

Position of the Academy of Nutrition and Dietetics: Interprofessional Education in Nutrition as an Essential Component of Medical Education



ABSTRACT

It is the position of the Academy of Nutrition and Dietetics that registered dietitian nutritionists (RDNs) should play a significant role in educating medical students, residents, fellows, and physicians in practice. The more physicians learn about the effectiveness of nutrition for the prevention and treatment of noncommunicable diseases, the more likely they are to consult with RDNs and refer patients for medical nutrition therapy. The more interprofessional education that occurs between medical students, other health professional students, and RDNs, the more likely all health care professionals will understand and value the role of the RDN in improving the quality of care provided to patients. The training and experience of RDNs make them uniquely qualified for the role of educating medical students about nutrition as it relates to health and disease. This position paper provides RDNs with the tools and language to emphasize to medical educators, course directors, curriculum committees, medical school deans, residency and fellowship directors, physicians, and other health professionals in training and practice how ongoing nutrition counseling and management, conducted by an RDN, can benefit their patients. Specific teaching settings and examples for RDNs to take a leadership role (paid and unpaid positions) in ensuring that future physicians discuss nutrition, healthy lifestyle, and physical activity with their patients, consult with RDNs, and refer patients for medical nutrition therapy are presented. This position paper supports interprofessional education in nutrition as an essential component of medical education.

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POSITION STATEMENT

It is the position of the Academy of Nutrition and Dietetics that registered dietitian nutritionists (RDNs) should play a significant role in educating medical students, residents, fellows, and physicians in practice. The more physicians learn about the effectiveness of nutrition for the prevention and treatment of diseases, the more likely they are to consult with RDNs and refer patients for medical nutrition therapy, which will improve medical care and has the potential to reduce health care costs.

SIGNIFICANT REPORTS AND RESOURCES have been published to provide registered dietitian nutritionists (RDNs) with relevant strategies, tools, and evidence to take a leadership role in teaching nutrition in medical education. Reviewing these documents can help RDNs to present teaching strategies to effectively integrate nutrition into medical education at all training levels. Understanding the history of nutrition in medical education and sharing these objectives and resources with medical educators during discussions, collaborations, and curriculum development will be helpful.

This position paper supports interprofessional education in nutrition as an essential component of medical education. Medical nutrition education is the introduction of scientific principles of nutrition into the clinical practice of medicine.¹ Medical nutrition education is directed toward preparing physicians to incorporate nutrition into the recognition, treatment, and prevention of acute and chronic illness to meet the needs of patients and the public.¹

HISTORY OF NUTRITION IN MEDICAL EDUCATION

The history of nutrition in medical education has been described and reviewed in numerous publications since 1930 and extensively throughout the 1980s and 1990s.² Research studies have shown deficiencies in nutrition education in medical schools and

residency programs for more than 30 years.²⁻⁴ In 1982 and 1995, Weinsier^{5,6} published consensus statements from medical nutrition educators who prioritized nutrition content and stressed its importance in the medical school curriculum. Professional organizations, medical nutrition experts, and student groups have published reports, articles, book chapters, user's guides, and a congressional mandate urging medical schools to reform curriculum to spend more time integrating nutrition.⁷⁻⁹

American Medical Association

As early as 1950, the American Medical Association (AMA) Council on Food and Nutrition criticized US medical schools for their lack of commitment to teach nutrition, stating that "nutrition received inadequate recognition, support, and attention in medical

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education.”⁷ It was assumed more than 30 years ago that the AMA’s recommendations would result in an increase in nutrition in medical education. The AMA committees reconvened in 1962 and 1972, both times to express concern for the lack of any discernible progress in the inclusion of nutrition in medical education.¹⁰

National Academy of Sciences, National Research Council Report

The National Research Council’s Nutrition in Medical Education Committee and numerous reports from others since 1985 have proposed that separate nutrition courses with a minimum of 25 hours should be required in every US medical school. However, the General Professional Education of the Physician report in 1984 recommended that overall lecture time be decreased in favor of active learning experiences and that health-promotion and disease-prevention information be integrated throughout the curriculum rather than taught as separate courses.² This integrated, multidisciplinary trend continues to exist at many medical schools and can be a useful framework for integrating nutrition.

National Nutrition Monitoring and Related Research Act

In response to a mandate from the National Nutrition Monitoring and Related Research Act of October 1990,⁸ Louis Sullivan, MD, then Secretary of the Department of Health and Human Services, reported in the article “Skills Necessary for Contemporary Health Professionals” that “health professionals must do more to help patients stay healthy and prevent the onset of disease.” Sullivan stressed that health professionals can help promote a “new vision of health care where individuals exert more control over their lives, meaning more empowerment of the individual and a climate of individual responsibility and community service.”¹¹ The specific activities listed for health promotion and disease prevention included adopting better dietary behavior, proper vaccination, regular physical exercise, moderate alcohol use, elimination of illegal drug and tobacco use, and consistent use of seat belts.

Residency Training Requirements in Nutrition

The American Academy of Family Physicians has required nutrition education in its residency programs since 1982.¹² The Group on Nutrition, a subcommittee of the Society for Teachers of Family Medicine, produced its Physicians Curriculum for Clinical Nutrition, which has been peer-reviewed and accepted for the Family Medicine Digital Library (www.fmdrl.org/138) and the Association of American Medical College’s (AAMC) MedPortal (www.aamc.org). The Group on Nutrition continues to suggest incorporating nutrition into the training of primary care residents to help boost their confidence and skill in ensuring patients receive adequate nutrition care from the physician and an RDN.¹³ Consumers continue to identify the physician as a trusted source of nutrition information, but physicians report a lack of confidence in nutrition assessment and counseling skills.¹³ Family medicine residency program directors are appropriate individuals for RDNs to approach to help family medicine residents improve their knowledge, skills, and attitudes about nutrition and achieve competency after completing the 3-year program.

Healthy People 2020

The nations’ health objectives, Healthy People 2020, outlined by the Office of Disease Prevention and Health Promotion of the US Department of Health and Human Services, included the following statement about nutrition in medical education: “Nutrition education and counseling should be included in all routine health contacts with health professionals.”¹⁴ Position papers have been written by the American College of Physicians and the Academy of Nutrition and Dietetics, both strongly supporting the essential role of nutrition in medical education and in medical practice.^{15,16}

Nutrition Academic Award Program

The National Heart, Lung, and Blood Institute and the National Institute of Diabetes and Digestive and Kidney Diseases established the Nutrition Academic Award Program in 1997

(www.nhlbi.nih.gov/funding/training/naa).^{17,18} The Nutrition Academic Award provided 21 US medical schools with 5-year grants to develop or enhance nutrition education programs for medical students, medical residents, and clinical faculty.^{17,18} The Nutrition Academic Award grantees collaborated on the development of *Nutrition Curriculum Guide to Training Physicians*, which contains more than 200 educational learning objectives that medical students, residents, and physicians in practice should acquire to achieve competency.¹⁹ These objectives provide medical educators with a vetted resource to assist learner development and creation of evaluation strategies.

Given the shortage of faculty prepared to teach nutrition and the ability to use nutritional clinical material in a variety of basic science courses and clinical clerkships, nutrition content lends itself well to self-directed learning, which can help promote lifelong learning.²⁰ The 5th edition of *Medical Nutrition and Disease: A Case-Based Approach* includes 13 chapters and 31 cases that meet all of the Nutrition Academic Award Curriculum Guide learning objectives.²¹ The cases begin with a patient vignette covering medical history, family history, medications, social and diet history, review of systems, physical examination, and laboratory data.²¹⁻²³ Each case includes at least five questions as well as the answers to these questions, making this an ideal self-study resource. The questions and answers cover physiology, pathophysiology, epidemiology, risk assessment, diagnosis, laboratory evaluation, treatment planning, medical nutrition therapy, prevention, wellness, and counseling issues.

Teaching Nutrition and Physical Activity in Medical School: Training Doctors for Prevention-Oriented Care

Funded by the Robert Wood Johnson Foundation and co-sponsored by the Bipartisan Policy Center, the American College of Sports Medicine, and the Alliance for a Healthier Generation, the efforts of these organizations focus on medical education and training—specifically, a more holistic, patient-centered, and prevention-oriented

approach to health care.²⁴ The initiative calls for all medical students and physicians to be trained in nutrition and physical activity as a way to help combat America's growing obesity problem.

American Heart Association Scientific Statement

In 2016, the American Heart Association's Physical Activity Committee of the Council on Lifestyle and Cardiometabolic Health published "Medical Training to Achieve Competency in Lifestyle Counseling: An Essential Foundation for Prevention and Treatment of Cardiovascular Diseases and Other Chronic Medical Conditions: A Scientific Statement from the American Heart Association."²⁵ This statement provides guidance in defining fundamentals in medical education and training needed for future physicians to be proficient in lifestyle medicine. The recommendations focus on key learning outcomes that can be implemented as each medical school deems appropriate.

FOCUS ON TOPICS RELEVANT TO PATIENT CARE

RDNs are uniquely qualified and positioned to identify, manage, and prevent malnutrition and make a positive impact on health care systems. By using evidence-based protocols shown to reduce hospital readmission rates, RDNs need to work closely with physicians to implement intervention strategies. Educating physicians about prompt identification, treatment, and monitoring of malnourished patients is needed to reduce morbidity, mortality, and health care costs.

Growing Rates of Hospital Malnutrition

Malnutrition is prevalent in hospitalized patients in the United States and estimates areas high as 69%.^{26,27} Malnourished patients require longer hospital stays, present with impaired respiratory and cardiac functions, decreased immune function, and therefore have higher morbidity and mortality rates.^{28,29}

Health care costs are much higher for malnourished hospitalized patients, and those who are discharged with a malnutrition diagnosis, compared to

patients without this diagnosis.²⁹ According to The Joint Commission, nutrition screening should occur within the first 24 hours of admission. The Academy and the American Society for Parenteral and Enteral Nutrition have developed criteria for the diagnosis, documentation, and treatment of hospital malnutrition useful in the management of this pervasive problem.²⁹

Nutrition Risk Factors for Noncommunicable Diseases

Studies show that teaching content that is relevant to medical practice stimulates learning and improves learners' confidence.^{5,6} Top medical conditions in the United States, such as obesity, heart disease, diabetes, and cancer, are linked to poor diet and sedentary behaviors. Most physicians in practice are aware of the risks associated with poor diet and sedentary lifestyle, but lack the training, skills, and time to effectively change their patients' dietary and lifestyle behaviors. Providing concrete examples to physicians in practice, such as improved hemoglobin A1c control after medical nutrition therapy, can help increase referral to RDNs.

According to the Centers for Disease Control and Prevention, the majority of US health care costs are now spent on chronic diseases associated with health risk behaviors.^{30,31} Specifically, heart disease, stroke, cancer, diabetes, obesity, and arthritis are among the most common, costly, and preventable health problems.³¹⁻³⁴ As of 2012, about half of all adults—117 million people—have one or more chronic health conditions.³¹ Two of these chronic diseases, heart disease and cancer, together accounted for nearly 48% of all deaths in 2010.³¹ In the United States, 9.3% of Americans have diabetes, most suffering from type 2 diabetes, and diabetes rates are increasing worldwide.³⁴

Obesity rates have dramatically risen in the past 30 years, and currently it is estimated that 37.9% of adults are obese.³⁵⁻³⁷ Obesity is associated with an increased risk of cardiovascular disease mortality and an increased risk of morbidity from hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, and some

cancer.³⁷ Today, more than one-third of the US population is obese and more than two-thirds are overweight. The medical costs of obesity in the United States are estimated to be as high as 20.6% of total health care costs and a significant amount of health care dollars are now spent on chronic lifestyle-related diseases.³⁸ Deans, associate deans, course directors, faculty, and curriculum committee members are aware of these issues and would benefit from RDNs' experience when developing and updating content across the medical education continuum.

Nutrition Guidelines for Diabetes, Cancer, Heart Disease, and Hypertension

Training medical students, residents, and fellows to advise patients to consume a healthy diet, exercise regularly, maintain desired body weight, avoid smoking, and drink alcohol in moderation are critical to reducing the risk of major causes of morbidity and mortality.³⁹ Ample evidence now exists in the literature to support these recommendations, and RDNs can be helpful to medical educators by providing current evidence-based references supporting dietary, lifestyle, and physical activity guidelines.

According to the Centers for Disease Control and Prevention, 47% of US adults have at least one of the following major risk factors for heart disease or stroke: uncontrolled high blood pressure, uncontrolled high low-density lipoprotein cholesterol, or current cigarette smoking.^{31,33} Ninety percent of Americans consume too much sodium, increasing their risk of high blood pressure.⁴⁰ With the current obesity epidemic and the costs associated with chronic disease skyrocketing, medical schools need to find creative learning opportunities to ensure that medical students graduate with the ability to recognize the association between lifestyle and chronic disease, take a diet and exercise history, and effectively intervene by promoting a healthy lifestyle.^{20,41,42}

STRUCTURE OF US MEDICAL SCHOOLS (UNDERGRADUATE MEDICAL EDUCATION)

Nutrition is an interdisciplinary topic that can be successfully integrated

across the 4-year medical school curriculum. When working with medical schools and interprofessional education programs, consider different approaches for nutrition content integration, such as lectures, small group sessions, case presentations, journal clubs, student interest groups, workshops, electives, grand rounds, clinical skills examinations, standardized patients, morning reports, and shadowing experiences.^{23,42}

AAMC

US and Canadian medical schools are accredited by the Liaison Committee for Medical Education (LCME), which is composed of representatives from both the AMA and the AAMC.⁴³ Over the past 20 years, teaching strategies have integrated basic sciences with clinical curriculum in order to provide more time for students to learn doctor–patient communication skills. Integrated curricula, where material from various disciplines presents a specific topic (eg, teaching medical students about cardiovascular disease) with learning objectives involving anatomy, physiology, biochemistry, pathology, pharmacology, and histology, might be addressed. The goal of an integrated curriculum is that students will maintain knowledge of the basic sciences when that knowledge and skill are displayed in the context of clinical problems. Small-group teaching including case-based and problem-based learning, where students are expected to learn on their own in small group settings, has begun to replace the standard lecture format in most medical curricula. Therefore, when approaching medical educators, course directors, academic deans, and faculty, appreciate that nutrition content will likely not be a standalone course or even a single lecture, but rather, the RDN's contribution could take the form of a question on a standardized patient case or a few slides integrated within a presentation about Crohn's or celiac disease during the gastroenterology block for second-year students.

LCME Curriculum Guidelines

Several LCME standards provide important opportunities for RDNS to assist with incorporating nutrition into existing curriculum as self-directed

material and to augment curricular content for medical students across all 4 years (Standard 6: Competencies, Curricular Objectives, and Curricular Design; Standard 7: Curricular Content; and Standard 8: Curricular Management, Evaluation, and Enhancement). RDNs are well positioned to play a leadership role in meeting these standards.⁴³

The LCME has created standards outlined in *Functions and Structure of a Medical School*, which medical schools must meet to achieve and maintain accreditation.⁴³

The new LCME accreditation standard ED-19-A aims to ensure improved patient outcomes and enhanced safety and quality of care: “The core curriculum of a medical education program must prepare medical students to function collaboratively on health care teams that include other health professionals. Members of the health care team from other health professions may be either students or practitioners.”⁴³

Results of Nutrition Coverage in US Medical School Surveys

Based on previous outcomes, RDNs need to be realistic about the amount of time that can be spent teaching nutrition across the 4-year medical school curriculum. Approach this deficiency by creating teaching opportunities to help physicians increase their comfort level with nutrition content and provide quality interactions for students and faculty.

A survey of medical schools by Adams and colleagues^{44,45} noted that the percentage of medical schools that offered a dedicated nutrition course declined from 35% in 2000 to 25% in 2008. The number of hours devoted to nutrition instruction and skill building was less than the recommendation minimum of 25 hours (19.6 hours in 2008). Institutions using online learning modules were able to provide significantly more hours of nutrition instruction (24.1 hours vs 13.7 hours) across the 4-year curriculum than nonusers.

AAMC All Schools Graduation Survey Results for Nutrition Content

According to the AAMC All School Graduation Surveys, >50% of graduating

medical students felt their nutrition knowledge was insufficient (Nutrition in Medicine Online Portal, unpublished data, 2000). Practicing physicians also feel their nutrition training was inadequate and that they lack the skills to provide effective diet and lifestyle counseling to their patients.^{46,47} A review of nutrition content in medical schools shows that, on average, only 4 to 6 hours are devoted to nutrition content during the entire 4-year curriculum.^{44,45} These deficiencies continue to exist at many medical schools and residency programs, mainly due to limited funding and competing content requirements.

Medical Educational Program Objectives

RDNs can collaborate with those overseeing the implementation of self-directed, nutrition-related content and bring important resources to the attention of course directors.⁴⁸ According to LCME Standard 8.2, “The faculty of a medical school, through the faculty committee responsible for the medical curriculum, ensure that the medical curriculum uses formally adopted medical education program objectives to guide the selection of curriculum content, to review and revise the curriculum, and to establish the basis for evaluating programmatic effectiveness.”

Self-Directed Nutrition Content

According to LCME Standard 6.3, “The faculty of a medical school ensure that the medical curriculum includes self-directed learning experiences and time for independent study to allow medical students to develop the skills of lifelong learning. Self-directed learning involves medical students' self-assessment of learning needs; independent identification, analysis, and synthesis of relevant information; and appraisal of the credibility of information sources.”⁴³ Approaching medical educators with self-directed learning ideas to teach nutrition could help start the conversation.

Currently, the LCME has recommended that medical schools begin to assess students' history taking and physical examination skills using standardized patients as a way to measure competency other than by written

examination. Licensure requires passing the clinical skills examination (Step 2 Clinical Skills), which includes standardized patient cases to assess students' history taking and physical examination skills as another reflection of medical students' competency. Lack of faculty to teach nutrition, competing curricular requirements, and the absence of funding for a nutrition curriculum coordinator at each medical school are major factors contributing to the ongoing problem. Fortunately, with advances in technology, electronic textbooks, online learning modules, and nutrition test questions posted on e-learning platforms for evaluation, these barriers can be overcome at minimal cost to medical schools.

The Nutrition in Medicine Modules, developed by University of North Carolina School of Medicine is a comprehensive online medical nutrition curriculum for training current and future health care professionals (www.nutritioninmedicine.org/portal). The objectives of the Nutrition in Medicine medical school curricula are to provide a core curriculum in nutrition for medical students that includes prevention and therapeutic perspectives of nutrition; spans the pre-clinical and clinical training of physicians; and presents the biochemical basis of nutrition, nutrition epidemiology, clinical nutrition (including nutrition assessment), and nutrition-related preventive health care.

There are many self-directed learning modules now available that can be implemented. These programs can be found by searching for obesity curriculum, plant-based nutrition curriculum; Lifestyle Medicine curriculum; Healthy Kitchens, Healthy Lives culinary medical school programs; and Healthy Kitchen Collaborative.

US MEDICAL LICENSING EXAMINATION

Appreciating prior reviews of the US Medical Licensing Examination (USMLE) nutrition content by medical nutrition educators will help RDNs provide evidence that nutrition is covered on the Step 1, Step 2 Clinical Knowledge, Step 2 Clinical Skills, and Step 3 examinations. RDNs can help medical students gain this interdisciplinary knowledge and acquire history taking and counseling skills.

Initiatives to Review Nutrition Content on Step 1, 2, and 3 Examinations

Since 1992, preparation to practice medicine includes passing the USMLE, administered by the National Board of Medical Examiners. The USMLE consists of a three-step examination, each step taken at different points in the educational process of the physician.⁴⁹ Most students take the USMLE Step 1 examination at the end of the second year of medical school and the Step 2 examination at the end of the fourth year of medical school. Step 1 examination questions assess application of basic science principles to clinical situations, interpretation of pictorial or tabular material, and other problem-solving skills, many posed within the context of a patient vignette.⁴⁹ Step 2 examinations assess whether students can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision, and includes emphasis on health promotion and disease prevention.⁴⁹ The Step 2 examination also covers normal growth and development and general principles of care during reproduction, infancy, childhood, adolescence, adulthood, senescence, as well as medical ethics, biostatistics, epidemiology of health and disease, health services delivery, and community dimensions of medical practice.

The Step 2 Clinical Skills examination has been required since 2011. Step 2 Clinical Skills is constructed according to an integrated content outline that organizes clinical science material along two dimensions: physician task and disease category. Step 2 Clinical Skills uses standardized patients to test medical students and graduates on their ability to gather information from patients, perform physical examinations, and communicate their findings to patients and colleagues. As a result, the majority of US and Canadian medical schools have standardized patient programs, where actors are hired as patients and used to train medical students in interviewing, history taking, and counseling skills. Approach the standardized patient program director and offer to develop a "taking a diet history" module and serve as a small group leader to critique the students' videotapes.

Summary of Nutrition Content Covered on the Step Examinations

In 1986, nutrition experts participated in a review of the 1980, 1982, and 1984 USMLE Part I and Part II examinations to quantify the percentage of nutrition-related questions, determine the core curriculum categories represented, and analyze students' performance.³ Their landmark report, *Nutrition Education in US Medical Schools*, concluded that only 4% of the examination questions were nutrition-related and content spanned all disciplines except microbiology.² The report recommended that the USMLE include additional nutrition questions to assess basic nutrition knowledge on the Part I and Part II examinations.³ The Comprehensive Part I and Part II examinations have since been revised and updated from 1985 to 1991 to become the integrated, multidisciplinary Step 1 and Step 2 examinations that systematically include high-priority topics, such as nutrition. Since this report, many nutrition educators have been working toward incorporating nutrition content for medical students, residents, and physicians in practice.²²

In 1994, another review by five medical nutrition professionals compared the nutrition coverage on the 1986 Part I and Part II examinations to the 1993 Step 1 and Step 2 examinations.⁵⁰ The percentage of nutrition-related questions, identified by these medical nutrition professionals, increased from 9% on the 1986 Part I examination to 11% on the 1993 Step 1 examination and from 6% on the 1986 Part II examination to 12% on the 1993 Step 2 examination. The percentage of nutrition questions related to vitamin deficiencies increased from 1986 to 1993 on both examinations. Nutrition coverage on the USMLE Step 1 and Step 2 was deemed adequate in amount; however, the increased focus on vitamin deficiencies was not consistent with the relevance of nutritional problems seen in clinical practice. These matters and the increase in the number of questions covering vitamin deficiencies, especially on the Step 2 examinations, were suggested as considerations for future reviews.⁵⁰ When writing multiple-choice questions for examinations, work with other medical

school faculty to develop multidisciplinary scenarios, which are representative of the USMLE test structure.

Structure of Graduate Medical Education

Research from Graduate Medical Education (GME) program graduates indicate that residents and fellows need more nutrition training to improve their confidence in managing patients' nutritional problems and skills to provide effective diet and lifestyle counseling.^{47,51} RDNs should approach residency and fellowship directors and offer to serve on task forces that are developing entrustable professional activities and encourage nutrition and lifestyle competencies to be achieved as part of GME training program requirements.⁵²

American College of Graduate Medical Education

The updated American Board of Medical Specialties (ABMS) Maintenance of Certification program for all physicians is designed to provide a comprehensive approach to physician lifelong learning, self-assessment, and quality improvement.⁵³ The role of ABMS is to assist the 24 approved medical specialty boards in the development and use of these standards for the ongoing evaluation and certification of physicians. The Maintenance of Certification assures that physicians are committed to lifelong learning and competency in a specialty and/or subspecialty by requiring ongoing measurement of six core competencies adopted by the ABMS and the American College of Graduate Medical Education (ACGME).⁵³ These core competencies include patient care, interpersonal and communication skills, professionalism, practice-based learning, systems-based practice, and medical knowledge.

At least 10 of the subspecialty boards, including Family Medicine, Internal Medicine, Obstetrics/Gynecology, Surgery, Pediatrics, Preventive Medicine, Ophthalmology, among others, need to integrate nutrition training, and a call for action has recently been published.⁵² These core competencies offer many opportunities where RDNs can propose to department chairs and residency and fellowship directors to be involved in teaching and curriculum development.

Developing Entrustable Professional Activities for GME

Within the last few years, the AAMC and the ACGME have encouraged the development of milestones and entrustable professional activities to guide clinical training and the assessment of competence of medical students and resident trainees.⁵⁴ Entrustable professional activities are those essential to the practice of medicine that requires demonstration of competence in a range of domains. A recent effort focused on the development of pediatric milestones and entrustable professional activities under the purview of the American Board of Pediatrics. Efforts are being made to now include sufficient reference to medical nutrition in the pediatric setting. The LCME now requires that all accredited medical schools have educational objectives that are grounded in outcomes and there is now strong emphasis and evaluation methods focusing on what skills medical students should have upon graduation.

IMPORTANT LEADERSHIP ROLES FOR RDNs IN MEDICAL CURRICULUM, INTER-PROFESSIONAL EDUCATION, AND TEAM-BASED CARE

RDNs are in an ideal position to help medical schools fulfill LCME interprofessional education requirements. Medical, nursing, physician assistant, dental, public health, and pharmacy students need basic training to effectively assess dietary intake and provide appropriate guidance, counseling, and treatment to their patients. This training is aimed at ensuring that future health professionals discuss nutrition and physical activity with their patients, consult with RDNs, and refer patients for individual and/or group nutrition and lifestyle counseling.

Leadership Role in Curriculum Development

With an understanding that LCME requires medical schools to develop educational objectives that are measurable and focused on outcomes, RDNs can offer to take a leadership role, both paid and unpaid, in teaching

clinical skills, such as taking a diet, exercise, and lifestyle history; nutrition counseling; and helping health professional students to understand when to refer to RDNs. These core competencies can be embedded into required courses for medical students across the 4-year curriculum with the advocacy and support of RDNs. Approach course directors that teach Introduction to Clinical Medicine in years 1 and 2, where interviewing and history taking are taught, as well as pathophysiology or integrative systems course directors for each system block, such as pulmonology, cardiology, endocrinology, renal, and gastroenterology.

Highlight Leadership Role of RDN at All Levels of Interprofessional Education

Within the last several years, interprofessional education has become an important approach promoted by the Institute of Medicine and adopted by the AAMC, ACGME, and other major medical societies.⁵⁵ The Interprofessional Education Collaborative (www.ipecollaborative.org), composed of six national education associations of schools of the health professions formed a collaborative to promote and encourage interprofessional learning experiences to help prepare future health professionals for enhanced team-based care of patients and improved population health outcomes. These organizations represent allopathic and osteopathic medicine, dentistry, nursing, pharmacy, and public health created core competencies for interprofessional collaborative practice to guide curricula development across health professions schools.⁵⁶

Increasingly, innovative approaches to interprofessional models of education, training, and practice are being implemented and evaluated for health professional students to learn with, from, and about each other. Contact the office that provides oversight to the interprofessional education programs at the medical or health professional schools and discuss ideas for how nutrition can be embedded, even if dietetics students are not part of the team. For example, many of these programs use health mentors and have the student teams make home visits together and dietary habits of

patients are often discussed. The more interprofessional education that occurs between medical students, other health professional students, and RDNs, the more likely these health care providers will understand and value the role of the RDN in improving the quality of care provided to patients.

Examples of Nutrition Content in Medical Schools, Residency, and Fellowship Programs

According to LCME Standard 7.2, “The faculty of a medical school are required to ensure that the medical curriculum includes content and clinical experiences related to each organ system; each phase of the human life cycle; continuity of care; and preventive, acute, chronic, rehabilitative, end-of-life, and primary care in order to prepare students to 1) recognize wellness, determinants of health, and opportunities for health promotion and disease prevention; 2) recognize and interpret symptoms and signs of disease; Develop differential diagnoses and treatment plans; 3) recognize the potential health-related impact on patients of behavioral and socioeconomic factors; and 4) assist patients in addressing health-related issues involving all organ systems.”⁴³

There are numerous ways RDNs can develop nutrition content that can be assigned to trainees through lectures, small group sessions, morning report, grand rounds, problem-based and case-based learning, web-based modules, or using e-textbook content.^{7,20,57} It is important that nutrition-related clinical cases be used in each phase of the human life cycle, including pregnancy, breast feeding, infant growth and development, childhood, adolescence, adulthood, women’s and men’s health, and older adults.

Proper nutrition is critical for wellness and provides many opportunities for health promotion and disease prevention education—for example, the role of the Mediterranean diet in the prevention of heart disease; Dietary Approaches to Stop Hypertension diet recommendations for hypertension and stroke prevention; and healthy eating and exercise strategies for diabetes management and cancer prevention.⁵⁸⁻⁶¹ Recognizing and interpreting symptoms and signs of

nutrition-related diseases, including malnutrition, overweight and obesity, and eating disorders can be integrated into physical diagnosis courses. Nutrition assessment and counseling needs to be a part of the treatment plan for disorders across many organ systems, including cardiovascular, pulmonary, endocrine, hematology, oncology, renal, neurology, and gastrointestinal.²¹ Taking a diet, exercise, and weight history; calculating body mass index; measuring waist-to-hip ratio; and understanding and interpreting relevant laboratory measures are critical skills for trainees to acquire.^{5,6,9} While curriculum hours and teaching methods vary widely, nutrition educators suggest that a total of 25 hours are needed to properly train medical students in nutrition.^{4,7,44,45}

Teaching Strategies in Basic Science, Clinical Clerkships, and Hospital Settings

Teaching nutrition as a theme across the medical curriculum has been very successful because it applies to many disciplines. There are teaching and self-learning opportunities in year 1 during Introduction to Clinical Medicine (history taking and physical examination); year 2 during psychiatry, cardiology, endocrinology, pulmonary, gastroenterology, renal, and ophthalmology; year 3 during obstetrics/gynecology, medicine, family medicine, pediatrics, oncology, and surgery clerkships; and during electives and sub-internships such as geriatrics and hematology.

Successful implementation of nutrition content in medical schools and graduate programs must acknowledge new trends in medical education, including earlier teaching of interviewing and physical examination skills, longitudinal experiences, and self-learning assignments. Case-based curricula have been adopted by many schools and interprofessional education to reinforce team-based care is growing.^{22,61} Students from medical, nursing, physician assistant, occupational therapy, and pharmacy schools are learning clinical content together and may work through clinical cases or visit patients in their homes together to gain real world experiences.²²

According to LCME Standard 7.5, “The faculty of a medical school

ensure that the medical curriculum includes instruction in the diagnosis, prevention, appropriate reporting, and treatment of the medical consequences of common societal problems.”⁴³ Obesity is a complex, multifactorial disease that has become a societal problem and increasingly common among adults and children world-wide.⁶² Once considered a problem only in developed countries, overweight and obesity are now dramatically on the rise in developing countries as well, particularly in urban settings.^{30,33}

Role of the Undergraduate and Graduate Dietetic Program Directors

The LCME accreditation standard ED-19-A states that the core curriculum of a medical education program must prepare medical students to function collaboratively on health care teams that include other health professionals. Members of the health care team from other health professions may be either students or practitioners; therefore, now is an ideal opportunity for RDNs to take a leadership role.²⁰

Prepare RDNs to Teach and Train Other Health Professionals

To develop an interprofessional approach to implementing nutrition into the health care team, three areas of professional competencies need to be addressed.^{63,64} Individual professional competencies remain the distinct domain of each profession, including dentistry, medicine, nursing, nutrition and dietetics, occupational therapy, pharmacy, physician assistant, physical therapy, and speech and language therapy. Subsequently, competencies in common among these professions and interprofessional collaborative competencies have been presented.⁶³ Undergraduate dietetics program directors and dietetics internship directors should ensure that their learners have opportunities to work with students or professionals from other disciplines in order to develop and maintain interprofessional competency. It is also imperative that dietetic students and interns understand that when they graduate and begin working in hospital and outpatient/ambulatory settings, they

may not be paid extra to teach medical students, residents, physicians, and other health professionals. Most physicians who work in an academic medical center do not get paid to teach. Recognition can be gained by requesting a faculty appointment or an academic title, such as program coordinator or program director. Initially, RDNs will likely be invited to serve as consultants, guest lecturers, and preceptors for shadowing experiences; transition to small group leader and a member of the curriculum committee, and eventually serve as a course director, which may be a paid position. It takes time, patience, and perseverance, and the understanding that this is a process and there are many other political issues that may come first.

Educate RDNs with Information about Reimbursement

As insurance reimbursement for nutrition counseling by RDNs continues to increase, RDNs can take an active role in informing physicians, other health professionals, and medical practice administrators about how nutrition counseling and weight-management programs can benefit their patients.

Since 2000, Medicare Part B medical nutrition therapy (MNT) services provided by RDNs have been available for patients with diabetes and renal diseases. In 2002, the Internal Revenue Service defined obesity as a disease, allowing taxpayers to deduct medical expenses related to obesity treatments ordered by a physician. Insurance companies are adding nutrition counseling to their disease-management programs and weight-management benefits to selected policies. In some cases, visits to both physicians and RDNs are reimbursed. The Alliance for a Healthier Generation launched its Health Care Initiative in 2009, a collaboration of major health insurers, employers, and national medical associations to provide overweight children access to at least four follow-up visits with their primary care provider and at least four follow-up visits with an RDN each year.²⁴

The availability of the MNT and weight-management benefits increases the likelihood that patients will receive nutrition counseling. Lack

of understanding by the patient of the value of MNT, readiness to change, physician endorsement or referral, access to credentialed RDNs, or office systems that support RDNs are barriers that physicians have reported to providing nutrition counseling.^{64,65} Informing providers of the benefits of MNT by an RDN, combined with reimbursement options for their patients, can improve RDN referral rates.

RDNs' Role in Teaching Cultural Competency

Understanding a patient's cultural influences builds strong patient-provider relationships with a high level of trust. Culturally competent care includes assessing nutritional issues and providing appropriate nutrition-related advice and counseling by RDNs.

According to the LCME, "The faculty of a medical school ensure that the medical curriculum provides opportunities for medical students to learn to recognize and appropriately address gender and cultural biases in themselves, in others, and in the health care delivery process. The medical curriculum should include instruction regarding the manner in which people of diverse cultures and belief systems perceive health and illness and respond to various symptoms, diseases, and treatments."⁴³

It is well known that cultural factors and diet-related attitudes and behaviors strongly influence health.⁶⁶ The manner in which people of diverse cultures and beliefs system perceive their health is influenced by the person's upbringing, whether or not the person emigrates to a new society, the degree of acculturation to the new society, and the degree to which traditional foods in the culture of origin are available in the new society.⁶⁷ The meanings and uses ascribed to foods in any particular culture may be unique to that culture and should be considered when prescribing treatment plans.⁶⁸ Culture influences many food-related behaviors, including food choice, food purchasing, preparation, where and with whom food is eaten, health beliefs related to food, and adherence to dietary recommendations.⁶⁶⁻⁶⁸ Therefore, understanding the sociocultural context of health for patients is very important to meet the health care

needs of all populations, as culture may influence health knowledge, attitudes, and behaviors, including diet and lifestyle.⁶⁹

CONCLUSIONS AND HIGHLIGHTS

- The information provided in this position paper encourages and promotes RDN involvement in educating physicians in training at the medical school, residency, and fellowship levels.
- The more physicians in training and practice learn about the benefits of nutrition, the more likely they are to consult with RDNs and refer patients for nutrition counseling.
- The training and experience of RDNs makes them uniquely qualified for the role of educating medical students about nutrition as it relates to health and disease.
- Tools, language, and resources have been provided to emphasize to physicians in training about how nutrition counseling, conducted by an RDN, can benefit their hospitalized and ambulatory patients. These benefits include improving blood sugar and lipid levels and reducing their patient's risk of hypertension, cardiovascular disease, obesity, cancer, and malnutrition.
- Emphasis should be placed on the critical role of RDNs as members of the health care team in assessing malnutrition in order to reduce hospital readmission rates and short-term and long-term health care costs.
- Many teaching settings and strategies have been provided for RDNs to take a leadership role in ensuring future physicians discuss nutrition and physical activity with their patients, consult with RDNs, and refer patients for MNT.
- The more interprofessional education that occurs between medical students, other health professional students, and RDNs, the more likely all health care professionals will understand and value the role of RDNs in

improving the quality of care provided to patients.⁶⁹

- The health of the nation depends on this important training at the medical school, residency, and fellowship levels to help patients improve their diets and lead an active lifestyle.

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