JOURNAL OF CME
2024, VOL. 13, 2418544
https://doi.org/10.1080/28338073.2024.2418544

COMMENT

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Viewpoint: Better Late Than Never: Nutrition Education Opportunities for Physicians in the United States

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ABSTRACT

Diet and nutrition have an important impact on chronic disease and mortality and have spurred growth in the food is medicine approach. Yet, in the United States (US), post-graduate nutrition education and training for physicians remain limited. This may change as American policies focused on nutrition security, quality care and health equity advance and create new incentives for practicing clinicians to engage in nutrition-focused education and training. This viewpoint summarises why nutrition is essential for quality medical care, nutrition knowledge of US physicians, evolving US policies and advocacy for nutrition in medicine and opportunities for nutrition-focused continuing medical education and training. Clinicians trained in nutrition are important to lead innovation and research in nutrition-focused clinical care and to define best practices and optimise population health.

ARTICLE HISTORY
Received 24 May 2024
Revised 25 September 2024
Accepted 11 October 2024

KEYWORDS
Physicians; diet and nutrition; food is medicine; post-graduate education; nutrition-focused continuing medical education; health policy

Introduction

Diet and nutrition are modifiable risk factors that have a large impact on both disease burden and mortality reduction [1]. Not surprisingly, there is a growing recognition of and demand for a more medically nuanced approach to nutrition – a food is medicine approach – particularly related to helping prevent and treat chronic diseases [2,3]. Still, post-graduate nutrition education and training for physicians remain limited in many countries, including in the United States (US) [4]. US policies focused on nutrition security, quality care and health equity are advancing [5–7], and this may create new incentives for practicing clinicians to engage in nutrition education and training. Therefore, even with limited nutrition education during medical school, we believe the nutrition education opportunities for US post-graduate physicians are better late than never.

The purpose of this viewpoint is to 1) summarise why nutrition remains an essential component of quality medical care, 2) outline what is currently known about US physician nutrition knowledge and continuing education, 3) describe evolving US policies and advocacy for nutrition in quality medical care and 4) explore opportunities for post-graduate nutrition-focused continuing medical education (CME) innovation and speciality training.

Nutrition as a Vital Component of Quality Medical Care

Nutrition is critical to health, resilience and well-being [8,9] and is thus an important part of quality medical care. Indeed, diet is a top risk factor for many chronic diseases, and dietary factors have been identified as the third highest risk group contributing to the global disease burden, second only to high blood pressure and tobacco [9,10]. Poor health resulting from poor nutrition is a leading cause of US morbidity and mortality [11]. Sixty per cent of American adults have one or more chronic diseases [12], and more than 40% of adults have obesity [13]. The new generation of obesity drugs holds promise for helping address these challenges, but also reinforces the need for a continued focus on nutrition. Diet and nutritional health remain fundamentally important upstream factors that influence the success of obesity and chronic disease prevention, treatments and interventions.

Children living in the US also face nutrition challenges. In an analysis of the National Health and Nutrition Examination Survey (NHANES) data, more than half of American youth were found to have poor quality diets [14]. NHANES data also document that compared to all other age groups in the US population,

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children ages 2–18 had the lowest average score on the Healthy Eating Index (54/100), showing a high prevalence of poor-quality dietary patterns across childhood that do not meet Dietary Guidelines for Americans recommendations [15]. Obesity and overweight and their complex aetiologies are also concerning in youth; the current childhood obesity prevalence is almost one in five American children [16].

Limited or poor access to nutritious food is a factor in health disparities and inequities, with many minoritized and historically marginalised groups experiencing higher rates of nutrition-related morbidity and mortality versus the general US population [17]. Poor nutrition or malnutrition can take many forms that impact health, including overweight, obesity and undernutrition. Intricately linked to malnutrition is food insecurity [18], which is also negatively associated with health [19]. In 2022, for at least some point during the year, 17.3% of US households with children and 12.8% of US households in general were food insecure [20].

The many health, economic and disparity impacts of poor nutrition have led to dramatic growth in the food is medicine movement in the US, where health systems, payers and providers are working together to advance "food and nutrition security for individuals with or at risk for diet-related diseases" [21]. Physicians are an integral part of the team needed to diagnose diet-related disease, prescribe the appropriate combination of interventions (including food is medicine), monitor outcomes and determine best practices. As part of this focus, there is a greater recognition of the need for increased physician education in nutrition [2,3], renewing interest in and creating openings for nutrition-focused medical education and training.

Physician Education and Training in Nutrition

The need for nutrition education for US physicians is not new. Nearly four decades ago, the US National Academy of Sciences recommended 25 h of nutrition training as the minimum standard for medical education [22]. Yet a 2021 survey of over 1000 US medical students documented an average of just 1.2 h of formal nutrition training per year across survey respondents, with over half of students (57.6%) reporting not participating in a medical school course on nutrition [23]. Such findings are underscored by results from a systematic review of the nutrition knowledge, skills and confidence of medical students, which showed nutrition is "insufficiently incorporated into medical education regardless of country, setting, or year of medical education" [24].

Medical students' interest and enthusiasm in nutrition rapidly diminishes if not reinforced by clinical house officers and faculty members, emphasising that nutrition education is essential in graduate and continuing medical education for residents, practicing physicians and medical school faculty [25]. Still, most efforts to advance nutrition education for physicians focus on medical school-based programmes, with limited emphasis on post-graduate training [25,26]. For this viewpoint, we delved into the medical literature (PubMed search) since the year 2000 and identified several studies [27,28] that reported on the nutrition knowledge and education of US medical residents and/or practicing physicians. A common finding was that with additional nutrition training, physicians believed they could provide better clinical care. The need for physicians to receive more nutrition education has also been reflected in the popular press [29,30], physician polls [31], opinion pieces [32] and the recent launch of a nutrition review series in the medical literature [33].

Health Policies Supporting Nutrition in Medical Care and Physician Education

Despite ongoing interest, there are still no recommended US standards, recommendations, or requirements for continuing nutrition education for physicians. Evolving US health policies and advocacy may help shape the environment to create new and stronger incentives for practicing clinicians to engage in nutrition-focused CME and equip them for the evolving landscape of practicing medicine.

At the federal level, the US Centers for Medicare and Medicaid Services (CMS) has taken several specific nutrition-related policy actions. In 2022, CMS adopted the Global Malnutrition Composite Score (GMCS); it was the first nutrition-focused quality measure in any CMS payment programme. CMS included the GMCS in its Hospital Inpatient Quality Reporting Program (IQR) and approved the GMCS as a health equity measure, after commenting that "one factor contributing to the burden of malnutrition is health disparity across racial and ethnic groups" [34]. Components of the GMCS are rates of nutrition screening, registered dietitian nutritionist (RDN) nutrition assessment, physician malnutrition diagnosis and nutrition care plan documentation [35]. The GMCS also underscores the importance of integrated team-based care to address malnutrition. In the acute care setting, disease-related malnutrition warrants a physician experienced in its early diagnosis and management, as well as increased physician education. In fact, because physician

awareness of malnutrition is low, nutrition therapy is underprescribed [36].

The GMCS measure incentivises physicians and health systems to identify malnutrition risk, including that from food insecurity [37] and while the GMCS is specific to acute care, CMS has also recognised the impact of food insecurity and malnutrition in care provided beyond hospitals. In its 2022 Physician Fee Schedule Final Rule, CMS included a food insecurity and nutrition risk improvement activity [38]. Improvement activities are part of the CMS' Merit-Based Incentive Payment System (MIPS), which is a payment programme for clinician-based care. In 2023, CMS took a further step by approving the food insecurity and nutrition risk improvement activity for seven MIPS value pathways (MVPs) ranging from value in primary care to rehabilitative support for musculoskeletal care [39].

CMS has also begun testing food is medicine initiatives in its Medicare and Medicaid programmes [40,41], including incentives for buying healthy foods, medically tailored meals for individuals with chronic conditions, clinical nutrition education and interventions that may help reduce healthcare costs [41–43]. Such programmes help fulfill one of the Biden-Harris Administration's commitments from its historic 2022 White House Conference on Hunger, Nutrition and Health (White House Conference), to expand food is medicine interventions access for Medicare and Medicaid beneficiaries [44].

While these initiatives collectively support the identification of and interventions for poor nutrition, the challenge becomes the education of clinicians on how to integrate nutrition screening and intervention into their practices. The 2022 White House Conference recognised this need, calling for more healthcare professional education and training in nutrition, including for physicians [44]. In addition to federal interest, some US state lawmakers have also been working to strengthen nutrition education and training for physicians [45–49]. However, when we examined the medical and grey literature over the last two decades (since the year 2000 through a PubMed and google search) we did not identify any state-specific mandates for physicians to complete nutrition CME for state licensure.

Nutrition-Focused CME and Other Education and Training Opportunities

While limited in number, over the past few decades several programmes have been built to support nutrition-focused CME. For example, the Nutrition in Medicine (NIM) Project, established in 1995, offers a 29-unit curriculum and online clinical and practical application modules [50]. Another programme is Healthy Kitchens, Healthy Lives, an annual conference supporting nutrition counselling through an immersive culinary experience and updates on the latest evidence of food and nutrition interventions [51]. There was also documentation in the medical literature of various CME offerings in nutrition and obesity care available during the early 2000s [25] and a report of positive outcomes for an online nutrition education programme [52]. More recently, culinary medicine approaches have been developed as active, hands-on, small-group learning that help solidify nutrition knowledge alongside culinary literacy. Culinary medicine is interprofessional and evidence-based, blending the art of cooking and food with medical science. It often uses a teaching kitchen to bring together multidisciplinary teams of RDNs, chefs, physicians, medical students and other medical professionals to teach nutrition skills and offer CME [53].

There has also been increased interest from both government entities and professional societies on nutrition education sources and pathways. As follow-up to the 2022 White House Conference, the Biden-Harris administration has issued several press releases highlighting various medical organisations' recent commitments for supporting physician nutrition education (Table 1). Those commitments ranged from a medical education in nutrition summit to free nutrition CME to increasing the "number and credit value of nutrition continuing education units and maintenance of certification credits for all specialties" [54,56].

Beyond CME, physicians have additional pathways to expand their educational focus and areas of speciality, which can include nutrition (Table 2). In the US, Maintenance of Certification (MOC) provides a voluntary training opportunity that incorporates assessment, education and practice activities, allowing clinicians to maintain board certification [57]. MOC aligns with the American College of Graduate Medical Education (ACGME) six core competencies [64]. While nutrition is not listed specifically as a competency, there are CME courses and modules that support nutrition speciality professional development and can be utilised under MOC. For example, the North American Society for Pediatric Gastroenterology, Hepatology & Nutrition (NASPGHAN) offers nutrition modules approved for its MOC [65]. As the importance of nutrition and diet are often recognised by a variety of medical specialities [66], similar opportunities could be created by other speciality MOC programmes.

There are also several clinician pathways specific to nutrition medical specialisation (Table 2). One example

Table 1. Commitments to support physician nutrition education emanating from the 2022 White House Conference on Hunger, Nutrition and Health.

Organization	Commitment
Association of American Medical Colleges and Accreditation Council for Graduate Medical Education	Host the first ever Medical Education Summit on Nutrition in Practice in 2023 [54] Update: Summit on Medical Education in Nutrition was held March 12-14, 2023 and included representatives from undergraduate and graduate medical education, the CME community, speciality societies/certifying boards, physician experts in teaching nutrition and registered dietitian nutritionists; participants worked "to codify key learnings and refine recommendations" for future follow-up [55]
American Academy of Pediatrics (AAP) and Share Our Strength	Offer training to AAP's 67,000 members on "screening for nutrition insecurity and referring patients to federal and community nutrition resources" [54]
American College of Lifestyle Medicine	Donate "5.5 hours of Continuing Medical Education [CME] course credits on nutrition and food is medicine topics to 100,000 health care providers located in regions with high rates of diet-related disease" [54]
National Medical Association, National Hispanic Medical Association, and other health sector organisations	Pledge to "fortify nutrition education as one of the foundational competencies for professional training in all health-related fields" and to "increase the number and credit value of nutrition continuing education units and maintenance of certification credits for all specialties; and ensure that hunger, nutrition, and lifestyle topics comprise at least 5% of board certification exam questions for both primary and subspecialty professional training programs" [54]
University of South Carolina School of Medicine Greenville	Help implement its open-source Lifestyle Medicine Curriculum in interested medical schools, provide guidance to National Board of Medical Examiners on adding questions/content in lifestyle medicine [54]
Gaples Institute Nutrition and Lifestyle Education	Offer 100 additional US medical schools and health professional training programs; and a "newly developed comprehensive package of nutrition education resources" with priority given to medical schools and training programs in underserved areas" [54]
Medical College of Georgia/Augusta University of Georgia Medical Partnership's Office of Personalized Health and Well-being	Launch National Training and Research Collaborative to serve as open-sourced web-based platform to provide primary care physicians with "evidence-based tools to help integrate nutrition, exercise, and sustainable behavior change into the current standard of care for the healthcare workforce and their patients" [56]
Teaching Kitchen Collaborative	Help establish "national standards for teaching kitchen environments and programs" [56]

is the Physician Nutrition Specialist® (PNS) certification. The PNS Certification as a Diplomate of the National Board of Physician Nutrition Specialists (NBPNS) "signifies a physician as having achieved a high level of competency and understanding in scientifically sound, evidence-based medical nutrition" [58].

Another pathway is the Lifestyle Medicine Certification focused on preventing, treating and reversing chronic disease [59]. The Certified Culinary Medicine Specialist (CCMS) which recognises clinicians with nutrition knowledge and culinary skills is offered by the American College of Culinary Medicine [60]. Diplomate of the American Board of Obesity Medicine signifies a physician's specialised knowledge and competency in obesity medicine [61]. A further specialisation pathway is available through the National Board of Nutrition Support Certification, which credentials the Certified Nutrition Support Clinician (CNSC) who is skilled in delivering parenteral and enteral nutrition support [62].

All the speciality certifications except the certified nutrition support clinician provide online directories of currently certified physicians. Such listings can help increase visibility for certified specialists regardless of their site of care, from academic healthcare facilities to private practice. In addition, certifications may help establish trust with patients and the doctors who refer them [67]. It is not known how the uptake in nutrition-related certifications has grown over time; however, several certifications have documented growth. Diplomate of the American Board of Obesity Medicine was established in 2011 and over the last decade, the number of diplomates increased from 587 in 2013 to 8,263 in 2023 [68]. The Certified Culinary Medicine Specialist programme is less than 5-years old, but its Moodle platform has over 800 active users [69].

Nutrition training opportunities for physicians can include nutrition fellowships through academic clinical institutions as well [63] (Table 2). With the recent introduction of the diagnostic term adiposity-based chronic disease [70] and the emergence of highly effective of anti-obesity pharmaceuticals, there may be even more opportunities in the future for nutrition medical specialisation, training and fellowships that could expand on the American Board of Obesity Medicine board certification.

Practical Applications and Suggestions for Further Development

As documented in this viewpoint, although interest in strengthening physician nutrition knowledge continues, meaningful permanent advancement towards including nutrition in US medical post-graduate training and practice has been limited. To achieve success,

Table 2. Potential pathways providing structured opportunities for physicians to enhance their knowledge, expertise and practice in nutrition.

Pathway	Description	Opportunities to Increase Nutrition Education and Training
Maintenance of Certification (MOC)	• Voluntary training programme that allows physicians to seek and maintain board certification in a specific medical practice area • Aligned with American College of Graduate Medical Education's (ACGME) six core competencies: medical knowledge, patient care and procedural skills, interpersonal and communication skills, professionalism, practice-based learning and improvement, and systems-based practice • Continuing medical education (CME) required to retain certification [57]	• Includes opportunities for nutrition-focused CME courses/modules as part of some individual MOC's structured, continuous learning and professional development process
Physician Nutrition Specialist® (PNS) Certification	• Board-certified physician with additional training or extensive clinical experience in nutrition therapy • American Society for Nutrition (ASN) is an affiliate partner that provides nutrition CME resources, and updates including a new case-based article series [58]	• Recognises clinician's advanced nutrition knowledge and skills • Creates pathway for continued education and additional skill development in nutrition • Must meet eligibility criteria of demonstrated expertise in nutrition, as defined by meeting two or more specified requirements
Lifestyle Medicine Certification	• Board-certified physician with additional experience in lifestyle medicine [59]	• Recognises clinician's knowledge and skill in integrating nutrition as a key component in the practice of lifestyle medicine • Creates pathway for continued education and additional skill development in nutrition as part of comprehensive lifestyle medicine • Must meet eligibility requirements of 30 h CME prerequisite from an approved online course and 20 h CME prerequisite from an approved event
Certified Culinary Medicine Specialist (CCMS)	• Certificate offered to licenced practicing physicians [60]	• Identifies clinician's foundational skills in incorporating healthy eating into patients' diet, comprehensive nutrition knowledge and culinary techniques • Features a hybrid 60-credit curriculum comprising online education, live conference learning and hands-on teaching kitchen modules
Certified Diplomate of the American Board of Obesity Medicine	• Board-certified physician completing required hours of specified education [61]	• Recognises physicians for training in "effective treatment options and practical tools for obesity and overweight counseling and treatment" [61] Certified Diplomate pathways available via CME or fellowship
Certified Nutrition Support Clinician	• Certificate offered to licenced healthcare providers [62] with at least 2 years of experience in nutrition support practice following professional licensure	• Demonstrates attainment of skills, knowledge necessary to provide quality nutrition support care
Nutrition Fellowships	• Advanced nutrition training through academic clinical institutions • Clinically based and may include research components • Potentially may include some financial support through industry sponsorship [63]	• Provides in-depth, specialised clinical training in nutrition

support and engagement across multiple societal stakeholders are needed [71], including a cultural shift within healthcare systems and organisations as well as CME providers to prioritise more integrated and preventive medical and nutrition care. As one physician stated, medicine's mission of protecting, defending and advancing the human condition "cannot be fulfilled if diet is neglected" [72].

It is never too late to improve nutrition education opportunities for post-graduate physicians. Here are several suggestions that can help address common barriers (Figure 1).

Expand Access to Existing Nutrition-Focused CME Programmes

In response to the 2022 White House Conference, the American College of Lifestyle Medicine pledged to donate nutrition CME course credits to providers working in regions with high rates of diet-related disease [54]. Similarly, the American Academy of Pediatrics has announced plans to offer training to its members on screening for nutrition insecurity and referring patients to available federal and community resources [54]. There is an opportunity for other CME providers and

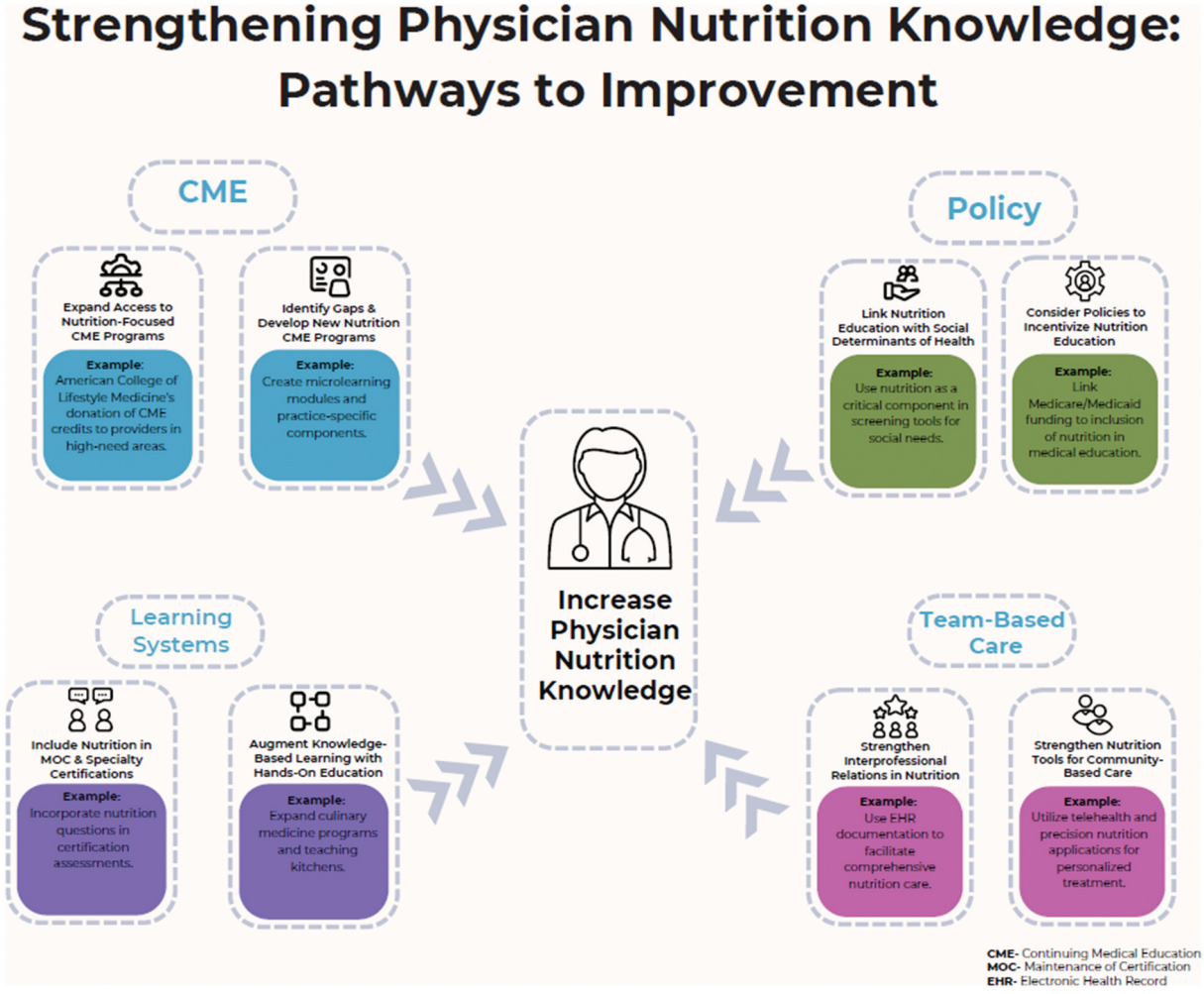

Figure 1. Potential solutions to help increase physician nutrition learning systems.

professional organisations to consider expanding the availability of their own nutrition CME and training programmes, including those offered at national meetings, to help improve access to nutrition education.

Identify Gaps and Develop New Nutrition-Focused CME Programmes

We found few studies in the medical literature specific to nutrition-focused CME, and nothing recent or specific to nutrition CME and food is medicine. Proceedings of the 2023 Medical Education Summit on Nutrition in Practice commented that "CME should support course correction with current foundational knowledge continually updated to reflect current nutrition science and best practices" [55]. CME providers could build on this and take the initiative to conduct needs assessments and identify gaps in physician knowledge of current nutrition science and best practices, particularly related to chronic disease. This may include developing new models for education such as breaking down evidence-based nutrition into smaller, more practice-specific components or microlearning modules.

Include Nutrition as a Component of MOC and Specialty Certifications

A number of medical specialities treat conditions with direct relationship to nutrition and as suggested previously in this viewpoint and called for by the National Medical Association and National Hispanic Medical Association [54], nutrition could be included as part of the MOC offerings for achieving and maintaining certification. Similarly, the latest report on nutrition education for physicians from the Food Law and Policy Clinic at the Harvard Law School recommends nutrition-related questions be incorporated into medical speciality certification assessments to demonstrate

connections between the speciality and nutrition, food and lifestyle [73].

Augment knowledge-based learning with case-based and hands on education opportunities that integrate nutrition into clinical practice

The Medical Education Summit proceedings explained that "Competency-based learning provides a framework for a wholistic approach to integrating nutrition education" [55] and the National Medical Association and National Hispanic Medical Association have pledged to "fortify nutrition-education as one of the foundational competencies for professional training in all health-related fields" [54]. Culinary medicine education programmes and teaching kitchens, which have been part of some medical school curricula and are the basis for the CCMS credential, are also more broadly available through CME [56] and could be expanded. The Teaching Kitchen Collaborative has pledged to help establish "national standards for teaching kitchen environments and programs" [74] and this could help further strengthen the evidence base for this learning approach.

Link nutrition education with training on social determinants of health, cultural sensitivity and weight bias and stigma

Nutrition is important to patient-centred medical care. For example, it is a critical social determinant of health [44], and food insecurity is a component of screening tools such as the Social Needs Screening Tool developed by the American Academy of Family Physicians [75]. Nutrition and diet are integrally linked to culture [76], and there has been an increased awareness of the need to include nutrition as part of cultural sensitivity training [55,73]. In addition, with the recognition of obesity as a chronic disease, nutrition is pivotal to education on weight bias and stigma in medical care [55,73].

Consider policies that require nutrition-focused physician education and increase funding for nutrition education and broader coverage of nutrition interventions

This viewpoint identified several state-specific efforts to strengthen nutrition education and training for physicians [45–49]. While mandating nutrition education for physicians may not be widely popular, state-specific licensure requirements and requirements for federal employees have been identified as the main policy levers to impact nutrition-focused CME [73]. One suggestion is that this education be integrated into existing CME requirements versus added as extra hours of CME requirements. The Medical Education Summit proceedings characterised lack of funding as the primary reason that over 60 years of continued attempts to integrate nutrition into medical education have had limited success [55]. One possible policy change is to link Medicare and Medicaid funding for graduate medical education to the inclusion of nutrition in those curricula [73]. Another opportunity is to expand coverage of nutrition interventions, specifically Medicare coverage of medical nutrition therapy and interventional behaviour therapy, as outlined in the Medical Nutrition Therapy Act [77] and the Treat and Reduce Obesity Act [78]. With the expansion of Medicare coverage of nutrition interventions, there is a greater chance other payers will follow and provide coverage.

Strengthen Interprofessional Relations and Practice in Nutrition

The Medical Education Summit proceedings identified that understanding the roles of the health team – especially registered dietitian nutritionists (RDNs) – is an important component of nutrition education and will increase the effectiveness of nutrition counselling [55]. In the acute care setting, the GMCS quality measure includes components specific to the dietitian (nutrition assessment) and physician (malnutrition diagnosis), providing a framework for electronic health record (EHR) documentation as well as for facilitating high quality, comprehensive nutrition care from inpatient settings to post discharge [79]. Importantly, while the GMCS was initially focused on adults aged 65 and older, CMS recently adopted expanding the GMCS to include all adults aged 18 and older [80].

Strengthen Nutrition Tools and Platforms to Support Community-Based Medical Care

Outside the hospital, physicians may have less access to nutrition professionals. Further, while food insecurity and nutrition screening have been included as improvement activities for primary care, some physicians may be reluctant to take on nutrition screening and interventions without support. Several technological innovations hold promise. Digital applications for precision nutrition have been identified as enabling physicians and other healthcare professionals to offer more personalised treatments [81]. Telehealth nutrition interventions with RDNs have been documented as

cost-effective in chronic disease populations [82]. Also, this viewpoint previously referenced the partnership announced by the Medical College of Georgia and Augusta University to develop a National Training and Research Collaborative as an open-sourced web-based platform for primary care physicians [56].

Conclusion

Recognition of the health, economic and disparity impacts of poor nutrition has led to increased awareness of nutrition as a vital component of quality medical care and renewed interest in nutrition-focused physician education and training. However, US clinicians receive little nutrition education during either medical school or post-graduate education and training. Evolving US health policy and advocacy may be shaping the environment to create stronger incentives for and interest in nutrition-focused CME and training. Ultimately, advancing post-graduate nutrition education strategies and opportunities for clinicians merit careful attention to align with existing continuing education requirements and create space for ongoing innovation and career development.

Consideration should also be given to increasing physician awareness about available medical board certifications related to nutrition as well as the development of career paths in these specialities to incentivise early-career physicians to pursue nutrition as a field of practice. There may also be a potential opportunity to expand available nutrition-related specialities and certifications, as the science in obesity and other chronic disease prevention and management continues to evolve.

The national emphasis on food is medicine impacts nearly every sector of society today. Clinicians trained in nutrition will be poised to lead innovation in delivery of nutrition-focused clinical care, study outcomes to define and deliver best practices that can inform clinical practice guidelines, and invest in educating and training the next generation of physicians to optimise the health of our population.

Disclosures Statement

JA has no disclosures. DRW, JTS, GS, ALG and MBA are employees and stockholders of Abbott.

Author Contributions

All authors were involved in the drafting of the paper, have provided their final approval, and agreed to be accountable for the paper's content.

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