The Time is Ripe: The Case for Nutrition in Graduate Medical Education in the United States

Bethany Agusala[1], Emily Broad Leib[2] and Jaclyn Albin[1]

[1]University of Texas Southwestern Medical Center, Dallas, TX, USA. [2]Harvard Law School, Cambridge, MA, USA.

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ABSTRACT: A poor-quality dietary pattern is a leading risk factor for chronic disease and death in the United States, and the costs of medical care continue to unsustainably rise. Despite this reality, nutrition training for physicians fails to adequately prepare for them to address the complex factors that influence diet-related disease. Expanding nutrition education for physicians-in-training is imperative to equip them for the growing demand of food is medicine services and is also supported by recent policy efforts in the United States as well as the governing bodies of graduate and undergraduate medical education. A multisector approach that links graduate medical education, clinical care delivery innovation, and health and food policy experts provides momentum to advance nutrition education as a core strategy for food is medicine expansion globally.

KEYWORDS: Nutrition, graduate medical education, health policy

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CORRESPONDING AUTHOR: Jaclyn Albin, Pediatrics and Internal Medicine, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd, Dallas, TX, 75390, USA.
Email: Jaclyn.albin@utsouthwestern.edu

Critical Role of Nutrition in Health

The leading risk factor for death in the United States and globally is a poor diet.[1,2] A nourishing diet rich in fruits, vegetables, legumes, nuts, seeds, whole grains, herbs and spices, however, can prevent and treat many costly chronic diseases.[2-8] In addition to health benefits, improving dietary quality on a large scale has profound implications for increasing healthcare costs. Experts conservatively estimate that the annual cost related to cardiometabolic deaths from poor diet is over $50 billion,[9] making diet-related disease a leading driver of healthcare spending.

Recent research demonstrates the utility of food is medicine services[10] to lower healthcare costs. These services respond to the connection between food and health by helping to prevent and treat diet-related disease, such as produce prescriptions, medically tailored meals and groceries, and population-level programs that coordinate food access and culinary nutrition education.[11] For example, Blue Cross Blue Shield (BCBS) North Carolina demonstrated that providing $60 worth of healthy food twice monthly reduced food insecurity and improved health indices including body mass index and self-reported physical and mental health.[12] Participants who completed the 6-month program saved BCBS $139 per member per month, translating to savings of $8.5 to $13.1 million annually. Another study reveals a broader scope of possibility, including evidence that national implementation of medically tailored meals for people with diet-related health conditions and impaired ability to perform activities of daily living in the United States could avert 1.6 million hospitalizations and save over $13 billion in health care expenses in 1 year.[13] A recent produce prescription program study for people with diabetes and food insecurity showed potential to dramatically reduce cardiovascular disease events, add quality-adjusted life years, and promote health system and societal cost savings.[14] While there remains much to learn in terms of ideal populations, implementation strategies, and dosing, using food alongside traditional health interventions appears promising.

Focusing on nutrition interventions thus can improve both health and economic outcomes. However, the traditional lack of emphasis on nutrition education in both undergraduate (UME) and graduate medical education (GME) in the United States neglects this vital strategy for cost-effective health.[15-17] Physicians-in-training need evidence-based, clinically relevant nutrition education to equip them to provide patients with accurate information within their scope, refer to registered dietitian nutritionists (RDNs), and promote the importance of nutrition in health, including advancing the science of food is medicine interventions. In many cases, RDN services are not covered by a patient's health insurance without a referral from a physician. Inclusion of nutrition education, particularly with interprofessional partnership, has been shown to increase physician awareness of the role and skillset of RDNs, expand referrals to RDN colleagues, and advance interprofessional collaboration.[18-22]

Past Efforts and Inadequate Progress

Efforts to improve nutrition education for physicians began nearly 3 decades ago, but progress has been slow and inadequate, without widespread adoption, consistent standards, or integrated strategies.[18,19,23-25] While many calls for nutrition education focus on UME, insufficient action[15] necessitates engagement in GME. Tailored education within GME is particularly important for developing the skillset needed for delivering evidence-based nutritional guidance to the physician-in-training's specific patient population.[20] Physicians need to work alongside dietitians, guiding patients through confusing messaging and combatting misinformation with evidence-based nutrition advice. A

framework for GME approaches can be tailored by specialty and focus on population-specific application. Ideally, this would build upon basic competencies in UME, developing a continuum of competency-based nutrition education.

The State of Nutrition Education in Graduate Medical Education

Evidence suggests that residents pursuing various specialties feel ill-equipped to provide nutrition counseling to patients.[26,27] A cross-sectional survey of medical, surgical, and obstetric interns at 6 programs evaluated preparedness to handle clinical cases requiring nutrition knowledge and found that only 29% of interns felt adequately prepared, and higher preparation correlated with more training during medical school.[28] Vetter and colleagues similarly found that while 94% of internal medicine (IM) residents believed nutrition counseling to be essential, only 14% felt adequately trained.[29]

Lack of adequate nutrition education is particularly problematic for cardiologists, given the impact of nutrition on cardiovascular disease, the leading cause of mortality. The 2019 American Heart Association/American College of Cardiology Guideline on the Primary Prevention of Cardiovascular Disease emphasizes lifestyle therapies as primary treatment,[30] but most cardiologists feel unprepared. In 2017, a survey of 646 cardiologists revealed that while 95% believed discussing nutrition information to be part of their role, only 10% felt adequately prepared.[31] The application to many other specialties including primary care,[32] gastroenterology,[33] endocrinology,[34] and critical care[35] is clear, demonstrating widespread opportunity for GME nutrition innovation.

Positively, a study of IM and obstetric residents demonstrated that elective training in obesity, nutrition, and physical activity counseling significantly increased both self-efficacy and positive attitude scores toward counseling.[36] Evidently, most graduating medical students are not equipped to manage common nutrition scenarios, but clinically relevant education successfully bridges the gap.

Intersection with Health Policy

The intersection of nutrition education with health policy is increasingly important as policymakers recognize the burden of diet-sensitive disease and the need for relevant physician education. In May 2022, the U.S. House of Representatives enacted a bipartisan resolution (H.R. 1118) calling on UME and GME programs, as well as federal agencies, to take steps to ensure more meaningful nutrition education.[37] The resolution highlights the economic implications, as the federal government bears much of the cost of diet-related disease in the form of Medicare coverage, while the Medicare program also provides the majority of funding for GME.

In September 2022, President Biden convened the White House Conference on Hunger, Nutrition and Health and announced a national strategy to end hunger and reduce the burden of diet-related diseases in the United States by 2030.[38] The plan highlights nutrition education for health professionals as a key priority but falls short of outlining specific steps. With collaborative guidance from nutrition scientists and experts, this sets the stage for medical education leaders to take strategic action.

To advance nutrition education and maintain oversight of the approach, educational leaders have an opportunity to collaborate with policymakers. Recognizing the impact of policy levers, the team at Harvard Law School's Food Law and Policy Clinic compiled an extensive report outlining potential strategies.[39] In the section focusing on GME, the authors propose that the Accreditation Council for Graduate Medical Education (ACGME) could amend its accreditation standards in the Common Program Requirements to require nutrition education, reaching over 135 000 residents and fellows. However, Common Program Requirements are intentionally broad, necessitating simultaneous attention to specialty-specific requirements tailored to specific patient populations and practice settings. Successful curricular change will require educational champions, dedicated time, and implementation of both acute and long-term strategies. The report[39] articulates other strategies for nutrition education expansion in GME, including addition of meaningful nutrition-related testing material on licensing and board exams.

Investing in physician nutrition education to advance prevention and food is medicine interventions has potential to reduce healthcare expenditures, especially costs borne by the Medicare program. Government investment in nutrition education—including strategies such as provision of incentive payments to UME or GME programs with high quality nutrition education or grant funding to support scalable nutrition education approaches and curricula—thus would have high predicted return on investment. Most boldly, as described in the report and echoed by H.R. 1118, the federal government could condition GME funding on the inclusion of nutrition education in the residency curriculum if other strategies are insufficient.

Emerging GME Approaches and Future Directions

In response to these recent events and the growing chorus calling for reform, the ACGME, in partnership with Association of American Medical Colleges (AAMC) and the American Association of Colleges of Osteopathic Medicine (AACOM), hosted a Summit on Nutrition in Clinical Practice in March 2023.[40] Summit attendees included nutrition education expert panelists alongside leaders from Residency Review Committees, specialty-specific boards, and physician and RDN organizations. During this historic gathering, passionate nutrition educators and scholars presented a compelling case for the *why* of nutrition education and the vital need for enhanced awareness. The group made thoughtful progress to define the *what* and the *how*, emphasizing collaboration to advance universal core competencies and assessment measures.

Table 1. Representative examples of common types of nutrition education.

EDUCATION TYPE	EXAMPLE AND BRIEF DESCRIPTION
Classroom didactic	Medical students attended a 1-h lecture and 1-h interactive workshop taught by a registered dietitian to build counseling confidence[45]
Case-based learning	Interactive, case-based activity for medicine residents to improve delivery of nutrition counseling to patients with hypertension, hyperlipidemia, obesity; includes handouts utilized[41]
Online modules	Online, 3-h, self-paced nutrition course to deliver interactive nutrition knowledge to medical residents; includes free patient-facing modules and handouts[46]
Simulated encounters	After a foundational nutrition lecture, teams of dietetic and medical students role-played nutrition history and nutritional counseling with subsequent feedback from the dietetic student after the encounter[47]
Culinary medicine	1) Culinary medicine (hands-on cooking integrated with nutrition and patient cases) workshop series for preventive medicine residents in a community setting. Includes facilitator guide, slides, recipes[44] 2) Virtual culinary medicine workshop[48]
Service-learning/ Community	Senior medical students completing a culinary medicine elective then engaged in teaching culinary medicine in an urban middle school, contextualizing community application of nutrition principles while navigating food insecurity, homelessness, and other social drivers of health[49]
Clinical application/ Integration	Curriculum integrated within ambulatory training experience to emphasize the importance of nutrition in chronic disease management and optimize use of current schedule opportunities for nutrition integration[50]

Note: Recent broad reviews of nutrition education approaches provide additional insights.[18,51-53]

Many are already exploring strategies to better equip learners to address diet-sensitive disease and to prepare for potential educational requirements. Educators share common concerns, including limited time, need for intersection with social determinants of health and health equity promotion, and the importance of sharing existing resources to reduce the up-front investment needed for nutrition education. Many educators have already developed innovative curricula to teach nutrition in a variety of formats ranging from workshops to community settings to teaching kitchens and culinary medicine models that promote nutrition education alongside practical skills and personal well-being.[41-44] Table 1 provides an overview of notable examples. These existing tools and curricula merit further study for both replicability and overlap with competency measures.

Advancing the bold goals of the House of Representatives resolution and White House Nutrition Conference[38] necessitates multifaceted, multisector strategies and requires alignment of nutrition education efforts with high quality research, innovative clinical practice, and equity promotion. We encourage GME leadership to explore resident and faculty perspectives, seek and train institutional faculty champions, and map a course for filling the gaps to equip the next generation of physicians, scientists, and innovators. The time is more than ripe.

Conclusion

The rising rates of illness linked to diet, as well as growing evidence in support of food is medicine interventions, necessitate increased knowledge of nutrition among physicians. US policymakers in Congress and the White House have shown support for these changes, making this an opportune time to demonstrate leadership from the UME and GME sector. Ensuring baseline nutrition education of physicians can ensure patients receive correct nutritional information, achieve an understanding of how important nutrition is to health, receive referrals to RDNs for in-depth nutrition guidance, and access a growing range of food is medicine services. It bears repeating that in many cases, access to RDN services or food is medicine supports require a referral, making it essential to educate physicians about when referrals are warranted. Each stakeholder in this space can help to make change: medical students or residents can ask their institutions for relevant coursework; GME or UME programs can support faculty in developing new course offerings or can establish nutrition education requirements; ACGME or the equivalent UME accrediting body (eg, the Liaison Committee on Medical Education) can implement competency requirements for accreditation; policymakers can create new incentives or restrictions in the funding streams for public support for medical education. Each step helps ensure more physicians are prepared to understand the importance of nutrition and have the tools to best serve their patients within the current landscape.

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Author contributions

The authors have all made significant contributions to this work. JA and EBL conceptualized this paper. JA completed a

literature review and developed an outline. BA wrote an initial draft of the manuscript. JA and EBL revised the manuscript. All authors approved the final version.

ORCID iD

Emily Broad Leib https://orcid.org/0000-0003-0798-3452

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