optimal calories, lipids, protein and glucose needed
- Determining optimal calcium, phosphorous and vitamin D needed
- Weaning



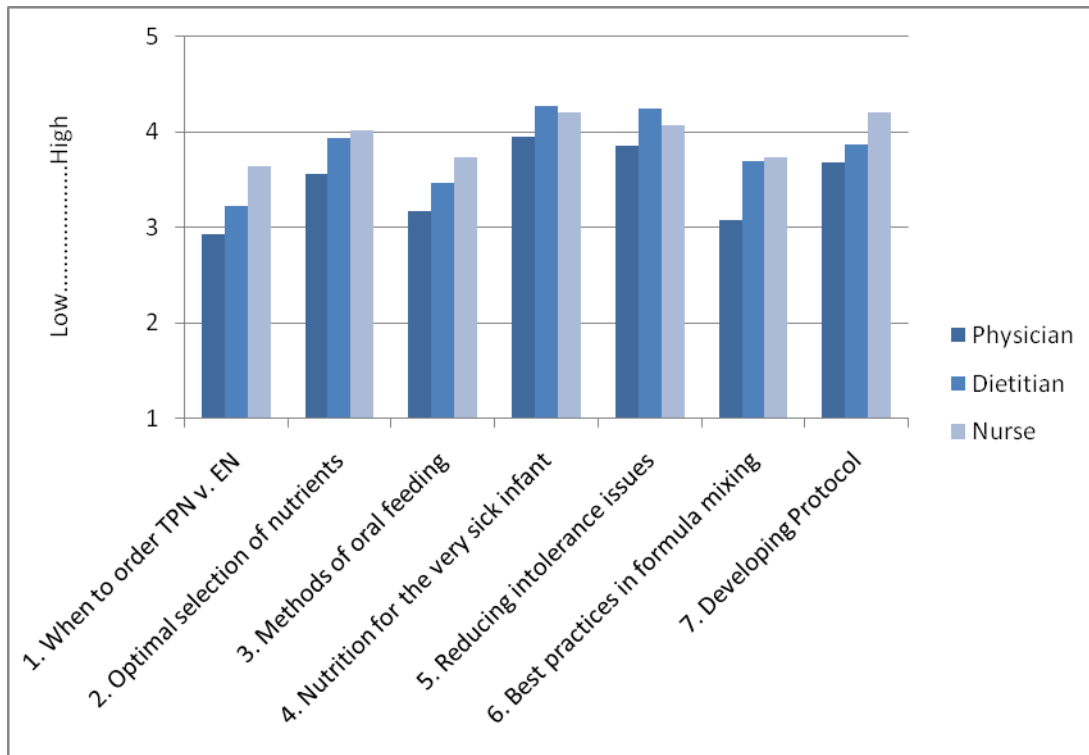
**Overall, how confident are you in nutritional management of pre-term infants at your institution?**



Levels of confidence in managing the nutrition of preterm infants varied according to stakeholder group. Overall, dietitians rated themselves, on average, the most confident, and nurses the least confident; physicians fell somewhere in the middle.

***Please rate your interest in the following areas for nutrition education.***

1. When to order TPN v. EN
2. Optimal selection of nutrients for individual patients (including fortification of breast milk)
3. Choosing the methods of oral feeding (oral gastric, NG tubes, bolus v. continuous, etc.)
4. Nutrition for the very sick infant
5. Reducing intolerance issues while advancing EN
6. Best practices in mixing formulas in the NICU
7. Developing protocols for nutrition in the NICU



Dietitians and nurses report higher levels of interest in education compared to physicians. Highest rated topics include *nutrition for the very sick infant* and *reducing intolerance issues while advancing EN*.

## IMPLICATIONS OF NICU DATA

The varied data collected through the process of this needs assessment presents a broad perspective on some of the challenges and issues in the management of nutrition in the NICU setting. We found that clinicians place a high value on knowledge, skill, and competency in nutrition management. At the same time, they recognize that nutritional management for neonates is a complex undertaking and that each patient must be managed on a case-by-case basis. They are moderately satisfied with their current practices; however, there is considerable variation in these practices, particularly in the areas of selection of nutritional support, advancing feeds, residuals, and communication.

Through careful analysis of clinical guidelines and literature, stakeholder interviews, survey data, and expert opinion, we synthesized a series of key educational implications and corresponding recommendations for continuing professional development.

### **1. Education should focus on areas of high perceived need while simultaneously introducing topics of actual need.**

Research on adult learning principles reveals that the optimal environment to learn and change practice occurs when clinicians perceive gaps between current and desired practices. Educational initiatives with

an emphasis on areas of high perceived need will pique learner interest, while simultaneously providing an opportunity to introduce other topics of educational need.

For example, NICU clinicians perceive a high educational need surrounding choice of appropriate enteral formulation and advancing feedings while managing intolerance issues. Meanwhile, survey respondents rated themselves highly in monitoring for feeding intolerance although literature, interviews and expert opinion suggest that there is room for improvement in this area. A potential educational activity might draw in learners by focusing on advancing feedings, then address issues in monitoring as well.

## **2. Educational initiatives should include content on residuals.**

Needs assessment data indicate that feeding residuals is an area of great uncertainty and variation in the NICU setting. Clinical guidelines provide little direction in this area, and there is high disparity in the amount of residual volume that is considered acceptable, between respondents from community and academic hospitals as well as between individuals practicing in the same institution. While the overwhelming majority of respondents reported measuring residuals on a regular basis, they are not particularly confident in their current practice of altering feedings as a result. Finally, the highest perceived needs for survey respondents involved managing intolerance issues, of which managing residuals is a key element. The management of feeding residuals is clearly an area in which continuing professional education is needed and desired.

## **3. Education in neonatal nutrition should address systems issues.**

A number of practice challenges revealed in the needs assessment involve issues in the health care system. The cost of specialized formula, the lack of staff and team support during nights and weekends, and physician rotation were all identified as hindrances to optimal patient care. Educational initiatives can assist in finding solutions to overcome these issues; in particular, discussions and workshops can create opportunities to dispel or overcome systems barriers to optimal nutrition management.

Transition from the NICU environment to the outpatient setting was specifically identified as an area for systems improvement. Protocols to develop a detailed discharge plan and communicate the plan with the parents and primary care physician will ensure a smooth transition to promote growth. Parent involvement is a key component of the discharge plan; parents should be provided with breastfeeding support and other educational resources.

## **4. Educational activities and resources should motivate physicians to make clinical changes in practice.**

Several needs assessment findings indicate that clinicians may need to become more motivated to make practice changes in the area of neonatal nutrition. In general, survey respondents rated their current competencies quite high and indicated that they are satisfied with their present abilities. They lack awareness of areas that need improvement, such as feeding intolerance. Physicians, in particular, do not indicate a high readiness to change their nutrition practices.

To impart awareness of opportunities for practice improvement, educational initiatives should demonstrate deviations from best practice through self-assessment or discussion with colleagues. Additionally, learners should understand the value of effective nutritional support and its effect on clinical outcomes.

#### **5. Education should incorporate team-based or inter-professional learner formats where appropriate.**

Most practicing clinicians are part of or have access to a nutritional team, which might include physicians, dietitians, nurses, pharmacists, and other healthcare professionals. The management of preterm infant nutrition is a group effort; each player fulfills unique roles and responsibilities. Survey data indicate that physicians, nurses, and dietitians differ considerably in their practices, confidence and competence levels, educational gaps, and readiness to change. While this information is useful in planning education directed toward specific learner populations, it also suggests that team-based education is central to understanding and communicating these differences within and between team members. Inter-professional education can be particularly helpful in addressing systems-based issues and transition procedures.

#### **6. Use interactive educational formats.**

Interactive formats are recommended to encourage practice-changing education in the area of neonatal nutrition. Case-based learning, for example, allows the learner to engage by specifically focusing on real-world problems. Systems issues can be written into the cases to promote active problem-solving, while inter-professional case-based education incorporates the roles and interaction of all team members.

The burgeoning availability of performance improvement opportunities in continuing professional development is an excellent format to encourage positive practice change in neonatal nutrition, allowing healthcare teams to conduct individual and collective self-assessment and work together to find effective solutions.

## Critical Care Unit

### INTERVIEWS

Sixteen physicians, nurses, and dietitians were interviewed about their attitudes and practices in the intensive care unit (ICU) setting. A number of themes were identified:

➤ **Problems in practice**

- Inconsistent assessment of nutritional needs (tools are lacking)
- Imprecise nutritional goals or requirements for specific patient types
- Choice of “best” formulation is unknown
- Neglected transition from total parenteral nutrition (TPN) to enteral nutrition (EN)
- Ambiguity of approach to residuals
- Ambiguity of approach to diarrhea
- Variable use of Reglan
- Ethical issues surrounding TPN counseling

➤ **Barriers to best care**

- Knowledge required to assess need, formulation choice and outcomes
- TPN issues (cost, family requests, formularies)
- Habits
- Lack of focus on nutrition

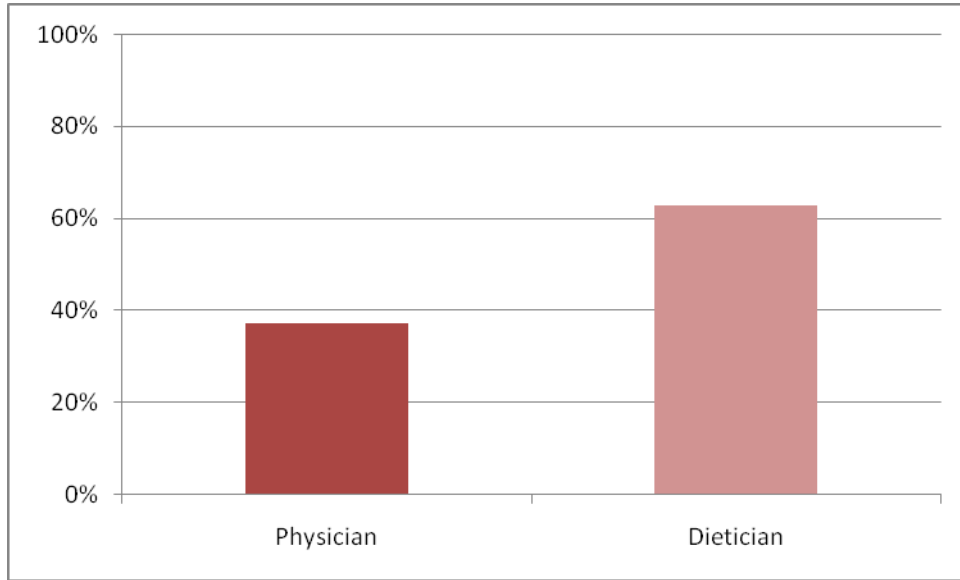
### SURVEY INSTRUMENT

Findings from the stakeholder interviews, supplemented by data from clinical literature and guidelines, informed the creation of a critical care survey to assess clinician practices, attitudes, and barriers. Two hundred and forty-three practicing clinicians completed the survey. The complete assessment tool is reproduced in Appendix 2 (pg 57).

Selected survey results are discussed in this section, while complete results are presented in Appendix 5 (pg 84).

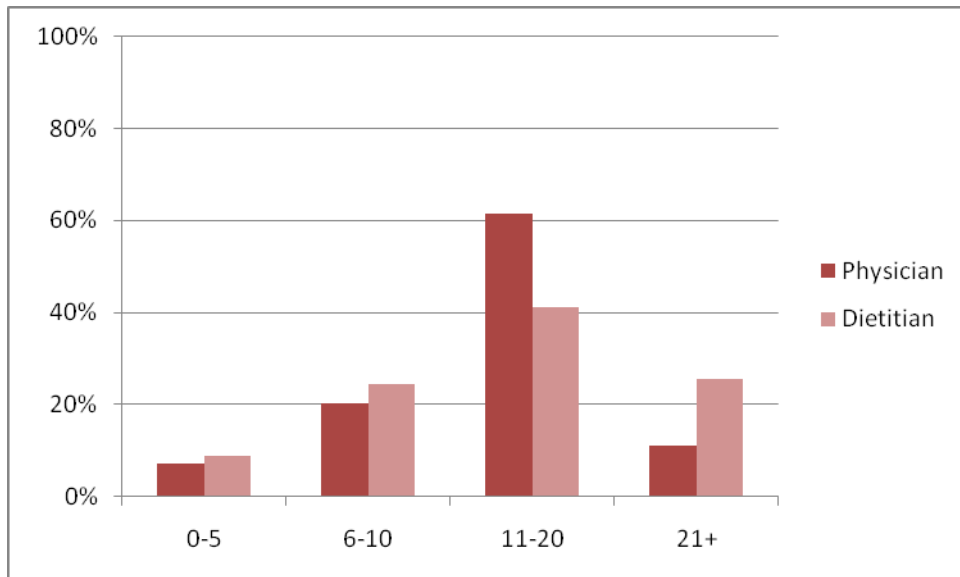
## Demographics

*Please select your degree/certification:*



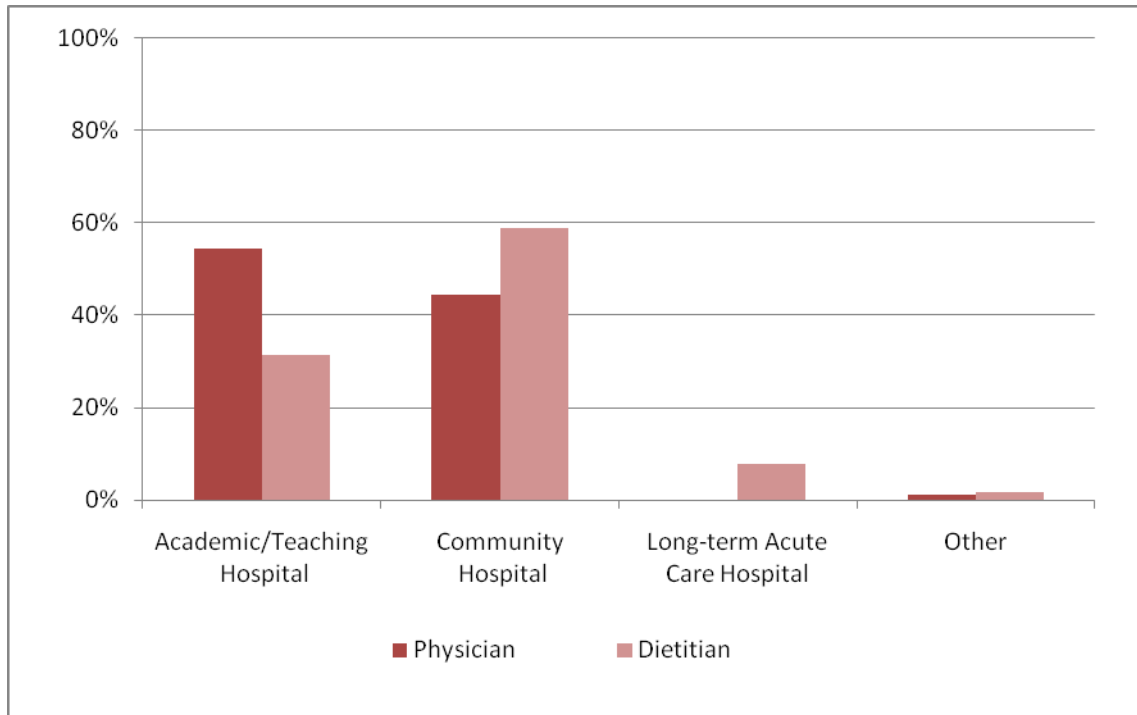
Two hundred and sixty-seven respondents completed the ICU survey. Ninety-nine identified themselves as physicians and 168 as dietitians.

*On an average day, how many patients are under your care?*



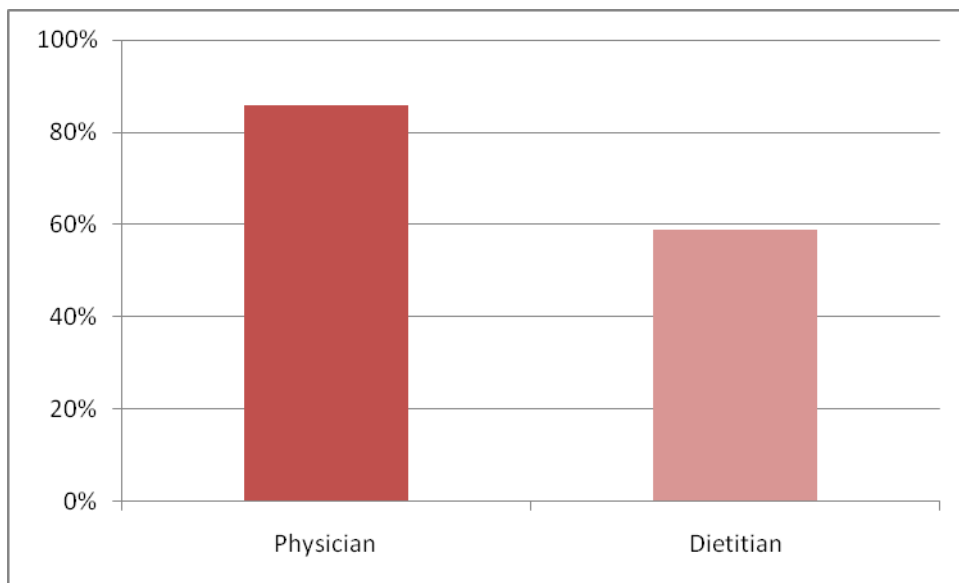
The majority of respondents cared for 11-20 patients on an average day.

**Which of the following best describes the setting where you practice?**



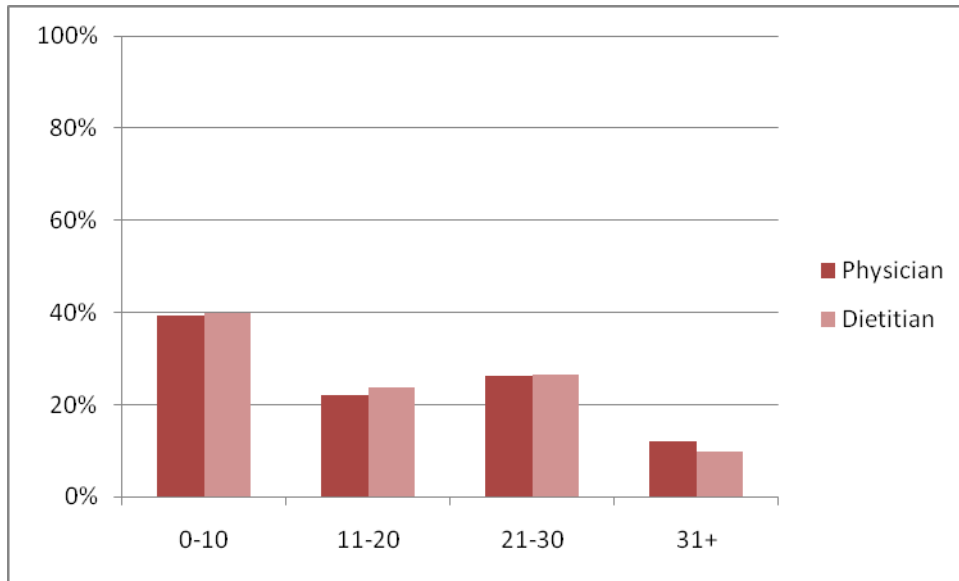
Physicians were more likely to practice in an academic or teaching hospital, while a majority of dietitians practiced in a community hospital; a small number of dietitians practiced in a long-term acute care setting, while respondents who chose *other* practiced in a Veterans Affairs facility.

**Do you have access to, or are you part of, a nutrition team in your institution?**



The majority of respondents had access to or were part of a nutrition team; 86% of physicians answered affirmatively, compared with 59% of dietitians. The definition of “nutrition team” was left open to the respondent’s interpretation.

***Please indicate how many years you have been in practice (since residency).***



Survey participants were asked how many years they had been in practice, a variable that often – although not always – correlates with age. This population of survey respondents was relatively inexperienced, with approximately 40% of clinicians reporting fewer than ten years in practice. There was negligible variation between physician and dietitian responses.

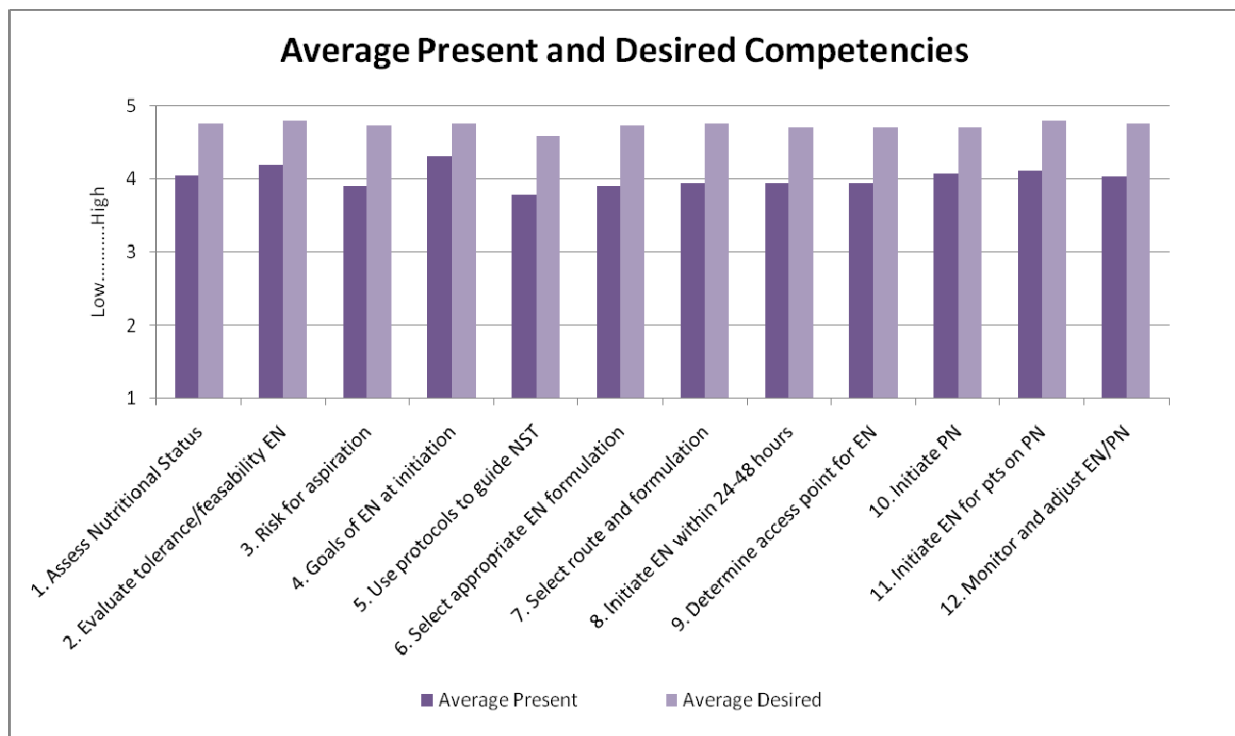
### ***Competency Assessment***

For the list of competencies, respondents were asked to rate both their present and desired levels of ability on a one-to-five scale (1-low, 5-high). The competencies, listed roughly in order of their appearance in the patient encounter process, were as follows:

1. Assess the nutritional status of critically ill patients (including weight loss, previous nutrient intake, level of disease severity, etc.) and the expected course of the patient.
2. Evaluate the likelihood of tolerating enteral feeding and identify patients for whom EN is not feasible.
3. Assess and reduce the risk of aspiration for patients on EN.
4. Determine the goals of EN at the time of initiation of nutrition support therapy.
5. Use protocols to guide nutritional support therapy.

6. Select the appropriate formulations for EN (including those for special populations such as trauma, burns, etc.).
7. Select route of nutrition and formulations for special patient populations (hemodialysis, liver failure, etc.).
8. Initiate enteral nutrition within 24-48 hours for critically ill patients unable to maintain volitional intake as indicated.
9. Determine the appropriate access point for enteral nutrition administration.
10. Initiate parenteral nutrition where indicated.
11. In patients stabilized on PN, periodically repeat efforts to initiate EN.
12. Monitor and adjust both EN and PN as needed.

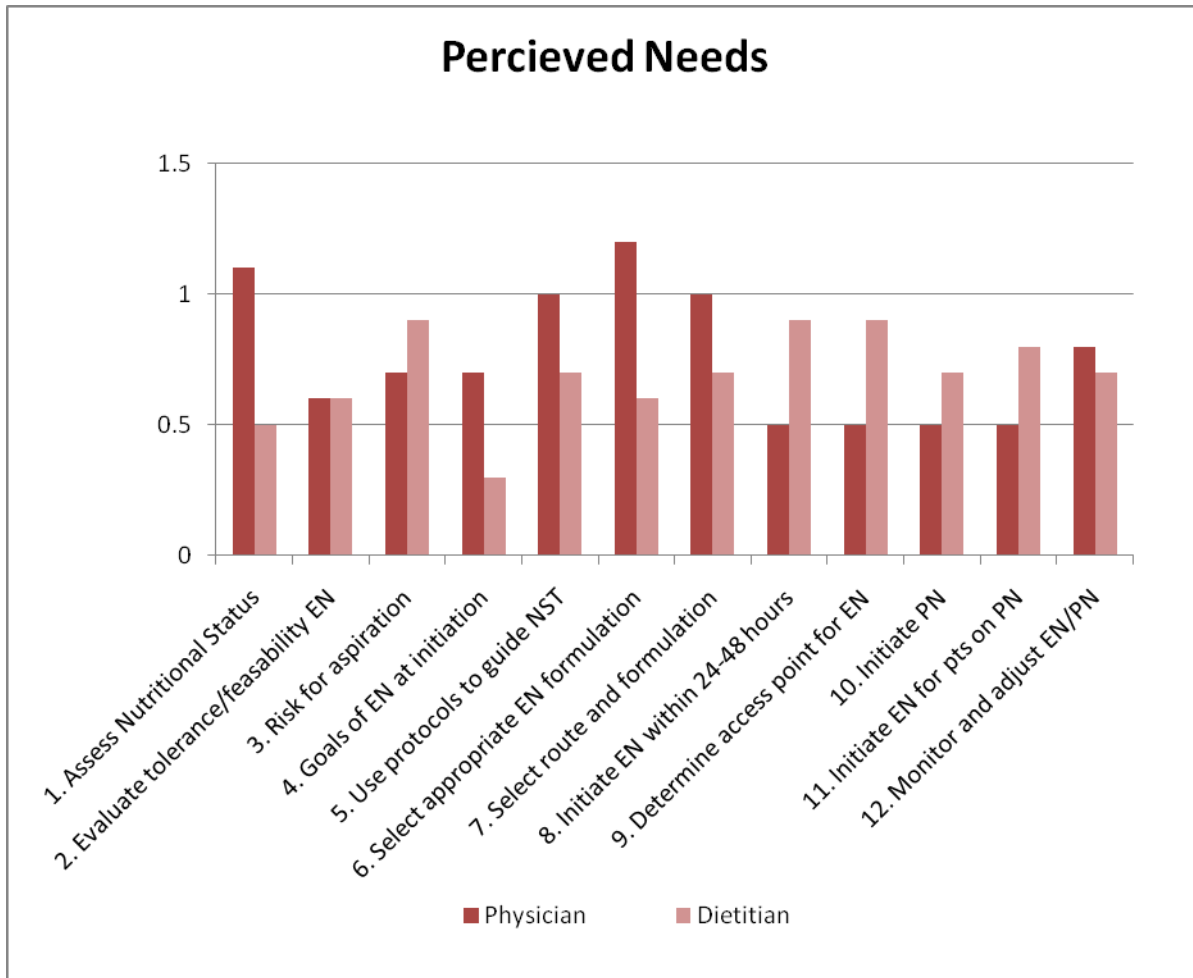
The following graph details the average present and desired competencies for all respondents.



The left-hand bars (dark purple), representing respondents' present levels of perceived ability, reveal moderate variability. The lowest perceived abilities correspond to *assess the nutritional status of critically ill patients, use protocols to guide nutritional support therapy, select the appropriate formulations for enteral nutrition, and select route of nutrition and formulations for special populations.*

The right-hand bars (light purple) represent the average desired ability levels of survey respondents. Like the NICU competencies, these too are uniformly high, indicating that clinicians value the skills involved in the nutritional management of critical care patients.

The following graph represents the perceived competency gap between respondents' present and desired abilities. This gap between the perception of "what is" and "what ought to be" indicates physician motivation to learn and change. A gap of 0.5 or higher is considered to be meaningful, while a gap of 1.0-2.0 is ideal for clinician education.



Notably, almost all competency gaps meet or exceed the meaningful point of 0.5 or higher; the only gap that does not do so is the dietitian responses for *determine the goals of EN at the time of initiation of nutrition support therapy*.

Among physicians, the highest competency gaps include *assess the nutritional status of critically ill patients, use protocols to guide nutritional support therapy, select the appropriate formulations for enteral nutrition, and select route of nutrition and formulations for special populations* – directly

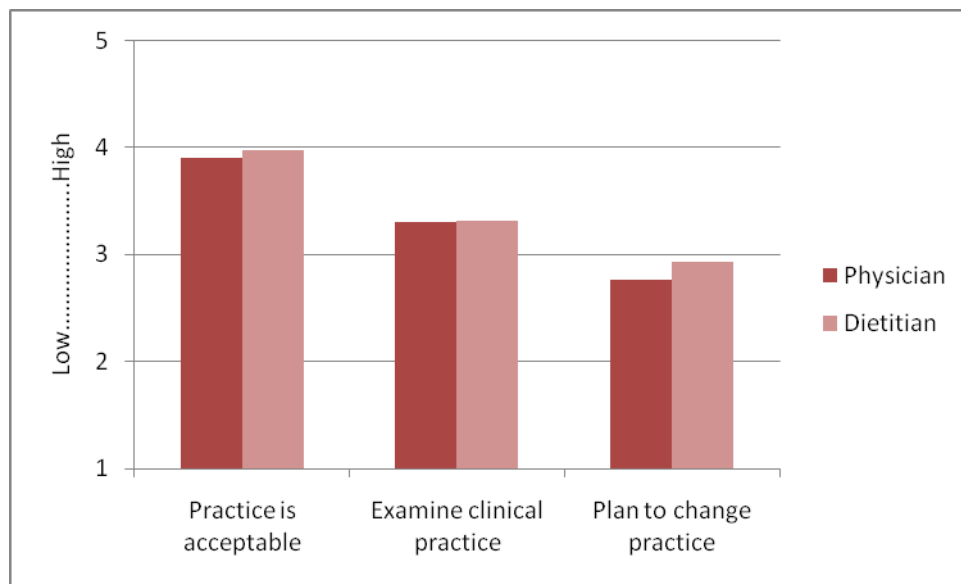
corresponding to the lowest current perceived competencies. These four competencies meet or exceed the 1.0 mark, indicating ideal topics for education.

Dietitian competency gaps vary slightly; their highest gaps include *assess and reduce the risk of aspiration, initiate enteral nutrition within 24-48 hours, and determine the appropriate access point for enteral nutrition*. Although none of the gaps fall into the ideal educational range, they are nonetheless meaningful and indicate topics for clinician education.

### **Attitude Toward Change**

In this section, respondents were asked to rate their agreement with the following statements related to attitude toward change:

- The way I practice in this clinical area is acceptable to me.
- I may need to change one or more of my clinical practices in this area.
- I plan to change the way I practice in this area in the near future.

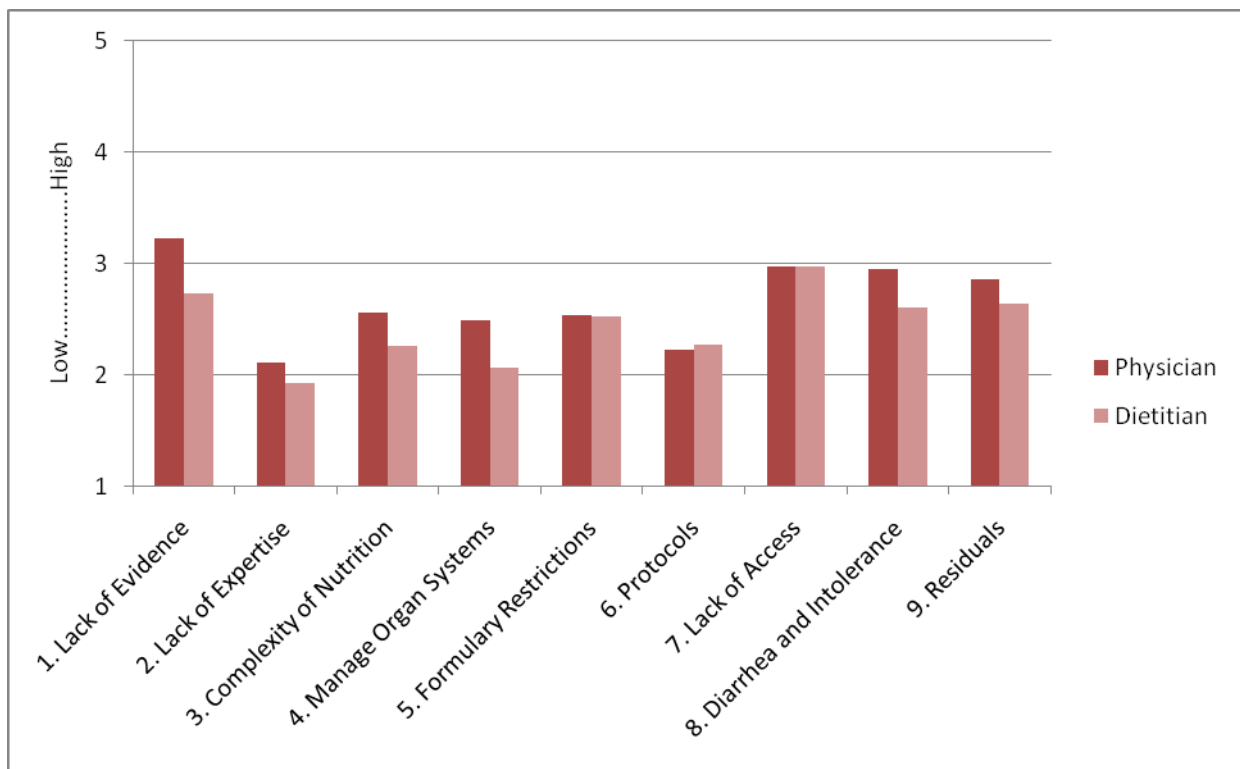


The results of these questions are typical for a clinical area in which health care professionals are moderately satisfied with their current practice, but perceive room for improvement. Approximately half of respondents plan to change their practice in the near future; some clinicians, therefore, must be first shown motivation to learn and modify their practices before positive change can be enacted. In this area, as well, there is little reported difference between physicians and dietitians.

## Barriers to Best Practice

In order to assess the impact of barriers to best practice, respondents were asked to rate their agreement with the following statements:

1. Published evidence does not provide enough guidance in nutrition management.
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.
4. The need to manage critical organ systems limits my time to focus on nutrition.
5. Formulary restrictions limiting choices in formula prohibit optimal management.
6. Nutrition protocols in my institution do not reflect best practices.
7. Access to supporting services (dietitian, pharmacist and radiologist) is limited on nights and weekends.
8. Diarrhea and feeding intolerance with enteral nutrition is a major problem.
9. Feeding residuals cause problems in determining appropriate volumes for patients.



Overall, respondents did not rate these barriers as particular hindrances to best practice. The only barrier that was rated above the midpoint (3) was the physician response to *published evidence does not provide enough guidance in nutrition management*. The lowest rated barriers were *we do not have necessary expertise* and *nutrition protocols do not reflect best practices*.

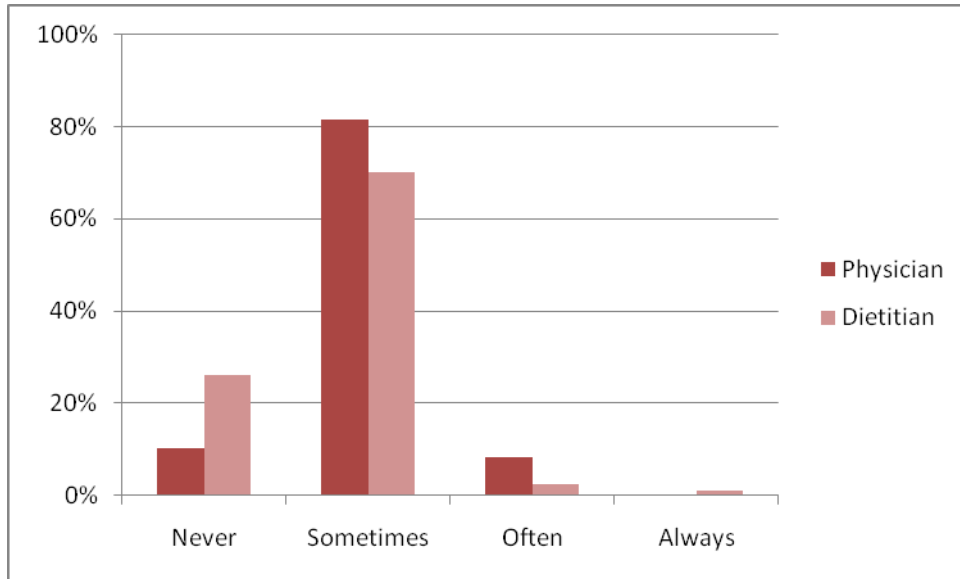
Barrier 7, *access to supporting services is limited on nights and weekends*, was largely directed toward physicians requiring services of dietitians, nurses, pharmacists, et cetera outside of normal working hours. The high dietitian rating for this item is surprising and may warrant further investigation.

In addition to the average barrier rating, it is also useful to distinguish the percentage of respondents who rated a particular barrier as high or very high (4 or 5 on a 5-point scale). For the item *published evidence does not provide enough guidance in nutrition management*, one out of four dietitians and more than two out of five physicians felt that it was a barrier to best practice.

Barriers	% rating high (4 or 5)	
	Physicians	Dietitians
1. Published evidence does not provide enough guidance in nutrition management.	43	25
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.	12	11
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.	18	17
4. The need to manage critical organ systems limits my time to focus on nutrition.	24	10
5. Formulary restrictions limiting choices in formula prohibit optimal management.	20	23
6. Nutrition protocols in my institution do not reflect best practices.	15	18
7. Access to supporting services (dietitian, pharmacist and radiologist) is limited on nights and weekends.	34	39
8. Diarrhea and feeding intolerance with enteral nutrition is a major problem.	31	17
9. Feeding residuals cause problems in determining appropriate volumes for patients.	28	24

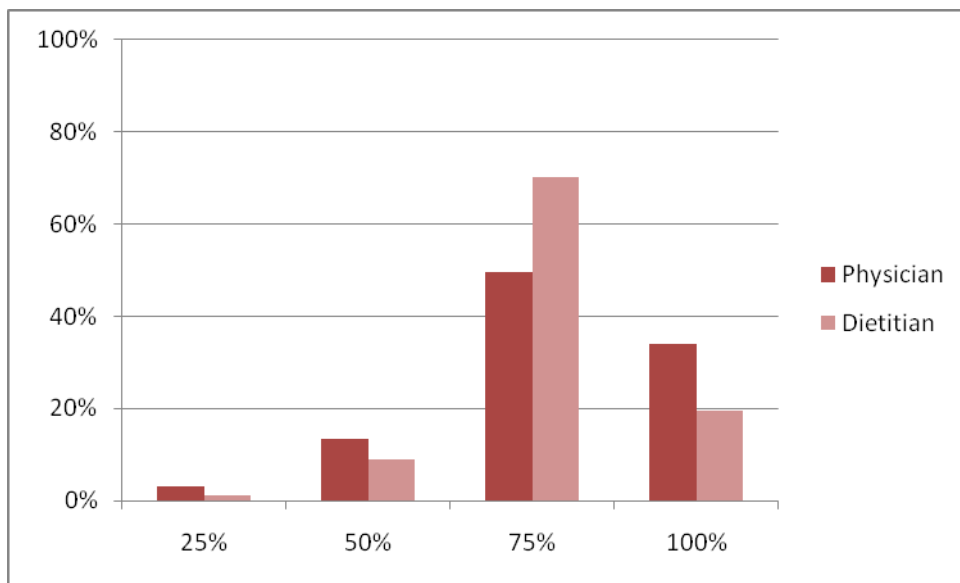
## Knowledge and Practice Assessment

*How often do you deviate from unit-specific protocols/procedures when managing nutrition?*



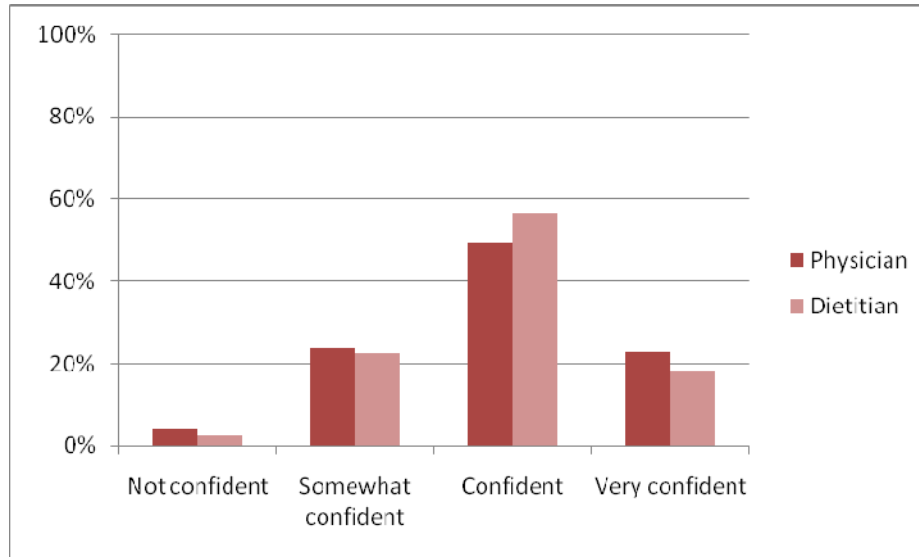
Respondents were asked how often they deviated from protocols or procedures when managing nutrition. Only 10% of physicians and 26% of dietitians maintained their protocols on a strict basis; the majority of other respondents answered “sometimes”.

*In your critically ill patients, achieving what percentage of nutrient goals is satisfactory to you?*



The faculty expert in critical care nutrition indicated that a patient achieving 75% of nutrient goal is a satisfactory amount. Most survey respondents agreed, although 34% of physicians and 20% of dietitians reported striving for more stringent nutrient goals.

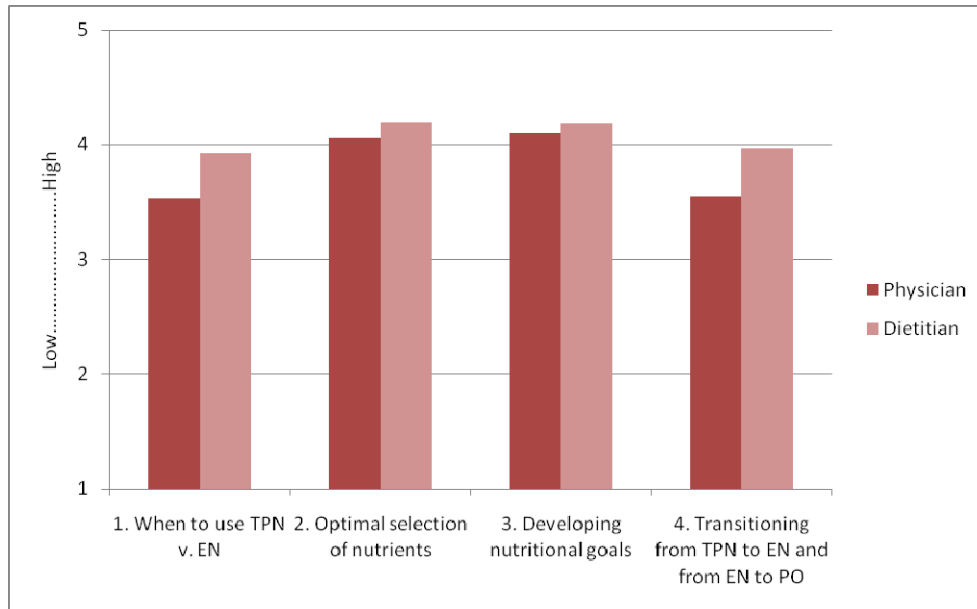
***Overall, how confident are you about nutritional management in your ICU?***



Respondents were asked about their confidence levels regarding nutritional management in the critical care unit. Overall, clinicians were moderately confident in their abilities, and no significant variations appeared between physician and dietitian responses.

***Please rate your interest in the following areas for nutrition education.***

1. Determining when to use TPN or EN and determining the route of administration
2. Optimal selection of nutrients for individual patients
3. Developing nutritional goals for patients in the ICU
4. Transitioning from TPN to EN and from EN to PO



Survey respondents were asked to rate their interest in future education topics on a scale from 1-5. On the whole, all topics were of interest to the clinicians; dietitians exhibited slightly more interest than physicians. *Optimal selection of nutrients for individual patients* and *developing nutritional goals for patients in the ICU* were the highest rated topics for future education.

## IMPLICATIONS OF CRITICAL CARE UNIT DATA

The varied data collected through the process of this needs assessment present a broad perspective on some of the challenges and issues in the management of nutrition in the critical care setting. Through careful analysis of clinical guidelines and literature, stakeholder interviews, survey data, and expert opinion, we synthesized a series of key educational implications and corresponding recommendations for continuing professional development.

### 1. There is a need for continuing education in the nutritional management of critically care patients.

All respondents rated their desired competence very highly, indicating that they value skill in this area and believe that nutritional support is a key component of critical care. However, their current perceived abilities are comparatively low, particularly among physicians; they see room for improvement in their practice. Additionally, high ratings for some of the barriers to best care point toward particular practice challenges that hinder optimal care.

Despite their awareness of practice gaps, critical care physicians and dietitians report being relatively satisfied with their current efforts in the nutritional care of critically ill patients. They demonstrate a general willingness to *examine* their practice, but not necessarily to *change* it. Consequently, both

groups of clinicians must be shown a higher standard of care, including evidence-based data that best nutritional practices positively impact patient outcomes.

Physicians who had been in practice for a shorter time were more interested in changing their practice than those with more experience. These clinicians could potentially serve as champions to motivate change in their colleagues.

## **2. Education should focus on the use of protocols to guide nutrition support therapy.**

Clinicians, particularly physicians, rated themselves quite low on the use of protocols to guide nutrition for critically ill patients. Literature indicates that the use of protocols can positively impact patient care.

Additionally, although clinical guidelines provide clear recommendation for best practices in nutrition — including the nutritional management of special populations such as patients with burns or liver failure — many clinicians feel that literature does not provide adequate guidance in nutrition management, suggesting that they may be unfamiliar with existing literature. Continuing professional development that presents and synthesizes guideline recommendations, or delivers evidence-based protocols, tools, and algorithms for best care, will satisfy learners' educational needs in this area.

## **3. Education must address individual needs while simultaneously recognizing that learners work in teams.**

The care of the critically ill patient necessitates coordinated efforts from a variety of healthcare providers, including physicians, nurses, dietitians, and many other clinicians. The majority of survey respondents reported having access to, or being part of, a nutrition team. Physicians and dietitians exhibit unique patterns of perceived and desired abilities, competency gaps, and practice patterns. Focused education must meet the individualized educational needs of different team members while acknowledging their roles within the practice team.

A number of strategies can be utilized to promote team-based interaction and learning. Round-table formats allow for discussion of variability in assessment and management strategies and provide opportunities for clinicians to share best practices and successes. Case-based education can be particularly useful for the management of special populations (i.e. trauma, cardiac, hemodialysis, liver failure, burns, etc.). Educational initiatives that are integrated with quality improvement efforts are particularly beneficial in engaging the team and improving protocols within the care unit.

## **4. Educational needs are influenced by the institutional environment.**

When developing education in nutritional management, educators must take into account the impact of the institutional setting on educational needs. Data indicate that physicians practicing in academic or teaching hospitals reported higher gaps in perceived ability compared to those working in community

hospitals. Other environmental variables, such as patient population, protocols, and systems procedures, can also impact clinician practice gaps. Education that incorporates individualized as well as team-based self-assessment can best meet learners' unique needs.

#### **5. Recommended topics for continuing professional development.**

Needs assessment data identified several areas of nutritional management in critical care in which further education will be particularly beneficial:

- Assessing the nutritional status of the critically ill patient
- Selecting the appropriate route of nutrition
- Selecting the appropriate formulations for enteral nutrition (including formulations for special patient populations)
- Monitoring and adjusting enteral and parenteral nutrition
- Issues in aspiration, intolerance, residuals, and diarrhea

## Primary Care

### INTERVIEWS

Eleven primary care physicians were interviewed about their attitudes and practices when dealing with supplementary nutrition in the primary care setting. A number of themes were identified:

- **Problems in practice**
  - Lack of training
    - Assessment (especially with alcoholism, dementia, etc.)
    - Treatment
  - Patient non-adherence
  - Lack of time to counsel
  - Lack of resources to help
  - Eating well is expensive and time-consuming
  
- **Barriers to best practice**
  - No assessment tools
  - Patients can deceive clinicians
  - No treatment standard, so clinicians improvise (Carnation, Boost, Ensure or Lucerna)
  - Cost of care
  - Insurance coverage
  - Patient resistance

### SURVEY INSTRUMENT

Findings from the stakeholder interviews, supplemented by data from clinical literature and guidelines, informed the creation of a primary care survey to assess clinician practices, attitudes, and barriers. Seventy primary care physicians completed the survey. The complete assessment tool is reproduced in Appendix 3 (pg 67).

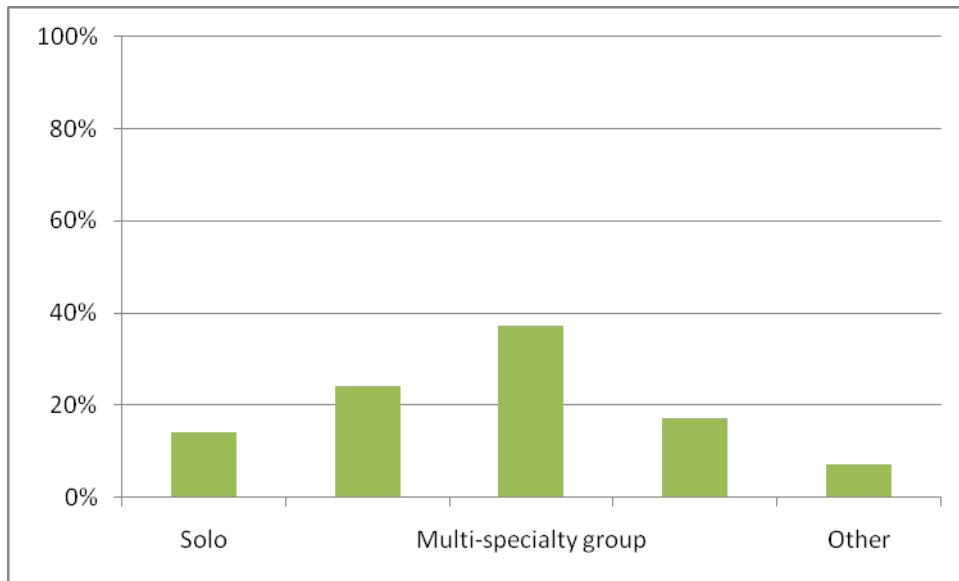
Selected survey results are discussed in this section, while complete results are presented in Appendix 6 (pg 88).

The interview process revealed confusion about the meaning of “nutrition management”. To ensure that all participants completed the survey with supplementary nutritional management in mind (rather than weight loss or obesity management), the following message appeared at the beginning of the survey:

For this study, nutritional support therapy is defined as: The provision of oral, enteral or parenteral nutrients to treat or prevent malnutrition. We are interested in your office-based (outpatient) experience.

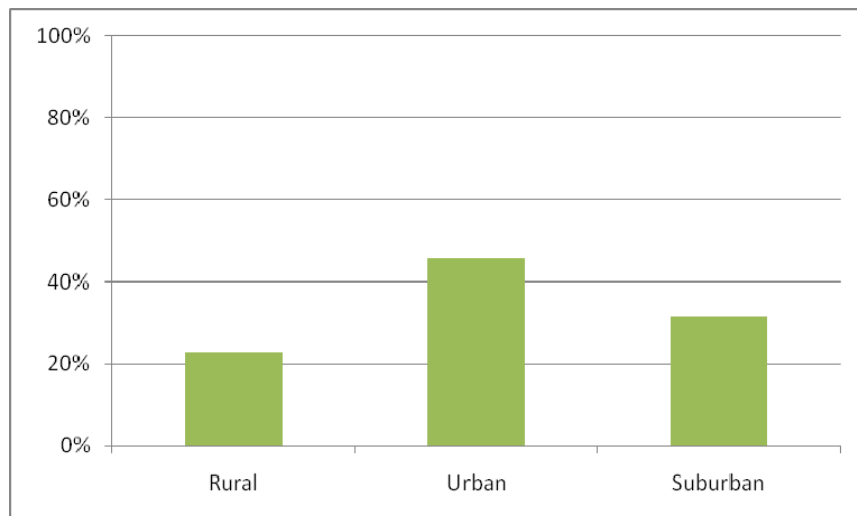
## Demographics

*Which of the following best describes the setting in which you practice?*



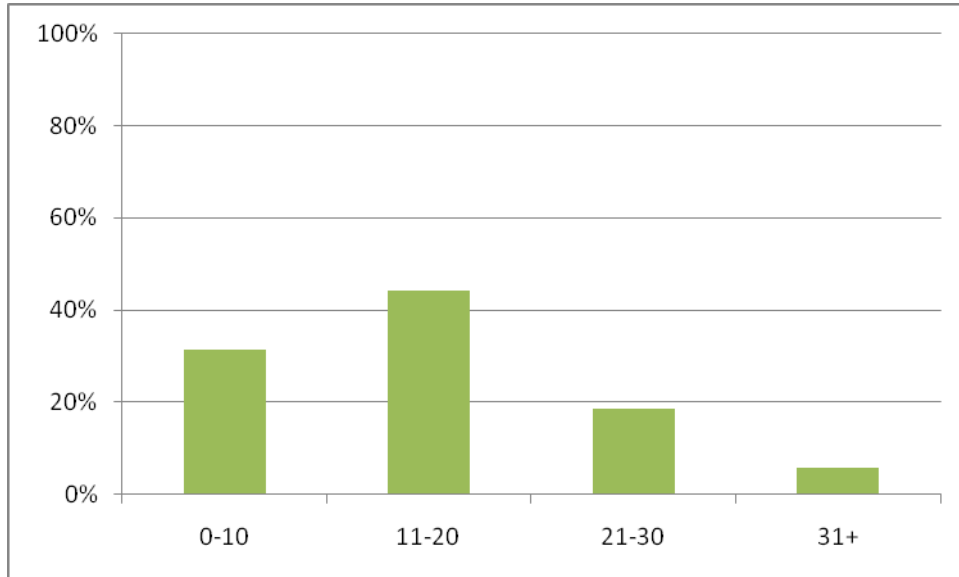
The majority of physicians practice in a multi-specialty group setting, although solo, single-specialty group, and hospital-based settings are represented among the survey population as well.

*What is the location of your practice?*



Respondents were questioned on the location of their practice setting. Almost half of survey participants practice in an urban area.

***Please indicate how many years you have been in practice (since residency).***



Survey participants were asked how many years they had been in practice, a variable that often – although not always – correlates with age. The majority of physicians reported having fewer than 20 years’ experience in practice.

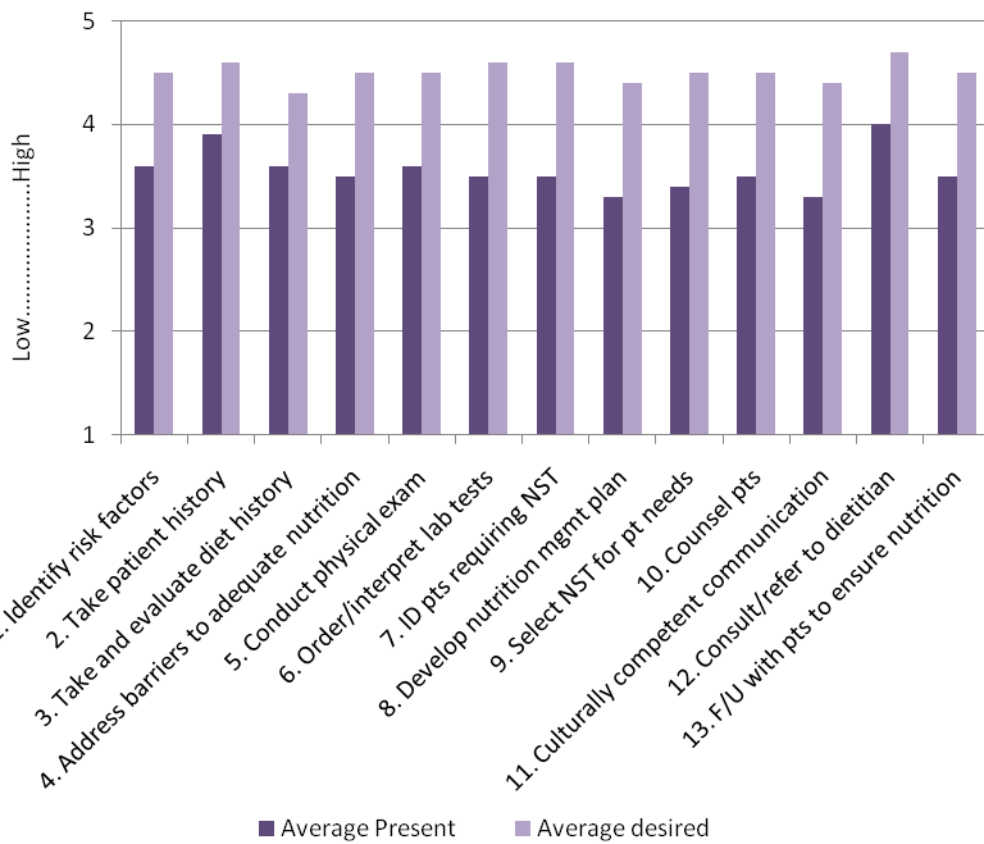
### ***Competency Assessment***

For the list of competencies, respondents were asked to rate both their present and desired levels of ability on a one-to-five scale (1-low, 5-high). The competencies, listed roughly in order of their appearance in the patient encounter process, were as follows:

1. Identify patient risk factors for malnutrition or clinical conditions that make malnutrition more likely.
2. Take an appropriate patient history, including medical, family and social history, weight history, and recent weight change and medication history.
3. Take and evaluate a diet history that includes typical daily food intake, timing of meals, and meals eaten out.
4. Identify and address barriers to adequate nutritional intake such as dysphagia, nausea, and altered taste sensation.
5. Conduct an appropriate physical examination, including BMI, evaluation of growth and development, and signs of nutritional deficiency (skin, hair, eyes, mouth, nails, muscle mass).

6. Order and interpret the results of laboratory tests to assess nutritional status, as appropriate.
7. Integrate nutritional assessment information (histories, physical exam, laboratory tests) to identify individuals who require medical nutritional support therapy.
8. Develop an individualized nutritional management plan for optimal health.
9. Select appropriate nutritional support therapy to match individual patient needs.
10. Effectively counsel patients to make informed nutritional decisions.
11. Effectively communicate with patients in a culturally competent manner to provide accurate nutritional information and dispel misinformation.
12. Consult with or refer to a registered dietitian or other credentialed healthcare professional and refer to community nutrition resources as appropriate.
13. Follow-up with patients to ensure adequate nutritional intake.

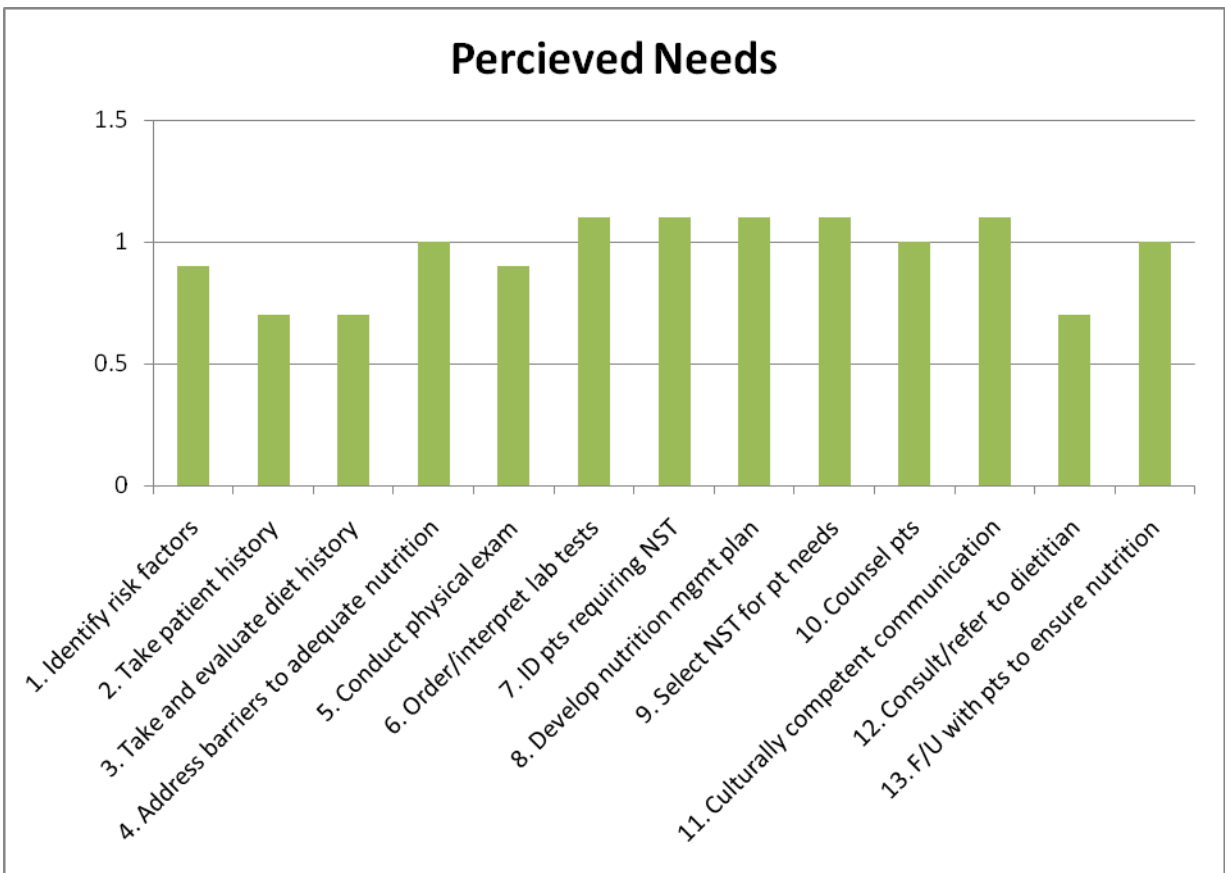
### Average Present and Desired Competencies



The left-hand bars (dark purple) indicate physicians' present level of perceived ability. The highest perceived ability is *consult with or refer to a registered dietitian... and refer as appropriate*. This competency corresponds neatly with the response to the barrier question; because physicians have adequate access to nutritional resources, they rate themselves highly at consulting with, and referring to, these resources.

The right-hand bars (light purple) refer to respondents' desired ability levels. These are uniformly high, indicating that primary care physicians feel that skills related to nutritional support therapy are valuable and that they wish to be competent in these areas.

The following graph represents the perceived competency gap between respondents' present and desired abilities. This gap between the perception of "what is" and "what ought to be" indicates physician motivation to learn and change. A gap of 0.5 or higher is considered to be meaningful, while a gap of 1.0-2.0 is ideal for clinician education.



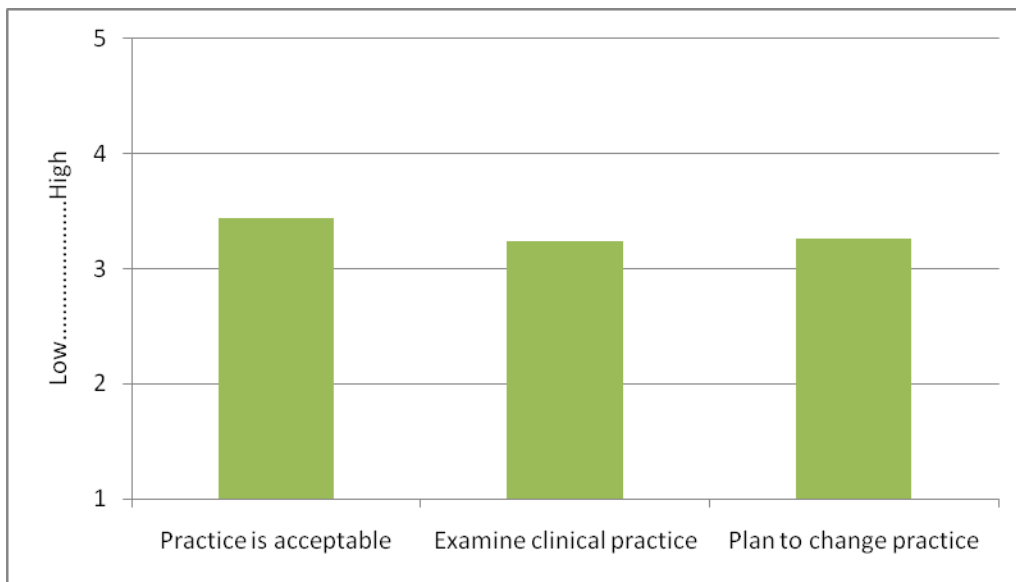
All of the competency gaps exceed the significant threshold of 0.5, indicating that all these areas are potentially meaningful educational opportunities. Additionally, a number of competencies fall into the 1.0-2.0 range, which is ideal for continuing education.

The highest perceived competency gaps are *order and interpret laboratory tests, integrate assessment information to identify patients who require nutritional support, develop an individualized nutritional management plan, select the appropriate therapy, and effectively communicate with patients in a culturally competent manner.*

### **Attitude Toward Change**

In this section, respondents were asked to rate their agreement with the following statements related to attitude toward change:

- The way I practice in this clinical area is acceptable to me.
- I may need to change one or more of my clinical practices in this area.
- I plan to change the way I practice in this area in the near future.



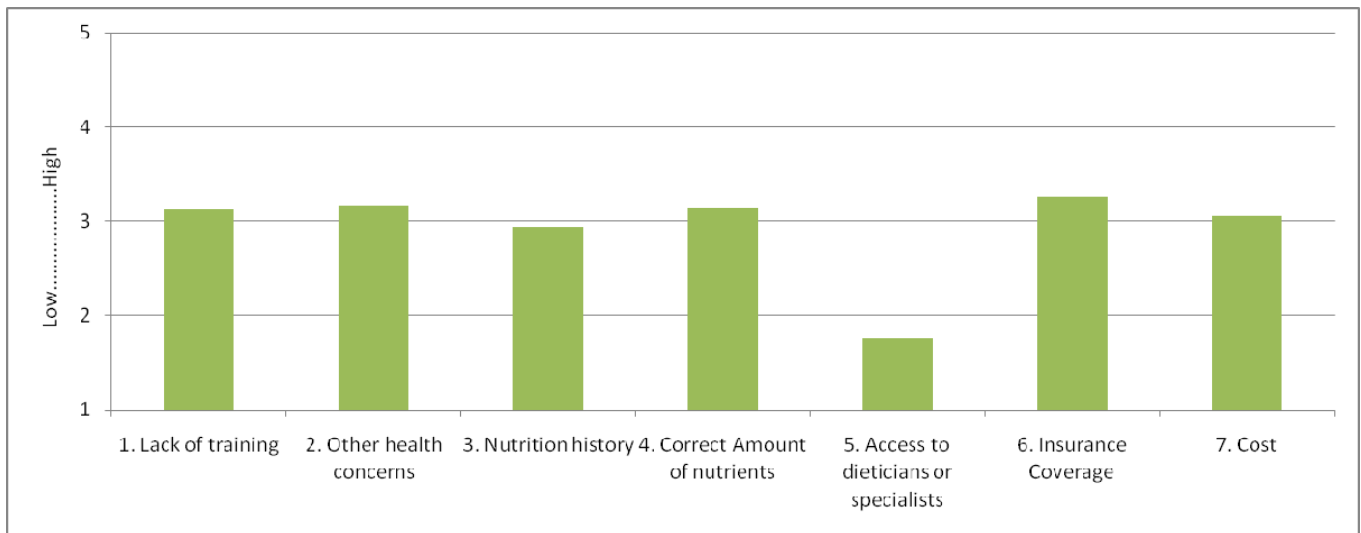
The graph for this question exhibits an atypical distribution of results. The average rating for *the way I practice in this clinical area is acceptable to me* is low compared to the expected rating of 4.0 to 4.5, which would be representative of clinical areas in which physicians are satisfied with their practice. This result indicates that primary care providers are quite dissatisfied with their current practices in nutrition management.

In addition, the average rating for *I plan to change the way I practice in this area in the near future* is comparatively high. Collectively, these results indicate that primary care physicians are not happy with their current performance and are ready and willing to change their practice.

## Barriers to Best Practice

In order to assess the impact of barriers to best practice, respondents were asked to rate their agreement with the following statements:

1. My training did not adequately prepare me in the area of nutrition.
2. Other health concerns or disease conditions prevent me from spending time on nutrition.
3. Accurate nutrition history is difficult to obtain (esp. alcoholism, dementia).
4. When nutrition is inadequate, it is difficult to determine the correct amount of nutrients to recommend.
5. I do not have access to dietitians or other nutritional specialists.
6. My patients do not have insurance coverage for nutritional services.
7. The cost of supplemental nutritional formulas inhibits patient use.



Participants rated seven of the eight barriers at around the midpoint (3); the highest-rated barrier was *my patients do not have insurance coverage for nutritional services*. The single outlying item was *I do not have access to dietitians or other nutritional specialists*, which rated only 1.8 on the barrier scale. This indicates that although most primary care physicians are easily able to access to dietitians and nutritional support services, insurance coverage for these services may hinder optimal care.

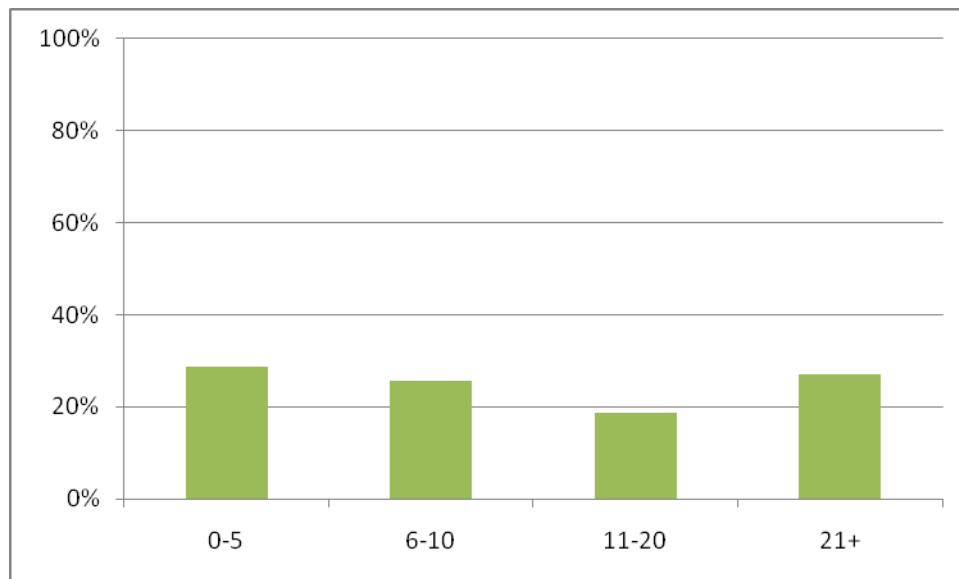
In addition to the average barrier rating, it is also useful to distinguish the percentage of respondents who rated a particular barrier as high or very high (4 or 5 on a 5-point scale).

Barriers	% rating high (4 or 5)
1. My training did not adequately prepare me in the area of nutrition.	39
2. Other health concerns or disease conditions prevent me from spending time on nutrition.	43
3. Accurate nutrition history is difficult to obtain (esp. alcoholism, dementia).	34
4. When nutrition is inadequate, it is difficult to determine the correct amount of nutrients to recommend.	40
5. I do not have access to dietitians or other nutritional specialists.	8
6. My patients do not have insurance coverage for nutritional services.	54
7. The cost of supplemental nutritional formulas inhibits patient use.	41

Seven of the eight barriers were rated high (4 or 5 on a 5-point scale) by more than 20% of respondents. More than half of respondents rated *my patients do not have insurance coverage for nutritional services* as a significant barrier.

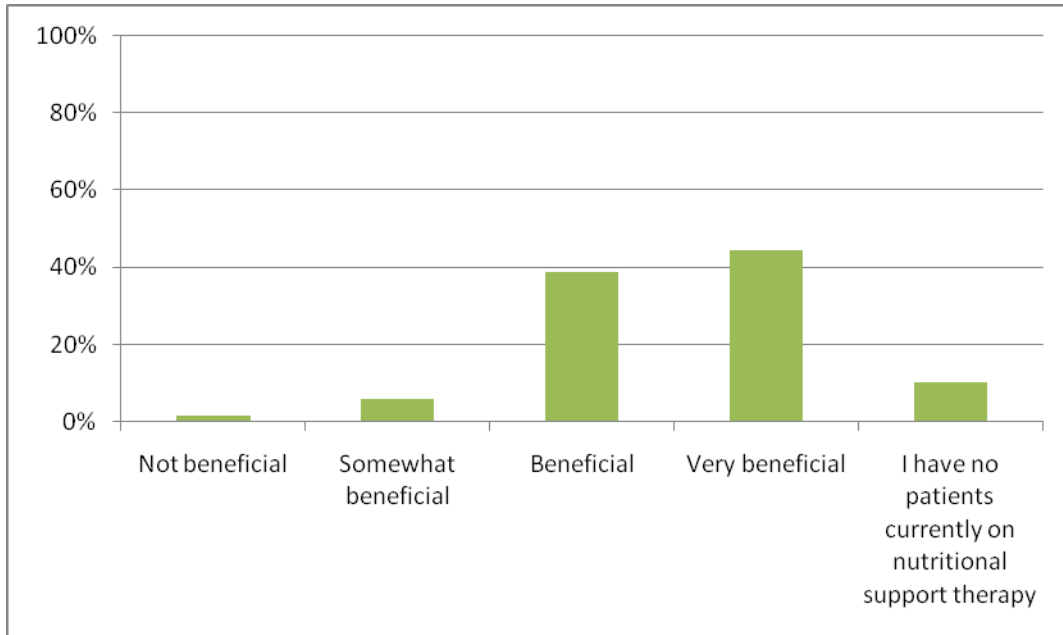
### ***Knowledge and Practice Assessment***

***At any given time, for about how many adult patients in your practice have you recommended nutritional support therapy?***



Physicians were asked how many of their current patients had been recommended nutritional support therapy. Answers varied widely, from fewer than six patients to more than twenty patients. The total number of patients in practice was not surveyed.

***For the patients whom you have started on nutritional support therapy, how beneficial do you believe nutritional support therapy has been for them?***



On the whole, primary care physicians overwhelmingly believe that nutritional support therapy is a worthwhile effort and that it positively benefits patient outcomes.

## **IMPLICATIONS OF PRIMARY CARE DATA**

The varied data collected through the process of this needs assessment presents a broad perspective on some of the challenges and issues in the management of nutrition in the primary care setting. Through careful analysis of clinical guidelines and literature, stakeholder interviews, survey data, and expert opinion, we synthesized a series of key educational implications and corresponding recommendations for continuing professional development.

### **1. There is a strong need for education in this area.**

Physicians lack knowledge of nutritional support of adults in the outpatient primary care setting. Resources and clinical guidelines within the primary care literature are sparse; in addition, interviewees immediately thought of weight control and dieting when the subject of nutritional support was broached, rather than supplementary nutrition. Primary care physicians recognize the benefit of nutritional support therapy, but rate their current skills as low. Encouragingly, primary care physicians are ready and willing to make changes in their practice; this area is a prime opportunity for continuing professional development.

## **2. Education should focus on the efficient assessment of nutritional status.**

In the busy primary care setting, physicians tend to focus their attention on immediate health care concerns that often take precedence over nutritional assessment. Health care providers are not familiar with tools to quickly and accurately assess nutrition. Although they would like to be skilled in this area – the highest desired competencies involved assessment and referral – survey data indicate that primary care physicians currently lack confidence in their ability to assess nutritional status and take a nutrition history.

Educational initiatives must aim to improve physician knowledge and skill relating to nutritional assessment. Tools and algorithms must take a straightforward approach to assessment and treatment and must be easily integrated into patient care.

## **3. Education should focus on the development of a nutrition management plan.**

Although more than two out of five physicians often or always create nutrition management plans for their patients, survey respondents rated themselves low on their current ability to develop an individualized management plan that promotes optimal health. A search of primary care literature reveals a dearth of resources or recommendations surrounding nutrition management plans.

Physicians are searching for guidance in this area; unfortunately, they are not finding it. The selection of nutritional therapy rated highest in physicians' interest for education; it is likely that educational initiatives and activities that focus on effective management strategies would garner a great deal of learner interest. Education should instruct learners to create nutritional plans that are mindful of cost and insurance coverage, including the costs of specific agents and formulas.

## **4. Systems-based education should recognize the role of the dietitian in patient nutrition care.**

Survey data indicate that primary care physicians have access to dietitians, nutritionists and other nutritional resources; furthermore, they feel comfortable referring to these resources as needed. Insurance coverage can be a barrier to care for some patients.

Education on nutritional support therapy must recognize the role that dietitians and other nutritional resources play in the patient management plan. Potential educational content might include: how and when to refer; solutions to insurance and reimbursement barriers; and communication and coordination of care on a systems level.

## **5. Nutrition education should aim to increase knowledge, confidence, and skill.**

Many primary care providers are unfamiliar with the basic skills involved in nutritional assessment and management. Educational efforts should encourage greater awareness of poor nutrition and

malnutrition, including risk factors and high-risk populations, clinical symptoms of poor nutrition, and easily implementable assessment and treatment algorithms.

Primary care providers should have access to effective, practical tools. These include evidence-based literature to demonstrate that nutritional support makes a difference in clinical outcomes; information on formulation choice and relative cost; and treatment strategies that reflect cultural, medical and personal dietary needs.

## Conclusions

A comprehensive, multi-faceted evaluation of the forces that impact clinician behavior — and, consequently, patient care — is key to the identification of practice gaps, educational needs, and the optimal design of appropriate educational strategies. The approach to nutritional management clearly differs for preterm infants, critical care patients, and primary care patients; however, despite the unique educational needs inherent in each practice setting, a number of common themes were identified.

- **Team-based care.** Optimal nutritional management of patients requires involvement and cooperation from a number of stakeholders, including physicians, dietitians, pharmacists, nursing staff, and a variety of other health care professionals. Education should acknowledge the role of the team, potentially involving multiple team members in an inter-disciplinary format.
- **Communication.** In nutritional management, as in so many other areas of medicine, effective communication is critical to best care. Open communication between team members and during referral will establish roles and responsibilities, convey practice plans, and ensure continuity of care.
- **Guidelines and literature.** Clinicians who provide nutritional management perceive that clinical literature and guidelines do not provide adequate practice recommendations. In some cases, this belief suggests a lack of familiarity with existing resources; in other cases, it indicates a desire for further guidance in the care of patients with complex co-morbidities or clinical conditions.
- **Evidence-based care.** Health care providers believe that nutritional care is beneficial. However, they desire clinical evidence that confirms that nutrition makes a marked difference in patient outcomes. Education and recommendations for care should be grounded in solid clinical evidence.

Certain spheres of nutritional care were beyond the scope of this needs assessment and would benefit from further research and consideration. These include a detailed, comprehensive measurement of clinician knowledge and practice; vertical assessment of unified healthcare teams; assessment of additional stakeholder groups, such as CCU nurses and primary care dietitians; and the investigation of clinician performance and patient clinical outcomes.

Pertinent, high-quality, evidence-based education that meets identified educational needs will ensure that clinicians continually improve their practice, ultimately resulting in improved care and optimal clinical outcomes in the nutritional care of patients.

## Appendix 1: NICU Survey

Welcome to the University of Wisconsin assessment on nutrition in the NICU. This is for a research study and the information will be used to assess needs and barriers of clinicians, in order to develop continuing medical education (CME) in nutrition. Completion of the survey implies your consent to be in the research study. Your participation is voluntary, and you may exit the survey at any time and skip any questions that you don't want to answer. It will take less than 9 minutes to complete the questionnaire. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. We will not ask for any information that can personally identify you. Upon completion of your survey, a donation of \$15 will be made to the American Red Cross Haiti Relief Fund. Please start with the survey now by clicking on the Continue button below.

The following items represent clinical competencies in nutrition management.

Present Ability						Desired Ability				
Low Ability 1	2	3	4	High Ability 5		Low Ability 1	2	3	4	High Ability 5
					1. Assess the nutritional needs of the pre-term infant, including nutrients, fluid and energy needs					
					2. Determine the type of nutrition (parenteral or enteral) warranted					
					3. Determine the appropriate enteral formulation, including human milk and nutrient levels for the infant's needs					
					4. Initiate early parenteral feeding at the appropriate levels of macronutrients (protein, lipid, carbohydrate)					
					5. Provide adequate enteral nutrition, including trophic feedings, for the pre-term infant					
					6. Provide the infant's mother with breastfeeding support, encouragement, and education					
					7. Monitor for feeding intolerance including necrotizing enterocolitis					
					8. Advance feedings while managing intolerance issues					
					9. Develop a discharge plan to promote growth, including the use of human milk and post-discharge formula					
					10. Effectively communicate a discharge plan with parents and the primary care physician					
					11. Utilize written procedures/orders when managing nutrition for preterm infants					

Please indicate your level of agreement with the next 3 statements. With regard to managing nutrition...

	Low Agreement 1	2	3	4	High Agreement 5
1. The way I practice in this clinical area is acceptable to me.					
2. I may need to examine one or more of my clinical practices in this area.					
3. I plan to change the way I practice in this area in the near future.					

Reflecting on your own experience in nutrition management, please rate the following statements according to your extent of agreement with each.

	Low Agreement 1	2	3	4	High Agreement 5
1. Published evidence does not provide enough guidance in nutrition management.					
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.					
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.					
4. The need to manage critical organ systems limits my ability to focus on nutrition.					
5. Formulary restrictions limiting choices in formula hinder optimal management.					
6. Hygiene in mixing formulas and by mothers expressing breast milk is an issue.					
7. Communication with practicing pediatricians is insufficient to ensure optimal feeding occurs once the infant leaves the hospital.					
8. The cost of specialized formula causes parents to switch therapy too quickly.					
9. Electronic ordering for nutrition is cumbersome.					

Please rate your interest in the following areas for nutrition education.

	Low Interest 1	2	3	4	High Interest 5
1. When to order TPN v. EN					
2. Optimal selection of nutrients for individual patients (including fortification of breast milk)					
3. Choosing the methods of oral feeding (oral gastric, NG tubes, bolus v. continuous, etc.)					
4. Nutrition for the very sick infant					
5. Reducing intolerance issues while advancing EN					
6. Best practices in mixing formulas in the NICU					
7. Developing protocols for nutrition in the NICU					

1. How often do you deviate from unit-specific protocols/procedures when managing nutrition for pre-term infants?

1. Never
2. Sometimes
3. Often
4. Always

2. At your site, how often do pre-term infants experience difficulty tolerating formula?

1. Never
2. Sometimes
3. Often
4. Always

3. In your critically ill neonatal patients, achieving what percentage of nutrient goals is satisfactory to you?

1. 25%
2. 50%
3. 75%
4. 100%

4. Do you measure residuals after feedings for pre-term infants at your site?

1. Yes
2. No

5. Is there a residual amount that causes an alteration in feedings?

1. Yes, and the amount is determined by NICU or hospital protocol
2. Yes, and the amount varies according to clinician judgment
3. No, feedings are not changed based on residuals.

6. How confident are you that this residual is the correct amount to be considered too much?

1. Not confident
2. Somewhat confident
3. Confident
4. Very confident

7. With respect to TPN, how problematic is each of the following at your site?

	Never a Problem	Sometimes a Problem	Usually a Problem	Always a Problem	N/A
Unstable glucose levels					
Unstable lipid levels					
Side effects of long-term TPN					
Initiating therapy at night or on weekends					
Determining optimal calories, lipids, protein and glucose needed					
Determining optimal calcium, phosphorous and vitamin D needed					
Weaning					

8. Overall, how confident are you in nutritional management of pre-term infants at your institution?

1. Not confident
2. Somewhat confident

3. Confident
4. Very confident

Please select your degree/certification:

1. MD/ DO
2. Dietitian
3. Nurse
4. NP
5. PA
6. Pharmacist/ PharmD
7. Other

On an average day, how many pre-term infants are under your care?

1. 0-5
2. 6-10
3. 11-20
4. 21+

Which of the following best describes the setting where you provide most of your care to pre-term infants?

1. Academic/Teaching hospital
2. Community hospital

Do you have access to, or are you part of, a nutrition team in your institution?

1. Yes
2. No

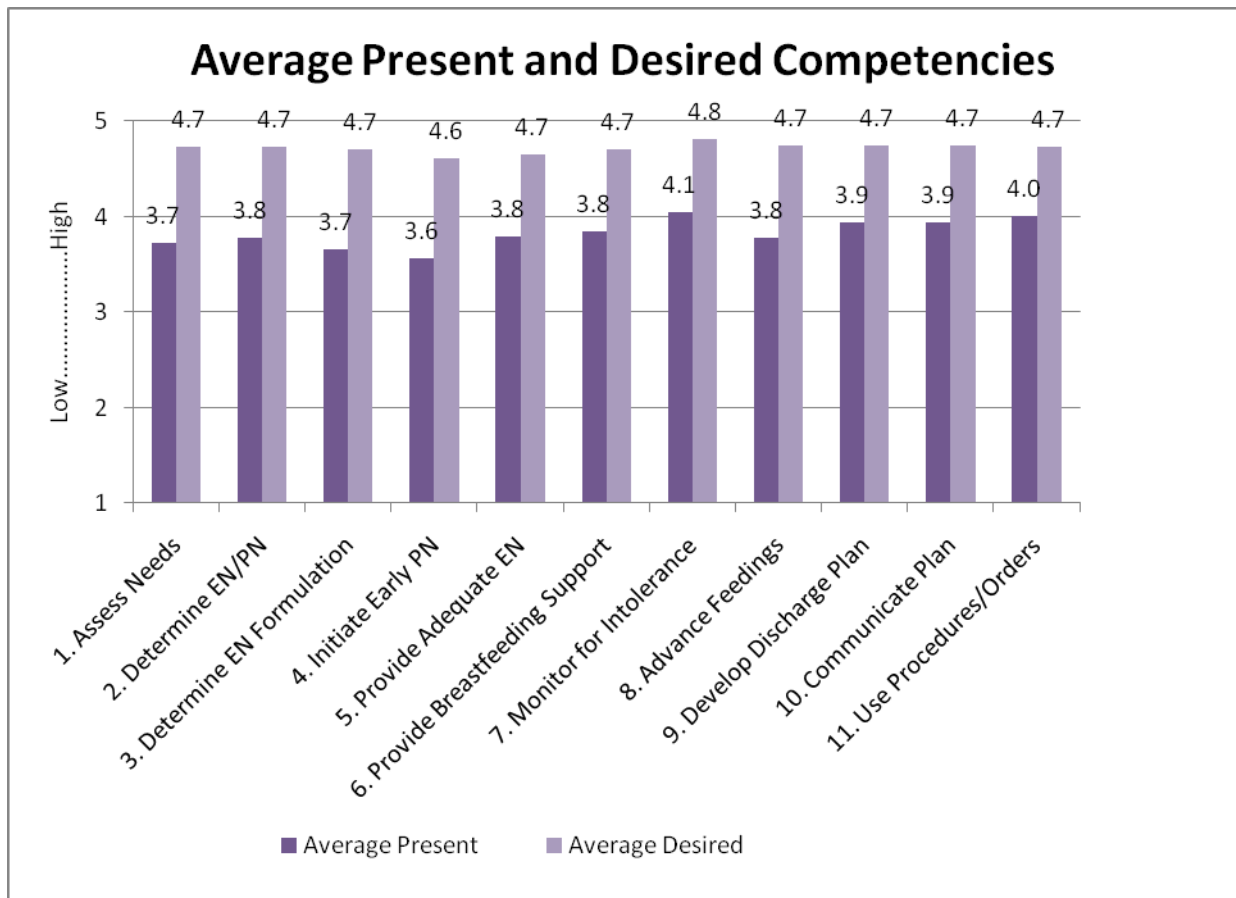
Please indicate how many years you have been in practice (since residency/training).

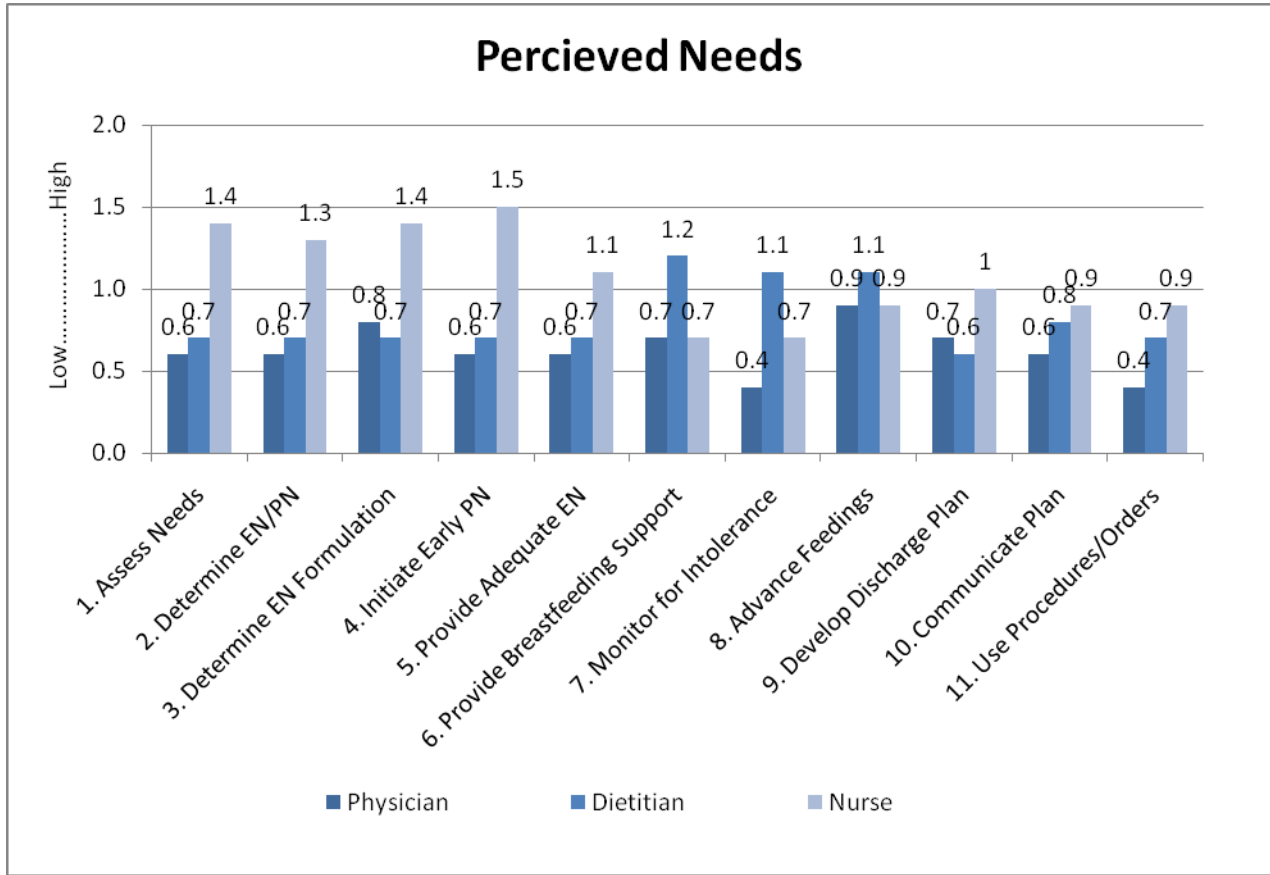
1. 0-10
2. 11-20
3. 21-30
4. 31+

## Appendix 2: NICU Survey Results

The following items represent clinical competencies in nutrition management. (Survey participants completed for both present and desired ability)

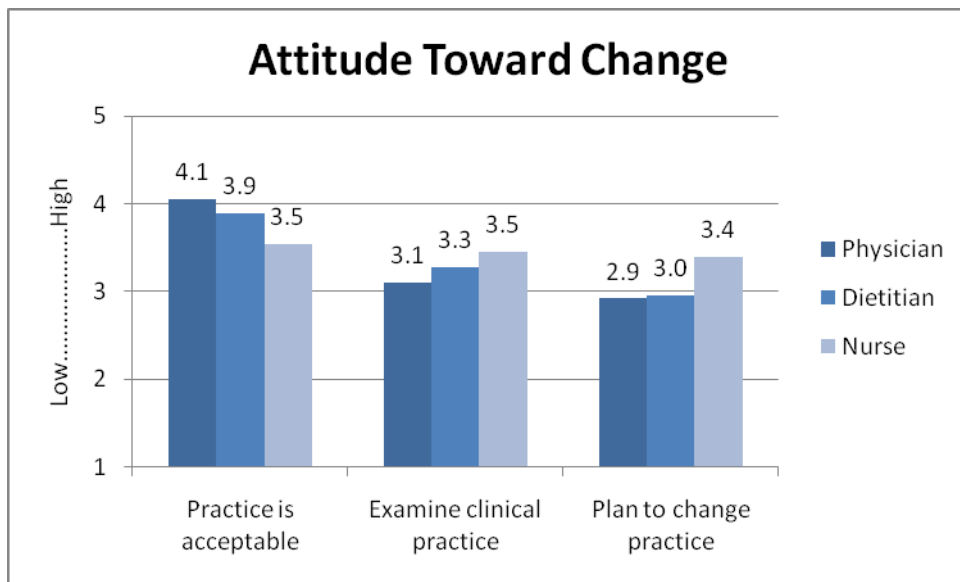
1. Assess the nutritional needs of the pre-term infant, including nutrients, fluid and energy needs
2. Determine the type of nutrition (parenteral or enteral) warranted
3. Determine the appropriate enteral formulation, including human milk and nutrient levels for the infant's needs
4. Initiate early parenteral feeding at the appropriate levels of macronutrients (protein, lipid, carbohydrate)
5. Provide adequate enteral nutrition, including trophic feedings, for the pre-term infant
6. Provide the infant's mother with breastfeeding support, encouragement, and education
7. Monitor for feeding intolerance including necrotizing enterocolitis
8. Advance feedings while managing intolerance issues
9. Develop a discharge plan to promote growth, including the use of human milk and post-discharge formula
10. Effectively communicate a discharge plan with parents and the primary care physician
11. Utilize written procedures/orders when managing nutrition for pre-term infants





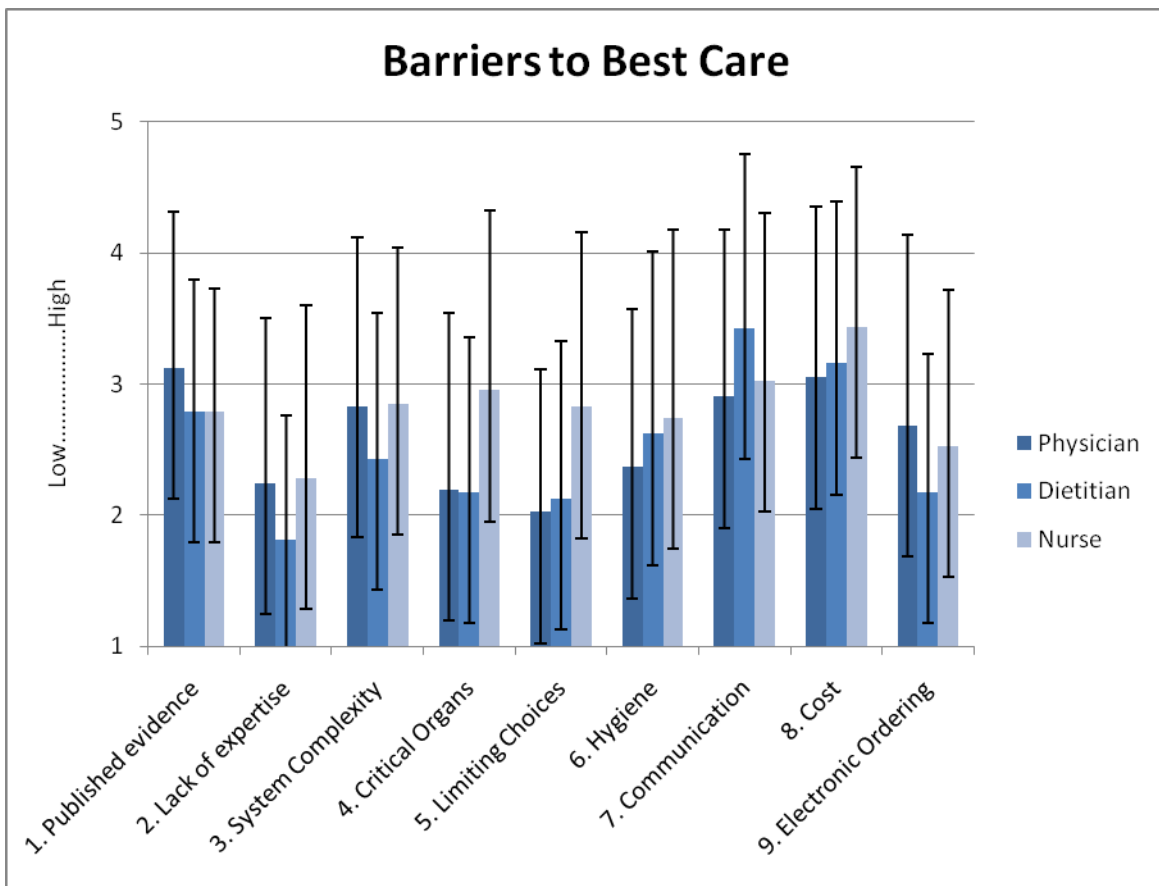
Please indicate your level of agreement with the next 3 statements. With regard to managing nutrition...

1. The way I practice in this clinical area is acceptable to me.
2. I may need to examine one or more of my clinical practices in this area.
3. I plan to change the way I practice in this area in the near future.

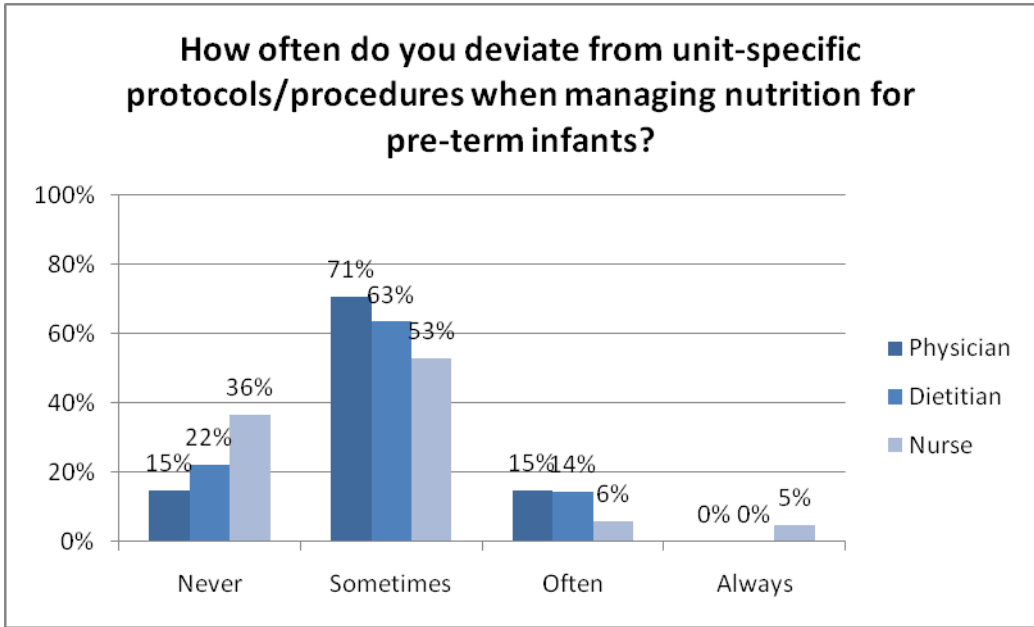
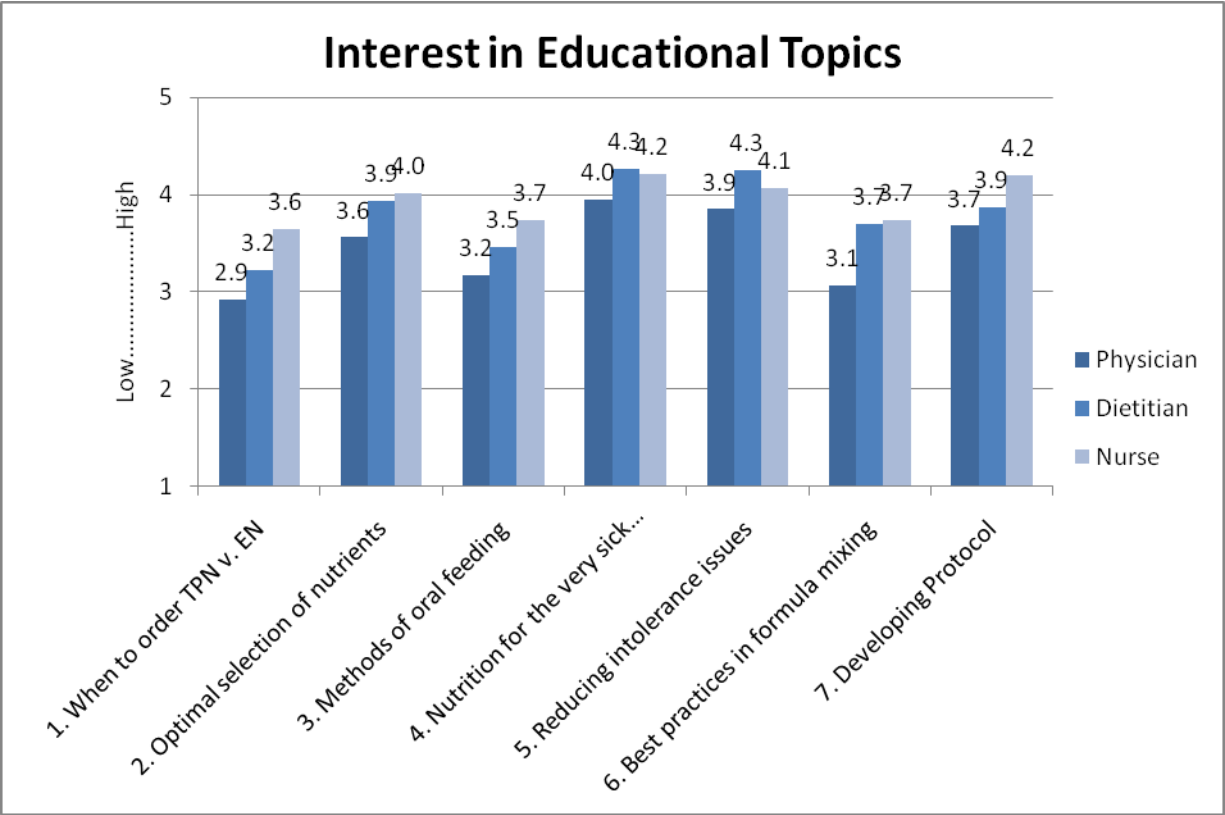


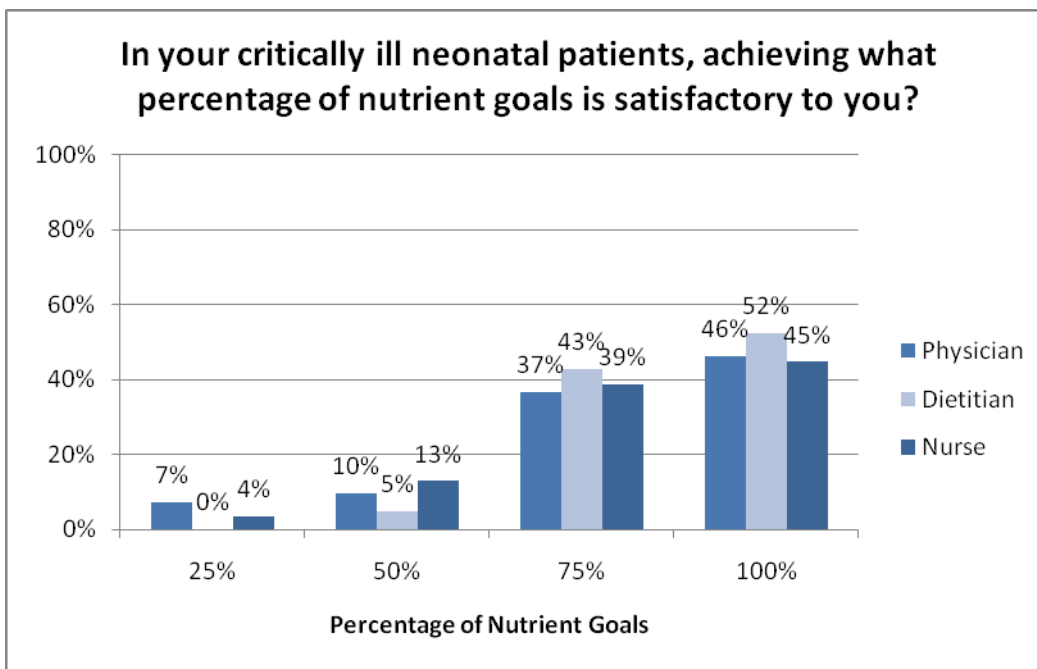
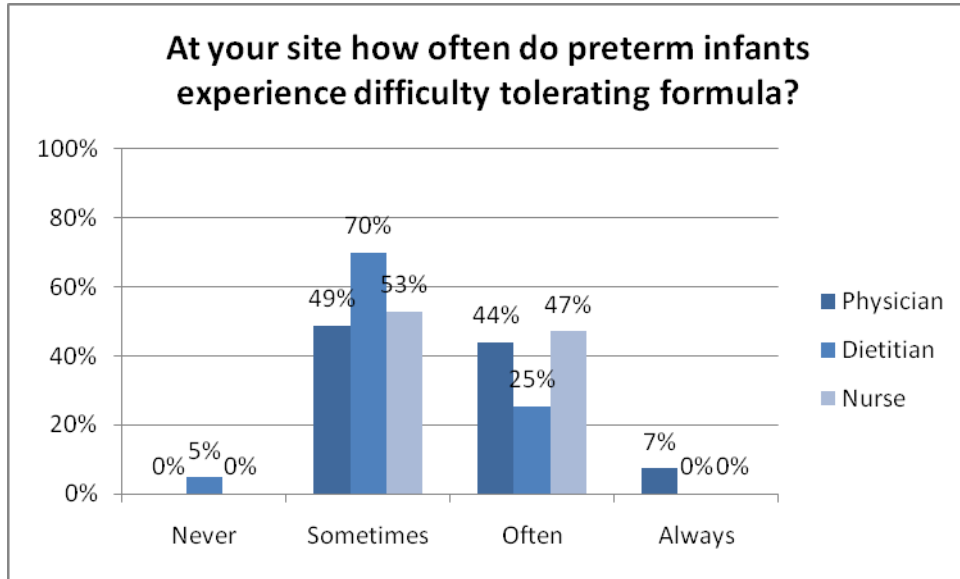
Reflecting on your own experience in nutrition management, please rate the following statements according to your extent of agreement with each.

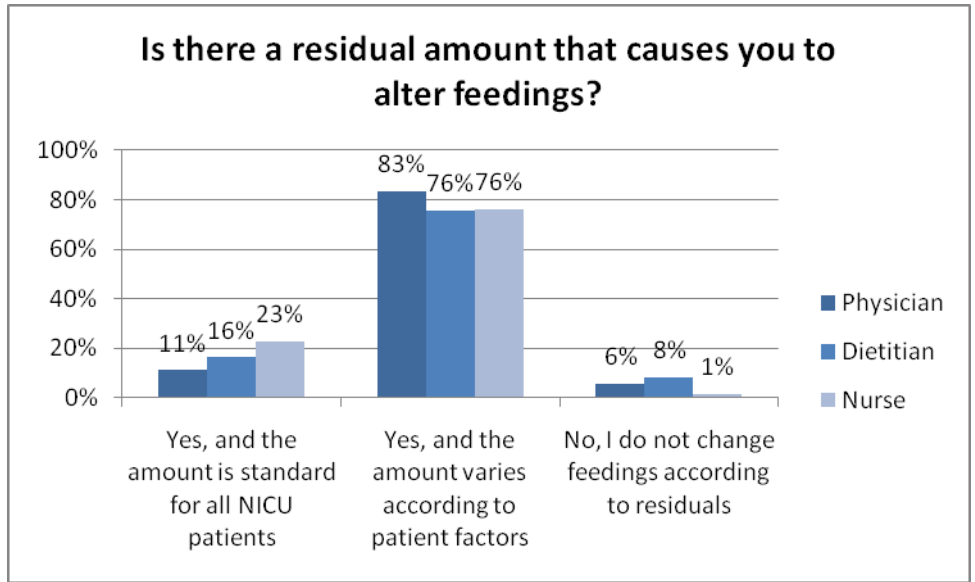
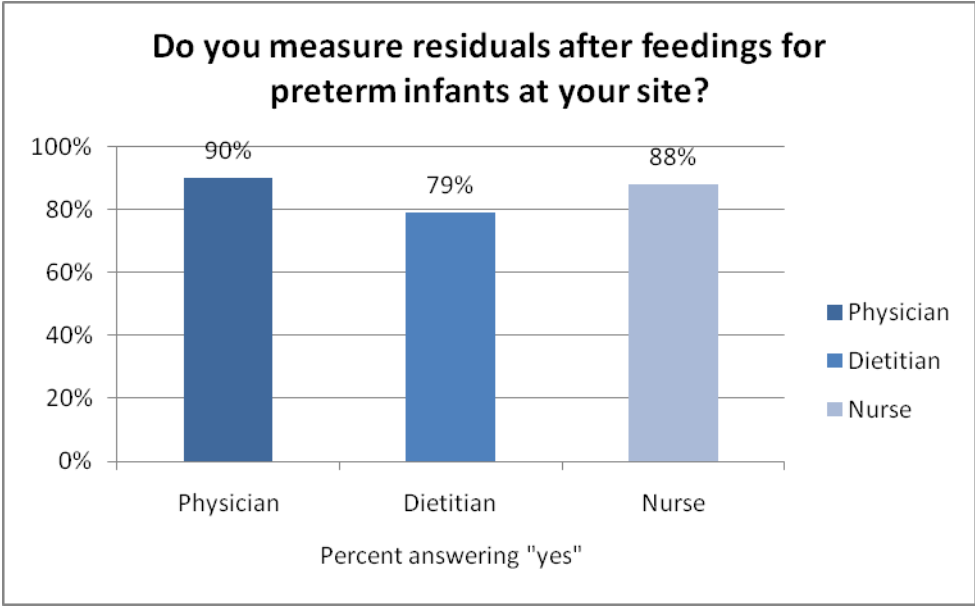
1. Published evidence does not provide enough guidance in nutrition management.
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.
4. The need to manage critical organ systems limits my ability to focus on nutrition.
5. Formulary restrictions limiting choices in formula hinder optimal management.
6. Hygiene in mixing formulas and by mothers expressing breast milk is an issue.
7. Communication with practicing pediatricians is insufficient to ensure optimal feeding occurs once the infant leaves the hospital.
8. The cost of specialized formula causes parents to switch therapy too quickly.
9. Electronic ordering for nutrition is cumbersome.



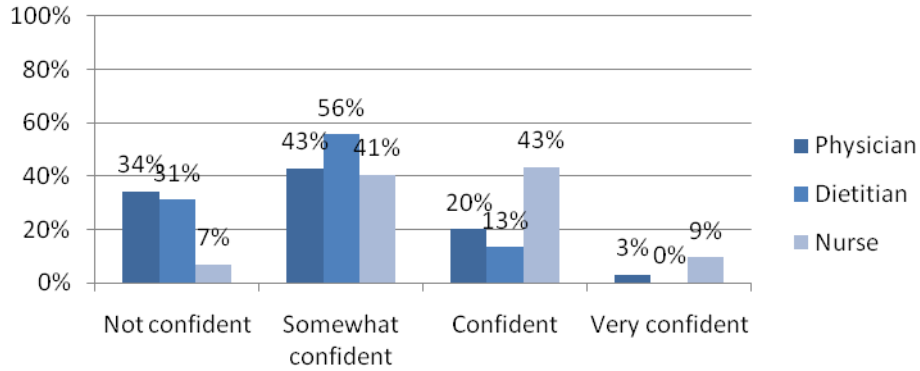
*(standard deviation noted for each response)*



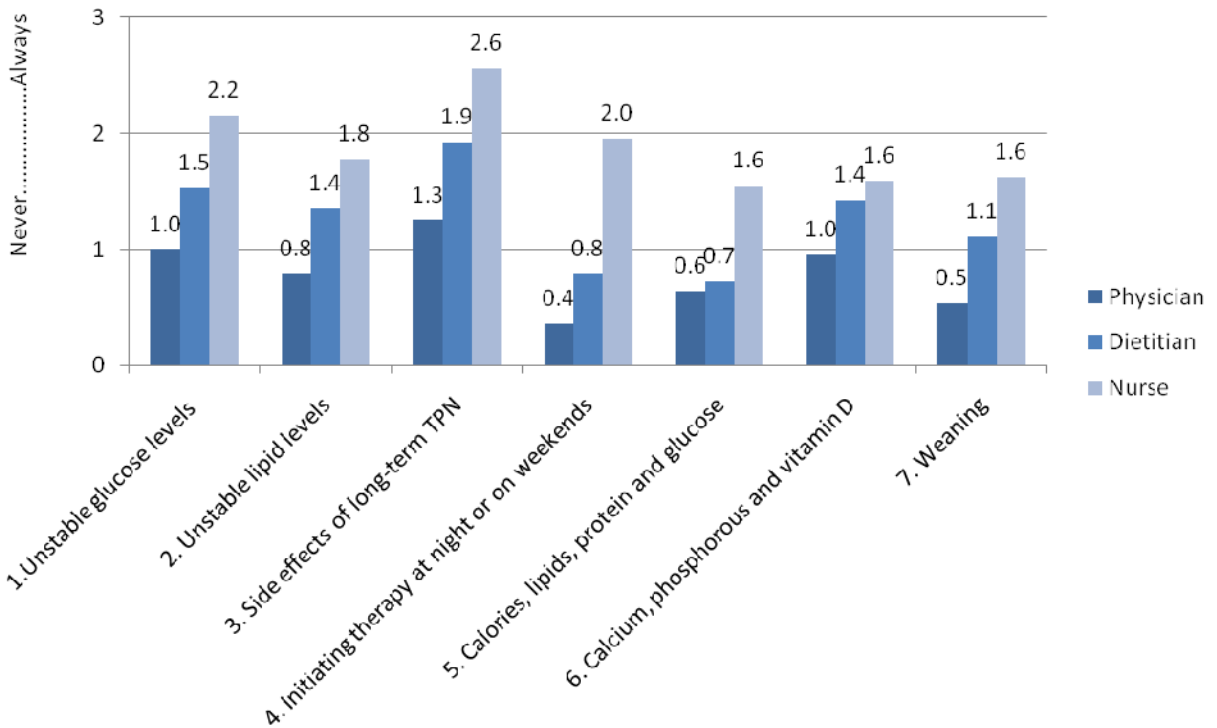




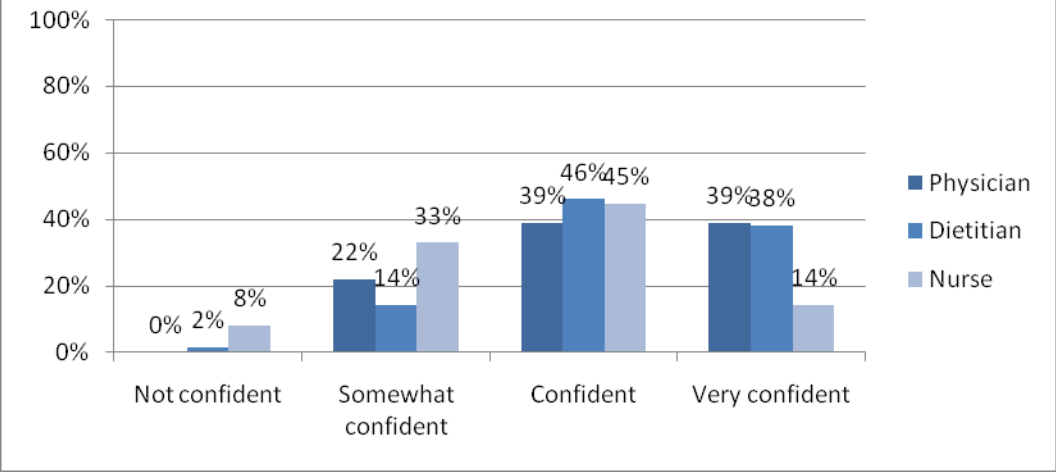
### How confident are you that this residual amount is the optimal number to be considered too much?



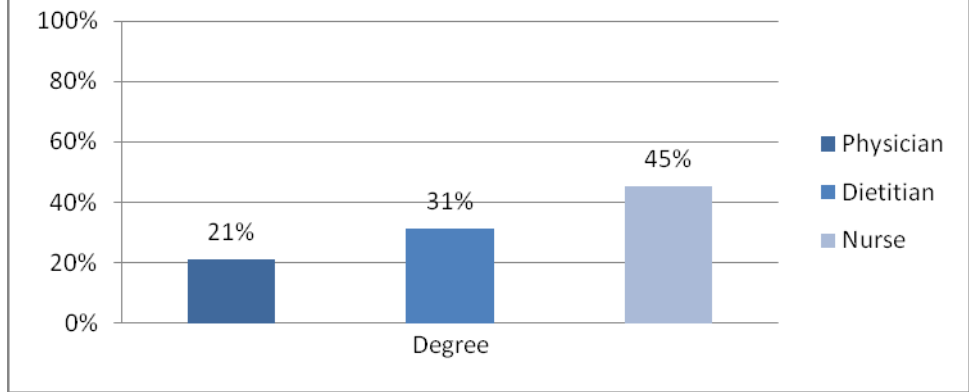
### With respect to TPN, how problematic is each of the following at your site?

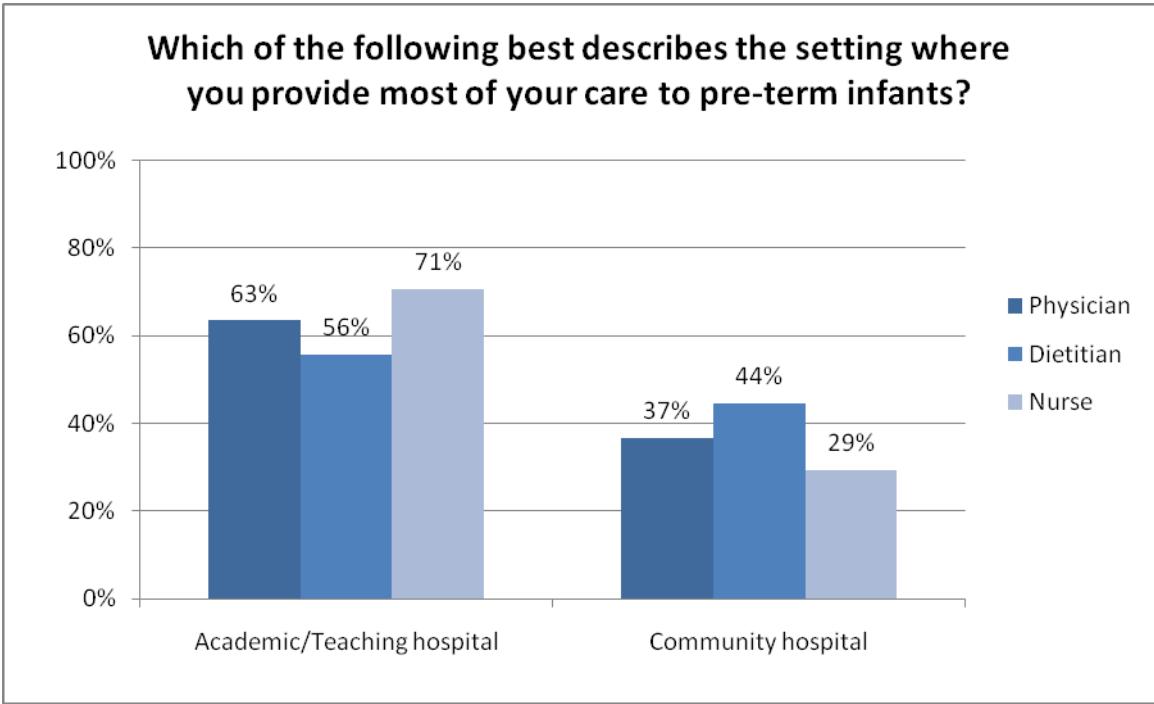
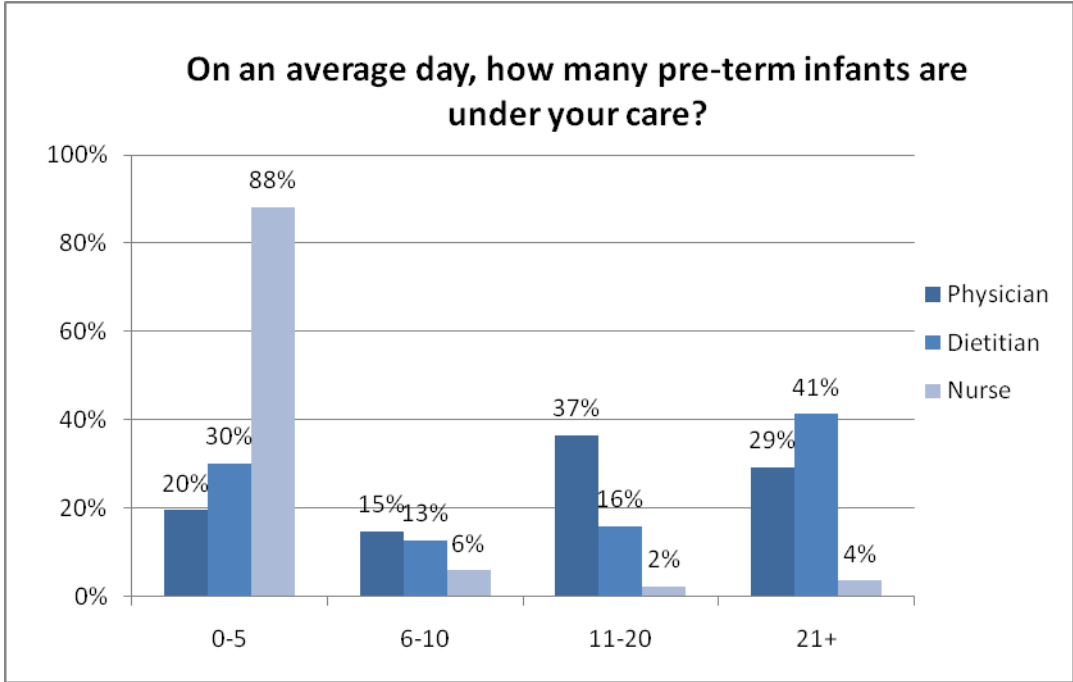


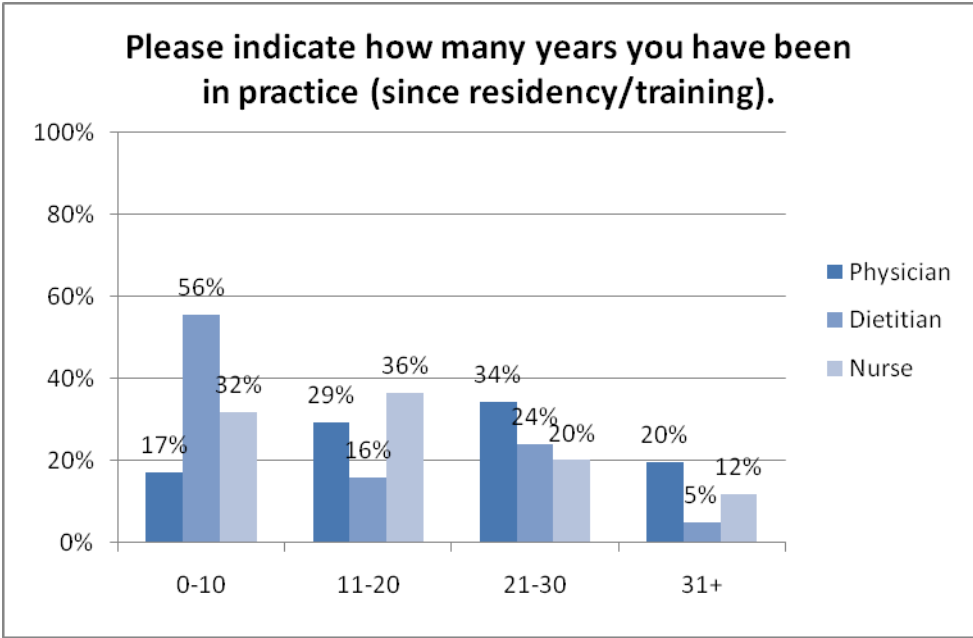
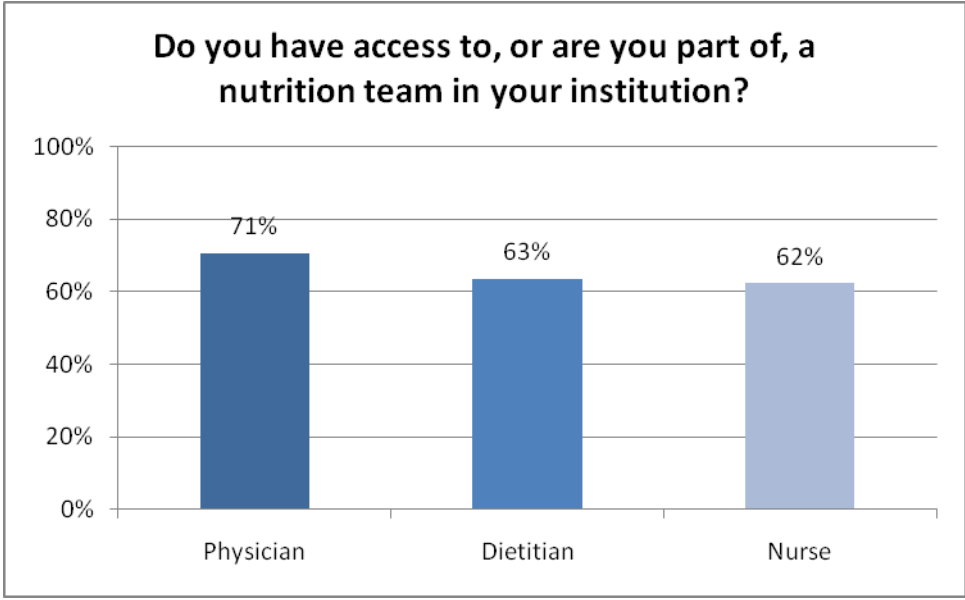
### How confident are you in the nutritional management of pre-term infants at your institution?



### Please select your degree/certification.







## Appendix 3: CCU Survey

Welcome to the University of Wisconsin assessment on nutrition in critical care. This is for a research study and the information will be used to assess needs and barriers of clinicians, in order to develop continuing medical education (CME) in nutrition. Completion of the survey implies your consent to be in the research study. Your participation is voluntary, and you may exit the survey at any time and skip any questions that you don't want to answer. It will take less than 8 minutes to complete the questionnaire. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. We will not ask for any information that can personally identify you. Upon completion of your survey, a donation of \$15 will be made to the American Red Cross Haiti Relief Fund.

Do you have recent experience in the intensive care or critical care unit (ICU, CCU)?

1. Yes
2. No

The following items represent clinical competencies in nutrition management. For each competency, please indicate your present ability to the left, and your desired ability to the right.

Present Ability						Desired Ability				
Low Ability 1	2	3	4	High Ability 5		Low Ability 1	2	3	4	High Ability 5
					1. Assess the nutritional status of critically ill patients (including weight loss, previous nutrient intake, level of disease severity, etc.) and the expected course of the patient.					
					2. Evaluate the likelihood of tolerating enteral feeding and identify patients for whom EN is not feasible.					
					3. Assess and reduce the risk of aspiration for patients on EN.					
					4. Determine the goals of EN at the time of initiation of nutrition support therapy.					
					5. Use protocols to guide nutritional support therapy.					
					6. Select the appropriate formulations for EN (including those for special populations such as trauma, burns, etc.).					
					7. Select route of nutrition and formulations for special patient populations (hemodialysis, liver failure, etc.).					
					8. Initiate enteral nutrition within 24-48 hours for critically ill patients unable to maintain volitional intake as indicated.					
					9. Determine the appropriate access point for enteral nutrition administration.					
					10. Initiate parenteral nutrition where indicated.					
					11. In patients stabilized on PN, periodically repeat efforts to initiate EN.					
					12. Monitor and adjust both EN and PN as needed.					
					13. Follow-up with patients to ensure adequate nutritional intake					

Please indicate your level of agreement with the next 3 statements. With regard to managing nutrition...

	Low Agreement 1	2	3	4	High Agreement 5
1. The way I practice in this clinical area is acceptable to me.					
2. I may need to examine one or more of my clinical practices in this area.					
3. I plan to change the way I practice in this area in the near future.					

Reflecting on your own experience in nutrition management, please rate the following statements according to the extent of your agreement with each.

	Low Agreement 1	2	3	4	High Agreement 5
1. Published evidence does not provide enough guidance in nutrition management.					
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.					
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.					
4. The need to manage critical organ systems limits my time to focus on nutrition.					
5. Formulary restrictions limiting choices in formula prohibit optimal management.					
6. Nutrition protocols in my institution do not reflect best practices.					
7. Access to supporting services (dietitian, pharmacist and radiologist) is limited on nights and weekends.					
8. Diarrhea and feeding intolerance with enteral nutrition is a major problem.					
9. Feeding residuals cause problems in determining appropriate volumes for patients.					

Please rate your interest in the following areas for nutrition education.

	Low Interest 1	2	3	4	High Interest 5
Determining when to use TPN or EN and determining the route of administration.					
Optimal selection of nutrients for individual patients					
Developing nutritional goals for patients in the ICU					
Transitioning from TPN to EN and from EN to PO.					

1. What information do you routinely seek to determine the nutritional status of critically ill patients? (check all that apply)

1. Level of disease severity
2. Anthropometry
3. Prealbumin
4. Expected duration of clinical impairment
5. Pre-existing/involuntary weight loss
6. Comorbid conditions
7. C-reactive protein
8. Albumin
9. Function of the GI tract
10. Transferrin
11. Other

2. In your practice, how often do you initiate enteral nutrition within 24-48 hours after admission for critically ill patients with no contraindications?

1. Never
2. Sometimes
3. Often
4. Always

3. In your practice, which of the following would influence you to initiate parental nutrition? (check all that apply)

1. Enteral nutrition is not feasible or is contraindicated
2. Absence of bowel sounds
3. Lack of enteral access
4. Evidence of protein-calorie malnutrition
5. Requested by family
6. Presence of a central venous catheter
7. Other

4. How often do you deviate from unit-specific protocols/procedures when managing nutrition?

1. Never
2. Sometimes
3. Often
4. Always

5. In your practice, for which of the following are critically ill patients on enteral nutrition assessed? (check all that apply)

1. Diabetes
2. Tachycardia
3. Aspiration due to reflux
4. Pneumonia

6. For patients stabilized on parenteral nutrition, how often do you evaluate for initiating enteral nutrition?

1. Daily
2. A couple times each week
3. Weekly

7. In your institution, how often is the need to transition a patient from TPN to EN overlooked?

1. Never
2. Sometimes
3. Often

4. Always

8. At your site, how much of a problem is catheter sepsis for critically ill patients on TPN?

1. Not a problem
2. A slight problem
3. A problem
4. A major problem

9. How often do you experience ethical dilemmas regarding counseling patients and their families on TPN?

1. Never
2. Sometimes
3. Often
4. Always

10. In your critically ill patients, achieving what percentage of nutrient goals is satisfactory to you?

1. 25%
2. 50%
3. 75%
4. 100%

11. In your critically ill patients, what is the highest blood sugar level with which you are comfortable?

1. No greater than 125 mg/dl
2. No greater than 150 mg/dl
3. No greater than 175 mg/dl
4. No greater than 200 mg/dl

12. Overall, how confident are you about nutritional management in your ICU?

1. Not confident
2. Somewhat confident
3. Confident
4. Very confident

Please select your degree/certification:

1. DO/MD
2. Dietitian
3. Nurse
4. NP
5. PA
6. Pharmacist/ PharmD
7. Other (please specify)

On an average day, how many patients are under your care?

1. 0-5
2. 6-10
3. 11-20
4. 21+

Which of the following best describes the setting where you practice?

1. Academic/Teaching hospital
2. Community hospital
3. Long-term Acute Care Hospital
4. Other

Do you have access to, or are you part of, a nutrition team in your institution?

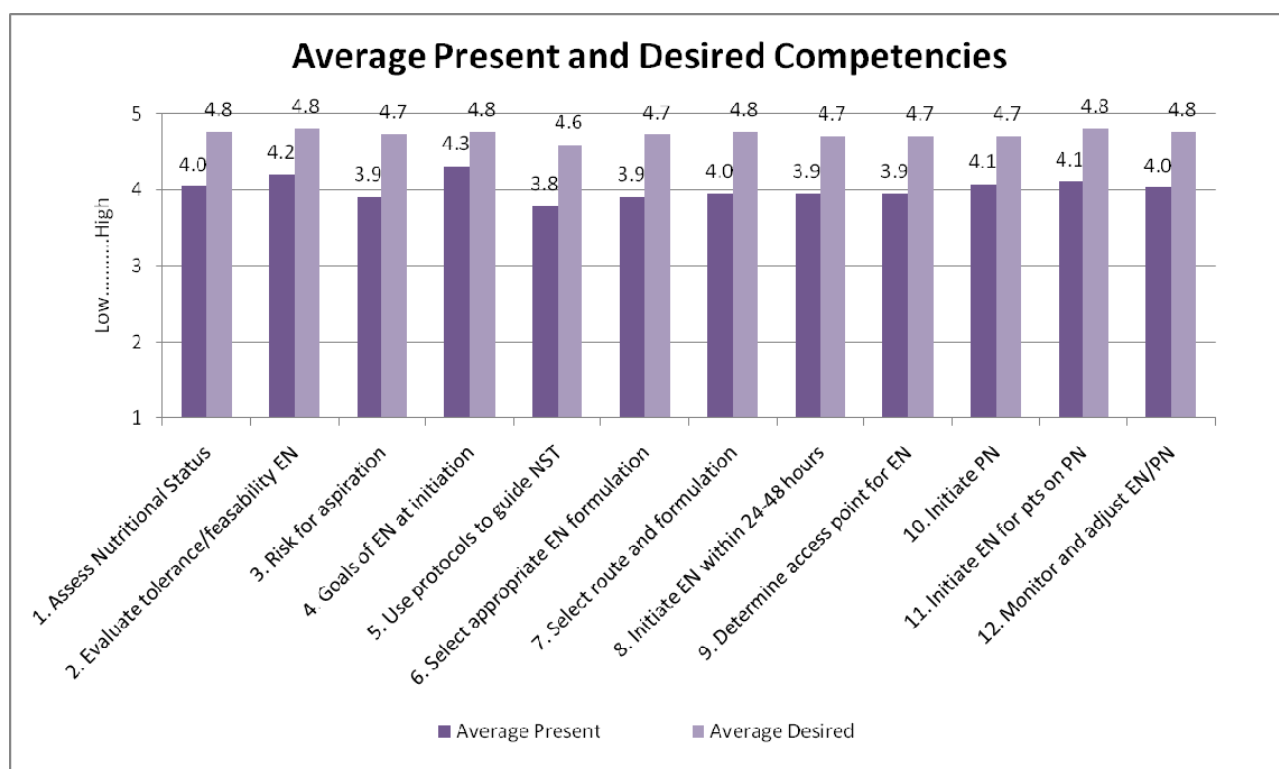
1. Yes
2. No

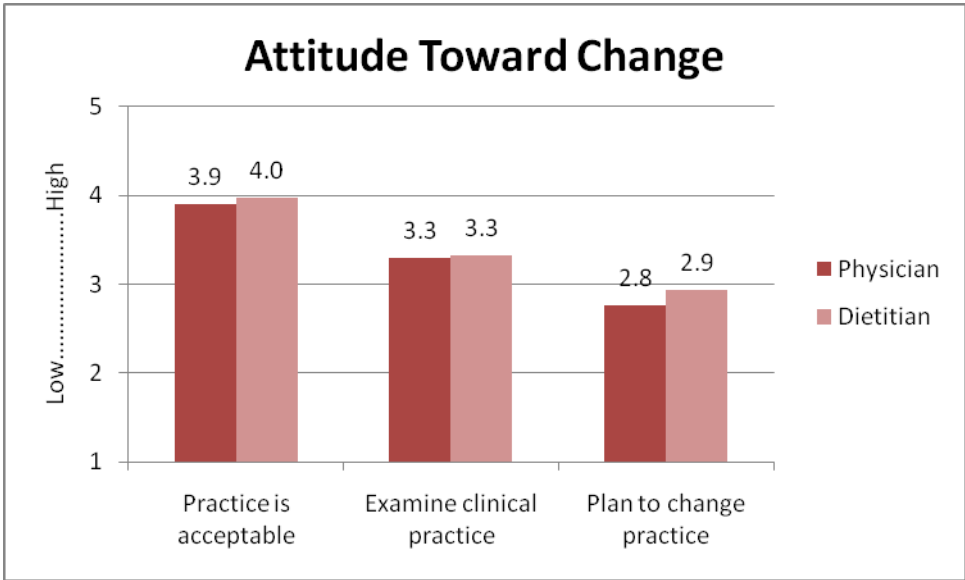
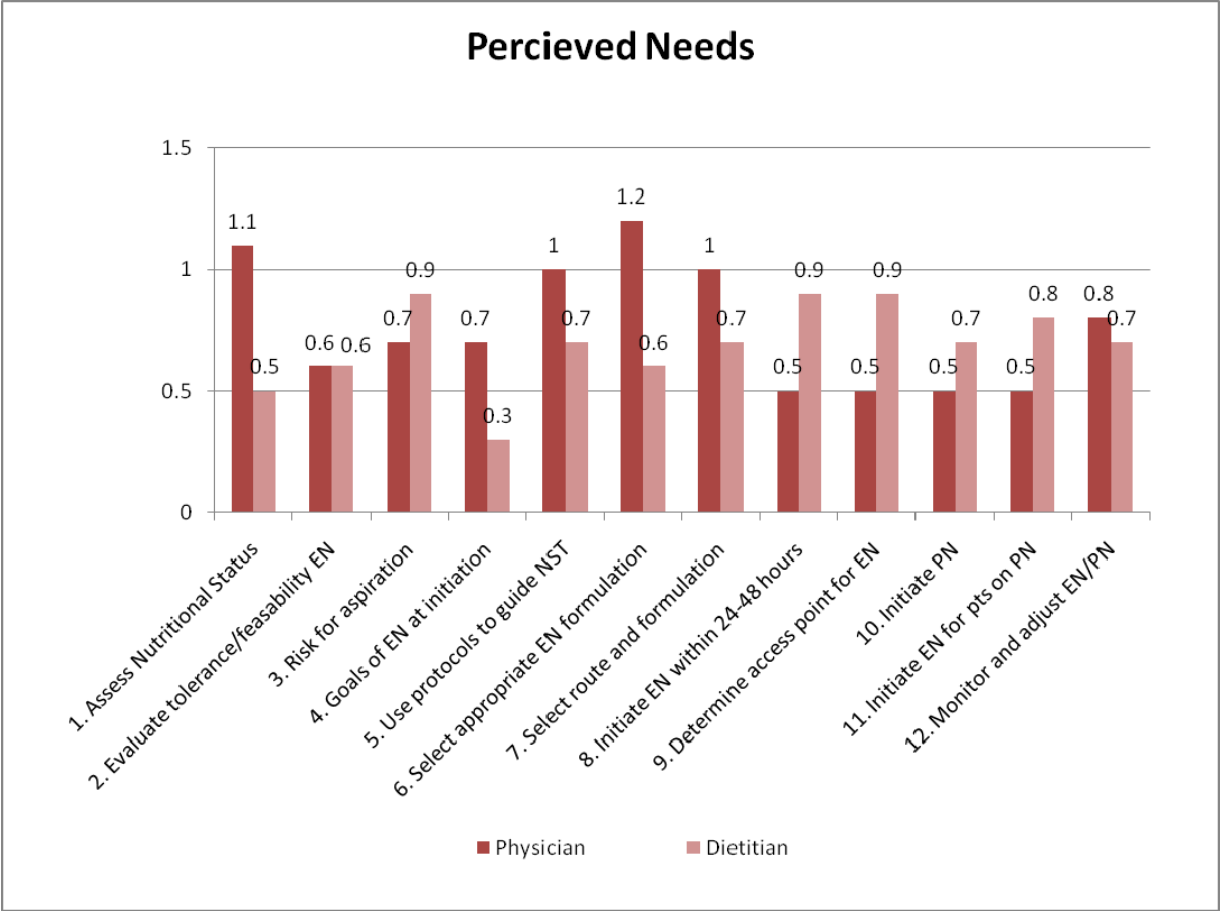
Please indicate how many years you have been in practice (since residency).

1. 0-10
2. 11-20
3. 21-30
4. 31+

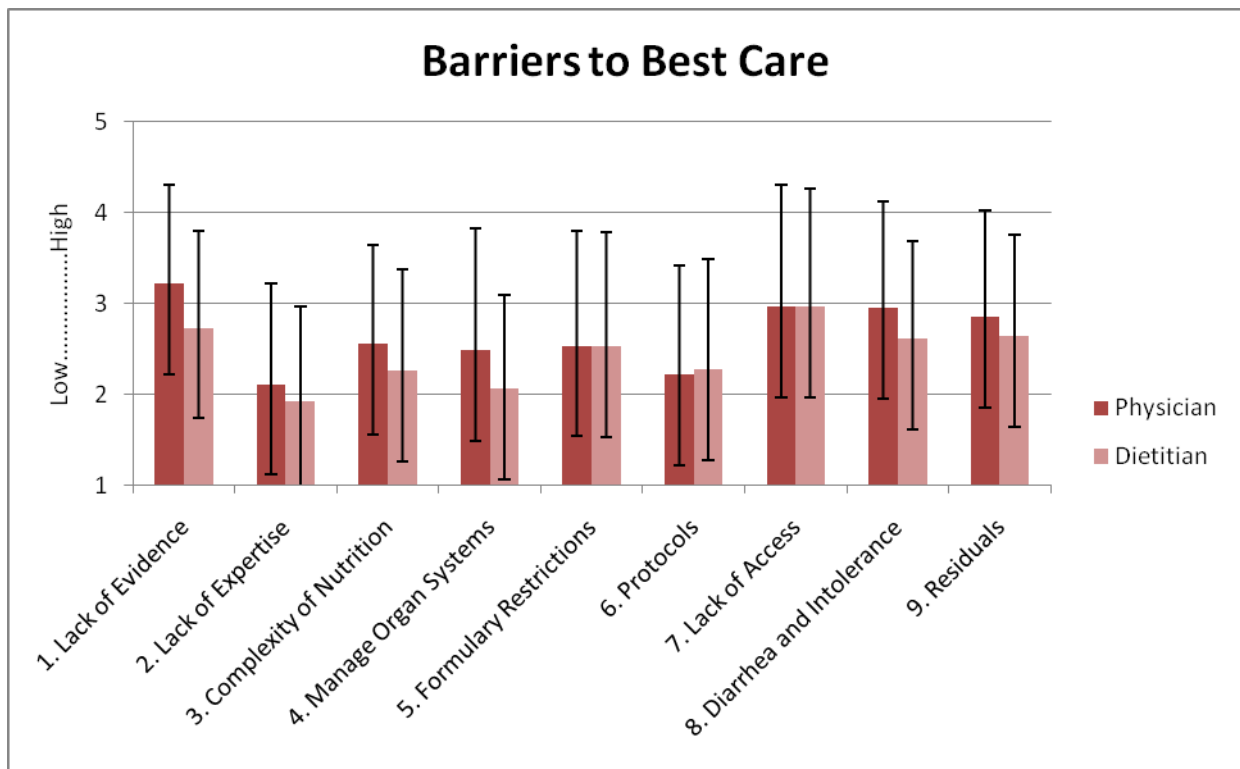
## Appendix 4: CCU Survey Results

1. Assess the nutritional status of critically ill patients (including weight loss, previous nutrient intake, level of disease severity, etc.) and the expected course of the patient.
2. Evaluate the likelihood of tolerating enteral feeding and identify patients for whom EN is not feasible.
3. Assess and reduce the risk of aspiration for patients on EN.
4. Determine the goals of EN at the time of initiation of nutrition support therapy.
5. Use protocols to guide nutritional support therapy.
6. Select the appropriate formulations for EN (including those for special populations such as trauma, burns, etc.).
7. Select route of nutrition and formulations for special patient populations (hemodialysis, liver failure, etc.).



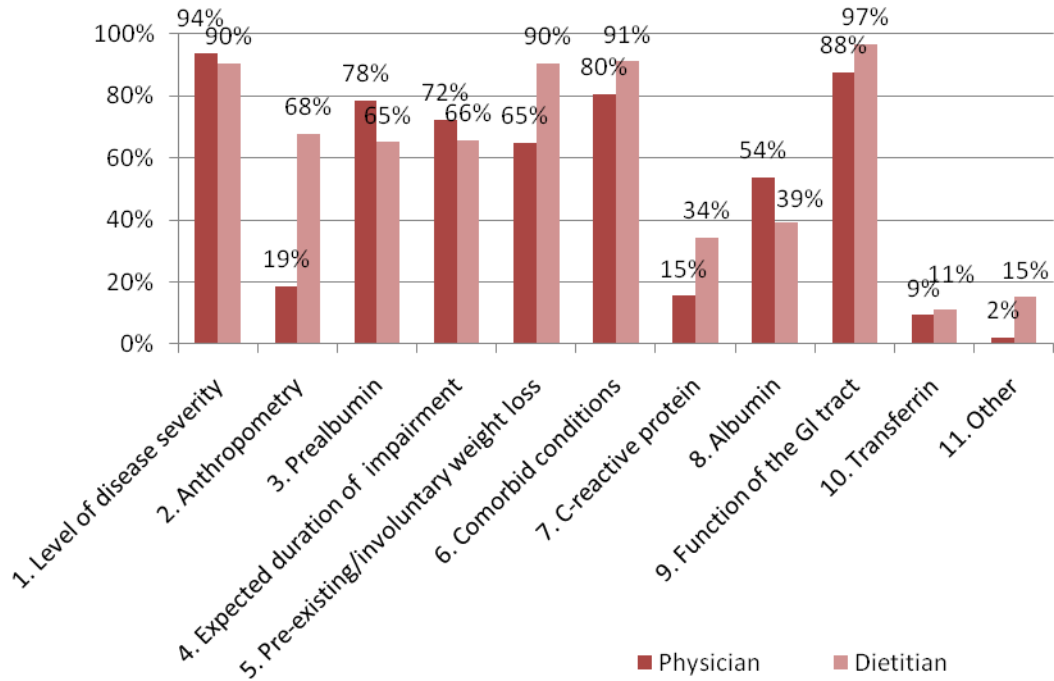


1. Published evidence does not provide enough guidance in nutrition management.
2. We do not have the necessary expertise/ knowledge (physicians, dietitians, pharmacists) to manage individual patient nutritional needs.
3. The complexity of nutritional management makes it hard to choose what is best for individual patients.
4. The need to manage critical organ systems limits my time to focus on nutrition.
5. Formulary restrictions limiting choices in formula prohibit optimal management.
6. Nutrition protocols in my institution do not reflect best practices.
7. Access to supporting services (dietitian, pharmacist and radiologist) is limited on nights and weekends.
8. Diarrhea and feeding intolerance with enteral nutrition is a major problem.
9. Feeding residuals cause problems in determining appropriate volumes for patients.

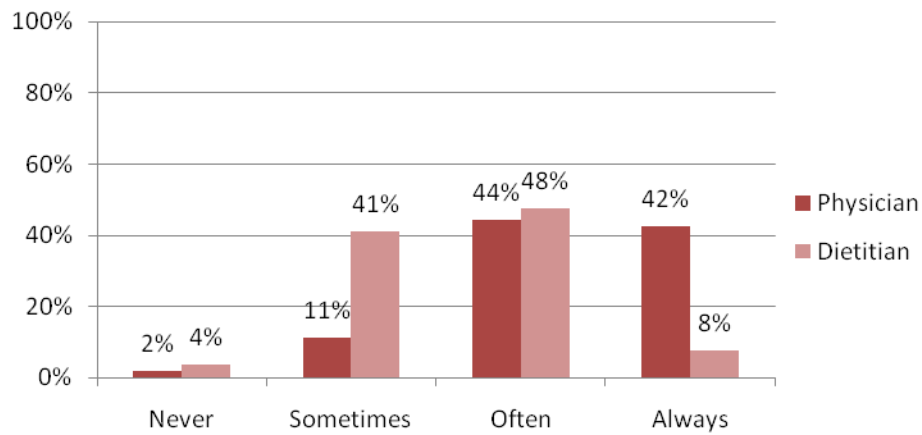


*(standard deviation noted for each response)*

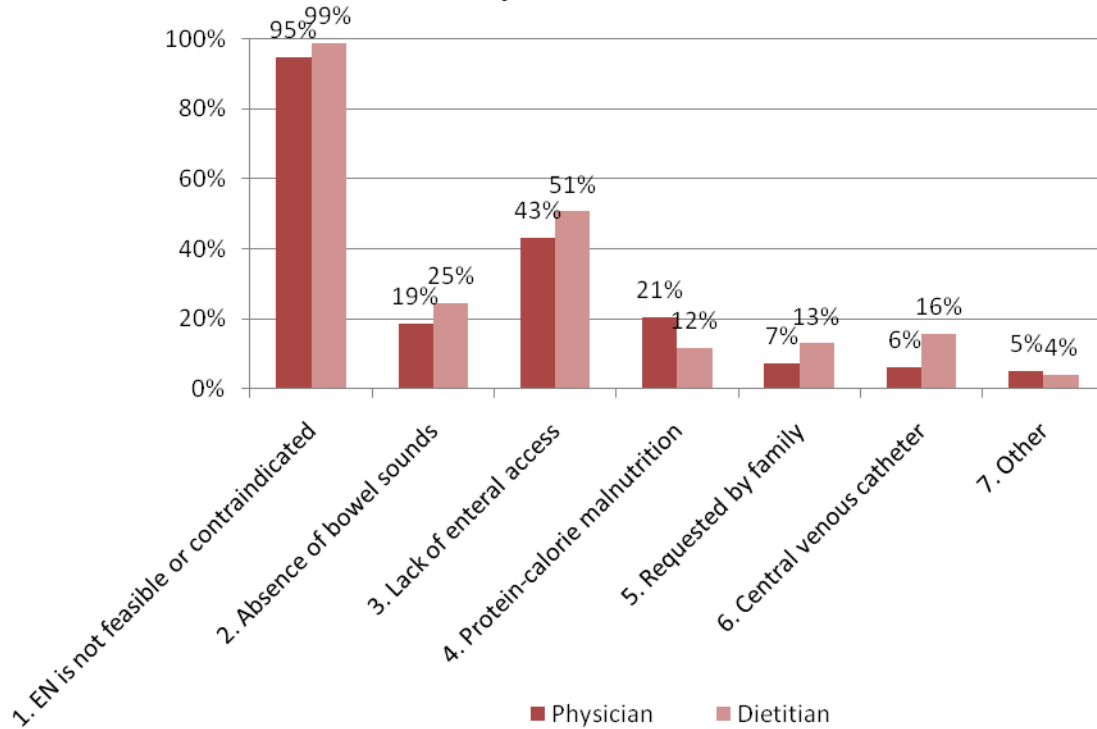
### What information do you routinely seek to determine the nutritional status of critically ill patients?



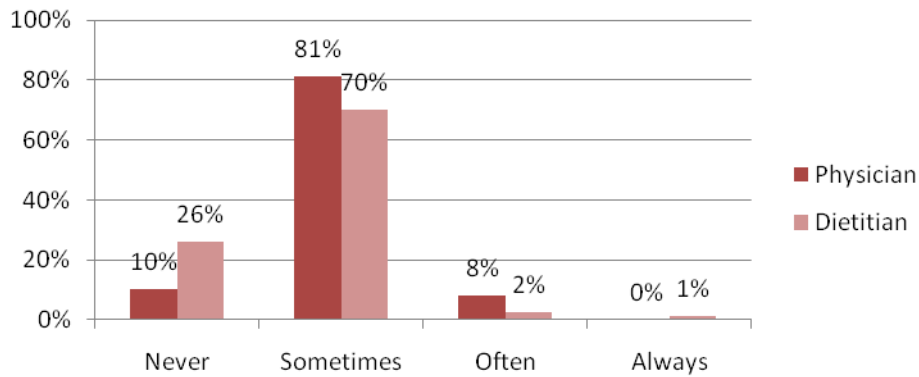
### In your practice, how often do you initiate enteral nutrition within 24-48 hours after admission for critically ill patients with no contraindications?



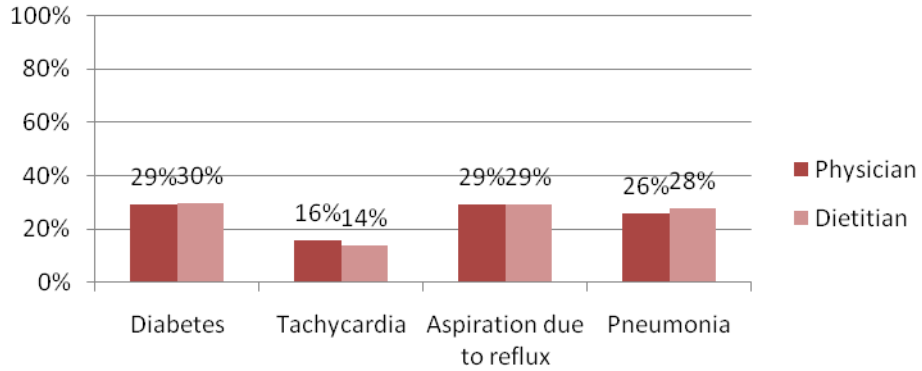
**In your practice, which of the following would influence you to initiate parental nutrition?**



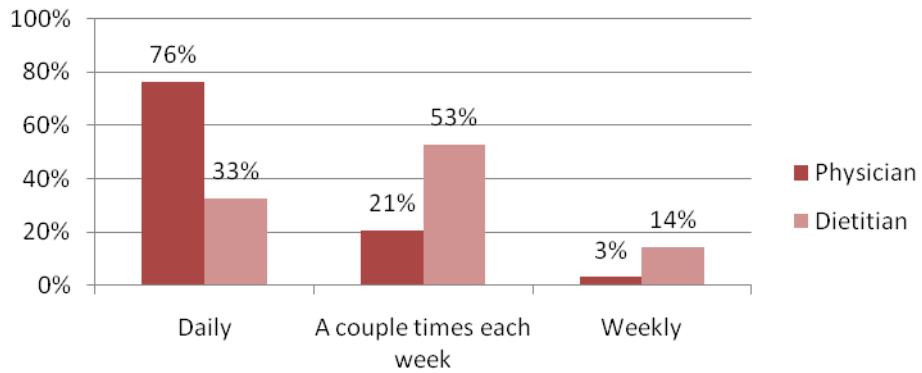
**How often do you deviate from unit-specific protocols/procedures when managing nutrition?**

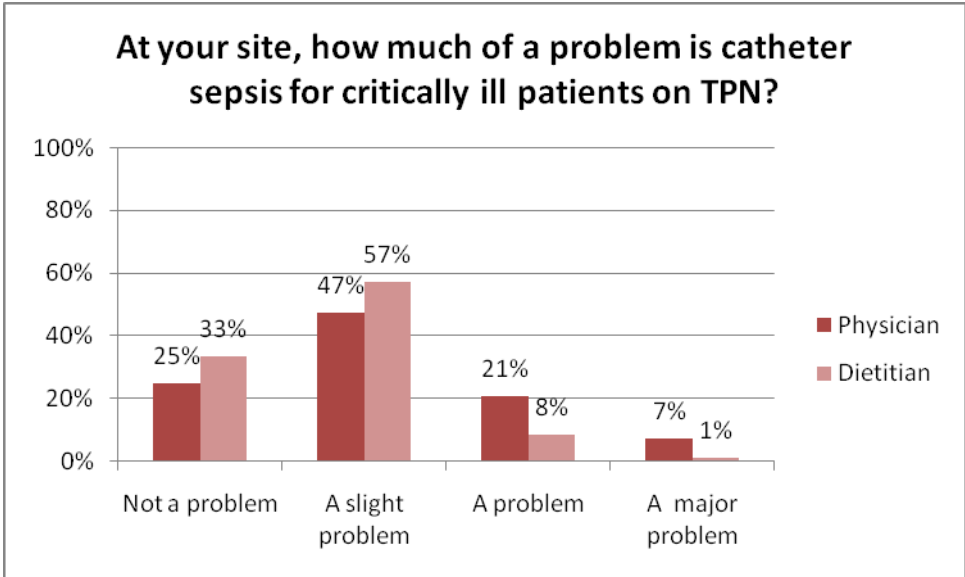
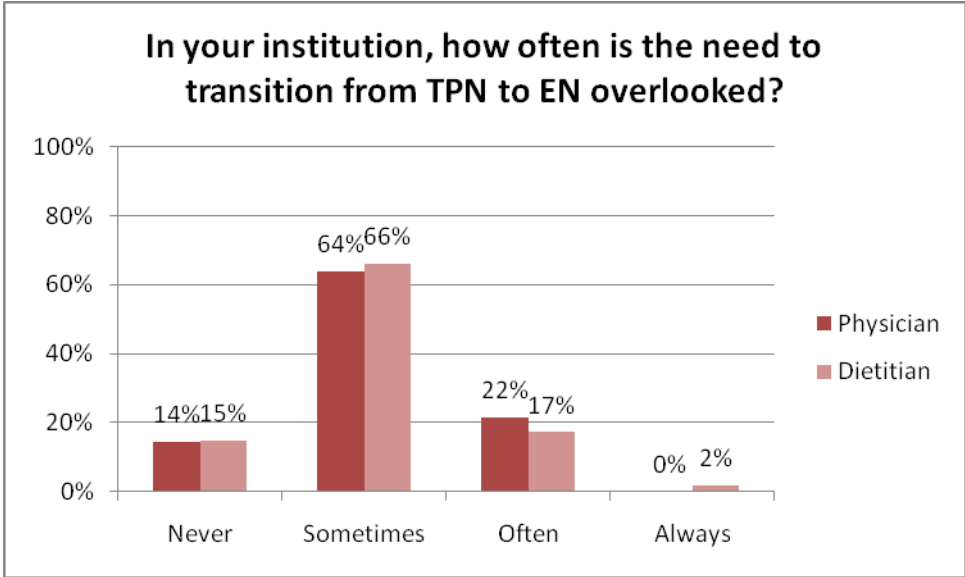


**In your practice, for which of the following are critically ill patients on enteral nutrition assessed?**

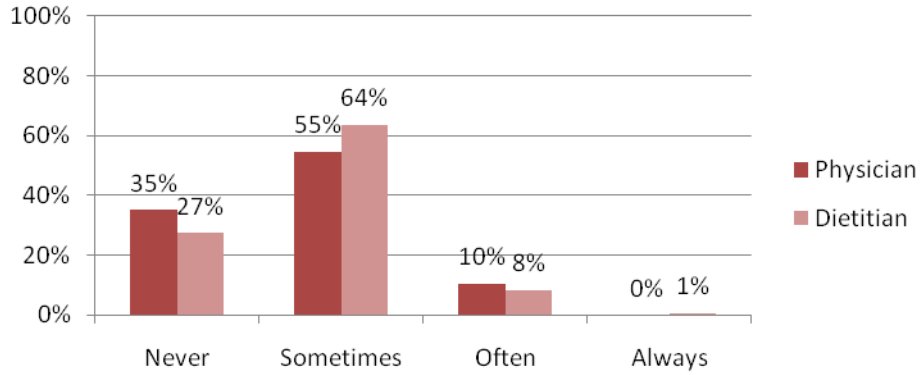


**For patients stabilized on parenteral nutrition, how often do you evaluate for initiating enteral nutrition?**

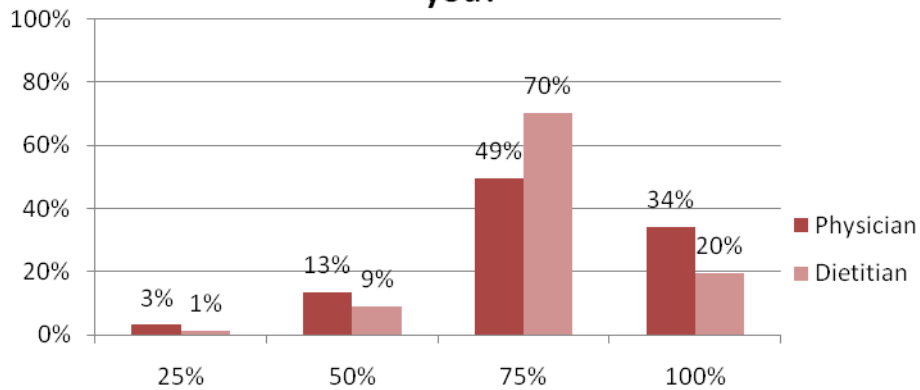




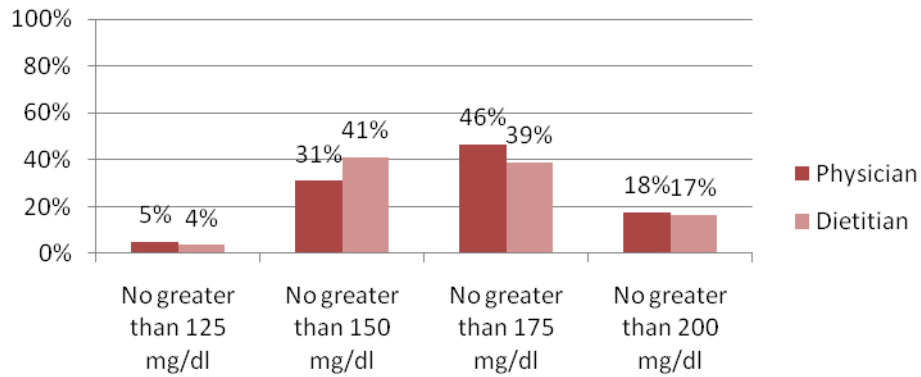
**How often do you experience ethical dilemmas regarding counseling patients and their families on TPN?**



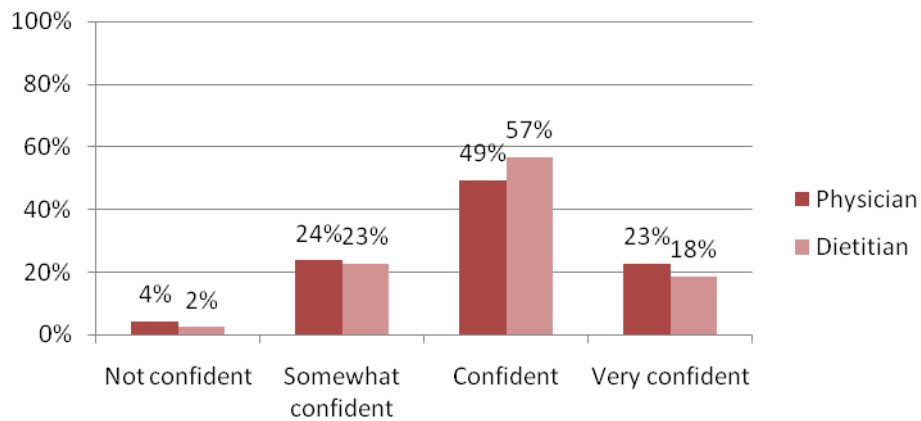
**In your critically ill patients, achieving what percentage of nutrient goals is satisfactory to you?**

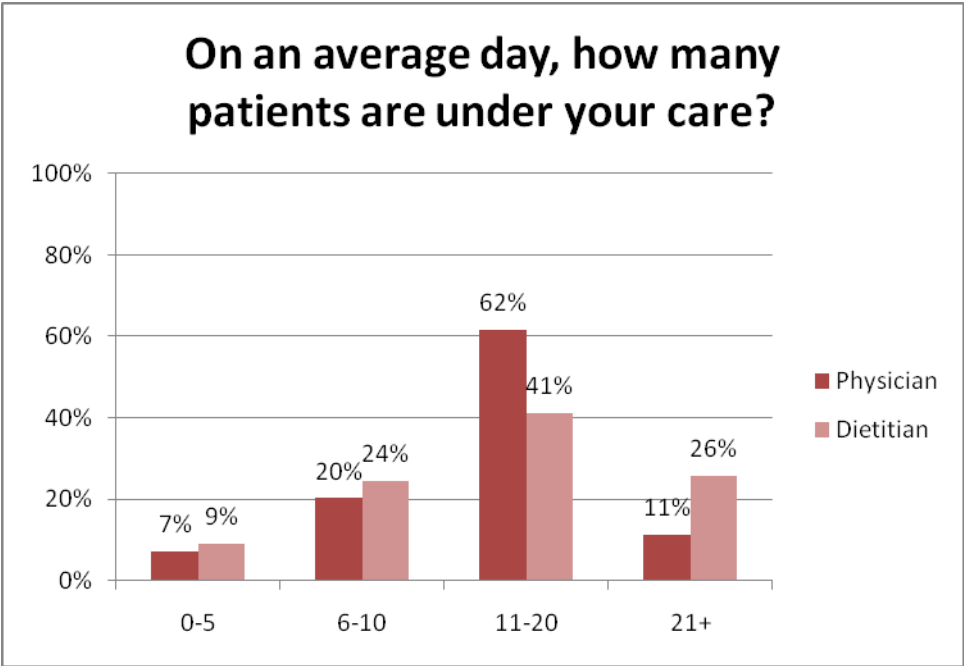
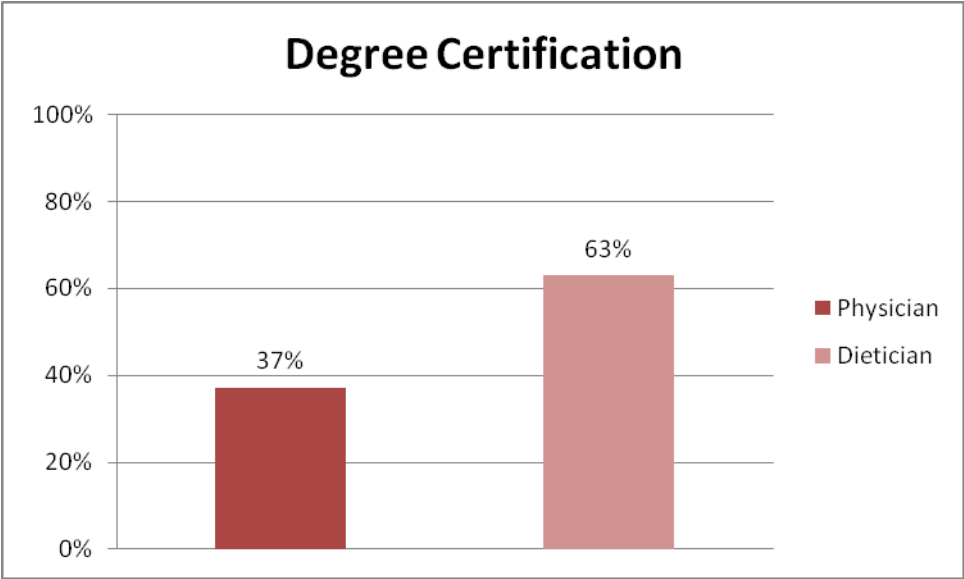


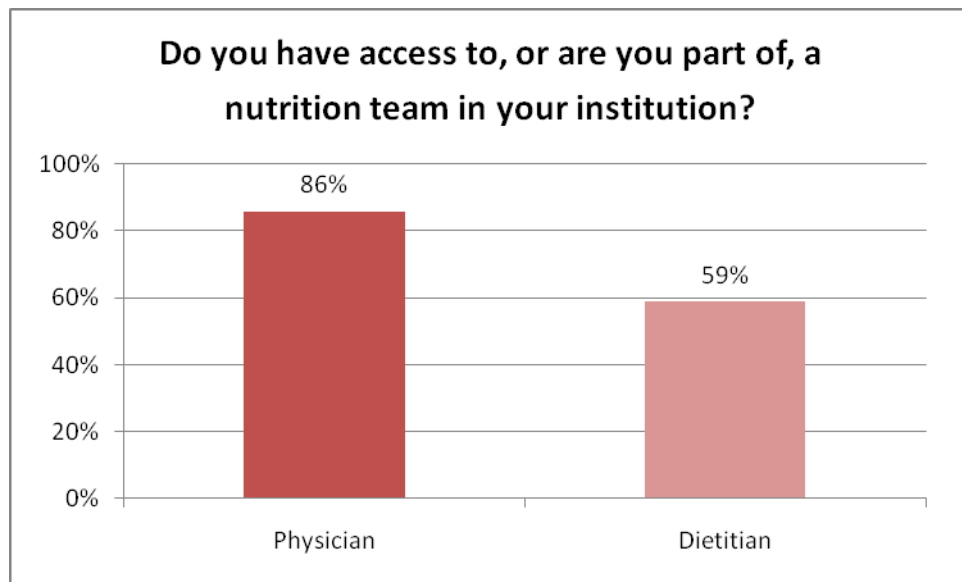
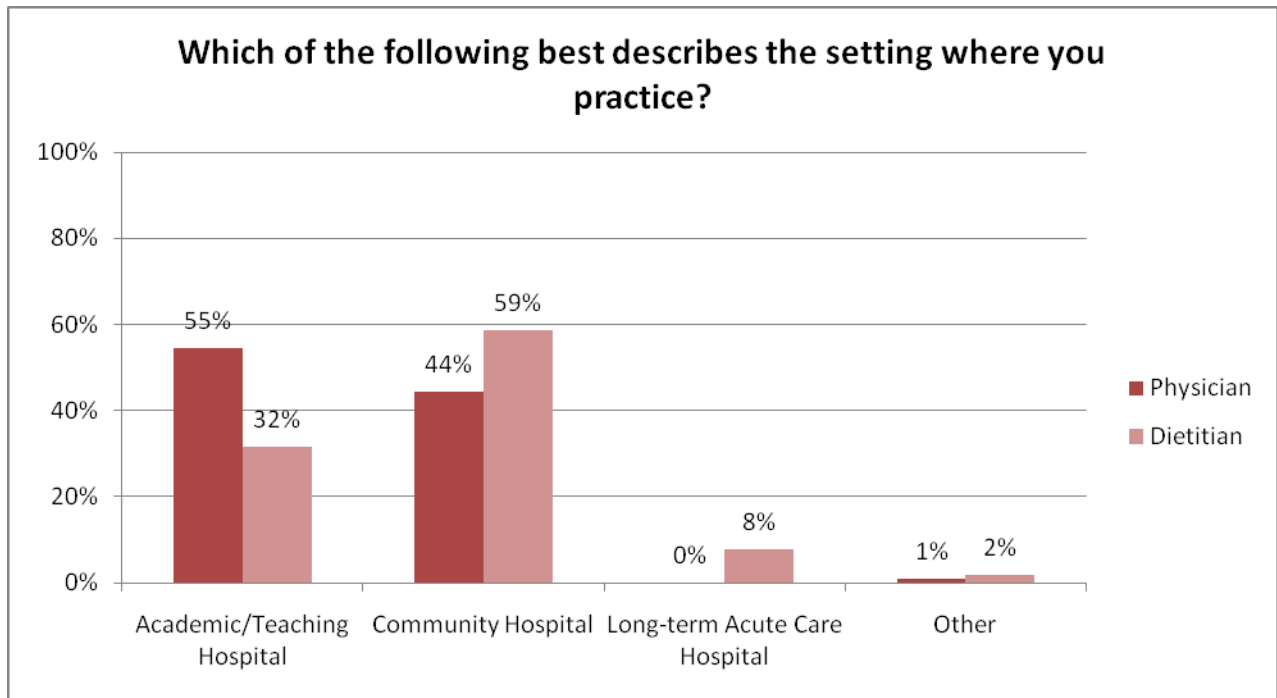
**In your critically ill patients, what is the highest blood sugar level with which you are comfortable?**



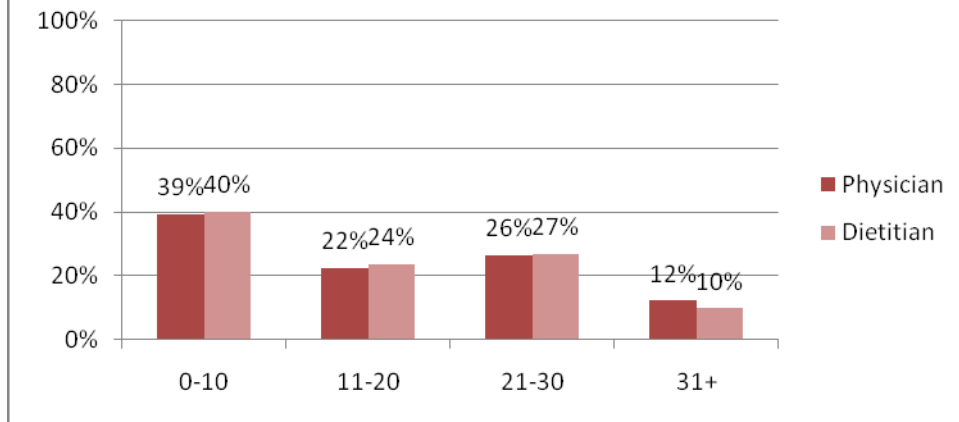
**Overall, how confident are you about nutritional management in your ICU?**







## How many years you have been in practice?



## Appendix 5: Primary Care Survey

Welcome to the University of Wisconsin assessment on nutrition. This is for a research study and the information will be used to assess needs and barriers of clinicians, in order to develop continuing medical education (CME) in nutrition. Completion of the survey implies your consent to be in the research study. Your participation is voluntary, and you may exit the survey at any time and skip any questions that you don't want to answer. It will take less than 9 minutes to complete the questionnaire. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. We will not ask for any information that can personally identify you. Upon completion of your survey, a donation of \$15 will be made to the American Red Cross Haiti Relief Fund. Please start with the survey now by clicking on the Continue button below. We would like your thoughts on nutritional support therapy. For this study, nutritional support therapy is defined as: The provision of oral, enteral or parenteral nutrients to treat or prevent malnutrition. We are interested in your office-based (outpatient) experience.

The following items represent clinical competencies in nutrition management. (Survey participants completed for both present and desired ability)

Present Ability						Desired Ability				
Low Ability 1	2	3	4	High Ability 5		Low Ability 1	2	3	4	High Ability 5
					1. Identify patient risk factors for malnutrition or clinical conditions that make malnutrition more likely					
					2. Take an appropriate patient history, including medical, family and social history, weight history, and recent weight change and medication history					
					3. Take and evaluate a diet history that includes typical daily food intake, timing of meals, and meals eaten out					
					4. Identify and address barriers to adequate nutritional intake such as dysphagia, nausea, and altered taste sensation					
					5. Conduct an appropriate physical examination, including BMI, evaluation of growth and development, and signs of nutritional deficiency (skin, hair, eyes, mouth, nails, muscle mass)					
					6. Order and interpret the results of laboratory tests to assess nutritional status, as appropriate					
					7. Integrate nutritional assessment information (histories, physical exam, laboratory tests) to identify individuals who require medical nutritional support therapy					
					8. Develop an individualized nutritional management plan for optimal health					
					9. Select appropriate nutritional support therapy to match individual patient needs					
					10. Effectively counsel patients to make informed nutritional decisions					
					11. Effectively communicate with patients in a culturally competent manner to provide accurate nutritional information and dispel misinformation					
					12. Consult with or refer to a registered dietitian or other credentialed healthcare professional and refer to community nutrition resources as					

					appropriate				
					13. Follow-up with patients to ensure adequate nutritional intake				

Please indicate your level of agreement with the next 3 statements. With regard to managing nutrition...

	Low Agreement 1	2	3	4	High Agreement 5
1. The way I practice in this clinical area is acceptable to me.					
2. I may need to examine one or more of my clinical practices in this area.					
3. I plan to change the way I practice in this area in the near future.					

Reflecting on your own experience in nutrition management, please rate the following statements according to your extent of agreement with each.

	Low Agreement 1	2	3	4	High Agreement 5
1. My training did not adequately prepare me in the area of nutrition.					
2. Other health concerns or disease conditions prevent me from spending time on nutrition.					
3. Accurate nutrition history is difficult to obtain (esp. alcoholism, dementia).					
4. When nutrition is inadequate, it is difficult to determine the correct amount of nutrients to recommend.					
5. I do not have access to dietitians or other nutritional specialists.					
6. My patients do not have insurance coverage for nutritional services.					
7. The cost of supplemental nutritional formulas inhibits patient use.					

Please rate your interest in the following areas for nutrition education.

	Low Interest 1	2	3	4	High Interest 5
1. Assessment of nutritional status in primary care patients					
2. Awareness and identification of clinical situations or disease processes that may increase the risk of malnutrition					
3. Practical approaches to nutritional support in primary care					
4. Selection of nutritional therapy for patients with specific medical and nutritional needs					

1. What are the important components of a patient history when determining the need for nutritional support therapy? (check all that apply)

1. Physical activity
2. Vaccines
3. Use of tobacco
4. Weight history
5. Marital status
6. Economic Status
7. Occupation
8. Level of education
9. Diet history
10. Social history

2. When conducting a physical examination of a patient to determine the need for nutritional support therapy, what indicators should you use? (Check all that apply)

1. BMI
2. Assessment of reflexes in extremities
3. Examination of lips and gums
4. Assessment of peripheral pulses
5. Body fat estimates (skinfolts, bioelectric impedance)
6. Skin color and texture
7. Assessment for heart murmur

3. How often do you create nutritional management plans for your patients?

1. Never
2. Sometimes
3. Often
4. Always

4. Would you like to provide more assessment and counseling regarding nutritional support therapy to your patients than you are currently providing?

1. Yes
2. No

5. In your practice, how often do you consult with or refer to a registered dietitian or other credentialed healthcare professional regarding nutritional support therapy for patients?

1. Never
2. Sometimes
3. Often
4. Always

6. What triggers a patient referral to a registered dietitian or other credentialed healthcare professional regarding nutritional support therapy for patients? (select all that apply)

1. Patient request
2. Family concern about patients nutrition
3. Abnormal lab results
4. Weight loss/gain
5. Physical exam signs of nutritional deficiency
6. Food allergies/intolerance
7. Change in appetite
8. Inadequate diet based on history (patient says only eating soup, etc.)

7. How familiar are you with the scientific literature recommendations on nutritional support therapy for adult

patients?

1. Not familiar
2. Somewhat familiar
3. Familiar
4. Very familiar

8. At any given time, for about how many adult patients in your practice have you recommended nutritional support therapy?

1. 0-5
2. 6-10
3. 11-20
4. 21+

9. For the patients whom you have started on nutritional support therapy, how beneficial do you believe nutritional support therapy has been for them?

1. Not beneficial
2. Somewhat beneficial
3. Beneficial
4. Very beneficial
5. I have no patients currently on nutritional support therapy

Please select your degree/certification:

1. DO
2. MD
3. Other

Please select your specialty:

1. Family Medicine
2. General Internal Medicine
3. Other (fill-in)

Which of the following best describes the setting in which you practice?

1. Solo
2. Single-specialty group
3. Multi-specialty group
4. Hospital based
5. Other

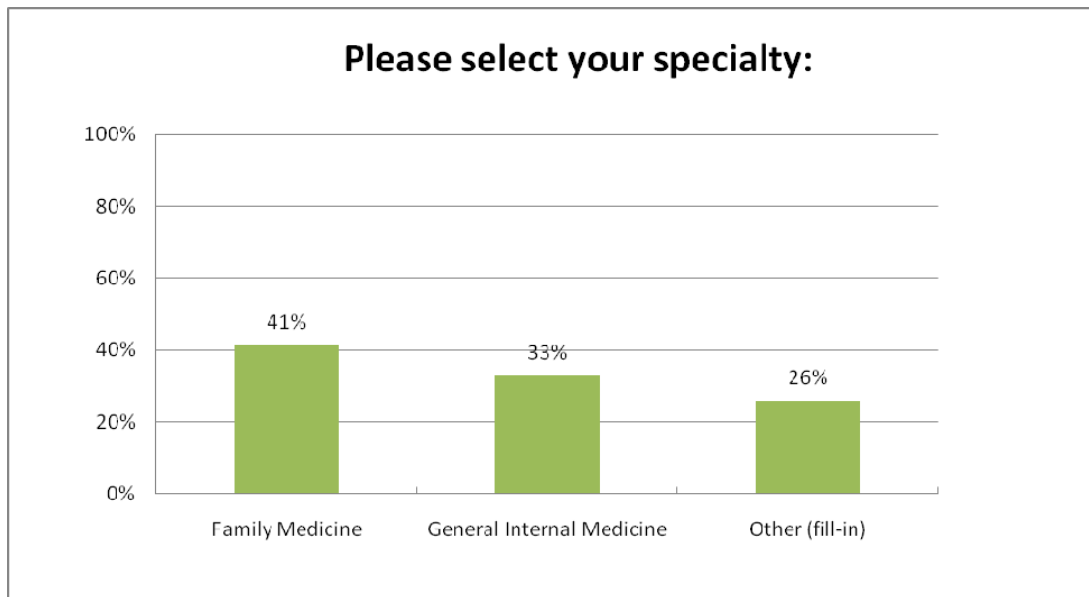
What is the location of your practice?

1. Rural
2. Urban
3. Suburban

Please indicate how many years you have been in practice (since residency).

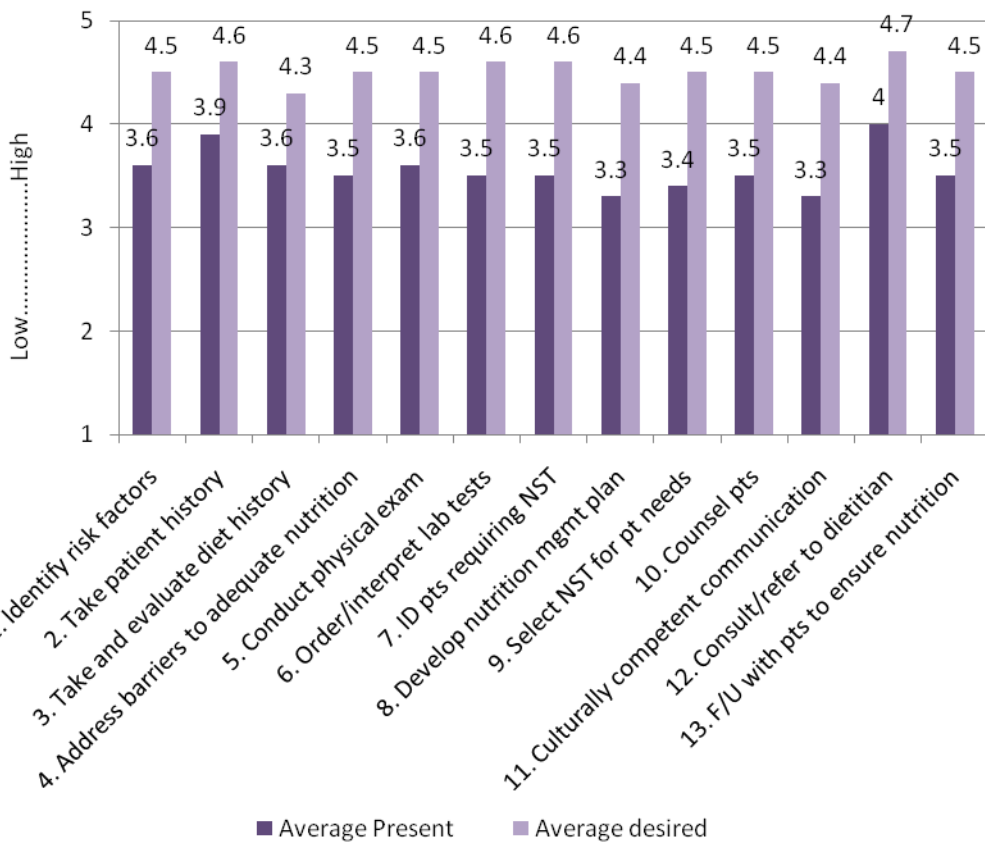
1. 0-10
2. 11-20
3. 21-30
4. 31+

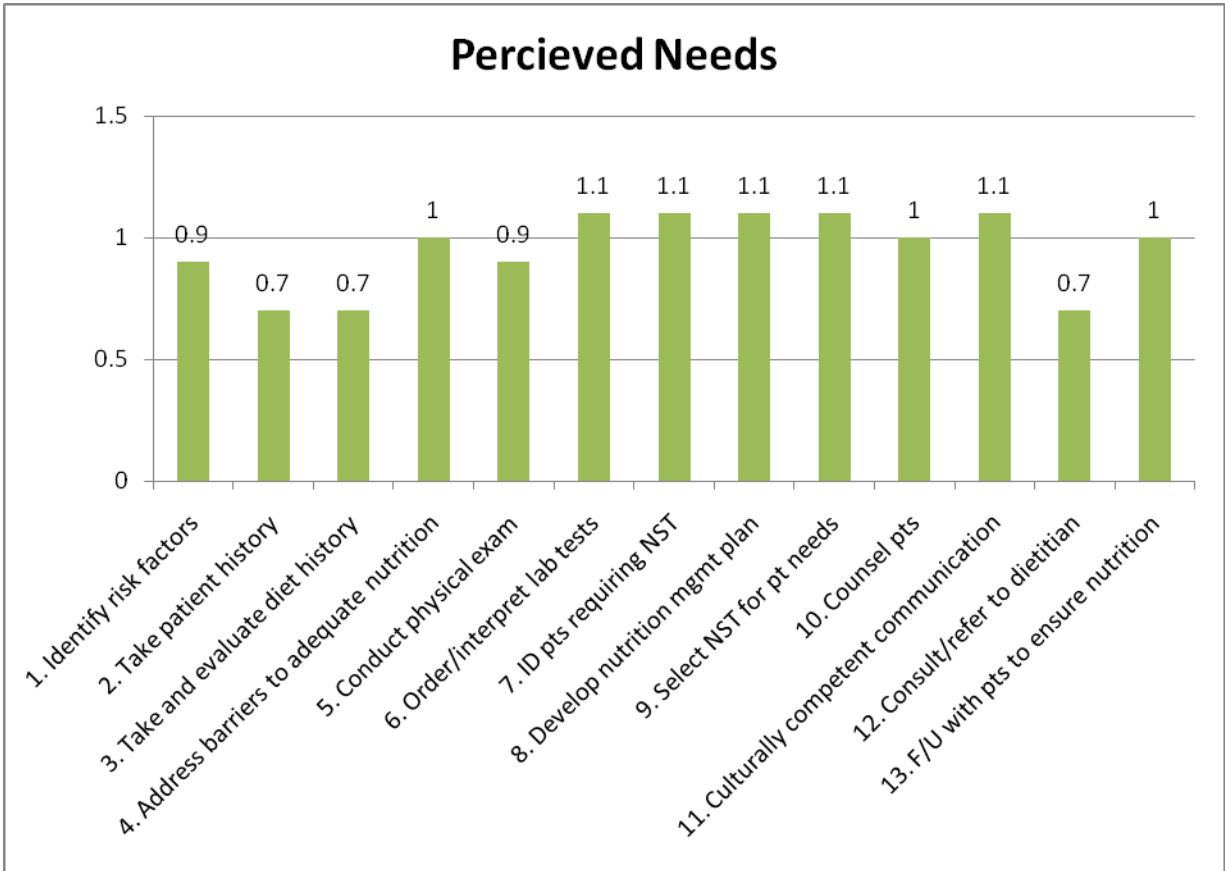
## Appendix 6: Primary Care Survey Results



1. Identify patient risk factors for malnutrition or clinical conditions that make malnutrition more likely
2. Take an appropriate patient history, including medical, family and social history, weight history, and recent weight change and medication history
3. Take and evaluate a diet history that includes typical daily food intake, timing of meals, and meals eaten out
4. Identify and address barriers to adequate nutritional intake such as dysphagia, nausea, and altered taste sensation
5. Conduct an appropriate physical examination, including BMI, evaluation of growth and development, and signs of nutritional deficiency (skin, hair, eyes, mouth, nails, muscle mass)
6. Order and interpret the results of laboratory tests to assess nutritional status, as appropriate
7. Integrate nutritional assessment information (histories, physical exam, laboratory tests) to identify individuals who require medical nutritional support therapy
8. Develop an individualized nutritional management plan for optimal health
9. Select appropriate nutritional support therapy to match individual patient needs
10. Effectively counsel patients to make informed nutritional decisions
11. Effectively communicate with patients in a culturally competent manner to provide accurate nutritional information and dispel misinformation
12. Consult with or refer to a registered dietitian or other credentialed healthcare professional and refer to community nutrition resources as appropriate
13. Follow-up with patients to ensure adequate nutritional intake

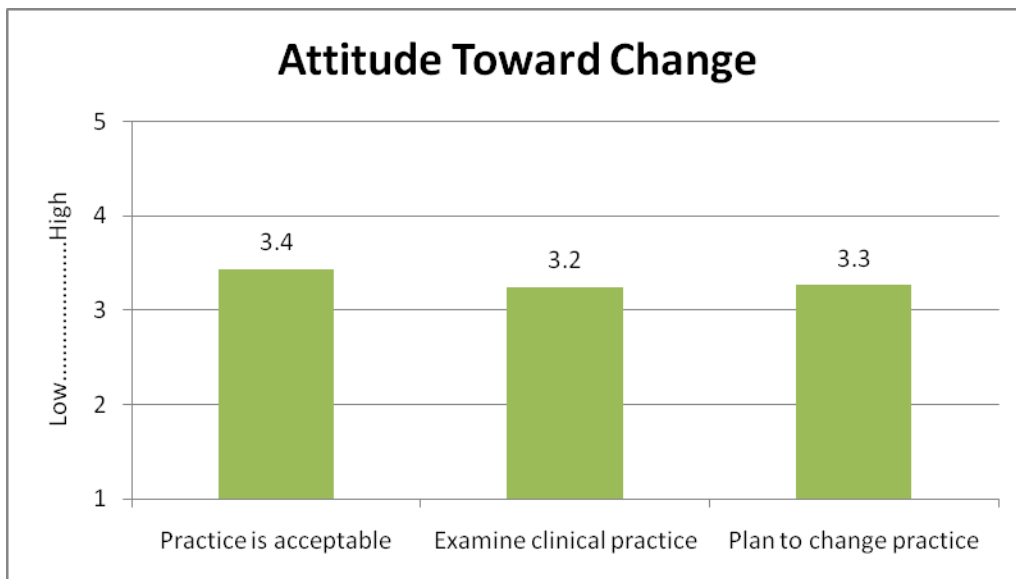
## Average Present and Desired Competencies



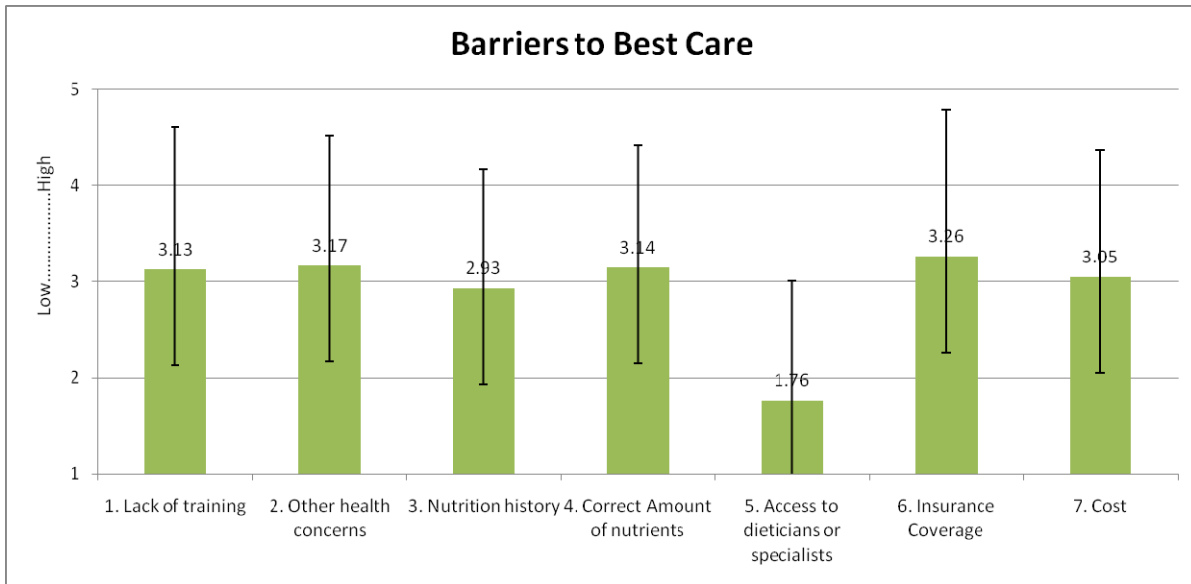


Please indicate your level of agreement with the next 3 statements: With regard to managing nutrition...

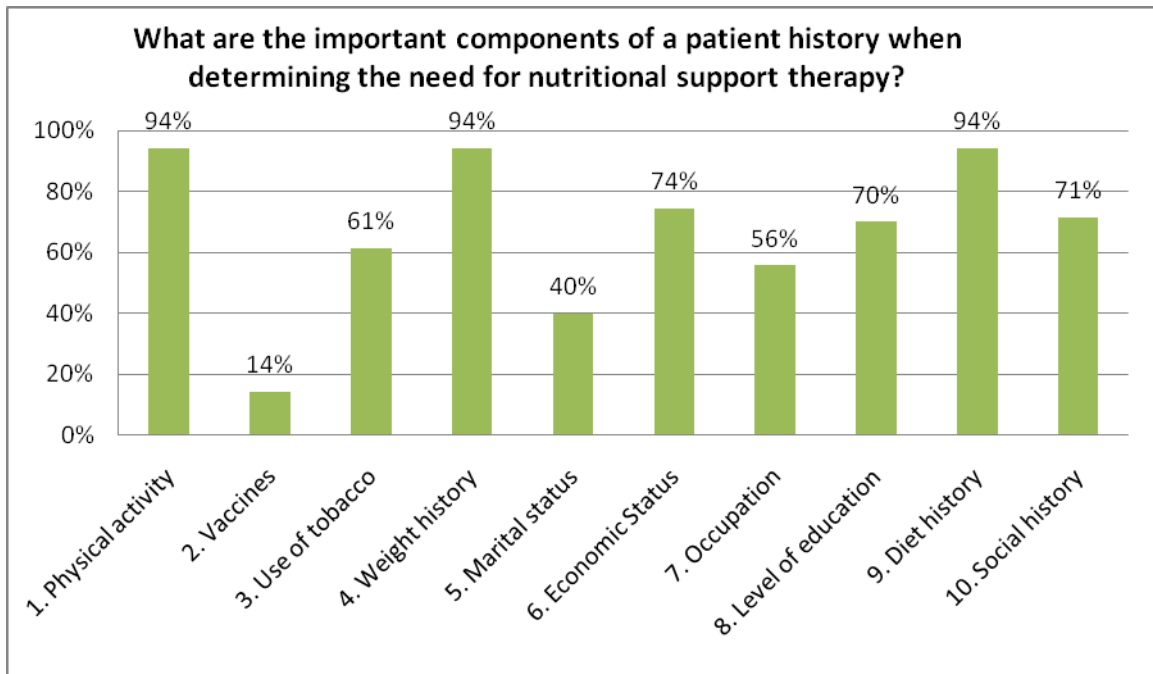
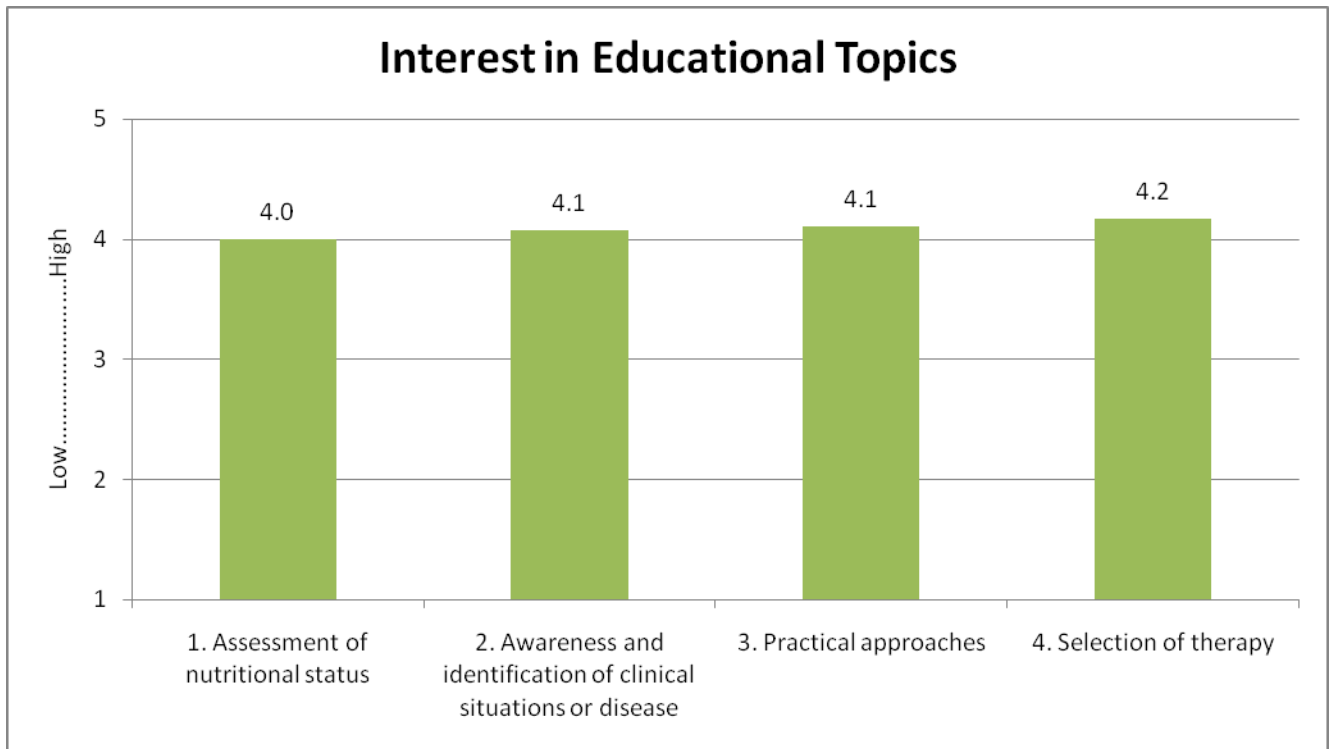
1. The way I practice in this clinical area is acceptable to me.
2. I may need to examine one or more of my clinical practices in this area.
3. I plan to change the way I practice in this area in the near future.



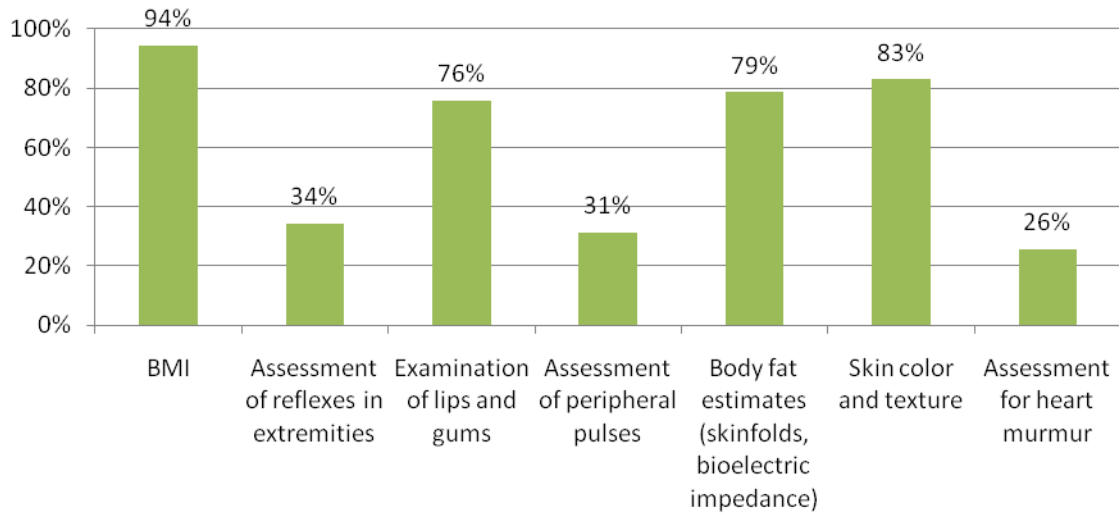
1. My training did not adequately prepare me in the area of nutrition.
2. Other health concerns or disease conditions prevent me from spending time on nutrition.
3. Accurate nutrition history is difficult to obtain (esp. alcoholism, dementia).
4. When nutrition is inadequate, it is difficult to determine the correct amount of nutrients to recommend.
5. I do not have access to dietitians or other nutritional specialists.
6. My patients do not have insurance coverage for nutritional services.
7. The cost of supplemental nutritional formulas inhibits patient use.



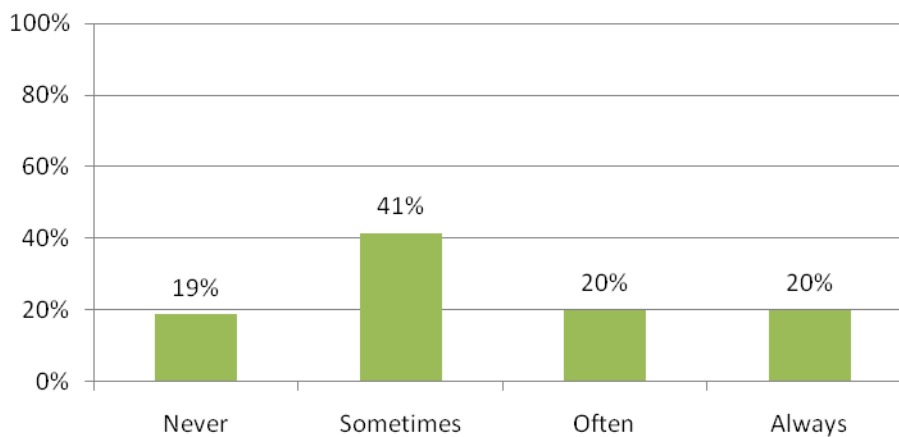
*(standard deviation noted for each response)*



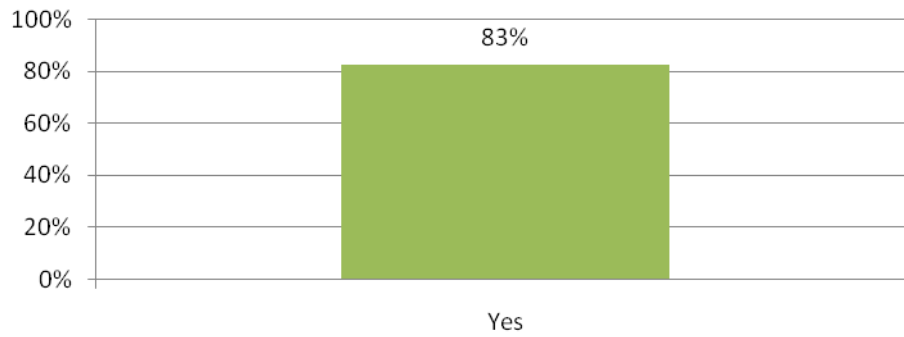
**When conducting a physical examination of a patient to determine the need for nutritional support therapy, what indicators would you use?**



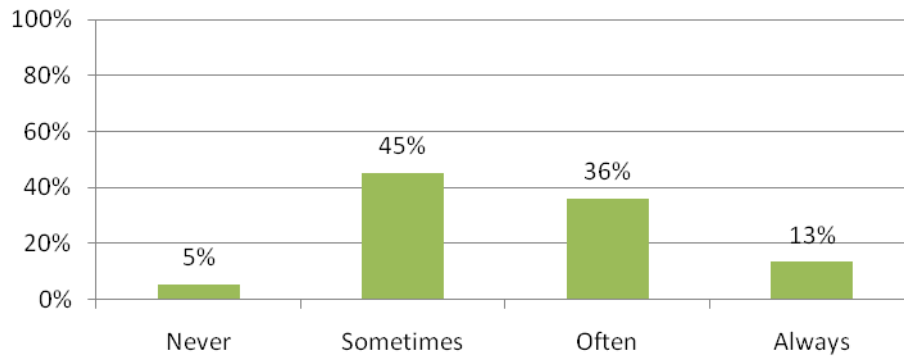
**How often do you create nutritional management plans for your patients?**

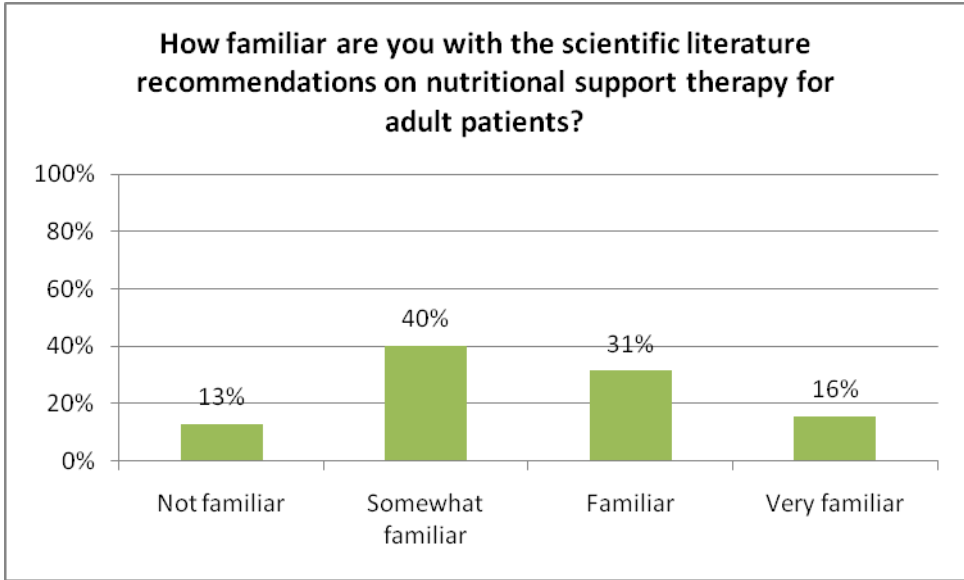
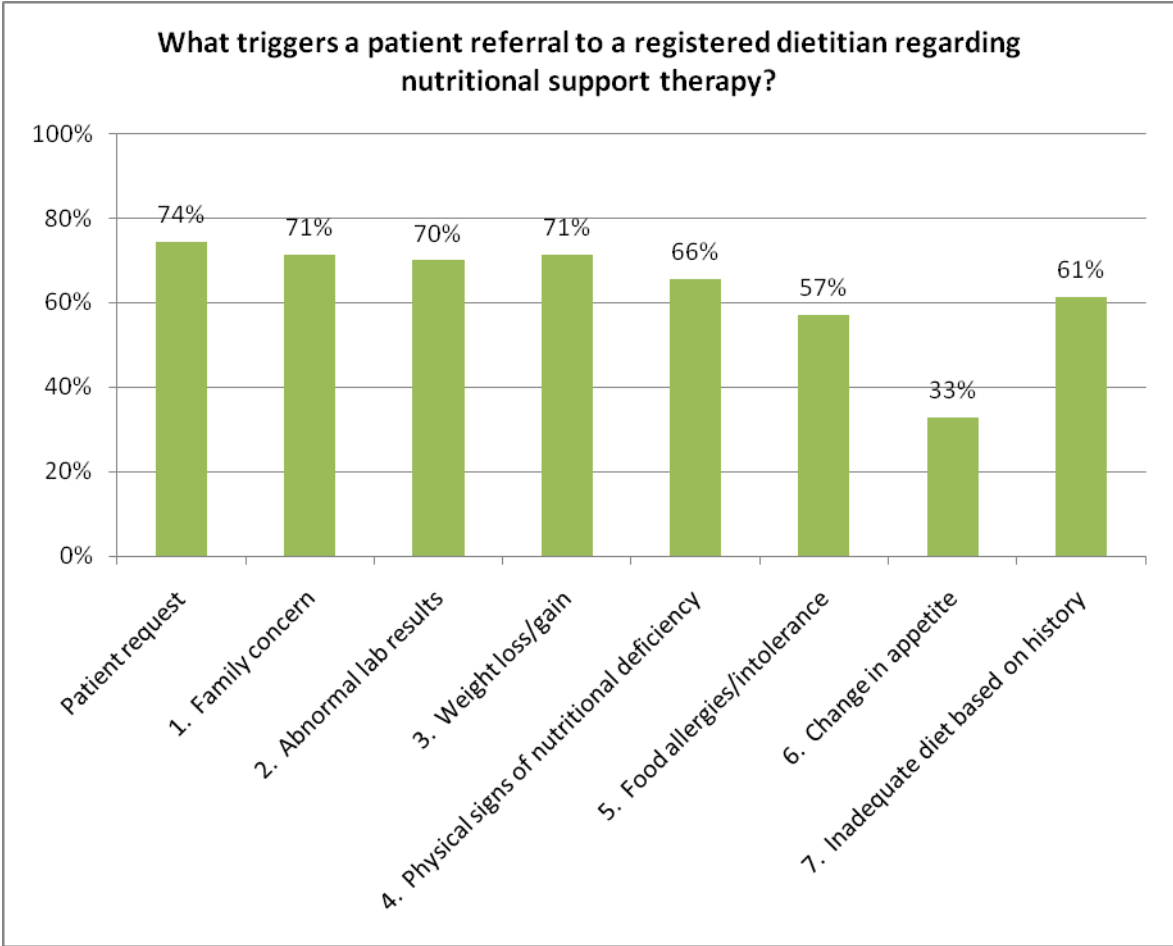


**Would you like to provide more assessment and counseling regarding nutritional support therapy to your patients than you are currently providing?**

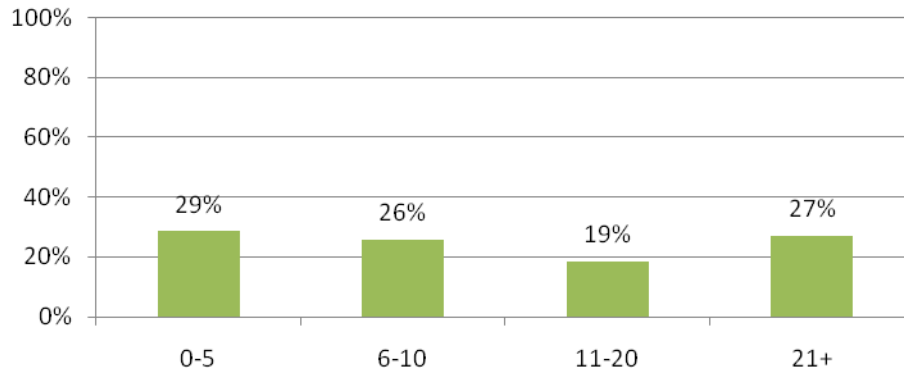


**In your practice, how often do you consult with or refer to a registered dietitian or other credentialed healthcare professional regarding nutritional support therapy for patients?**

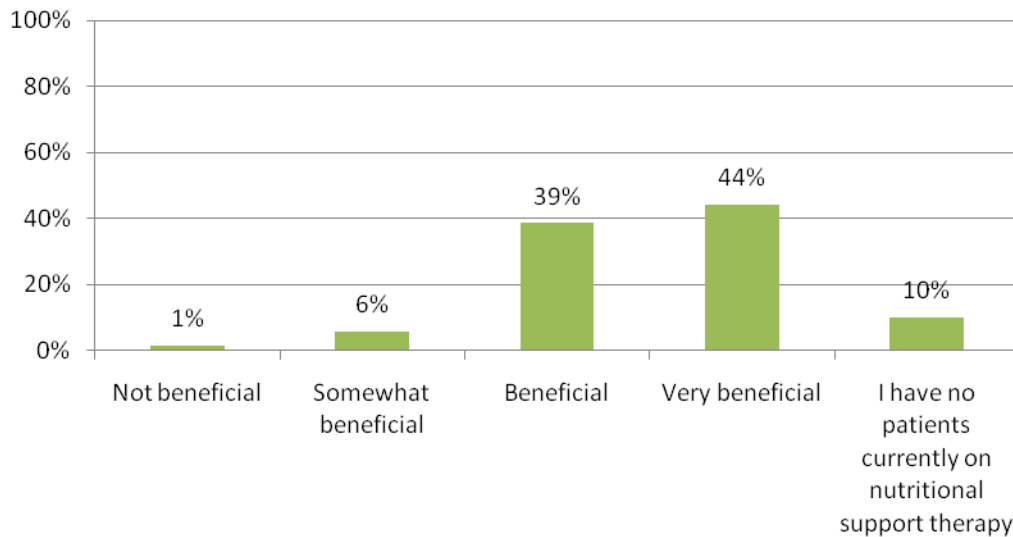


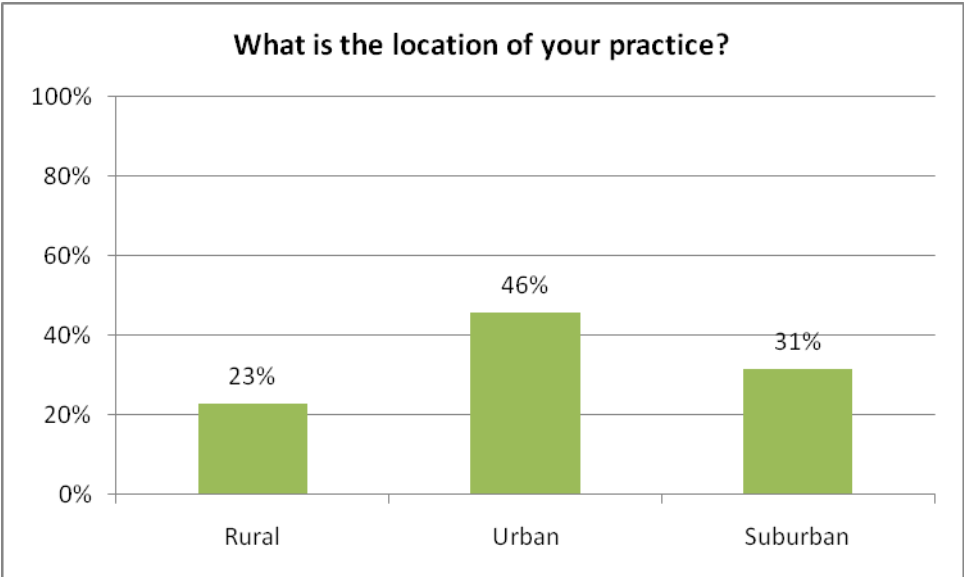
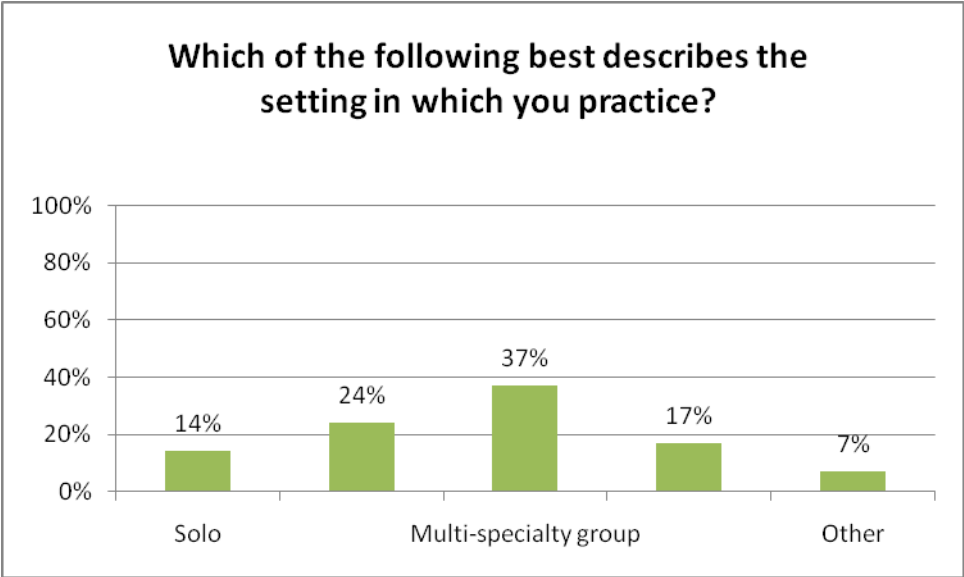


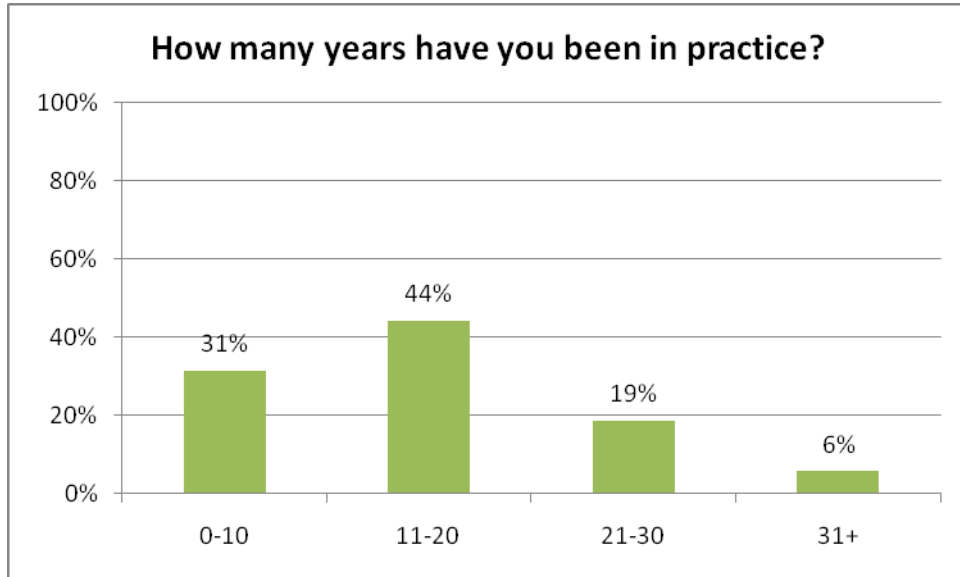
**At any given time, for about how many adult patients in your practice have you recommended nutritional support therapy?**



**For the patients whom you have started on nutritional support therapy, how beneficial do you believe nutritional support therapy has been for them?**







## Appendix 7: Bibliography

- Agostoni C, Buonocore G, Carnielli VP, et al. Enteral nutrient supply for preterm infants: commentary from the European Society of Paediatric Gastroenterology, Hepatology and Nutrition Committee on Nutrition. *J Pediatr Gastroenterol Nutr.* Jan 2010;50(1):85-91.
- American Academy of Pediatrics. Committee on Nutrition. Barnes LA. *Pediatric nutrition handbook.* 6th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009.
- Bankhead R, Boullata J, Brantley S, et al. Enteral nutrition practice recommendations. *JPEN J Parenter Enteral Nutr.* Mar-Apr 2009;33(2):122-167.
- Ben XM. Nutritional management of newborn infants: practical guidelines. *World J Gastroenterol.* Oct 28 2008;14(40):6133-6139.
- Bombell S, McGuire W. Early trophic feeding for very low birth weight infants. *Cochrane Database Syst Rev.* 2009(3):CD000504.
- Clinical Guidelines for the Use of Parenteral and Enteral Nutrition in Adult and Pediatric Patients, 2009. *JPEN J Parenter Enteral Nutr.* May-Jun 2009;33(3):255-259.
- Heyland DK, Dhaliwal R, Drover JW, Gramlich L, Dodek P. Canadian clinical practice guidelines for nutrition support in mechanically ventilated, critically ill adult patients. *JPEN J Parenter Enteral Nutr.* Sep-Oct 2003;27(5):355-373.
- Kreymann KG, Berger MM, Deutz NE, et al. ESPEN Guidelines on Enteral Nutrition: Intensive care. *Clin Nutr.* Apr 2006;25(2):210-223.
- McClave SA, Martindale RG, Vanek VW, et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN J Parenter Enteral Nutr.* May-Jun 2009;33(3):277-316.
- Nutrition Support in Adults.* National Institute for Health and Clinical Excellence (NICE); 2006.
- Nutrition Support for Adults: Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition.* London: National Collaborating Centre for Acute Care; 2006.
- Puntis JW. Nutritional support in the premature newborn. *Postgrad Med J.* Mar 2006;82(965):192-198.
- Sampson G. Weight loss and malnutrition in the elderly--the shared role of GPs and APDs. *Aust Fam Physician.* Jul 2009;38(7):507-510.

Singer P, Berger MM, Van den Berghe G, et al. ESPEN Guidelines on Parenteral Nutrition: intensive care. *Clin Nutr.* Aug 2009;28(4):387-400.

Stratton RJ. Elucidating effective ways to identify and treat malnutrition. *Proc Nutr Soc.* Aug 2005;64(3):305-311.

Tsang R. *Nutrition of the Preterm Infant*. 2nd Edition ed: Digital Educational Publishing, Inc.; 2005.

## Appendix 8: References

1. Martin PY TB. Grounded Theory and Organizational Research. *Journal of Applied Behavioral Science*. 1986;22(2):141-157.
2. Fox RD, Mazmanian PE, Putnam RW. *Changing and learning in the lives of physicians*. New York: Praeger; 1989.
3. Moore DE, Jr., Green JS, Gallis HA. Achieving desired results and improved outcomes: integrating planning and assessment throughout learning activities. *J Contin Educ Health Prof*. Winter 2009;29(1):1-15.