

# Current Status of Nutrition Training in Graduate Medical Education From a Survey of Residency Program Directors: A Formal Nutrition Education Course Is Necessary

Journal of Parenteral and Enteral Nutrition  
 Volume 40 Number 1  
 January 2016 95–99  
 © 2015 American Society  
 for Parenteral and Enteral Nutrition  
 DOI: 10.1177/0148607115571155  
 jpen.sagepub.com  
 hosted at  
 online.sagepub.com



Brian J. Daley, MD<sup>1</sup>; Jill Cherry-Bukowiec, MD<sup>2</sup>; Charles W. Van Way III, MD<sup>3</sup>; Bryan Collier, DO<sup>4</sup>; Leah Gramlich, MD<sup>5</sup>; M. Molly McMahon, MD<sup>6</sup>; and Stephen A. McClave, MD<sup>7</sup>; A.S.P.E.N. Task Force on Postgraduate Medical Education

## Abstract

**Introduction:** Nutrition leaders surmised graduate medical nutrition education was not well addressed because most medical and surgical specialties have insufficient resources to teach current nutrition practice. A needs assessment survey was constructed to determine resources and commitment for nutrition education from U.S. graduate medical educators to address this problem. **Methods:** An online survey of 36 questions was sent to 495 Accreditation Council for Graduate Medical Education (ACGME) Program Directors in anesthesia, family medicine, internal medicine, pediatrics, obstetrics/gynecology, and general surgery. Demographics, resources, and open-ended questions were included. There was a 14% response rate (72 programs), consistent with similar studies on the topic. **Results:** Most (80%) of the program directors responding were from primary care programs, the rest surgical (17%) or anesthesia (3%). Program directors themselves lacked knowledge of nutrition. While some form of nutrition education was provided at 78% of programs, only 26% had a formal curriculum and physicians served as faculty at only 53%. Sixteen programs had no identifiable expert in nutrition and 10 programs stated that no nutrition training was provided. Training was variable, ranging from an hour of lecture to a month-long rotation. Seventy-seven percent of program directors stated that the required educational goals in nutrition were not met. The majority felt an advanced course in clinical nutrition should be required of residents now or in the future. **Conclusions:** Nutrition education in current graduate medical education is poor. Most programs lack the expertise or time commitment to teach a formal course but recognize the need to meet educational requirements. A broad-based, diverse universal program is needed for training in nutrition during residency. (*JPEN J Parenter Enteral Nutr.* 2016;40:95-99)

## Keywords

graduate medical education; outcomes research/quality; nutrition support practice; administration

## Background

The impact of diet and nutrition status on health is unquestionable and universally recognized. Unfortunately, the education of nutrition has lagged conspicuously behind the science. The education of practicing physicians in all medical fields in clinical nutrition has long been recognized to be inadequate.<sup>1</sup> Over the past 25 years, educators in both the undergraduate and graduate realms of medical education have sought to improve teaching, learning, and the application of sound nutrition practices to daily patient care in order to improve outcomes. Despite the nutrition community's own efforts at board recognition,<sup>2</sup> a more forceful cry from national experts prompted the American Board of Medical Specialties to formally recognize Nutrition Medicine.<sup>3</sup>

The incomplete integration of nutrition into the undergraduate curriculum is well documented.<sup>4</sup> Even more worrisome is the failure to advance nutrition into the postgraduate environment. Reinforcement of nutrition concepts as well as implementation of nutrition therapies into clinical care is lacking.<sup>5</sup> This represents a contrast to the educational goals of residency

programs where nutrition in all phases of care (outpatient, inpatient, and specialized care units) is suggested from Accreditation

From the <sup>1</sup>Department of Surgery, University of Tennessee Medical Center at Knoxville, Knoxville, Tennessee; <sup>2</sup>Department of Surgery, University of Michigan, Ann Arbor, Michigan; <sup>3</sup>Department of Surgery, University of Missouri–Kansas City, Kansas City, Missouri; <sup>4</sup>Department of Surgery, Virginia Tech Carilion School of Medicine, Roanoke, Virginia; <sup>5</sup>Departments of Medicine, University of Alberta, Edmonton, Alberta, Canada; <sup>6</sup>Mayo Clinic, Rochester, Minnesota; and <sup>7</sup>University of Louisville, Louisville, Kentucky.

This document has been approved by the A.S.P.E.N. Board of Directors.

Financial disclosure: None declared.

Received for publication December 20, 2014; accepted for publication January 9, 2015.

This article originally appeared online on February 11, 2015.

### Corresponding Author:

Brian J. Daley, MD, Department of Surgery, University of Tennessee Medical Center at Knoxville, Box U-11, 1924 Alcoa Highway, Knoxville, TN 37920, USA.  
 Email: bdaley@utmck.edu

Council for Graduate Medical Education (ACGME) and Residency Review Committee (RRC) documentation. In surgery, the ACGME program requirements clearly state that knowledge in surgical nutrition is required for competency.<sup>6</sup>

Recognition of this problem is not new. Several areas for improvement have been noted. Weinsier et al<sup>7</sup> in 1990 and Olsen et al<sup>8</sup> in 1991 conducted resident program surveys and identified the need for expert clinicians to be able to teach and demonstrate the application of nutrition science. Heimburger et al<sup>9</sup> in 1998 surveyed available clinical nutrition fellowships, likewise surmising that there were very few programs and very few experts. Krebs and Primak<sup>10</sup> established a curriculum based on adult learning principles, and they concluded that vertical integration of nutrition from medical school must be carried into and throughout residency. Their solution relied primarily on key clinical leaders to effect this. Friedman et al,<sup>11</sup> in the *Journal of Parenteral and Enteral Nutrition (JPEN)* supplement from the 2010 Physicians Summit on Physician Shortage in Nutrition, stated the need for more nutrition education and faculty champions in residency training. These reports suggest there are too few nutritionally minded clinical experts to achieve sufficient nutrition training.

Other solutions have been proposed. Waitzberg et al,<sup>12</sup> in a report from Latin America in 2004, described a 2-day course called Total Nutritional Therapy. This course achieved the short-term goals of educating and ultimately certifying physicians in nutrition and was well received but has not been recently vetted. The University of North Carolina in Chapel Hill developed the Nutrition in Medicine program, an online and free series of modules geared toward medical students.<sup>13</sup> Despite federal funding, only half of the medical schools in the United States subscribe to this program. DeLegge et al,<sup>3</sup> writing from the discussion at the 2010 summit on the shortage of physicians in clinical nutrition, ventured that an Advanced Cardiac Life Support (ACLS)-type course in nutrition would suffice to meet such needs. A conference sponsored by the National Heart, Lung, and Blood Institute and National Institutes of Health Office of Disease Prevention led to a supplement focused on nutrition education for healthcare professionals. The manuscript referred to residency and specialty training and highlighted gaps in training. The authors proposed consideration of a number of steps to address this problem.<sup>14</sup> To further expound on this, the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), representing the physician nutrition experts and leaders in the country, convened the Task Force on Postgraduate Medical Education in Nutrition to seek a solution. The first step was a needs assessment.

## Materials and Methods

A survey, developed by the A.S.P.E.N. Task Force on Postgraduate Medical Education, was designed to evaluate the current status of postgraduate nutrition education, to test capability of institutions to support a formal nutrition course, and,

as a secondary objective, to evaluate the level of interest in participating in such a sponsored course. The survey was comprised of 36 questions regarding the following topics: demographics of the residency program and nutrition expertise of the program director (questions 1–7), existence of a nutrition program (8–15), institutional expertise/faculty in nutrition (16–22), existence of other required courses (23 and 24), interest level for nutrition course (25–31), and curriculum content issues such as topics, format, timing, value, duration, and barriers to implementation (32–35) (see Table 1).

The survey was sent electronically to 580 program directors in various subspecialties in anesthesia, family medicine, general surgery, internal medicine, obstetrics and gynecology, and pediatrics. The mailing list for the program directors of ACGME-accredited programs was also obtained. The committee was able to personally interview 15 program directors. The study responses were tabulated, and results follow. Answers from open-ended questions were reviewed by the committee and summarized in a repetitive Delphi process.

## Results

### Demographics

A total of 580 mailings were sent via email from one address. A total of 15 direct interviews were conducted and tabulated by committee members. One hundred emails were returned for wrong addresses; therefore, 495 purportedly received the survey instrument. There were 72 respondents (14.5%).

The average number of residents being trained at each institution was 31 (with a range of 3–119). There were 17 community hospital residency programs and 55 university academic centers. The subspecialties of the respondents were 45.8% family medicine (33/72), 33.3% internal medicine (24/72), 16.7% surgery (12/72), 2.8% anesthesiology (2/72), and 1.4% pediatrics (1/72).

The program directors rated themselves with regard to level of expertise in nutrition, as advanced in 9.7% (7), intermediate in 62.5% (45), and low in 27.8% (20).

### Existing Courses in Nutrition and the Format

Of the 72 residencies programs responding, only 19 (26.4%) had a formal course in nutrition, and the majority of these (10/19) were in family medicine. Sixty-seven percent of the formal courses were required, of which 72% were required for residents and 28% for subspecialty fellows. Some form of training, required or otherwise, was offered by 56 programs. No form of training in nutrition was reported at 10 of the institutions. The format of the educational events was self-reported and primarily listed as didactic lectures (17), informal rounds (12), specialty conferences (5), and web-based programs (2). Thirteen programs reported multiple modalities for nutrition education. The length of the educational

**Table 1.** Summary of Survey Questions.

- 
1. Program Director Name (optional)
  2. Program Director Phone Number (optional)
  3. Program Director Email Address (optional)
  4. Number of Residents in Program
  5. Institution/University
  6. Department
  7. What is your own level of comfort/expertise in clinical nutrition?
  8. Does your program/institution have a formal course or curriculum in nutrition?
  9. Is the nutrition program elective or required?
  10. Is the nutrition program given during residency or subspecialty training?
  11. At what point in your program is the nutrition training provided? (eg, start of the internship, during critical care rotation, etc)
  12. If you do not have a formal course or curriculum in nutrition education, do your residents get any training in nutrition?
  13. If so, what is the format of that training?
  14. What is the length of the nutrition training?
  15. Do you feel that the training adequately meets your residents' educational needs?
  16. Do you have faculty in your department identified as experts in clinical nutrition?
  17. If you have nutrition faculty in your department, how many?
  18. Are there faculty with expertise in clinical nutrition at your institution, but outside your department?
  19. How many faculty outside your department are experts in clinical nutrition?
  20. Do these faculty have sufficient expertise to teach/staff a live course?
  21. Are these faculty members physicians are they represented by other disciplines? (Please identify)
  22. Please provide the names of the faculty in your department with an expertise in clinical nutrition. (optional)
  23. Are your residents required to take a test in nutrition skills?
  24. When are your residents required to take a test in nutrition skills?
  25. What areas of clinical nutrition would you want covered in a nutrition course for residents?
  26. Are there any other topics you would like to see covered in a nutrition training program for residents? Please describe.
  27. If a training course in nutrition were initiated at your institution, when would the optimal time be for such a course?
  28. What would be the optimal format for such a course?
  29. Do you think an ACLS-type course in nutrition would be valuable to your residents?
  30. How much time would you consider appropriate for a nutrition course?
  31. If 8 hours or more is needed, how should the course be segmented?
  32. If not already required, should such a nutrition course ever be required of your residents?
  33. What factors would contribute to the success of a nutrition course? (What are the strengths of this concept?)
  34. What factors would "kill" such a course? (What are the weaknesses of this concept?)
  35. Please provide any additional comments related to the strengths or weaknesses of this concept.
  36. Any additional comments you have are welcomed and appreciated.
- 

sessions lasted from a single 45-minute lecture to 10 one-hour sessions.

In addressing the educational needs for nutrition training at both the residency and fellowship level, only 23% (17/72) of the program directors felt this goal was accomplished. About half (9/19) of the programs with formal training felt they did not meet the educational goals for nutrition education, and only 8 of 37 with informal programs felt the educational goals for nutrition were met under their current curriculum.

### *Faculty*

All 72 programs responded to questions regarding faculty. While the majority of the program directors (77.8%) reported that they had expertise in clinical nutrition at their institution, less than half (45.8%) indicated that the faculty within their

own department possessed this expertise. Almost a third (31.9%) of program directors relied on faculty members outside their department to provide expertise in nutrition. Sixteen programs (22.2%) had no identifiable nutrition expert.

Physicians did not provide all of the educational expertise in nutrition. Of the 56 programs with some form of nutrition training, 16 (28.6%) were taught by physicians alone and 22 (39.3%) were taught by physicians along with nonphysician health professionals (nurses, dietitians, pharmacists, physician assistants, and nurse practitioners). At 18 of the institutions (32.1%), any nutrition education was provided entirely by non-physician faculty. Further compounding the problem of few instructors in clinical nutrition, there was a perceived credibility issue in those recognized as supposedly having expertise in this area. Surprisingly, at nearly a third (32.7%) of those institutions where some number of faculty were purported to have

expertise in nutrition, program directors felt that those designated faculty members would not be competent in teaching a live nutrition course to their residents.

### *Value, Format, Length, and Barriers*

The program directors were questioned on the most effective timing for offering a course in nutrition, what they felt was the optimal format for this course, and what were the most important considerations for success. The directors could choose multiple responses in each category, or none at all. Overwhelmingly, the majority of respondents (72%) thought that a nutrition course should be required for their residents.

When queried on the optimal timing to offer a nutrition course to the residents, 27 directors (38%) responded that it should be provided during a specific primary residency rotation, 15 (21%) preferred during an elective residency rotation, and 10 (14%) favored during intern orientation. Six directors (8%) felt that the residents should receive nutrition training during medical school prior to starting their residency training.

When questioned what the optimal format for a nutrition course should be, 28 (39%) preferred a web-based (self-study) course, 23 (32%) preferred a live course with faculty, and 30 (40%) felt that a combination of web-based (self-study) and live courses would be optimal. Ten (14%) supported a PowerPoint lecture format. Interestingly, only 2 (3%) of respondents favored a live webinar course. Only 2 (3%) of directors felt a test-book or workbook based program would be successful, likely reflecting the technological focus of contemporary residents.

When inquiring about the appropriate time allowance for a nutrition course to be both useful and practical to implement, the response varied widely. Most directors felt that if the course required 8 hours of time, the course should be segmented into multiple 1- or 2-hour sessions. Only 4 directors felt that 2 half-day or 1 full-day session should be considered.

Program directors were asked what requirements must be met to ensure successful implementation of such a course and what they thought would be the most significant barriers to offering such a course to their residents. Respondents felt that the most important requirements for success were relevance to clinical practice (89%), ease of implementation (68%), sufficient time for resident participation (63%), and buy-in from faculty (53%). Forty percent of directors felt that some sort of formal assessment or testing of knowledge acquired by the residents was essential to the course success. Only 15% felt that buy-in from the dean, ACGME, or other governing body was necessary for success. The majority (63%) of respondents were most concerned about having adequate resources to properly implement such a course. Numerous other requirements and commitments of residency training in the era of the shortened work week were cited by 43% of directors as a major barrier to success, while faculty issues were predicted to be a significant obstacle by 28% of the program directors.

## **Conclusion**

Over the past 25 years, numerous efforts have been directed toward addressing the weaknesses in medical education with regard to nutrition. These weaknesses are manifested by a lack of knowledge and a failure to practice clinical nutrition in residency training which carries on into independent practice. It is also clear over the course of the past 3 decades that the critical elements for success have been identified. A successful program in clinical nutrition requires sufficient faculty expertise, a solid and clinically relevant curriculum, and demonstrated benefit to practitioners.

Interestingly, the deficiencies are noted both in the primary care setting and in the surgical arena. It is well known both in the medical community as well in the public eye that nutrition is at the forefront of disease. Nutrition plays a key role in health promotion, disease prevention, and disease treatment. The prevalence of obesity has doubled over the past 30 years, and two-thirds of adults in the United States are considered overweight or obese.<sup>15</sup> Increased risk of hypertension, dyslipidemia, type 2 diabetes, and heart disease, among other conditions, is associated with obesity. Overcoming these health burdens takes more than a greater number of primary care physicians. Addressing obesity and obesity-associated conditions takes educated physicians who understand not only what drives obesity but also what constitutes the multimodality nutrition approach that helps patients sustain weight loss and combat the complications of obesity. In elective surgical practice, a prehabilitation program to prepare patients for their operation is founded in nutrition. Many hospitalized patients are malnourished, which contributes to increased frequency and length of hospital stay.<sup>16</sup> Programs that emphasize appropriate pre- and postoperative nutrition can decrease complication rates and length of stay. Our previous Surgeon General C. E. Koop published improved results in patients who were provided as few as 5 days of preoperative nutrition.<sup>17</sup> The poor dissemination of nutrition education to the surgeon at the undergraduate and postgraduate levels is apparent at the survey level as illustrated in this manuscript. Unfortunately, these simple nutrition practices have been late to reach the patient, negatively affecting patient outcomes.

In this study, similar deficiencies are seen. Starting with undergraduate education, barely 25% of medical schools have a course in nutrition,<sup>18</sup> and there is no formal system for nutrition education at the residency level despite the regulatory inclusion in the program requirements promulgated by the ACGME. It is clear that problems relate to a lack of major resources—teachers, curriculum, and time. What is not clear is whether these same institutions value nutrition as much as other areas of the residency curriculum. In these current days of insufficient resources and exorbitant demands on staff personnel, students, and processes, program directors must find a quick, inexpensive, but comprehensive solution.

Based on experience in the literature and current educational structures in the United States, a greater number of

physician educators is unlikely, particularly those directing their focus on nutrition. Additional resources from other disciplines have risen to assist in patient care, but this group may be inconsistent and unreliable as a pool of educators to teach residents at all institutions. A.S.P.E.N. has been anticipating the development of an ACLS-like course in nutrition for residents and has begun to act on it. A formal nutrition education course required of residents may be the solution for program directors and self-realized deficiencies in training.

## References

1. Committee on Nutrition in Medical Education, Food and Nutrition Board, National Research Council. *Nutrition Education in U.S. Medical Schools*. Washington, DC: National Academy Press; 1985.
2. Heimburger DC. Training and certifying physician nutrition specialists: the American Board of Physician Nutrition Specialists (ABPNS)—supplement: an evidence-based approach to medical nutrition education. *Am J Clin Nutr*. 2006;83 (suppl):985S-987S.
3. Kiraly LN, McClave SA, Neel D, Evans DC, Martindale RG, Hurt RT. Physician nutrition education. *Nutr Clin Pract*. 2014;29(3):332-337.
4. DeLegge MH, Alger-Mayer S, Van Way CW III, Gramlich L. Specialty residency training in medical nutrition education: history and proposal for improvement. *JPEN J Parenter Enteral Nutr*. 2010;34(suppl):47S-56S.
5. Vetter ML, Herring SJ, Sood M, Shah NR, Kalet AL. What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *J Am Coll Nutr*. 2008;27(2):287.
6. Accreditation Council for Graduate Medical Education. *ACGME program requirements for graduate medical education in general surgery*. [http://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/440\\_general\\_surgery\\_07012014.pdf](http://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/440_general_surgery_07012014.pdf). Accessed January 28, 2015.
7. Weinsier RL, Boker JR, Brooks CM, et al. Nutrition training in graduate medical (residency) education: a survey of selected training programs. *Am J Clin Nutr*. 1991;54(6):957-962.
8. Olson AK, Mark DA, St. Jeor ST, et al. Nutrition training in graduate medical (residency) education programs: a survey of selected training programs. *Am J Clin Nutr*. 1991;54:957-962.
9. Heimburger DC, Stallings VA, Routzahn L. Survey of clinical nutrition training programs for physicians. *Am J Clin Nutr*. 1998;68(6):1174-1179.
10. Krebs NF, Primak LE. Comprehensive integration of nutrition into medical training. *Am J Clin Nutr*. 2006;83(4):945S-950S.
11. Friedman G, Kushner R, Alger-Mayer S, Bistran B, Gramlich L, Marik PE. Proposal for medical school nutrition education: topics and recommendations. *JPEN J Parenter Enteral Nutr*. 2010;34(suppl):40S-46S.
12. Waitzberg DL, Correia MI, Echenique M, et al. Total nutritional therapy: a nutrition education program for physicians. *Nutr Hosp*. 2004;19(1):28-33.
13. Lindell KC, Adams KM, Kohlmeier M, Zeisel SH. The evolution of Nutrition in Medicine, a computer-assisted nutrition curriculum. *Am J Clin Nutr*. 2006;83(4):956S-962S. PMID: PMC2459319 (<http://www.nutritioninmedicine.net>).
14. Lenders CM, Deen DD, Bistran BR, et al. Residency and specialties training in nutrition: a call to action. *Am J Clin Nutr*. 2014;99(suppl):1174S-1183S.
15. Ogden CL, Carroll MD, Kit B, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. 2014;311(8):806-814.
16. Consensus Statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition: Characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *JPEN J Parenter Enteral Nutr*. 2012;36(3):275-283.
17. Riegel C, Koop CE, Drew J, Stevens LW, Rhoads JE. The nutritional requirements for nitrogen balance in surgical patients during the early postoperative period. *J Clin Invest*. 1947;26:18-23.
18. Adams KM, Kohlmeier M, Zeisel SH. Nutrition education in U.S. medical schools: latest update of a national survey. *Acad Med*. 2010;85(9):1537-1542.