

DOCTORING OUR DIET

Policy Tools to Include Nutrition
in U.S. Medical Training



FOOD LAW
and POLICY CLINIC
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ABOUT THE HARVARD LAW SCHOOL FOOD LAW AND POLICY CLINIC

The Harvard Law School Food Law and Policy Clinic (FLPC) serves partner organizations and communities by providing guidance on cutting-edge food system issues while engaging law students in the practice of food law and policy. FLPC focuses on increasing access to healthy foods, supporting sustainable production and regional food systems, and reducing waste of healthy, wholesome food. FLPC offers law students the opportunity to work alongside practicing attorneys to develop policy strategies and legal and skills relating to the overarching goals of the Clinic. For more information, visit www.chlpi.org/FLPC.

Nutrition plays a critical role in the prevention and treatment of many chronic diseases, and diet is one of the most significant risk factors for disability and premature death in the United States. Leading causes of death include heart disease, cancer, stroke, and diabetes—all of which have a high correlation to poor diet and nutrition. Yet despite the overwhelming evidence linking food with health, nutrition receives little attention in medical school and throughout the education of physicians.

The lack of comprehensive nutrition education for physicians represents a missed opportunity for doctors to promote good health, illness prevention, and treatment of chronic diseases. Physicians have the trust of their patients, and therefore have the opportunity to influence patient behavior. Without adequate nutrition education, however, physicians are less likely to recognize the importance of dietary problems, include nutrition assessments during patient exams, offer accurate basic nutrition advice, or be equipped to provide referrals as needed. Nutrition education should therefore be an essential component of all physician training. Luckily, many opportunities exist to increase the basic knowledge level of physicians about the relationship between food, diet, and health.

This report identifies the policy opportunities most likely to drive an increase in nutrition education at various stages of medical education, including: undergraduate medical education (UME); graduate medical education (GME); step and board examinations; and continuing medical education (CME). The following overview identifies the primary recommendations outlined in each section of the report. Relevant background information, rationales for pursuing the policy option, and benefits and challenges of each approach are explored in more detail in the full report.

1 | INCREASE NUTRITION EDUCATION IN UNDERGRADUATE MEDICAL EDUCATION (UME)

Because UME, or medical school, is the first stage of medical education, enhancing nutrition education during this time would instill a baseline level of knowledge regarding diet and the importance of nutrition that can be developed throughout a physician's training and practice.

RECOMMENDATIONS:

- **Amend the Liaison Committee on Medical Education (LCME) accreditation standards to require nutrition education.**

The LCME is the principal accrediting body for medical schools in the U.S. Some federal grants and programs are conditioned upon LCME accreditation, meaning that schools have an incentive to receive and maintain their accreditation. Amending accreditation standards to include competency in nutrition would assure compliance by the majority of UME programs.

- **Tie government funds for medical schools to nutrition education.**

Government investment can be used to drive medical schools to include nutrition content

in their curricula. Several models for how to use governmental funding as a lever for change include:

Condition non-grant funding on inclusion of nutrition education

- Make government funding to medical schools contingent upon whether the schools provides certain credit hour or curricular requirements for nutrition education.

Provide performance-based incentive payments to medical schools that include nutrition education

- Governments may offer small, performance-based awards to all medical schools that offer baseline nutrition education or meet certain nutrition training standards.

Offer grant funding for nutrition education programming in UME

- Governments may administer grants to medical schools to fund the inclusion or expansion of nutrition education into existing curricula.

- **Provide technical assistance and resources to support nutrition-curricula development.**

Governmental agencies can encourage medical schools to increase education about nutrition by raising the profile of programs that do this successfully. Agencies can also facilitate sharing of existing nutrition education materials to enable schools to more easily design and adopt nutrition programs and courses.

2 | INCREASE NUTRITION EDUCATION IN GRADUATE MEDICAL EDUCATION (GME)

GME, which encompasses residency and fellowships, is the second phase of American medical education and includes both clinical and didactic training requirements of physicians in their chosen specialty areas (*i.e.* internal medicine, pediatrics, surgery) as well as later subspecialty training (*i.e.* cardiology, gastroenterology, cardiac surgery). An increased focus on nutrition education in GME will provide physicians with tailored tools to apply nutrition to their specific practice areas and to practice discussing food and diet with their patients.

RECOMMENDATIONS:

- **Amend the American Council of Graduate Medical Education (ACGME) accreditation requirements to include nutrition education.**

ACGME is the accrediting body for GME programs nationally. Currently, the ACGME does not require nutrition to be taught to physicians in most graduate medical training programs. The accreditation requirements for GME programs could be amended to require nutrition competency for residents and fellows, which would have widespread impact. Changes could be made to either the Common Program Requirements that all residency programs must meet or to the specialty-specific requirements that are tailored to accreditation for different medical specialties.

- **Tie government funds for residency programs to the inclusion of nutrition education.**

GME programs receive the bulk of their funding from federal, and to a lesser extent state, government investment. Federal Medicare spending especially plays a critical role in subsidizing GME, and Medicaid funding directed by states also plays a role in GME operational support. Several models could be used to change governmental support to GME programs in order to drive inclusion of diet and nutrition into training, including:

Condition Medicare, Medicaid, and other non-grant funding on inclusion of nutrition education

- Make government funding to GME programs contingent upon whether the schools provide certain credit hour or curricular requirements for nutrition education; this can be done in the Medicare program at the federal level or in the Medicaid program at either the federal or state level.

Provide performance-based incentive payments to GME programs that include nutrition education

- Governments may offer small, performance-based awards to all GME programs that offer baseline nutrition education or meet certain nutrition training standards.

Offer grant funding available for GME programs to incorporate nutrition education

- Governments may administer grants to GME programs to fund the inclusion or expansion of nutrition education into existing curricula.

3 | INCREASE NUTRITION-RELATED QUESTIONS IN STEP AND BOARD EXAMINATIONS

Incorporating more nutrition-focused questions in Step and Board examinations could prompt both UME and GME programs to change their curricula to include more coverage of nutrition education in order to ensure their students will be successful on these exams.

RECOMMENDATIONS:

- **Incorporate nutrition-focused content on medical step exams.**

Including test questions about nutrition knowledge and competency on the Step 1, 2, and 3 exams may prompt both UME and GME programs to change their curricula to include more coverage of nutrition science and behavioral counseling.

- **Incorporate nutrition-focused content on medical board exams.**

Re-classifying nutrition as a primary content category as opposed to cross-content category in the specialty-specific board exams may help increase nutrition content in the exams. Nutrition-related content would encourage schools and training programs that “teach to the exam” to emphasize the importance of nutrition to trainees and to include nutrition in the curriculum.

4 | INCREASE NUTRITION EDUCATION IN CONTINUING MEDICAL EDUCATION (CME)

States generally set requirements as to the number of hours and types of areas in which physicians must take CMEs in order to retain licensure. Requiring or encouraging physicians to take continuing medical education courses in nutrition can ensure that physicians currently in practice know about basic diet and nutrition principles and can help practicing physicians stay up-to-date with new advances in clinical nutrition science.

RECOMMENDATIONS:

- **Include nutrition in state continuing medical education requirements.**

State requirements for continuing medical education could be amended to include nutrition courses as a requirement that physicians must fill to maintain their licensure, or to encourage physicians to take CME courses in nutrition.

- **Include nutrition in continuing education requirements for federal employees.**

The federal government could lead by example and require federally-employed doctors to take continuing medical education courses in nutrition and diet.

Many opportunities are available to increase physicians' knowledge of nutrition. This knowledge will help to improve physicians' practical skills assessing and advising patients on issues related to food and diet. Integrating nutrition as an essential component of U.S. medical education will enable doctors to support better outcomes for individual patients and to address the most common and costly health risks facing our country.



INTRODUCTION

Doctors with training in diet and nutrition can have a monumental impact on individual patient health and the public health landscape, generally.¹ Patients rely on physicians to understand the universe of factors that impact good health, prevent illness, and treat chronic diseases, including those related to nutrition and diet.² Unfortunately, many physicians lack basic nutrition knowledge, as nutrition receives little attention in medical school curricula and throughout medical training.

This report demonstrates that even a modest investment in nutrition training for physicians can significantly improve patient outcomes, provide for better population health, and contain costs associated with the most prevalent and preventable diet-related diseases. To make this change, the report proposes a range of policy opportunities available to federal and state governments, as well as other medical accreditation and licensing boards, to include nutrition in each stage of physician education, and briefly analyzes the feasibility of each option.

The Harm and Cost of Diet-Related Disease

Diet is the most significant risk factor for disability and premature death in the United States.³ Heart disease, cancer, stroke, and diabetes,⁴ which are among the leading causes of death nationwide, all have a high correlation to diet and nutrition. Levels of overweight and obesity have increased in the United States in recent decades.⁵ Today, nearly forty percent of adults⁶ and eighteen percent of children are considered obese.⁷ Nearly ten percent of Americans suffer from diabetes, and more than one-third are pre-diabetic,⁸ compared with less than one percent fifty years ago.⁹ Some epidemiologists predict that America's youth may live less healthy and shorter lives than their parents due to the rising prevalence of these and other diet-related diseases.¹⁰

The costs of chronic poor health, including healthcare costs from diet-related diseases, also have risen exponentially.¹¹ According to recent estimates, healthcare costs related to obesity exceed \$200

billion per year,¹² and healthcare costs related to diagnosed diabetes are well over \$300 billion per year.¹³ More than one-third of cancers are related to diet,¹⁴ and projections show the direct cost of cancer in the U.S. will reach \$172 billion by 2020.¹⁵ A 2009 report from the Centers for Disease Control and Prevention (CDC) estimated that preventable diseases, such as diabetes, account for approximately seventy-five percent of total healthcare spending in the U.S.¹⁶ Diet and physical activity warrant increased attention, as modifications in behavior may reduce major risk factors for costly and harmful diseases.¹⁷

A Missed Opportunity for Nutrition Education

Despite the rising rates of diet-related diseases in the U.S., doctors receive little to no nutrition education during their medical training.¹⁸

OVERVIEW OF MEDICAL EDUCATION

The first stage in American medical education is **Undergraduate Medical Education (UME)**, more commonly referred to as medical school. During medical school, all students are required to take **Step 1** and **Step 2** of the medical licensing exams.

After medical school, doctors begin their residency programs, or **Graduate Medical Education (GME)**. GME can also include a fellowship, a specialty training program after residency. All doctors take the **Step 3 exam** after their first year of residency (their “intern” year).

After their residency is complete, many physicians will opt to become Board-certified in their specialty by taking a specialty-specific **Board exam**. Over the course of their careers, doctors must continue their education through **Continuing Medical Education (CME)** courses in order to maintain licensure.

The missed opportunity to include nutrition education in medical training starts in medical school, or “undergraduate medical education.” Over the

course of a four-year medical degree, the average American medical school offers a mere nineteen hours of nutrition education.¹⁹ This accounts for less than one percent of total lecture hours.²⁰ Since the 1980s, well before the current epidemic levels of diet-related diseases, the National Research Council has recommended that medical schools provide at least twenty-five hours of nutrition education; this should be considered a bare minimum today.²¹ However, only twenty-nine percent of U.S. medical schools offer students even this minimum level of nutrition education.²²

The absence of diet and nutrition in medical education has repercussions for patients throughout physicians’ careers and on society at large. One study found seventy-two percent of students entering medical school thought that nutrition counseling would be highly relevant in their practices, yet less than half maintained this view by graduation.²³ Seventy-three percent of physicians reported that they received no or minimal instruction on nutrition.²⁴ Despite the relevance of nutrition to cardiovascular health, ninety percent of cardiologists recall receiving no or very little instruction on nutrition during their fellowship training, while ninety-five percent of cardiologists surveyed felt that it was their personal responsibility to at least begin a nutrition conversation with their patients.²⁵

It is therefore unsurprising that only fourteen percent of practicing physicians report feeling qualified to offer nutritional advice to their patients.²⁶ This deficiency of knowledge results in a lack of confidence to address diet and nutrition-related health. The reluctance to engage in conversations about nutrition and avoidance of the issues represents a lost opportunity to improve not only individual patient well-being, but also population health.

Physician Education Should Include Training on Diet and Nutrition

Physician visits present ideal opportunities to help patients understand information about health and nutrition because patients trust the advice of their physicians.²⁷ Patients who receive advice from their doctors on the importance of weight loss, for example, are more likely to improve diet, increase activity, and

lose weight.²⁸ Indeed, the general public considers physicians to be among the most credible sources for accurate, up-to-date guidance about diet and food, despite the fact that many physicians lack the training and knowledge to confidently take on this role.²⁹ Improving the capacity for doctors to address diet and nutrition through nutrition education therefore opens the door for better health outcomes.

Medical education should inform future and practicing physicians of the latest evidence linking nutrition and the most common and costly diseases. Although diet controversies are spotlighted in the media, nutrition researchers have built a solid consensus of knowledge regarding health-promoting diets. For example, nutrition science has developed the links between folate deficiencies and birth defects, and between trans fats and heart disease.³⁰ Several leading governmental agencies and academies release regular updates on the status of nutrition knowledge. This includes the Dietary Guidelines for Americans, released every five years by the U.S. Department of Agriculture and Department of Health and Human Services,³¹ and periodic research initiatives by the National Academies of Sciences, Engineering, and Medicine.³²

Despite this progress in nutrition research, medical schools continue to devote little attention to nutrition. This approach does not reflect the current scientific consensus regarding basic diet and nutrition principles, and it fails to adequately arm future doctors with the information necessary to address diet-related diseases. Physicians should be adequately equipped to counsel patients about eating a healthy overall diet and making food choices that complement other health goals. For example, physicians should be able to provide patients with up-to-date information that is based on the current Dietary Guidelines for Americans and to address common dietary questions from patients.³³ Coursework and training should enable physicians to assess the quality of macronutrients, to understand dietary patterns associated with prevention and treatment of diseases, and to counsel their patients appropriately.

Providing physicians with knowledge about nutrition can improve the ways in which they counsel patients, manage other healthcare staff, and allocate

resources. Not every physician will find it necessary or appropriate to provide detailed patient counseling on proper nutrition; however, possessing basic knowledge about healthy diets will help physicians to:

- Include nutrition assessments in medical exams and recognize when and how nutrition can optimize health outcomes for patients;³⁴
- Provide meaningful referrals to nutrition professionals when necessary,³⁵ which is often required for such professionals to claim reimbursement from health insurance payers;³⁶
- Give better preventive health guidance and effectively counsel their patients about eating habits; and³⁷
- Access updated nutrition guidance so they can provide current evidence-based advice to their patients.

Opportunities to Incorporate Nutrition into Medical Education

Despite the dearth of nutrition education provided in medical training to date, many opportunities exist to add food, diet, and nutrition to medical education. Training students to integrate nutrition knowledge into practice can take several forms, including: teaching students about nutrition in the classroom; conducting clinical training on nutrition counseling with patients; and implementing teaching kitchens and culinary medicine programs that teach medical students cooking and food preparation skills that they can pass on to their patients. In medical school, nutrition education should address both clinical knowledge and practice skills, including patient dietary assessment, motivational interviewing, and counseling skills. Nutrition education in residency programs and later specialty training should reinforce principles in early training, with a focus on the specific nutrition issues most important for the relevant medical specialty.

This report proposes a range of recommendations to include diet and nutrition at every stage of physician education. The report builds upon the work of a growing number of stakeholders and experts that have highlighted the deficit of nutrition education throughout medical training and argued in favor of added relevant education.

GROWING NUMBER OF ORGANIZATIONS CALLING FOR NUTRITION EDUCATION FOR PHYSICIANS

A number of recent reports discuss the dearth of medical training on diet and nutrition and call for changes to improve physician education on these topics. Notable examples are listed here.

- **The Bipartisan Policy Center's** 2014 report details the lack of nutrition education in medical schools, the importance of implementing nutrition curricula, and various recommendations for bringing about such curricular changes.³⁸
 - **The American Heart Association**³⁹ and the **Academy of Nutrition and Dietetics**⁴⁰ have issued advisories urging the implementation of medical competencies, training, and education to advance guideline-based diet counseling from physicians.
 - **The National Heart, Lung, and Blood Institute** (NHLBI) has written papers on the content and implementation of nutrition education for health professionals.⁴¹ It held a two-day working group in September 2012 on “Future Directions for Implementing Nutrition
- Across the Continuum of Medical and Health Professions Education and Training, and Research.” The working group aimed to “guide future directions for implementing nutrition across the continuum of medical education and specialty training.”⁴²
- A 2018 **American Heart Association** Science Advisory advocates for guideline-based diet counseling by physicians. The Advisory highlights the current gaps in medical nutrition education and training in the U.S. and outlines opportunities for facilitating more robust nutrition education programs in undergraduate and graduate medical education.⁴³
 - Although not specifically related to nutrition education, a 2012 Healthy Policy Brief in **Health Affairs** discusses the federal funding mechanisms of medical residency programs in the United States,⁴⁴ and the **National Academies** published a report about how these funding mechanisms might be altered to provide for greater accountability and transparency in order to produce the types of physicians most needed by the nation.⁴⁵

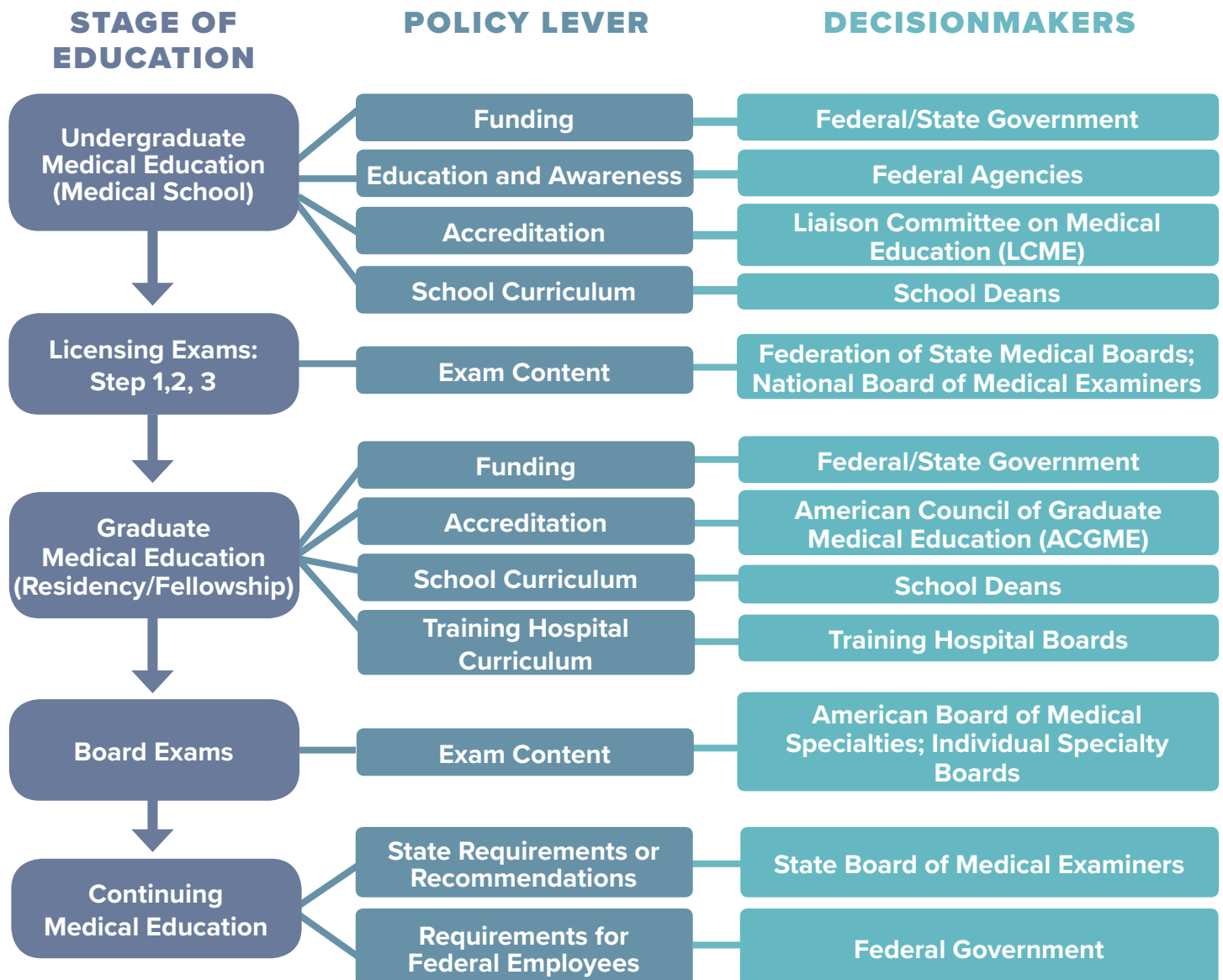


Building on the foundation laid by these groups, this report advances the discussion by proposing an array of specific policy levers available to policymakers who are committed to improving medical education in the U.S. Recommendations include policy changes that can be implemented by federal government, state governments, and medical accreditation and licensing boards. These policy changes will help ensure that physicians and the healthcare system are better equipped to respond to the greatest nutrition

and diet-related health risks currently facing so many Americans. These changes are well worth making, as even a modest investment in nutrition education today can prevent steep healthcare and human costs in the future.

The figure below provides a graphic overview of the various stages of medical education, policy levers available at each stage, and relevant decisionmakers discussed in this report.

OPPORTUNITIES TO IMPLEMENT NUTRITION EDUCATION FOR PHYSICIANS



UNDERGRADUATE MEDICAL EDUCATION (UME)

Improving nutrition education early in the training of physicians would help to instill a core competency that physicians can later explore clinically in residency and apply during practice. The first step of medical education is medical school, also known as Undergraduate Medical Education (UME). The four-year UME student experience in medical school has traditionally been divided into two stages, transitioning from course instruction to clinical experiences between years two and three.

Opportunities exist to incorporate nutrition education in both the classroom and clinical contexts. These opportunities include: (1) amending the Liaison Committee on Medical Education accreditation standards for medical schools; (2) tying government funding of UME to the inclusion of nutrition education, via either conditional payments, performance-based incentive payments, or grant opportunities; and (3) facilitating school-level curricular changes. Each is discussed in more detail below.

RECOMMENDATIONS

1

Amend the Liaison Committee on Medical Education accreditation standards to require nutrition education

The Liaison Committee on Medical Education (LCME), the primary accrediting body for U.S. medical schools, publishes standards for accreditation of medical schools in its *Functions and Structure of a Medical School*.⁴⁶ Medical schools in the United States and Canada voluntarily undergo the LCME peer-reviewed accreditation process to demonstrate that their programs meet these standards.⁴⁷ Eligibility for certain federal grants and programs, such as the Health Professions Student Loan program, also is

tied to LCME accreditation, and many state medical boards require that physicians graduate from LCME-accredited institutions in order to be licensed to practice medicine in the state.⁴⁸ Medical schools are reviewed every eight years for compliance with the standards⁴⁹ and must complete annual surveys.⁵⁰

In 2015, the LCME redesigned UME standards by replacing the 132 individual standards with twelve broad, overarching standards and six to twelve supporting elements per standard.⁵¹ The 2015 redesign represents a shift toward a broader and less prescriptive accreditation regime, allowing for more flexibility in curriculum design.⁵²

LCME standards are published each year.⁵³ As with earlier versions, the 2019 publication of the 2020–2021 LCME standards do not explicitly mention nutrition education.⁵⁴ Although the new broader format of the LCME standards make it difficult to incorporate very specific requirements, changing the LCME standards to require nutrition education would ensure that more schools would pay attention to the topic in order to maintain their accreditation.

Prior to issuing each year's standards, the LCME solicits feedback from the medical school community and accepts comments from the public at large, in both planned and ad-hoc reviews.⁵⁵ Members of the public can submit a proposal to change accreditation standards through the LCME's formal review process, and the LCME Executive Committee will approve or deny potential changes over their five-year review cycle.⁵⁶ Substantive changes, deletions, or additions to the standards may be adopted only after review by the public, a public hearing, and consideration by the LCME.⁵⁷ Should the LCME decide that the circumstances require revision of a standard, it will act on that change within twelve months.⁵⁸

To increase nutrition education through changes

to LCME standards, amendments could be made to LCME accreditation standard 6, which relates to required clinical experiences, or to standard 7, which relates to curricular content, or to both. For example, LCME could do the following:

- Amend Standard 6.2, “Required Clinical Experiences,” to add the following underlined text:

The faculty of a medical school define the types of patients and clinical conditions that medical students are required to encounter, the skills to be performed by medical students, including utilizing non-pharmacological approaches such as nutrition counseling and education, the appropriate clinical settings for these experiences, and the expected levels of medical student responsibility.⁵⁹

- Amend standard 7.2, which requires that medical schools provide content in the category of “Organ Systems/Life Cycle/Primary Care/Prevention/Wellness/Symptoms/Signs/Differential Diagnosis, Treatment Planning, Impact of Behavioral and Social Factors,” to specifically mention food and nutrition in the first sub-bullet, with the following underlined text:

“Recognize wellness, determinants of health, and opportunities for health promotion and disease prevention, including through diet and nutrition.”⁶⁰

Benefits and challenges: amending LCME accreditation standards

Amending the accreditation standards to explicitly include nutrition would situate nutrition as a core element of UME education and be a bold step by the LCME in recognizing the importance of diet and nutrition training for medical practice. A change in the standards would have a significant and far-reaching impact because all medical schools would have to comply to retain their accreditation. Furthermore, this change would allow LCME accreditors to evaluate nutrition education directly as an independent instructional experience.

A challenge to effecting change through the LCME

process, however, is the broad phrasing of the LCME standards, which does not allow for articulation of a specific course or credit hour requirement needed to provide competency in a topic. Thus, it may be difficult to achieve the end goal of increasing the number of nutrition education hours (for example, to the recommended twenty-five hour minimum) or to ensure the quality of nutrition education just by amending the broadly-worded LCME standards.⁶¹

Medical schools may argue that incorporating an additional curricular requirement imposes a heavy burden, as schools already have time and resource constraints due to other curricular requirements. Changing the curriculum would also require UME programs to invest financial resources, at least in the short term, in order to hire or train faculty in the relevant evidence-based nutrition science.⁶² This is because most medical schools do not have full nutrition departments⁶³ and over two-thirds of medical schools do not have any departments with even a partial focus on nutrition.⁶⁴

2 | Tie government funds for medical schools to nutrition education

In 2018, the 140 accredited U.S. medical schools took in \$137 billion dollars in revenue,⁶⁵ a significant portion of which was received through government funding.⁶⁶ Because the educational and research missions of medical schools do not generate a profit, schools must look to other sources of income, such as government support, clinical practice, and research grants.⁶⁷ Data on medical school funding sources lacks precision. However, estimates indicate that federal grants and contracts provided fourteen percent of medical school revenue in 2017; other grants and contracts, including from state and local governments, provided eight percent of revenue; and government and parent university support combined provided four percent of revenue.⁶⁸

Governments at all levels have a strong incentive to leverage this funding to support nutrition education in medical schools because they generally bear much of the costs associated with diet-related illness. Training medical students in diet and nutrition will ultimately help to reduce these costs in the long term.

Providing new financial resources for this purpose may be challenging, especially when the change requires developing new grants or allocating incentive payments.⁶⁹ However, given the potential for reduced future healthcare expenses, governments may be convinced to provide funding for nutrition education.

There are three main ways that governments could leverage the funding they provide to medical schools to increase education about food and nutrition: first, governments can condition future non-grant funding to schools on the inclusion of certain nutritional coursework and training; second, governments can offer financial incentives to all schools that provide a baseline level of nutrition education; and third, governmental grant programs can provide direct funding for schools to create or improve nutrition education programs.

A | Condition non-grant funding on inclusion of nutrition education

Non-grant financial support from federal and state governments for UME programs is relatively small, contributing only four percent of the overall UME budget;⁷⁰ however, it is still an important source of revenue for medical schools.⁷¹ Government agencies providing non-grant funding could condition funding on the administration of a specific course concerning nutrition or diet-related illnesses or on the provision of a baseline amount of nutrition education, such as the National Research Council's recommended twenty-five hours.⁷²

This approach is not unprecedented; it has been presented in other contexts. For instance, as discussed later in this report, stakeholders have proposed conditioning at least some portion of training hospitals' Medicare funding for residency programs on the attainment of desired educational outcomes and standards.⁷³ A similar approach could be used to condition governmental funding for undergraduate medical school on nutrition-related curricular requirements.

Benefits and challenges: conditioning government funding on inclusion of nutrition education

Conditioning funding on the inclusion of a certain amount of nutrition education is an effective policy lever for governments. This option does not require any additional governmental money; instead, it would simply leverage the existing support to ensure that medical schools would better educate students on ways to prevent and treat the costliest and most prevalent diseases. UME programs will likely comply with reasonable requirements attached to government funding so as to maintain this important revenue source.

The impact of this approach, however, is somewhat limited, as non-grant governmental funding supplies only four percent of revenue for UME programs, far less than governmental funding for GME/residency programs (discussed in more detail below).⁷⁴ In addition, because of the potential for medical schools to lose current and future funding if they do not meet the conditions, this policy option likely would receive the most pushback from UME programs. Resource-constrained schools that rely more heavily on government support would be disproportionately impacted. UME administrators may also balk at the condition and instead solicit additional funds from industry and pharmaceutical companies, whose increased support may impact research and training at these schools in ways that bring unexpected consequences for the greater medical field.⁷⁵

B | Provide incentive payments to medical schools that include nutrition education

Performance-based incentive payments offer another model to encourage and support greater inclusion of nutrition education in medical schools. Under this model, federal or state governments could offer medical schools a small monetary incentive on top of existing funding for complying with certain conditions, such as providing a baseline amount of nutrition education. These supplemental payments to participating medical schools could take the form of increased patient care payments or per capita payments for each student educated. As detailed below, policymakers have previously discussed performance-based incentive payments for nutrition education at the GME stage. The Graduate Medical Education Reform Act of 2012, for example, proposed

enabling hospitals to compete for a percentage of GME funding by showing performance with certain required measures.⁷⁶

This policy approach has also been successfully applied in other contexts. For example, the Healthy, Hunger-Free Kids Act, the 2010 reauthorization of the Child Nutrition Act, created a \$0.06 performance-based increase per lunch for compliance with the new nutrition guidelines for school meal programs.⁷⁷ Given the number of students in the school and the number of days in the school year, this small per-meal increase quickly accumulates into a strong incentive for many schools. USDA reported that ninety-seven percent of schools were certified to receive the incentive payment by the second year of operation.⁷⁸ Unlike placing conditions on all government funding, which may result in non-compliant schools losing an important revenue stream, performance-based incentive payments would reward schools that take strides to implement nutrition education in their programs, without taking away any existing funding from schools.

Benefits and challenges: providing incentive payments to medical schools

Performance-based incentive payments have the potential to reach the broader UME landscape, as any medical school that meets the underlying criteria would be eligible for the benefit. For schools that have the capacity to add nutrition content to their curricula, a small incentive can make a measurable difference in course offerings nationally. Compared to conditional funding approaches, medical schools will likely look more favorably at performance-based incentive payments. Instead of feeling forced to make curricular changes in order to keep longstanding funding sources, schools will have the opportunity to gain a small amount of additional funding if they improve nutrition education, and they will not risk a penalty or loss for failure to do so. Because incentive payments are small, they can also be spread across all participating schools, rather than delivered as a lump sum to just a few schools (as is the case with grants, discussed in more detail below).

Despite the potential benefits of this policy option, the impacts on nutrition education may be limited.

The amount provided to each school is often small, meaning that incentive payments alone may be insufficient to support a complete curriculum overhaul or galvanize schools to launch a comprehensive new curriculum. Furthermore, any new funding program, even the relatively small amount of governmental funding required to pay for the incentive payments, can be a challenging sell, despite the long-term payoff in reduced healthcare costs.

C | Offer grant funding for nutrition education

In addition to non-grant support, federal and state governments support medical education through research grants and scholarships for medical students who apply for these opportunities.⁷⁹ Federal grants and contracts provided fourteen percent of medical school revenue in 2018.⁸⁰ At the federal level, such grants and contracts come from agencies such as the National Institute of Health (NIH), the Food and Drug Administration (FDA), and the Defense Advanced Research Projects Agency (DARPA).⁸¹ These grants help to advance shared goals, such as encouraging more physicians in certain specialties or geographic areas or supporting socioeconomic diversity in medical schools.⁸²

Providing grant funding for nutrition education would be consistent with other funding programs that the federal government uses to achieve its policy goals. The federal government previously provided limited grant funding to nutrition education: for a brief period starting in 1999, the National Heart, Lung, and Blood Institute provided funding to medical schools for nutrition education through its Nutrition Academic Award.⁸³

A recent federal bill, the Expanding Nutrition's Role in Curricula and Healthcare Act (ENRICH Act) offers a model for a grant program that incentivizes schools to develop nutrition courses or programs.⁸⁴ Under the ENRICH Act, the Secretary of Health and Human Services and the Administrator of the Health Resources and Services Administration would offer three-year grants of up to \$500,000 to UME schools that create or expand their nutrition education programs.⁸⁵ Grant decisions would prioritize applications that utilize grant funds for an

integrated nutrition and physical activity curriculum spanning medical school and residency and offering at least twenty-five hours of nutrition education.⁸⁶ The program would authorize up to \$5 million in expenditures per year.⁸⁷

Alternatively, state grants can fund nutrition education in medical schools. During the 2007-2008 academic year, funding from state and local governments amounted to approximately eight percent of medical school revenues in the United States.⁸⁸ Like the federal government, states have used this funding to further specific policy agendas.⁸⁹ For example, in order to encourage palliative care education, New York's Palliative Care Education and Training Act authorized the New York Department of Health to award grants to eligible undergraduate and graduate medical schools that met certain standards set by the Department.⁹⁰ This example demonstrates the potential for states to use grants as an incentive to directly support nutrition education at UME schools.

Benefits and challenges: offering grant funding for nutrition education

Federal and state grant programs offer a viable solution to medical schools interested in providing

nutrition education, particularly those that have cited a lack of funding as an obstacle to more widespread adoption of nutrition education.⁹¹ Developing new courses and changing curriculum requirements can require a significant investment of faculty and staff time. Schools may also need to hire new faculty with expertise in nutrition science or invest in training faculty to ensure that they have the required knowledge and skills to teach these new courses.⁹² Grants can help to defray these costs, enabling medical schools to adapt curricula without having to make major financial investments or divert scarce resources from other areas of their programs. Even short-term grants could help schools to cover the upfront costs necessary to build infrastructure, develop curriculum, train teachers, assess impact, and demonstrate student interest in nutrition education. Although grants may help advance nutrition education at the UME level, the potential impact of this policy approach is limited compared to the other funding options. Unlike incentive payments, which provide a small financial benefit to an unlimited number of medical schools, grants for nutrition education provide a larger amount of funding to only a few schools, which limits the reach of this approach. But, grant recipients may develop programs and curricula that subsequently serve as models for future adoption



by other schools, expanding the potential impact. To facilitate this sharing, governmental agencies providing the grants could require or strongly incentivize the grantees to make the curricular materials developed using the grant funding publicly available. Even in a tight fiscal environment, actors in favor of such grants can make the case that these targeted investments are far less than the much larger costs associated with diet-related diseases that the government will need to pay in the future.

3 | Provide technical assistance and resources to support nutrition-curricula development

Developing and implementing new educational programs can be time-consuming and expensive, but the cost and burden of this work is far less if schools are able to adapt or replicate successful nutrition education programs from other sites. Federal and state governments can play a key role in helping schools to identify and connect with such programs.

Specifically, federal or state government actors can raise awareness about nutrition education, provide encouragement for curriculum expansion, and directly link schools to information about successful programs. Relevant agencies at the federal or state level can offer a clearinghouse that shares information about existing initiatives and curricular offerings. At the federal level, agencies within the U.S. Department of Health and Human Services (HHS), such as the NIH or the Health Resources and Service Administration (HRSA), could compile and share a regularly updated guide on these resources and circulate the best available data on the impact of including diet and nutrition in the medical curriculum.

These activities fall within the scope of these agencies' respective missions; HRSA, for example, is devoted to improving equitable access to healthcare through grant-making and professional training, especially in rural areas.⁹³ Meanwhile, the NIH has already developed a *Nutrition Curriculum Guide for Training Physicians* to capture the efforts of medical nutrition educators from 21 medical schools that received grants for nutrition education under the Nutrition Academic Award Program, though this guide is now nearly twenty years old.⁹⁴

Listed below are examples of successful nutrition education programs that can serve as models or provide guidance to other schools seeking to develop similar programs. Government agencies can help facilitate coordination and replication of these programs, as some may already provide curricula and training materials that can be licensed and used by medical schools or other institutions.

- **Tulane University School of Medicine's Goldring Center for Culinary Medicine** is the first teaching kitchen established at a medical school.⁹⁵ Medical students in all four years may elect to take culinary medicine classes at the center.⁹⁶ The curriculum is available for use by other medical schools or education programs, and more than fifty medical schools and healthcare centers have now licensed the Goldring Center's curriculum.⁹⁷ Several reports have documented the potential contribution to public health of medical students who have learned from the curriculum.⁹⁸
- **The Teaching Kitchen Collaborative** is a joint project of Culinary Institute of America and the Harvard T.H. Chan School of Public Health's Department of Nutrition. The Collaborative is a network of organizations (at medical schools and beyond) that have created or plan to create teaching kitchens.⁹⁹ Members of the Collaborative aim to spread knowledge about their facilities, develop best practices, and create a research network to assess the impact of those best practices.¹⁰⁰ The Collaborative develops toolkits, training materials, recipes, and other resources to assist interested groups in building teaching kitchen facilities across various settings.¹⁰¹
- **The Gaples Institute** is a cardiologist-led nonprofit organization that provides education regarding the powerful role of nutrition and lifestyle changes for prevention of heart disease.¹⁰² The Institute offers an interactive, self-paced clinical nutrition course with over 700 physicians and healthcare professional registrants.¹⁰³ The course includes continuing medical education credit and maintenance of certification by the American Board of Internal Medicine. The Institute also offers nutrition science/hands-on cooking conferences,¹⁰⁴ as

well as free, interactive public-facing nutrition learning activities. These resources are currently geared toward practicing physicians, but could be adapted for use by medical schools.

- **The Lifestyle in Medicine Education Collaborative (LMEd)** aims to provide leadership, guidance, and resources to further the adoption and implementation of lifestyle medicine curricula in medical schools.¹⁰⁵ LMEd provides mentorship and guidance to its members that wish to start or expand lifestyle medicine programs at their respective schools, including programs addressing nutrition.¹⁰⁶ The LMEd website houses both free and fee-based resources, including research, curricula, and e-learning.¹⁰⁷
- **The Nutrition in Medicine (NIM) program**¹⁰⁸ is a free-standing curriculum in therapeutic, preventive, and clinical nutrition, among other topics, available for use in both the pre-clinical and clinical components of medical school.¹⁰⁹ These entirely web-based courses are provided free of charge to medical schools.¹¹⁰ Since 1992, more than 100 medical schools in the United States and 150 medical schools around the world have taken advantage of the NIM curriculum and deployed it in their programs.¹¹¹

There are several strategies for government agencies to facilitate information-sharing and the replication of successful nutrition education programs in medical schools. A federal agency, such as NIH or HRSA, could catalogue nutrition education courses and programs currently available for medical students and analyze the successes and challenges at medical schools where they are implemented. Widely sharing this information would demonstrate the possibilities of teaching nutrition and provide ideas for new schools to enter the field. A catalogue of available curricula could also lower the costs of developing new programs, as institutions could use the catalogue to identify curricula available to license or use the information as a starting point to develop their own programming. Such a resource could also provide a repository of research findings related to the impacts of nutrition education in medical schools.

Alternatively or in addition, NIH or HRSA could identify particular components of nutrition education that are fundamental to core subjects taught at UME schools and provide a list of possible curricular interventions specific to these subjects. Some nutrition topics fit naturally within core subjects already covered in the UME curriculum. For medical schools that do not have the resources to rework their entire curriculum, integrating nutrition topics into existing units would allow them to provide students with nutrition education within existing course structures. For example, lifestyle-related obesity, hypertension, and diabetes information and interventions could be incorporated as nutrition education subjects within cardiovascular and endocrine system instruction.

Benefits and challenges: providing technical assistance and resources to support nutrition-curricula development

Medical schools generally have significant control over their own curricula, and therefore, have the discretion to increase the quantity and quality of nutrition education offered to students. Governmental facilitation in this area could help to lower implementation barriers by making existing resources more readily available so that schools do not need to reinvent the wheel.

Policymakers should not, however, consider this approach to be an end-all solution or a driver of major policy change, as it relies on medical schools' voluntary action without addressing the critical need for mandatory nutrition education at the UME level. It also fails to address the funding obstacles that medical schools face in making curriculum changes and training educators. Relying on medical schools to voluntarily take necessary action without requiring changes or providing funding or incentives could also perpetuate disparities in physician education and thus health disparities in different areas of the country. Medical schools with less resources, such as those in poor and rural settings, may be less likely to pursue curriculum changes that are not mandated or funded. As a result, patients in these communities, who already suffer alarming health disparities, may have less access to physicians with nutrition education and training.

GRADUATE MEDICAL EDUCATION (GME)

As with UME, several different policy interventions can help increase nutrition education during graduate medical education (GME). GME includes residency and fellowship programs. After earning an M.D. or an O.D. (Osteopathic Doctor), physicians start their residency with a one-year internship that they must complete in order to be licensed to practice medicine in the U.S. Most physicians subsequently complete their residency, which, when focused in a particular specialty, renders them eligible for Board-certification in their practice area. Some physicians also complete a fellowship that provides additional specialized training. Since GME is a necessary component of all physicians' licensing, requiring nutrition-based training during this stage would guarantee that all physicians receive some level of nutrition education.

Even if physicians receive some basic nutrition education during medical school, this education may not effectively prepare physicians to apply this information in a clinical setting.

Medical students gain some clinical training during UME; however, GME remains the primary setting of clinical exposure for physicians during training. Implementing nutrition education during GME will allow physicians to receive tailored nutrition information that is relevant to their practice area, enabling them to integrate this knowledge into their practice more seamlessly. As GME students learn material in the context of their clinical work, they are more likely to retain the information because they will better understand how nutrition affects their specific patient population and how to counsel those patients accordingly. Policy options for including nutrition education in GME are discussed below.

RECOMMENDATIONS

1 | Amend the American Council of Graduate Medical Education accreditation standards to require nutrition education

GME residency and fellowship programs must secure accreditation from the American Council of Graduate Medical Education (ACGME) in order to educate residents and fellows.¹¹² To receive ACGME accreditation, a GME program must demonstrate compliance with the ACGME Common Program Requirements through a voluntary evaluation and review process. The Program Requirements are basic standards required of all residency and fellowship programs to ensure adequate training and preparation of physicians.¹¹³ Each residency and fellowship program must also follow ACGME's specialty-specific requirements.¹¹⁴

The Common Program Requirements and specialty-specific requirements generally do not require training or competency in nutrition, even for practice areas with a focus on prevention. In the lengthy and comprehensive document enumerating competency requirements for a Pediatrics residency program, for example, there is no mention of "food," "diet," or "nutrition," in the context of competencies for patient health; strangely, "food" and "diet" are referenced but only in the context of the residents' own well-being and health.¹¹⁵ Similarly, the ACGME does not reference nutrition in the program requirements for residents in Internal Medicine,¹¹⁶ nor for specialty training in Cardiovascular Disease.¹¹⁷



During the 2017–2018 academic year, approximately 830 institutions with ACGME accreditation hosted about 11,200 residency and fellowship programs in more than 180 specialties and subspecialties.¹¹⁸ These programs educated 135,000 medical residents and fellows.¹¹⁹ Amending the common program or specialty-specific requirements to require nutrition education would have far-reaching effects, impacting the training of thousands of residents and fellows and empowering them to serve as more effective tools for prevention and patient resources.

There are two avenues through which ACGME requirements can be amended in order to include required competency in nutrition.

Amend ACGME Common Program Requirements.

The ACGME could amend the Common Program Requirements to include training in diet, nutrition, and lifestyle interventions using non-pharmacological solutions. The ACGME regularly reviews and updates its requirements to ensure that they reflect the most up-to-date evidence about patient safety, competency development, and supervision of residents and fellows.¹²⁰ After deciding to make an update, the ACGME will accept public comments during a forty-five-day window.¹²¹

In 2017, the ACGME revised Section VI of the Common Program Requirements, which addresses patient safety, resident professionalism and well-being, and the clinical team dynamic.¹²² This revision prioritized institutions' flexibility in designing their programs while still promoting the professional development of residents and fellows.¹²³ Among other changes, these revised standards require programs to “strengthen expectations around team-based care,”¹²⁴ which could signal an opportunity for nutrition counseling to be more widely available to patients, if provider teams include dietitians in addition to physicians, nurse practitioners, and physician assistants. In 2018, ACGME amended Sections I-V of the Common Program Requirements to include different common requirements for residency and fellowship programs for the first time, acknowledging the distinctions in specialty and subspecialty training.¹²⁵ However, neither the residency nor fellowship Common Program Requirements include any mention of “food,” “diet,” or “nutrition” in the context of advising or treating patients.¹²⁶

In future revisions, ACGME could amend the Common Program Requirements to highlight the importance of nutrition science and competency in patient counseling on food choices and interventions. The ACGME requirements prioritize institutions' discretion in creating their programs and utilize broad competency areas; thus, any proposed changes should match the tone of the existing requirements. Amending these requirements could have broad consequences for the medical profession because it would impact the 135,000 residents and fellows participating in ACGME-accredited programs.¹²⁷

The following amendments could be made to require instruction in nutrition and nutritional counseling (proposed language additions are underlined):

- **IV.B.1.b).(1)** Could be revised to read: “Residents (Fellows) must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health, including nutrition and lifestyle counseling relevant to practice.”
- **IV.B.1.c)** Could be revised to read: “Residents (Fellows) must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, social-behavioral, and nutrition and lifestyle sciences, as well as the application of this knowledge to patient care.”
- **IV.C** Could be amended to insert an additional requirement: “The curriculum structure must include didactic instruction and clinical training in nutrition and lifestyle assessment and interventions appropriate to practice.”

Amend ACGME Specialty Requirements.

In addition to amending the Common Program Requirements, ACGME could revise requirements for particular specialties and subspecialties.¹²⁸ The Program Requirements for each specialty and subspecialty are reviewed every ten years, in accordance with a schedule listed on the ACGME website.¹²⁹ After reviewing comments from interested parties, the Review Committee presents its recommendations to the ACGME Board for final action.¹³⁰ Revisions to ACGME's specialty and subspecialty requirements could incorporate instruction in nutrition science and counseling specific to a specialty's patients and practice. Such revisions

would be especially beneficial for specialties that address general prevention and population health as well as for those that relate to treatment of diseases that are particularly impacted by nutrition, such as Pediatrics, Family Medicine, Preventive Medicine, Internal Medicine, Cardiovascular Disease, Oncology, Endocrinology, and others.

Benefits and challenges: amending ACGME accreditation standards to require nutrition education

Amending ACGME standards presents an opportunity to widely advance physician competency in diet and nutrition health. Revising the Common Program Requirements to require nutrition education training in all GME programs, in particular, would guarantee nutrition education for all 135,000 residents and fellows participating in ACGME-accredited programs. A potential limitation to this approach, however, is the broad language that ACGME employs to enumerate the required competencies.¹³¹ The Common Program Requirements generally do not mention specific subjects that GME programs must teach or that residents or fellows must study. For example, the Common Program Requirements broadly require that residents “demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care.”¹³²

Including nutrition requirements consistent within the ACGME’s style would likely warrant the use of relatively broad language rather than specific, tailored text. Generally recognizing nutrition as a requirement would serve as an acknowledgement from ACGME that diet and nutrition education is critical to GME, but may not result in measurable or sufficient changes to physician training.

In contrast, including specific nutrition-focused required competencies in specialty and subspecialty requirements might prove more effective in changing physician training. Unfortunately, these revisions will take longer to shape the GME landscape because each residency program is reviewed only once every ten years. The revisions are also limited to the specific specialty and to participating residents and fellows.

2 | Tie government funds for GME programs to nutrition education

The federal government provides a tremendous amount of support to hospitals that train residents. In fact, training hospitals that support GME residents rely almost exclusively on federal funds.¹³³ In 2015, the federal government spent \$14.5 billion through five programs to fund GME training for physicians.¹³⁴ This funding comes primarily through the Medicare program, which accounted for \$10.3 billion in funding for GME in FY2015.¹³⁵ Additional federal funding comes through the Veterans Administration (VA), the Department of Defense (DOD), and HRSA.¹³⁶ GME programs also receive \$5.8 billion from Medicaid in the forty-two states (and the District of Columbia) that have decided to allocate some of their Medicaid funds to graduate medical education.¹³⁷ Government grants provide a further source of GME funding.¹³⁸

This financial support, especially from the Medicare program, is essential for residency programs. New York teaching hospitals, for example, note that they receive about \$2 billion annually from Medicare payments.¹³⁹ The Medicare subsidy to residency programs is divided into two parts: Direct Medical Education (DME) and Indirect Medical Education (IME).¹⁴⁰ DME covers the direct costs of training new doctors, including salaries, benefits, and teaching.¹⁴¹ IME covers the indirect efficiency and agency costs to hospitals associated with maintaining trainees instead of fully independent physicians—for instance, IME covers the time spent when a physician educator instructs a trainee through a task or delegates tasks to a trainee and has to subsequently review the trainee’s performance and correct errors.¹⁴²

Because GME is largely supported by government funding, tying that funding to nutrition education can be a powerful driver for change. Requiring education about nutrition in order to receive such an important funding source will motivate curricular change and ensure that more physicians understand the importance of diet and nutrition to overall health. From a governmental perspective, using funding to train and empower doctors to better treat and prevent diet-related diseases is a sound investment that will pay off in lower healthcare costs.

This is an especially strong lever for change in the context of Medicare, which provides the lion's share of GME funding. The Medicare program also serves as the ultimate insurer for many Americans suffering from diseases related to or caused by diet. According to a recent study, even a very modest shift in American diets at the population level could save between \$16.7 and \$31.5 billion in healthcare costs.¹⁴³ A moderate investment in relevant education that can result in

large savings due to improved diet and thus better health outcomes will be money well spent. As is the case for UME, finding additional resources for incentive payments and grants may be challenging at both the federal and state levels.¹⁴⁴ However, because governments are bearing much of the rising costs of diet-related diseases, the investment up front to reduce healthcare costs in the long term can provide a strong justification for new spending.



Medicare is the largest single purchaser of healthcare in the United States.¹⁴⁵ Of the \$2.6 trillion spent on personal healthcare in 2014, Medicare accounted for \$580 billion, or twenty-three percent.¹⁴⁶ Medicare spending is increasing rapidly, rising from \$337 billion in 2005¹⁴⁷ to an estimated \$704 billion in 2018¹⁴⁸ as the program insures more Americans who are expected to live longer.¹⁴⁹ Following this trajectory, Medicare spending is expected to reach \$1 trillion by 2020.¹⁵⁰

As the prevalence of diet-related diseases increase, so do Medicare costs. This is because Medicare funds the care of the majority of elderly Americans.¹⁵¹ In 2015, more than fifty-five million Americans were enrolled in Medicare,¹⁵² the majority of whom were aged sixty-five and over or were living with disabilities. In 2014, five of the eight most common conditions suffered by beneficiaries were diet-related diseases, including: vascular disease (16.4%), diabetes with chronic complications (14.4%), diabetes without complications (13.2%), congestive heart failure (11.1%), and morbid obesity (5.8%).¹⁵³ These percentages are going up; for instance, the number of Medicare-eligible adults who are suffering from obesity is expected to rise from 40.2 million in 2010 to 88.5 million by 2050.¹⁵⁴ Diet-related diseases correlate with other medical conditions and with greater use of healthcare services in general.¹⁵⁵

Medicare costs are disproportionately impacted by the costs associated with diet-related diseases. Diabetes, for example, is one of the costliest diseases, both to Medicare and to the greater healthcare system. The total costs of diagnosed diabetes reached \$327 billion in 2017,¹⁵⁶ and an estimated one-third of Medicare's budgeted costs for its beneficiaries are directed towards patients with diabetes.¹⁵⁷

In addition, all Americans suffering from end stage renal disease (ESRD) are eligible for Medicare coverage.¹⁵⁸ Diabetes and hypertension, both of which are heavily

correlated with diet, are the leading causes of ESRD.¹⁵⁹ Although patients with ESRD make up only 0.8% of Medicare beneficiaries, they utilize 6.5% of Medicare expenditures.¹⁶⁰ The per-year costs of insuring ESRD patients is, on average, more than six times the cost of insuring other categories of Medicare patients.¹⁶¹ Diabetes and ESRD costs provide just two salient examples of how diet is leading to a costly disease burden borne by Medicare.

While so many Medicare patients are suffering from diet-related diseases, Medicare is simultaneously providing the largest source of federal funding for GME—\$10.3 billion in 2015.¹⁶² In other words, Medicare is bearing both the costs of diet-related diseases and of the GME programs that have the potential to train doctors in diet and nutrition so that they may help patients prevent and treat those diseases. Medicare funding for GME is therefore a uniquely powerful lever that should be utilized to drive curricular changes and thus proactively reduce the prevalence and costs of diet-related diseases before they materialize.¹⁶³

The government's financial investment in GME indicates its commitment to ensuring that the U.S. has a steady supply of well-trained physicians to meet the nation's needs.¹⁶⁴

Because the government has invested so heavily in this portion of medical education, policymakers and legislators may be responsive to proposals for altering the funding structure to improve physicians' curriculum so that doctors are prepared to treat today's most pressing health issues. This improvement requires integrating fundamental skills and disciplines, including nutrition science and counseling.

Congress should use Medicare GME funding, in particular, to encourage or require integration of nutrition education into GME programs in order to ultimately reduce costs borne by Medicare. Congress could accomplish this by making Medicare funding for GME conditional on providing nutrition education or by offering incentive payments or grants tied to specific nutrition content within the Medicare funding framework for GME.

As in the UME context, there are three main ways that governments could tie GME funding to nutrition education content. First, government funders can condition the existing funding GME programs receive on those programs providing certain nutrition content. This approach could focus on funding from Medicare at the federal level and from Medicaid at the state level. Second, governments can offer financial incentives to all GME programs that provide a specified level of nutrition education. Finally, government grant programs can provide funding for GME programs to create or improve nutrition education content.

A | Condition Medicare, Medicaid, and other funding on inclusion of nutrition education

GME programs rely on several types of government support; changes to the requirements or conditions imposed for this support could be effective in pushing GME programs to incorporate nutrition education. This section focuses on two main sources of funding: federal funding through Medicare and other federal programs and state funding through Medicaid.

i | Federal funding through Medicare and other programs

The federal government invests in health by providing funding for GME. As noted above, the lion's share of funding for GME programs comes from the Medicare program.¹⁶⁵ Medicare funding for GME currently does not have any strings attached and does not impose any requirements on the recipient schools or training hospitals. Congress can condition existing GME funding through Medicare on the provision of a certain level of nutrition education in curricula. This would mean withholding federal funds unless recipient residency programs provide a baseline number of lecture hours or clinical training components devoted to nutrition and disease prevention across the curriculum. As noted above, Medicare funding to residency programs comes through both IME and DME payments; this condition could apply to only IME payments, only DME payments, or to both. Changes to requirements for Medicare GME funding is the strongest lever for change because it is the largest pot of funds that the federal government uses to

support GME.

Additional federal funding for GME comes from the VA, the DOD, and HRSA.¹⁶⁶ These funds could also be leveraged to ensure nutrition education is provided as a requirement for residency programs to receive ongoing funding. For example, the Veteran's Health Administration (VHA), which operates one of the nation's largest integrated health care delivery systems, distributed \$816 million in funding to VHA medical centers in FY2012 for indirect costs of training physicians.¹⁶⁷ As with Medicare, using these funds to require nutrition training for physicians may ultimately help save VHA care for veterans in the long-term; in 2017, the VHA spent \$69 billion to support the health of 9.1 million enrollees and 6 million veteran patients.¹⁶⁸ Funding for the VHA's GME support comes from the agency's annual appropriations;¹⁶⁹ VHA does not receive any Medicare funding by law.¹⁷⁰ Conditioning GME funding on the implementation of nutrition education in VHA hospitals is another potential way to drive change in the training of residents and save long-term healthcare costs that can be accomplished either instead of or in combination with changes to Medicare funding for GME.

Benefits and challenges: conditioning Medicare and other federal funding on inclusion of nutrition education

Because GME programs rely so heavily on federal funding, they will be responsive to conditions attached to these sources. Consequently, conditioning federal funding for GME on nutrition education would be quite effective and impactful; GME programs would need to comply in order to maintain their funding. Increasing nutrition education in GME programs also offers an attractive policy solution for the federal government, as it has the potential to reduce Medicare's overall costs of insuring its patients by lowering the incidence of diet-related diseases, reducing the associated healthcare utilization, and generally improving the health of the Medicare population. A similar overall cost reduction could occur in other federal health programs.

Although conditioning Medicare funding of GME on integration of nutrition education could provide a

powerful incentive, medical centers may perceive it as unnecessarily coercive and harmful efforts to ensure there are enough doctors being trained in the U.S. because such a significant portion of GME financing comes from Medicare.¹⁷¹ The added conditions would be particularly jarring to GME programs, as obtaining Medicare funding currently involves compliance with few restrictions. Thus, while the idea of restricting Medicare funding in order to orient it towards advancing national health priorities is gaining momentum,¹⁷² this strategy would pose a major change to the current model. Creating performance-based incentive payments could serve as an interim, less drastic measure. This possibility is discussed in more detail below.

ii | State funding through Medicaid

The second-largest source of funding for GME programs after Medicare is Medicaid.¹⁷³ Although the federal government imposes some requirements on how states use their Medicaid funds, it does not require states to support GME programs with Medicaid dollars.¹⁷⁴ Nevertheless, in 2018, forty-two states and the District of Columbia allocated a portion of their Medicaid funds to GME.¹⁷⁵ State support for GME programs through Medicaid has been increasing, reaching a total of \$5.58 billion in 2018, nearly a fifty percent increase since 2009.¹⁷⁶ Nevertheless, the continuation of this support is subject to states' fiscal limitations. In 2018, one state discontinued all GME payments made under managed care,¹⁷⁷ and two states reported that they had recently considered stopping Medicaid GME payments due to budget shortfalls and cost control needs.¹⁷⁸ Four states also reported GME payments that were fifteen percent lower than those reported in 2015.¹⁷⁹

Despite these trends, Medicaid funding of GME remains substantial; as with Medicare and VHA funding, any conditioning of Medicaid funding on the provision of nutrition education would have a notable impact on GME curricula. Either the federal government or individual state governments could use Medicaid funding of GME as a lever to incorporate nutrition education into GME programs.

Several options exist to incorporate requirements for nutrition education as a condition of receiving GME

funding from Medicaid. The first option is to require under federal law that any Medicaid dollars spent on GME programs would be conditioned on those programs offering nutrition education. Congress could recommend or require that individual states condition Medicaid's funding of GME programs on the adoption of nutrition education in coursework or clinical training. State Medicaid programs must meet minimum standards under federal law for the use of their Medicaid funds. Although Congress does not currently require state Medicaid programs to fund GME,¹⁸⁰ it could instruct states to meet certain requirements for the use of those funds. Alternatively, the Centers for Medicare and Medicaid Services (CMS), which administers the Medicaid program, could consider restricting the use of Medicaid funds for GME programs to only support those programs that offer a qualifying amount of nutrition education.

Another option is to change policies at the state level to condition Medicaid funding on nutrition education in those states. Especially in those states that educate the most residents and fellows, such a change could have a significant impact on the overall physician population. For example, more medical residents are educated in New York than in any other state, and many of these residents go on to practice outside New York.¹⁸¹ New York also provides a substantial amount of governmental funding to GME, primarily through Medicaid;¹⁸² in 2018, \$1.69 billion of New York Medicaid dollars funded GME programs.¹⁸³ If New York decided to tie all or a portion of its Medicaid funding to a certain level of nutrition education, the change would have a disproportionately broad impact on public health.

Benefits and challenges: conditioning Medicaid funding on inclusion of nutrition education

Although Medicaid funding of GME programs varies depending on the state, Medicaid continues to be an important source of support for physician training in most states.¹⁸⁴ Because state Medicaid funds often make up a sizable portion of GME programs' finances, conditioning this funding on the implementation of nutrition education could induce GME programs to make these changes in their curricula. Compared to Medicare funding for GME, however, Medicaid funding is much more variable and generally provides far less

support. As a result, conditioning Medicaid funding in order to support changes to the GME curriculum may have limited impact.

Since conditioning Medicaid funding for GME could be done at the state level, instead of only at the federal level, this approach could provide an opportunity for state action and experimentation in the absence of a federal change. It also offers states an avenue for increasing nutrition knowledge among physicians treating local populations, regardless of whether the federal government adopts similar action.

B | Provide incentive payments to GME programs that include nutrition education

As an alternative to conditioning Medicare or Medicaid payments on providing nutrition education, federal or state governments could provide additional performance-based incentive payments for GME programs that offer such training. Government agencies could add a small bump to GME programs' current Medicare or Medicaid payment levels if programs include a baseline amount of nutrition education in their curricula. As explained in the UME section, incentive payments are smaller than grants (discussed below) but are made to any qualifying programs to encourage broad-based adoption.

In the Medicare context, Congress could create a performance-based incentive payment to allocate additional funding to each residency program that includes a certain amount of nutrition education into its programming. State governments could implement similar programs for Medicaid funds. These policies can preserve current GME funding levels and provide additional GME funding for training hospitals willing to add a certain competency level or number of hours of nutrition education into their curricula. This increased funding could be implemented as a flat amount per school in compliance, or scaled to match the size of the residency program, measured by the number of residents. The payments could be small, but they would need to be large enough in aggregate to elicit a response from GME programs.

This could be achieved by allocating additional funding to Medicare GME payments. Many medical

training programs have called for an increase in the number of Medicare-supported residency slots in order to ensure more doctors are trained each year.¹⁸⁵ If more Medicare funds go to support GME, this new funding could take the form of performance-based incentive payments for including nutrition-related training.

Another option is for the federal government to turn a small portion of the current Medicare GME payments into a performance-based incentive. The Graduate Medical Education Reform Act of 2012 proposed reducing Medicare GME funding to each training hospital by three percent, and then enabling the hospitals to compete for this portion of GME funding by meeting certain performance measures.¹⁸⁶ In that bill, the performance measures were not related to nutritional education, but the model could be used in this way. Using a portion of current funding as a performance-based incentive payment offers a hybrid model of the conditional funding and performance-based incentives, and presents several benefits: first, it would not increase the overall Medicare GME funding required to incentivize the inclusion of nutrition education; second, while it would reduce by some portion the Medicare funds schools currently receive, the approach would not involve the bulk of current Medicare GME funding, and thus would not come across to GME programs as potentially jeopardizing an entire essential funding source.

Benefits and challenges: providing incentive payments to GME programs

Although performance-based incentives may require increased funding in the corresponding Medicare and Medicaid programs depending how they are structured, this increase will likely be offset by long-term healthcare savings. Unless the funding comes from a portion of current Medicare or Medicaid GME funding, providing new performance-based incentives would cost more than adding conditions to current funding sources, but the approach would be less coercive. Research is needed to identify the optimal level of incentive that would elicit a response from GME programs, as states have attempted to utilize Medicaid GME incentive funding to attain other educational objectives in the past with limited success.¹⁸⁷

C | Offer grant funding for nutrition education

Grant funding for programs to provide nutrition education can spur investment in curriculum and training of teachers at GME programs. Congress or state legislatures may want to invest in grant programs directed at increasing nutrition education in GME because of the potential to reduce the incidence and high costs of diet-related diseases. Unlike a performance-based incentive or a condition on current funding, grants would infuse into fewer schools a larger amount of money, thus supporting education at those few schools, while helping to create models for nutrition education that other programs could emulate.

Several HRSA grant programs offer guidance for developing a GME nutrition education program at the federal level. These grants are funded through a combination of annual discretionary appropriations, mandatory funding through the Affordable Care Act, Program Evaluation Set-Aside Funds through the Public Health Service, and user fees.¹⁸⁸ The following approaches offer models that federal government could use to adapt existing or create new programs to support GME nutrition education.

- **Model a nutrition education grant on the Teaching Health Centers Graduate Medical Education grant program.**

The Teaching Health Centers Graduate Medical Education (THCGME) grant program provides funding to non-hospital sites for residency training offering new or expanded residencies in the primary care practices.¹⁸⁹ THCGME works to ensure that the supply of primary care physicians meets expected demand by placing residents in underserved areas where family physicians are needed.¹⁹⁰ The THCGME grant program could serve as a model for a GME grant program that would fund nutrition education.

- **Tailor or replicate the Preventive Medicine Residency Program.**

HRSA's Preventive Medicine Residency Program¹⁹¹ awards grant funding to residency programs that support preventive medicine

residency in order to increase the number of physicians and residents trained in preventive care.¹⁹² Nutrition education and training is relevant to preventive medicine because it concentrates on disease prevention, population health management, and health promotion.¹⁹³ With funding from this grant program in 2014, Meharry Medical College in Tennessee provided nutrition training not only to medical students, residents, and fellows, but also to undergraduate college students, physicians, and non-physicians, as part of a collaboration with U.S. Department of Agriculture.¹⁹⁴ HRSA's Preventive Medicine Residency Program could either be tailored to include nutrition by offering bonus points to those grant applicants proposing to incorporate nutrition education or could serve as a model for the administration to implement a separate GME nutrition education grant program. However, the Preventive Medicine Residency Program is at risk because it is subject to annual appropriation; the President did not request funding for the program in his 2018 or 2019 budget proposals,¹⁹⁵ and HRSA sought to defund the program for fiscal year 2020.¹⁹⁶

- **Use the Maternal Child Health Nutrition Training Program to model a program for physicians.**

HRSA's Maternal and Child Health Nutrition Training Program aims to improve maternal and child health by promoting the healthy nutrition of the entire family.¹⁹⁷ Grants are awarded to nutrition graduate programs pledging to develop and improve nutrition training for nutrition professionals with focuses on population health promotion and management.¹⁹⁸ This program for nutrition professionals¹⁹⁹ could act as a model for a similar grant program for physicians aimed towards increasing nutrition training in residencies and fellowships.

- **Model a nutrition education program on the Title VII Health Professions Programs.**

The Title VII Health Professions Programs, administered by HRSA, supports the diversity, distribution, and supply of health professionals

and especially primary care physicians.²⁰⁰ As part of the Primary Care Training Programs, HRSA may distribute grants to a variety of institutions, such as medical schools and hospitals that provide primary care training through residencies and fellowships.²⁰¹ Although not related to nutrition education, the Title VII Health Professions Program offers a model that provides HRSA grant funding to medical schools and GME programs that increase primary care training. A similar approach could be used to provide funding to programs that would increase training in nutrition and diet. Funding for the Title VII Health Professions Program was authorized through 2014 under the Affordable Care Act and has since expired.²⁰²

- **Create a program modeled on the 2019 Opioid Workforce Act.**

A 2019 bipartisan bill would add 1,000 Medicare-supported graduate medical education positions over five years in hospitals that have or are establishing residency programs in addiction medicine, addiction psychiatry or pain management.²⁰³ This bill responds to the opioid crisis by aiming to prepare future generations of healthcare professionals to be able to combat the opioid epidemic.²⁰⁴ A similar grant model could be proposed to combat the equally dire healthcare crisis in the U.S posed by the rising costs of diet-related diseases.

As evidenced by this list, Congress has a long history of creating grant programs to support medical training and residencies in certain specialties and fields of public concern. To encourage nutrition education in GME, Congress could develop a new grant program similar to the model programs noted above or it could add nutrition education to an existing program, such as the Preventive Medicine Residency

Program, provided that the program receives future appropriations. Adding dedicated nutrition education funding to an existing HRSA program or using a past HRSA grant as a template can reduce administrative costs and may be more likely to gain support among legislators, the graduate medical community, and other stakeholders because such programs have already proven successful in achieving desired educational outcomes. Alternatively, Congress could create a new grant program just for nutrition education in GME programs. To do so, it could introduce legislation similar to the ENRICH Act, as previously described, and propose grants for nutrition education in GME programs instead of or in addition to UME programs.

Benefits and challenges: offering grant funding for nutrition education

Although it may be difficult to convince Congress or state legislatures to invest in new grant programs, such programs offer a less contentious approach to including nutrition education in GME programs than placing conditions on current funding. GME programs may resist attempts to condition funding on new requirements, as such conditions would restrict their funding unless or until they comply with the restrictions. In contrast, grant programs provide the extra funding that is needed to create a new education component.

Unfortunately, as previously noted, any increased government spending is often viewed with suspicion. Similarly, grant programs that are funded are always at risk of being eliminated. This trend is evident with respect to HRSA's grant funding. Grants will also only impact the programs that receive them because they can reach only a few GME programs and will not necessarily achieve systemic national change.



STEP AND BOARD EXAMINATIONS

Medical schools are motivated to prepare their students to succeed on standardized examinations; these examinations can therefore serve as important vehicles to drive curricular change. Residency programs rely heavily on students' scores on standardized exams when making admissions decisions.²⁰⁵ Because prospective medical students often evaluate UME programs based on the prestige of their students' residencies, medical schools are motivated to improve their students' exam scores and subsequent residency placement to attract students.²⁰⁶ Consequently, medical schools are incentivized to "teach to the test."²⁰⁷ Incorporating test questions about nutrition knowledge and competency could prompt both UME and GME programs to change their curricula to include more coverage of nutrition science and behavioral counseling.²⁰⁸

The National Board of Medical Examiners (NBME) and the Federation of State Medical Boards (FSMB) sponsor the three medical licensing exams—Step 1, Step 2, and Step 3—that make up the United States Medical Licensing Examination (USMLE) for prospective physicians.²⁰⁹ Step 1 and 2 occur during UME and Step 3 occurs after the internship year. The three tests have slightly different goals: Step 1 assesses understanding and application of science concepts to medicine; Step 2 evaluates application of medical knowledge to patient care in a supervised setting; and Step 3 tests application of medical knowledge to patient care in an unsupervised setting.²¹⁰ In addition to the Step tests, most physicians opt to take a specialty-specific Board exam after they complete residency so that they can become Board-certified.

RECOMMENDATIONS

1 | Incorporate nutrition-focused content on medical step exams

Medical students must pass all three Step exams in order to continue with their medical education. Nutrition is relevant in all three of the exams, as physicians must be able to identify and understand when nutrition and diet behaviors are of heightened consequence to their patients' health and to counsel their patients accordingly. A study of the preparation materials for the three exams, published in 2015, found that NBME has included some questions related to nutrition.²¹¹ In general, however, nutrition is mentioned only to assess students' capabilities in recognizing vitamin and micronutrient deficiencies²¹² and not in the context of general prevention and healthy diet. More importantly, obesity prevention and treatment concepts also are not represented in the Step examinations.²¹³

Although the exams include a few nutrition references, the references are limited in their scope, as they do not relate nutrition to chronic diseases and disease prevention.²¹⁴ In Step 1, the nutrition-related questions tested students' ability to diagnose a disease, and in Steps 2 and 3, questions tested students' abilities to relate nutrition to disease treatment.²¹⁵ The limited scope of assessment is inadequate to evaluate students' capabilities to advise patients on good nutrition²¹⁶ or motivate schools to provide curricular focus on this important topic. Because practitioners must pass all three assessments to be licensed,²¹⁷ these examinations present opportunities to shape the learning of all medical students.

Step 1 Examinations

Students typically sit for Step 1 examinations at the end of their second year of medical school. The Step 1 examination comprises seven sixty-minute sections of multiple-choice questions and is conducted over the course of one day.²¹⁸ USMLE preparation materials list nutrition as one of the interdisciplinary topics covered on the exam.²¹⁹ Step 1 usually assesses nutrition with an emphasis on micronutrient deficiencies treated by

vitamin supplements, but does not include questions that relate to food or diseases that result from poor diet choices.²²⁰

To more fully address nutrition in Step 1, assessments could include questions pertaining to nutrition in the context of preventive medicine or chronic diseases associated with diet and lifestyle.²²¹ Questions might assess students' ability to determine risk factors associated with food groups, caloric intake, or lifestyle behaviors among a target population.

Step 2 Examinations

Step 2 is taken after students' fourth year of medical school and consists of two sections, one written and the other in a clinical setting.²²² The first section, Clinical Knowledge, is a multiple-choice exam administered over one day that is meant to assess students' clinical science knowledge of certain organ systems, diagnosis, disease prevention, and health maintenance.²²³ The second section, Clinical Skills, was added in 2005 and requires students to examine twelve "standardized" actor-patients and issue them a proper diagnosis within ten minutes.²²⁴

To increase testing of nutrition in Step 2, NBME could incorporate more nutrition-related questions into the preventive medicine section of the Clinical Knowledge test. The standardized patients in the Clinical Skills portion of the examination could also present symptoms of nutrition-related chronic diseases, and the diagnosis could require students to identify the proper way to counsel patients on nutrition issues as a part of disease management.

Step 3 Examinations

Students take Step 3 examinations following their intern year. Step 3 aims to assess whether students can apply medical knowledge and understanding for the unsupervised practice of medicine.²²⁵ The test cases reflect clinical situations that a general physician could possibly encounter in a specific setting.²²⁶ Step 3 is administered over two days. The first day, Foundations of Clinical Practice, contains multiple-choice questions and assesses knowledge of basic medical and scientific principles essential for effective health care.²²⁷ The second day, Advanced Clinical Medicine, involves both multiple-choice testing and computer-based case simulations

(CCS) and assesses the ability of students to apply knowledge of health and disease to address patient management and the evolving manifestation of disease over time.²²⁸

Nutrition-related questions could be included in various portions of Step 3 testing. Test makers could add more questions regarding nutrition and nutrition-related disease in the multiple-choice questions, along with an assessment of beneficial disease-specific nutritional interventions. The case simulations also could contain more patient responses with respect to dietary patterns and diet-related diseases.

Benefits and challenges: incorporating nutrition-focused content on medical step exams

GME and UME programs often modify their curricula to ensure that students are adequately prepared for the Step exams. These programs are more likely to include nutrition education in the curricula if the exams comprehensively test this knowledge. However, adding only a few nutrition-focused questions may be insufficient to trigger medical school curricular change. The medical school curriculum is already very crowded and there are many other topics that are required for accreditation or are also tested on the standardized exams. Testing nutrition topics without implementing other curricular changes may not improve physicians' general knowledge of nutrition or their ability to counsel patients in those issues, especially if questions are primarily focused on micronutrient deficiencies and do not concern general health and the general between diet and disease.

2 | Incorporate nutrition-focused content on medical board exams

After completing residency, most physicians opt to take a specialty-specific Board exam so that they can become Board-certified. Board exams, which vary between specialties, also drive curricular and training content so that physicians will be prepared for the relevant content on their Board exam. Featuring nutrition as a more prominent category in the Board exams would also motivate medical schools and especially residency programs to increase the amount of time they devote to the topic and, consequently,

improve students' knowledge of nutrition and perception of its importance.

A physician can earn Board certification in a specialty by undergoing a voluntary testing and evaluation process after completing their residency.²²⁹ The American Board of Medical Specialties (ABMS) partners with member boards to set professional and certification standards for specialty medical practice.²³⁰ The member boards, which are made up of specialists in their given fields, administer the specialty board exams and other components of board certification.²³¹ For example, the American Board of Internal Medicine (ABIM) has twenty committees devoted to writing the board certification exams for different subspecialties, including internal medicine, cardiovascular disease, and geriatric medicine.²³² These exams often have associated “blueprints” or “tables of specifications” which identify the questions and topics that are tested on the exam.²³³ The exam committees annually review the blueprints and update them as needed.²³⁴

The exam blueprints help identify those topics that are most heavily tested and are therefore a higher priority for test-takers to learn. As with the Step exams, nutrition is generally tested to a lesser degree than other topics in the Board exams. For example, the 2018 blueprint for the Internal Medicine Certification Examination contains two groupings: primary medical content categories and cross-content categories.²³⁵ Whereas every question falls into one of the primary medical content categories, cross-content categories are not as comprehensively represented on the exam.²³⁶ Nutrition is currently classified as a cross-content category,²³⁷ meaning that it receives less coverage. One way to increase nutrition content is for

ABIM or other Boards to include nutrition as a primary content category in their exams. Another way is to increase the number of questions asked on nutrition. Increasing testing on nutrition and flagging this on the exam blueprints could help to drive curricular change or at least motivate students to call for additional training in this area.

Benefits and challenges: incorporating nutrition-focused content on medical board exams

As in the Step exam context, GME programs have a strong incentive to ensure that students are adequately prepared for the board exam and will modify their curricula accordingly. Including nutrition content on board exams will also require practicing physicians who have likely interacted with patients affected by nutrition and diet-related diseases to demonstrate competence in this field.

However, achieving inclusion of nutrition-related questions on board examinations may be time-consuming and resource-intensive. Many different committees and experts administer and develop these exams, and the exams differ from specialty to specialty, meaning that adding questions to board exams will have to proceed specialty-by-specialty. Developing questions also takes substantial time because questions must be carefully framed to address the most up-to-date science and to fairly test competency. Thus, while addition of nutrition content on these examinations would certainly help to show the importance of nutrition topics to the medical community, a singular focus on addition of test questions may not be the most efficient strategy for increasing nutrition education.



CONTINUING MEDICAL EDUCATION

Continuing Medical Education (CME) is a critical part of physician education. Individual states set their own requirements for CME, usually through state Boards of Medicine.²³⁸ The annual CME requirements depend on the state, but the average number of CME hours required per year is between twenty and twenty-five hours. Requirements range from zero hours in Montana to fifty in Washington.²³⁹ Thirty-seven states require physicians to receive CME training in specific topic areas, including opioid prescriptions, end-of-life care, child abuse, and infectious diseases.²⁴⁰ Integrating nutrition education into state CME requirements can ensure that all practicing doctors receive at least a foundation in nutrition and that they stay current on emerging science and developments in the field.

RECOMMENDATIONS

1 | Include nutrition in state CME requirements

States can increase nutrition education by requiring or encouraging physicians to take CMEs in this topic. States can require doctors to have CMEs in nutrition education, as they have done in other topic areas. Such a requirement is a powerful way to ensure physicians get continuing education on nutrition. Alternatively, states can use a recommendation instead of a requirement; for example, the Medical Board of California is statutorily directed to consider including a CME course in nutrition and to encourage every physician and surgeon, especially those involved in primary care, to take credits in nutrition as part of his or her continuing education.²⁴¹ Although this is merely a recommendation to both the Board and physicians, physicians and surgeons are required to complete CME courses in other subjects, such as

pain management and the treatment of terminally ill and dying patients, by statute.²⁴² Other states could apply California's approach to either require or recommend nutrition as a CME topic.

Benefits and challenges: including nutrition in state CME requirements

CME courses in nutrition provide a forum for physicians to learn the most up-to-date information in the field of nutrition instead of relying on old information they may have acquired during medical school, residency programs, or their licensing exams. Several states already have topic-specific CME requirements. Advocates could likely persuade those states to adopt additional topic areas, especially one as salient to population health as nutrition. Encouraging adoption on a state-by-state basis may also lead to a domino effect: early adopters can act as models for states considering the policy.

This state-by-state strategy, however, would not have the same broad and immediate effect as a nutrition education policy adopted on the national level. Additionally, a substantial minority of states do not have any topic-specific CME requirements and are unlikely to make an exception for nutrition. Another challenge is that some states have two medical boards, one governing osteopathic physicians and another governing medical physicians; this strategy would have to target both boards in order to broadly affect all physicians and patients. Finally, adding CME requirements is also likely to face resistance from physicians, many of whom feel overburdened by bureaucratic requirements, including maintenance of patient electronic medical records²⁴³ and the costs and time associated with recertification.²⁴⁴ In the face of physician burnout, additional requirements are likely to receive pushback, even if they would have a positive impact on the physician's practice.

2 | Include nutrition in CME requirements for federal employees

Congress or the HHS could create a CME nutrition requirement for federally-employed doctors. In 2017, this option was proposed in Congress as the Education and Training for Health Act, or EAT for Health Act.²⁴⁵ Under this proposed legislation, HHS would be required to establish guidelines to ensure that all federally employed doctors and other healthcare providers receive continuing education in nutrition.²⁴⁶ The continuing education would have to include “content on the role of nutrition in the prevention, management, and, as possible, reversal of obesity, cardiovascular disease, diabetes, or cancer.”²⁴⁷ This legislation did not proceed out of committee in the House of Representatives.²⁴⁸

Benefits and challenges: including nutrition in CME requirements for federal employees

A requirement for federally-employed doctors to complete nutrition CMEs would reach a wide geographic area more efficiently than state-based CME requirements because federally-employed

doctors are employed across the country in departments such as the Indian Health Service,²⁴⁹ Military Health System, and VHA,²⁵⁰ as well as others. The scope of such legislation appears narrow because it would only apply to federal employees and the patients that they treat; however, the VHA’s health facilities make up the largest single clinical training provider in the nation.²⁵¹ Patients of these departments include members of the military, veterans, Indian tribal citizens, and others. Thus, the impact of such a policy could have a significant and far-reaching impact across the medical field.

A federal government requirement for nutrition CME could also highlight the topic’s importance to population health and galvanize states to change their own CME requirements. States may be inspired to adopt legislation that requires similar nutrition training for state employees, or the state Board of Medicine may follow suit and require nutrition CME for licensure of physicians practicing in the state. Mandating nutrition-focused CMEs for federal employees also would generate more, and thus more affordable, CME content that could be widely accessed by physicians nationally, even if they were not required to take CMEs in this area.

CONCLUSION

This report presents an initial roadmap of policy options to provide nutrition education to physicians throughout their time in medical school, residency, and beyond. To address the epidemic of chronic, costly, and preventable diet-related diseases in the U.S., physicians must be prepared to understand and counsel on nutrition as a critical healthcare tool. Including nutrition education at each stage of medical training can better equip physicians to counsel patients about good preventive health and effective disease management. This guide encourages greater action to promote physician competency and

training on nutrition and diet-related diseases, through both voluntary initiatives and mandatory policies administered by decisionmakers at the federal, state and local levels. This report recognizes that the feasibility and attractiveness of these interventions may vary depending on the decisionmaker and the political climate. Nevertheless, increased nutrition education for doctors at every stage of their career can ultimately improve outcomes for individual patients, advance population health, and change the healthcare landscape for the better.

RECOMMENDATIONS TO INCREASE PHYSICIANS' NUTRITION EDUCATION, BY DECISION MAKER

Category	Responsible Body	Policy Recommendations
Federal	Congress	<p>Undergraduate Medical Education (UME)</p> <ul style="list-style-type: none"> Condition non-grant government funding of UME on nutrition education Offer performance-based incentives for UME inclusion of nutrition education Authorize and fund new grant program to support UME nutrition education <p>Graduate Medical Education (GME)</p> <ul style="list-style-type: none"> Condition Medicare or other funding on the inclusion of nutrition education in GME Instruct states to condition state Medicaid funding of GME on nutrition education Offer performance-based incentives in Medicare or other funding to GME programs that provide nutrition education Authorize and fund new grant programs to support GME nutrition education <p>Continuing Medical Education (CME)</p> <ul style="list-style-type: none"> Require federally-employed physicians to complete CME courses in nutrition
	Federal Agencies (Centers for Medicare and Medicaid Services; Health Resources and Services Administration; National Institutes of Health; Veterans Health Administration)	<p>Undergraduate Medical Education (UME)</p> <ul style="list-style-type: none"> Condition non-grant government funding of UME on nutrition education Administer grant programs to support UME nutrition education Provide technical assistance and share resources to support nutrition-curricula development <p>Graduate Medical Education (GME)</p> <ul style="list-style-type: none"> Condition funding of GME on the inclusion of nutrition education Instruct states to limit Medicaid funds to GME programs that offer nutrition education <p>Continuing Medical Education (CME)</p> <ul style="list-style-type: none"> Require federally-employed physicians within that agency to complete nutrition CME courses
State	State Legislatures	<p>Undergraduate Medical Education (UME)</p> <ul style="list-style-type: none"> Offer performance-based incentive payments for UME inclusion of nutrition education Authorize and fund new grant programs to support UME nutrition education <p>Graduate Medical Education (GME)</p> <ul style="list-style-type: none"> Condition Medicaid funding for GME on inclusion of nutrition education Condition other state government funding of GME on inclusion of nutrition education Offer performance-based incentive payments for GME inclusion of nutrition education Authorize and fund new grant programs to support GME nutrition education <p>Continuing Medical Education (CME)</p> <ul style="list-style-type: none"> Require physicians to complete nutrition CME courses for re-licensure in the state
	State Agencies (State Departments of Health; State Medical Boards)	<p>Undergraduate Medical Education (UME)</p> <ul style="list-style-type: none"> Condition funding of UME on inclusion of nutrition education Administer grant programs to support UME nutrition education Provide technical assistance and resources to support nutrition-curricula development <p>Graduate Medical Education (GME)</p> <ul style="list-style-type: none"> Condition Medicaid funding of GME on the adoption of nutrition education Condition other funding of GME on inclusion of nutrition education Administer grant programs to support GME nutrition education <p>Continuing Medical Education (CME)</p> <ul style="list-style-type: none"> Require physicians to complete nutrition CME courses for re-licensure in that state
Non-governmental accrediting or testing bodies	Liaison Committee on Medical Education	<p>Undergraduate Medical Education (UME)</p> <ul style="list-style-type: none"> Amend the LCME accreditation standards for UME to require nutrition competency
	American Council of Graduate Medical Education	<p>Graduate Medical Education (GME)</p> <ul style="list-style-type: none"> Amend ACGME Common Program Requirements for GME to include nutrition competency Amend ACGME Specialty Requirements for GME to include nutrition competency
	National Board of Medical Examiners; Federation of State Medical Boards	<p>Step Examinations</p> <ul style="list-style-type: none"> Incorporate nutrition-focused content on medical step exams
	American Board of Medical Specialties (ABMS); ABMS Member Boards	<p>Board Examinations</p> <ul style="list-style-type: none"> Incorporate nutrition-focused content on medical specialty board exams

ENDNOTES

- ¹ See Kelly Adams et al., *The State of Nutrition Education at US Medical Schools*, J. BIOMEDICAL EDUC., 2015, at art. 357627, 2.
- ² *Id.*
- ³ Christopher J.L. Murray et al., *The State of US Health, 1990–2010: Burden of Diseases, Injuries, and Risk Factors*, 310 AM. J. MED. 591 (2013).
- ⁴ *Leading Causes of Death*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm> (last updated Mar. 17, 2017).
- ⁵ Murray et al., *supra* note 3.
- ⁶ *Adult Obesity Facts*, CTRS. FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/obesity/data/adult.html> (last updated Aug. 13, 2018).
- ⁷ *Childhood Obesity Facts*, CTRS. FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/obesity/data/childhood.html> (last updated June 24, 2018).
- ⁸ CTRS. FOR DISEASE CONTROL & PREVENTION, NATIONAL DIABETES STATISTICS REPORT, 2017 (2017), <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>; as of 2017, diabetes and prediabetes affected more than 100 million adults in the U.S. Press Release, Ctrs. for Disease Control & Prevention, New CDC Report: More than 100 Million Americans have Diabetes or Prediabetes (July 18, 2017), <https://www.cdc.gov/media/releases/2017/p0718-diabetes-report.html>.
- ⁹ CTRS. FOR DISEASE CONTROL & PREVENTION, LONG-TERM TRENDS IN DIABETES (2017), http://www.cdc.gov/diabetes/statistics/slides/long_term_trends.pdf; see also WORLD HEALTH ORG., UNITED STATES OF AMERICA: PREVALENCE OF DIABETES AND RELATED RISK FACTORS (2016), http://www.who.int/diabetes/country-profiles/usa_en.pdf (noting that 9.1% of Americans were living with diabetes in 2016); see also Press Release, Ctrs. For Disease Control & Prevention, More Than 29 Million Americans Have Diabetes; 1 in 4 Doesn't Know, (June 10, 2014), <https://www.cdc.gov/media/releases/2014/p0610-diabetes-report.html>.
- ¹⁰ S. Jay Olshansky et al., *A Potential Decline in Life Expectancy in the United States in the 21st Century*, 352 NEW ENG. J. MED. 1138, 1142–43 (2005).
- ¹¹ BIPARTISAN POLICY CTR. ET AL., TEACHING NUTRITION AND PHYSICAL ACTIVITY IN MEDICAL SCHOOL: TRAINING DOCTORS FOR PREVENTION-ORIENTED CARE 16 (2014), https://bipartisanpolicy.org/wp-content/uploads/2019/03/Med_Ed_Report.pdf.
- ¹² See *The Healthcare Costs of Obesity*, STATE OF OBESITY, <https://stateofobesity.org/healthcare-costs-obesity/> (last visited Sept. 6, 2019) (noting that estimates of healthcare costs of obesity range from \$147 billion to nearly \$210 billion per year).
- ¹³ *The Cost of Diabetes*, AM. DIABETES ASS'N, <https://www.diabetes.org/resources/statistics/cost-diabetes> (last visited Sept. 6, 2019). The total estimated cost of diagnosed diabetes in 2017 is \$327 billion, including \$237 billion in direct medical costs and \$90 billion in reduced productivity. *Id.*
- ¹⁴ Expanding Nutrition's Role in Curricula and Healthcare Act (ENRICH Act), H.R. 1888, 116th Cong. (2019); Preetha Anand et al., *Cancer is a Preventable Disease that Requires Major Lifestyle Changes*, 25 PHARM. RES. 2097, 2100–01 (2008).
- ¹⁵ H.R. 1888, *supra* note 14. The direct costs of cancer in the United States was \$102.8 billion in 2010. *Id.*
- ¹⁶ CTRS. FOR DISEASE CONTROL & PREVENTION, THE POWER OF PREVENTION 1 (2009), <https://www.cdc.gov/chronicdisease/pdf/2009-Power-of-Prevention.pdf>.
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- ¹⁹ Adams et al., *supra* note 1, at art. 357627, 2.
- ²⁰ *Id.*
- ²¹ *Id.* at art. 357627, 4; NATIONAL RESEARCH COUNCIL, NUTRITION EDUCATION IN U.S. MEDICAL SCHOOLS (1985), <https://doi.org/10.17226/597>.
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- ²³ Elsa Spencer et al., *Predictors of Nutrition Counseling Behaviors and Attitudes in US Medical Students*, 84 AM. J. CLINICAL NUTRITION 655, 659 (2006).
- ²⁴ Monica Aggarwal et al., *The Deficit of Nutrition Education of Physicians*, 131 AM. J. MED. 339, 343 (2018).
- ²⁵ Stephen Devries et al., *A Deficiency of Nutrition Education and Practice in Cardiology*, 130 AM. J. MED. 1298, 1299, 1304 (2017).
- ²⁶ Marion L. Vetter et al., *What Do Resident Physicians Know About Nutrition? An Evaluation of Attitude, Self-Perceived Proficiency, and Knowledge*, 27 J. AM. C. NUTRITION 287, 287 (2008); see also Marigold Castillo et al., *Basic Nutrition Knowledge of Recent Medical Graduates Entering a Pediatric Residency Program*, 28 INT'L J. ADOLESCENT MED. & HEALTH 357 (2016) (study assessing the basic nutritional knowledge of fourth-year medical/osteopathic school graduates entering a pediatric residency program and finding that, on average, the incoming interns answered only fifty-two percent of the eighteen questions correctly).
- ²⁷ BIPARTISAN POLICY CTR. ET AL., *supra* note 11, at 11.
- ²⁸ *Id.*
- ²⁹ See Devries et al., *supra* note 18, at 804.
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- ³¹ *Dietary Guidelines for Americans 2015–2020*, HEALTH.GOV, <https://health.gov/dietaryguidelines/2015/guidelines/> (last visited Sept. 6, 2019).

³² See *Food and Nutrition: Health and Medicine Division*, NAT'L ACAD. SCI., ENGINEERING, & MED., <http://www.nationalacademies.org/hmd/Global/Topics/Food-Nutrition.aspx> (last visited Sept. 6, 2019).

³³ *Dietary Guidelines for Americans 2015-2020*, *supra* note 31.

³⁴ Adams et al., *supra* note 1, at art. 357627, 1.

³⁵ See BIPARTISAN POLICY CTR. ET AL., *supra* note 11, at 30; See Lisa A. Hark & Darwin Deen, *Position of the Academy of Nutrition and Dietetics: Interprofessional Education in Nutrition as an Essential Component of Medical Education*, 117 J. ACAD. NUTRITION & DIETETICS 1104 (2017).

³⁶ E.g., *Your Medicare Coverage: Nutrition Therapy Services (Medical)*, MEDICARE.GOV, <https://www.medicare.gov/coverage/nutrition-therapy-services.html> (last visited Sept. 6, 2019); see Krista Ulatowski, *Guide to Insurance and Reimbursement*, TODAY'S DIETITIAN, Feb. 2017, at 40, <http://www.todaysdietitian.com/newarchives/0217p40.shtml>. In order to provide patients with nutrition services, physicians can also make referrals to nutrition professionals, such as a Registered Dietician (RD). Sonja L. Connor, *Connect the Patient to the Expert: Referral to a Registered Dietitian Nutritionist*, 128 AM. J. MED. ONLINE e25 (2015). In some instances, referral requirements prevent patients from accessing these services. Kari Kren et al, *Referral Systems in Ambulatory Care—Providing Access to the Nutrition Care Process*, 108 J. AM. DIETETIC ASS'N 1375, 1375–1379 (2008). Referral requirements can vary based on insurance policy, state regulation, and facility procedure. *Referring Patients to an RDN*, EATRIGHTPRO, <https://www.eatrightpro.org/about-us/what-is-an-rdn-and-dtr/work-with-an-rdn-or-dtr/referring-patients-to-an-rdn> (last visited Sept. 6, 2019). For example, some private insurers require a physician's referral prior to initiating payment to the nutrition professional or coverage for the patient. *Id.*

³⁷ BIPARTISAN POLICY CTR. ET AL., *supra* note 11 at 1, 16.

³⁸ See *Id.*

³⁹ See Karen E. Aspry, *Medical Nutrition Education, Training, and Competencies to Advance Guideline-Based Diet Counseling by Physicians: A Science Advisory from the American Heart Association*, 137 CIRCULATION e821 (2018).

⁴⁰ See Hark & Deen, *supra* note 35.

⁴¹ Penny Kris-Etherton et. al., *The Need to Advance Nutrition Education in the Training of Health Care Professionals and Recommended Research to Evaluate Implementation and Effectiveness*, AM J. CLINICAL NUTRITION (2014).

⁴² *Nutrition Education for Health Professionals*, NAT'L HEART, LUNG, & BLOOD INST., <https://www.nhlbi.nih.gov/events/2012/nutrition-education-health-professionals> (last visited Sept. 6, 2019).

⁴³ Aspry, *supra* note 39.

⁴⁴ See Catherine Dower, *Graduate Medical Education (Updated)*, HEALTH AFFAIRS (Aug. 31, 2012), <https://www.healthaffairs.org/doi/10.1377/hpb20120831.529171/full/>.

⁴⁵ See JILL EDEN ET AL., INST. OF MEDICINE, GRADUATE MEDICAL EDUCATION THAT MEETS THE NATION'S HEALTH NEEDS 16 (2014), <https://www.ncbi.nlm.nih.gov/books/NBK248027/>.

⁴⁶ E.g., LIAISON COMM. ON MED. EDUC., FUNCTIONS AND STRUCTURE OF A MEDICAL SCHOOL: STANDARDS FOR ACCREDITATION OF MEDICAL EDUCATION PROGRAMS LEADING TO THE MD DEGREE (2019).

⁴⁷ *Scope and Purpose of Accreditation*, LIAISON COMMITTEE ON MED. EDUC., <http://lcme.org/about/> (last visited Sept. 6, 2019).

⁴⁸ *Id.*; *Health Professions Title VII Student Loan Programs*, ASS'N OF AM. MED. COLLS., https://www.aamc.org/advocacy/diversity/74120/laborhhs_labor0028.html (last visited Sept. 6, 2019).

⁴⁹ LIAISON COMM. ON MED. EDUC., RULES OF PROCEDURE 7 (2017); see *Standards, Publications, & Notification Forms*, LIAISON COMMITTEE ON MED. EDUC., <http://lcme.org/publications/> (last visited Sept. 6, 2019) (housing LCME's standards from current and past years).

⁵⁰ LIAISON COMM. ON MED. EDUC., *supra* note 49 at 26.

⁵¹ Barbara E.C. Knollmann-Ritschel et al., *Pathology Course Director Perspectives of a Recent LCME Experience: Preparation in an Integrated Curriculum with Revised Standards*, ACAD. PATHOLOGY, Jan. 27, 2017, at 1, 2.

⁵² See *Id.* at 1, 2–3.

⁵³ See *Standards, Publications, & Notification Forms*, *supra* note 49.

⁵⁴ See LIAISON COMM. ON MED. EDUC., *supra* note 46; *Standards, Publications, & Notification Forms*, *supra* note 49.

⁵⁵ LIAISON COMM. ON MED. EDUC., *supra* note 46, at iv; LIAISON COMM. ON MED. EDUC., *supra* note 49, at 24–25.

⁵⁶ LIAISON COMM. ON MED. EDUC., *supra* note 49, at 25.

⁵⁷ LIAISON COMM. ON MED. EDUC., *supra* note 46, at iv.

⁵⁸ LIAISON COMM. ON MED. EDUC., *supra* note 49, at 25.

⁵⁹ LIAISON COMM. ON MED. EDUC., *supra* note 46, at 8.

⁶⁰ *Id.* at 10.

⁶¹ NATIONAL RESEARCH COUNCIL, *supra* note 21.

⁶² See BIPARTISAN POLICY CTR. ET AL., *supra* note 11, at 18.

⁶³ Adams et al., *supra* note 1, at art. 357627, 4.

⁶⁴ *Id.*

⁶⁵ *Tables and Graphs for Fiscal Year 2018*, ASSOC. OF AMER. MED. COLLEGES, <https://www.aamc.org/data/finance/2018-tables/> (last visited Sept. 6, 2019).

⁶⁶ David B. Moore, *AM Last Page: The Federal Budget and Academic Medicine*, 87 ACAD. MED. 990, 990 (2012).

⁶⁷ See Jeffrey C. Miller et al., *Follow the Money: The Implications of Medical Schools' Funds Flow Models*, 87 ACAD. MED. 1746, 1746 (2012).

⁶⁸ *Revenue of U.S. Medical Schools by Source, Fiscal Year 2018*, ASSOC. OF AMER. MED. COLLEGES, <https://www.aamc.org/data/finance/498082/>

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¹³⁶ ELAYNE J. HEISLER ET AL., CONG. RESEARCH SERV., R44376, FEDERAL SUPPORT FOR GRADUATE MEDICAL EDUCATION: AN OVERVIEW 10, 12–15 (2016), <https://fas.org/sgp/crs/misc/R44376.pdf>; see also Ian S. Metzler et al., *The Critical State of Graduate Medical Education Funding*, AM. COLL. SURGEONS BULL., Nov. 2012, at 11, <https://www.facs.org/~media/files/publications/bulletin/2012/2012%20november.ashx>.

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¹³⁸ See, e.g., HEISLER ET AL., *supra* note 136, at 17.

¹³⁹ Fitzhugh Mullan et al., *The Geography of Graduate Medical Education: Imbalances Signal Need for New Distribution Policies*, 32 HEALTH AFF. 1914, 1917 (2013), <https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2013.0545>.

¹⁴⁰ See HEISLER ET AL., *supra* note 136, at 9, 11–12. The dollar amounts for DME and IME are not based on the actual total costs of each residency program, but rather are set by formulae based on the percentage of patients treated at that facility that are Medicare beneficiaries, the number of beds, and the number of residents and interns.

¹⁴¹ Metzler et al., *supra* note 136 at 11.

¹⁴² See HEISLER ET AL., *supra* note 136, at 9.

¹⁴³ Carolyn G. Scrafford et al., *Health Economic Evaluation Modeling Shows Potential Health Care Cost Savings with Increased Conformance with Healthy Dietary Patterns among Adults in the United States* J. ACAD. NUTRITION & DIETETICS (forthcoming; published online Dec. 24, 2018), [https://jandonline.org/article/S2212-2672\(18\)30461-1/fulltext](https://jandonline.org/article/S2212-2672(18)30461-1/fulltext). A shift at the population level toward improving diet, as measured by a 20% increase in the healthy eating index or Mediterranean diet score, could save \$16.7 billion to \$31.5 billion, respectively. Savings would come from reduced costs to address cardiovascular disease, cancer, diabetes, Alzheimer's disease, and hip fractures. *Id.*

¹⁴⁴ See, e.g., Zernike & Rappeport, *supra* note 69; cf. Barrett & Greene, *supra* note 69 (arguing that states and localities should rely on other funding sources than the federal government).

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¹⁴⁷ *Id.* at 11.

¹⁴⁸ HHS FY 2018 Budget in Brief – CMS – Medicare, HEALTH & HUMAN SERVS., <https://www.hhs.gov/about/budget/fy2018/budget-in-brief/cms/medicare/index.html>.

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¹⁵³ MEDICARE PAYMENT ADVISORY COMM'N, *supra* note 145, at 140.

¹⁵⁴ TALA H.I. FAKHOURI ET AL., NAT'L CTR. FOR HEALTH STATISTICS, NO. 106, PREVALENCE OF OBESITY AMONG OLDER ADULTS IN THE UNITED STATES, 2007–2010 (2012), <https://www.cdc.gov/nchs/data/databriefs/db106.pdf>.

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¹⁵⁶ AM. DIABETES ASS'N, *supra* note 13.

¹⁵⁷ Ping Zhang & Sundar Shrestha, *Estimating the Costs of Diabetes by Episodes of Care: Promises and Challenges*, 29 J. DIABETES & ITS COMPLICATIONS 463, 463 (2015).

¹⁵⁸ See CTRS. FOR MEDICARE & MEDICAID SERVS., MEDICARE COVERAGE OF KIDNEY DIALYSIS & KIDNEY TRANSPLANT SERVICES 8–10 (2017), <https://www.medicare.gov/Pubs/pdf/10128-Medicare-Coverage-ESRD.pdf>.

¹⁵⁹ *End Stage Renal Disease (ESRD)*, JOHNS HOPKINS MED., https://www.hopkinsmedicine.org/healthlibrary/conditions/kidney_and_urinary_system_disorders/end_stage_renal_disease_esrd_85,P01474 (last visited Sept. 6, 2019).

¹⁶⁰ MEDICARE PAYMENT ADVISORY COMM'N, *supra* note 145, at 19.

¹⁶¹ *Id.*

¹⁶² HEISLER ET AL., *supra* note 136, at 4.

¹⁶³ Cf. *Id.* at 1 (arguing that federal support of GME could drive changes to the program to improve access to health care).

¹⁶⁴ Cf. *Id.*

¹⁶⁵ *Id.* at 4.

¹⁶⁶ *Id.* at 10, 12–15; see also Metzler et al., *supra* note 136 at 11.

¹⁶⁷ EDEN ET AL., *supra* note 45, at 85.

168 HEIDI GOLDING, CONG. BUDGET OFF., POTENTIAL SPENDING ON VETERANS HEALTH CARE, 2018-2028, 1 (2018) .

169 Eden et al., *supra* note 45, at 85.

170 *Id.*

171 *Cf.* Nat’l Fed’n of Indep. Bus. v. Sebelius, 567 U.S. 517, 581 (2012) (Supreme Court case holding that the federal government’s conditioning of state Medicaid funds on states significantly expanding Medicaid was unconstitutional).

172 Dower, *supra* note 44.

173 ASS’N OF AM. MED. COLLS., *supra* note 137, at 3.

174 *Id.*

175 *Id.* at 1. States may provide funding through fee-for-service programs, risk-based managed care programs, or both. In 2018, forty-one states funded GME programs through their Medicaid fee-for-service program and thirty-nine states apportioned funds through their Medicaid risk-based managed care programs. *Id.*

176 *Id.* at 1.

177 *Id.* at 8.

178 *Id.* at 5.

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180 *Id.* at 3.

181 EXEC. OFFICE OF HEALTH & HUMAN SERVS., COMMONWEALTH OF MASS., REPORT OF THE SPECIAL COMMISSION ON GRADUATE MEDICAL EDUCATION 33 (2013), <http://www.mass.gov/eohhs/docs/eohhs/gme-final-report.pdf>.

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186 Dower, *supra* note 44; Graduate Medical Education Reform Act, S. 3201/H.R. 6352, 112th Cong. (2012).

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