

## Teaching Doctors-in-Training About Nutrition: Where Are We Going in 2016?

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### ABSTRACT

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of preventable death in the U.S., and its public health and economic burdens are rising. There is substantial evidence that dietary factors significantly reduce ASCVD-related morbidity and mortality, and that Americans, including those with established ASCVD, adhere poorly to cardio-protective diet patterns. Despite this, there continues to be a large gap in nutrition education during medical school and post-graduate training, leaving physicians poorly prepared to counsel patients on diet, nutrition, and related behavior change. The result is a massive missed opportunity to improve cardiovascular disease prevention at the health system level. However, recent calls for change by stakeholder groups, and a surprising new experiential learning model, suggest this may be changing.

**KEYWORDS:** nutrition education, graduate medical education, culinary medicine, cardiovascular disease prevention

### ABUNDANT DATA SUPPORT DIET CHANGES TO REDUCE ASCVD RISK

Data from numerous lines of evidence over the past half century have shown that dietary factors impact cardiovascular morbidity and mortality, and various mechanisms are involved, including effects on blood lipids, blood pressure, body weight, inflammation, insulin sensitivity, endothelial function, platelet function, and other mechanisms.<sup>1</sup> In the last 15 years, randomized trials have shown that a combination of diet changes may produce large effects on cardiovascular outcomes. In the 2001 Lyon Diet Heart Study, post-myocardial patients randomized to a Mediterranean diet supplemented with plant and marine omega-3-fatty acids demonstrated marked reductions in the rate of cardiac death and recurrent non-fatal infarction at 46 months compared to those assigned to usual diet advice (1.24 per hundred patients per year vs. 4.07 per hundred patients per year).<sup>2</sup> In the 2006 PREDIMED trial, subjects free of cardiovascular disease at entry and randomized to a Mediterranean diet supplemented with extra virgin olive oil or with nuts showed 15.5 % and 44.8% relative risk reductions in

stroke, respectively, compared to those randomized to a control diet.<sup>3</sup> Based on these and other data, the 2013 American Heart Association/American College of Cardiology (AHA/ACC) Guideline on Lifestyle Management to Reduce Cardiovascular Risk made class I and II recommendations for diet change that included increased intake of fruits, vegetables, whole grains, low-fat dairy products, poultry, oily fish, legumes, nuts and non-tropical oils, and reduced consumption of sweets, sugar-sweetened beverages and red meats.<sup>4</sup> Although there are some differences, the guideline-recommended diet changes are food-based (vs. nutrient-based) and aligned with a Mediterranean diet pattern.

### ADHERENCE TO CARDIO-PROTECTIVE DIETS IS POOR IN THE U.S.

Despite the large evidence base supporting diet interventions for the primary and secondary prevention of ASCVD, the typical American diet has remained poor. In fact, of the seven cardiovascular health metrics established by the American Heart Association in 2010, goal achievement has been lowest in the area of diet adherence.<sup>5</sup> In addition, more than one-third of adults are obese and increased intake of sugar-sweetened beverages and foods has been identified as a contributor.<sup>6</sup> Even among those with established coronary disease (CHD), data show low adherence to recommended diet changes. A 2008 survey study by Ma et al showed that subjects diagnosed with CHD a year prior met only 12.4% and 7.8% of the recommended intake of vegetables and fruits, respectively, and had higher than recommended intakes of trans-fats.<sup>7</sup> Similarly, in the cross-cultural Prospective Urban Rural Epidemiology (PURE) study, only 39% of more than 7,500 subjects with a history of CHD or stroke reported adherence to healthy diets as assessed via the Alternative Healthy Eating Index.<sup>8</sup>

### THE NUTRITION TRAINING GAP IS LARGE

Despite recommendations by the National Academy of Sciences in 1985 that at least 25 hours of nutrition education be provided during the 4 years of medical school training, a 2010 survey showed that little more than one-quarter of medical schools offered a nutrition course, and the average number of nutrition education hours in 2008 was under twenty.<sup>9-10</sup> Moreover, survey data show that most nutrition

training during medical school remains didactic-based, with little to no experiential or problem-based learning. This is unfortunate because recent reforms in medical school curricula would appear to provide ample opportunity to vertically integrate the principles of diet, nutrition and behavior change over the 4 years of training.

Nutrition education during post-graduate training is similarly inadequate: few requirements exist, and there is little to no reinforcement of principles learned during medical school, nor opportunities for competency-building across the domains established by the Accreditation Council for Graduate Medication Education (ACGME), i.e., medical knowledge, patient care, practice-based learning, systems-based practice, communication skills and professionalism.

The reasons for the low prioritization of nutrition in medical training likely include a lesser focus on disease prevention and management compared to technologically advanced acute and chronic treatments, both in outpatient or inpatient settings; earlier perceptions of nutrition as less evidence-based than other sciences; and lack of core nutrition faculty, and funded research, within medical institutions.

Against this background, it is not surprising that data show physicians perceive significant barriers to effective diet counseling of patients, including lack of time, knowledge and resources, and have low confidence in their ability to effect diet change.<sup>11</sup> These gaps, in knowledge, competencies, confidence and practice, translate to a massive missed opportunity to optimize cardiovascular health at the health system level.

## NEW CALLS TO ACTION, AND NEW NUTRITION EDUCATION MODELS

Fortunately, the nutrition training gap may be closing. The nutrition-science evidence base has grown rapidly over the last several decades. Cardiovascular disease prevention and health promotion have now been prioritized by policy makers and payers. Also, the fact that clinicians lack competencies for translating diet and lifestyle knowledge to patients has been well publicized, leading to calls to action from various stakeholders.

The most vocal of these have been nutrition leaders who, in 2014, published an extensive summary of current training in nutrition education in the *American Journal of Clinical Nutrition*. In it, they outlined the history of governmental and non-governmental activities aimed at improving nutrition education during medical training, and called for reforms of medical school curricula to increase exposure to nutrition.<sup>12</sup> Similarly, in 2015, the *Journal of Parenteral and Enteral Nutrition* also questioned the current status of nutrition training in Graduate Medical Education after a survey of 72 ACGME program directors in a variety of medical specialties showed that only 26% of programs had formal nutrition education curricula, and these varied substantially in length and form.<sup>13</sup> The American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) has since created a Task

Force on Postgraduate Medical Education in Nutrition to identify ways to close the gaps.<sup>13</sup> Similarly, the ACC has recommended that cardiovascular training programs provide nutrition education pertinent to treating obesity and its associated risks in its 2015 Core Cardiology Training Statement (COCATS 4) on cardiovascular disease prevention.<sup>14</sup>

In response to these and other calls for change, some residency training programs have begun to incorporate formal nutrition training into graduate medical education. The University of North Carolina at Chapel Hill has developed an open-access, web-based Nutrition in Medicine program targeting medical students and residents, reportedly in use by a number of residency programs.<sup>15</sup> Innovative partnerships between medical and culinary schools, most notably Johnson and Wales, also have led to the development of experiential nutrition learning activities. Dubbed 'culinary medicine,' these new electives and courses are now in place in at least 10 medical schools (including Brown University's Alpert Medical School) and one residency program in the U.S. They aim to teach medical students and trainees the relationship between food components and health, how to distinguish between healthier vs. unhealthier diet components, and practical aspects of healthy food sourcing and preparation. Students and trainees take part in workshops and live cooking demonstrations that teach the differences between whole vs. refined grains and saturated vs. unsaturated fats, and how to prepare tasteful meals with healthier macronutrient and sodium contents. The goal: impart food knowledge and skills that will translate to teachable moments at the bedside and in the clinic. This translational aspect of not only teaching the science of nutrition and the effects of dietary components on health outcomes, but providing experiential learning, is being utilized in the area of public health nutrition as well. A similar culinary medicine partnership between the Harvard School of Public Health and the Culinary Institute of America, that teaches food and cooking skills to practicing clinicians, has shown promising early outcomes.<sup>16</sup>

## CONCLUSION

In conclusion, the economic and health burdens from cardiovascular disease are large and growing, and payers and other stakeholders have called for an increased focus on disease prevention and health promotion, including by health systems. Although robust evidence supports diet change to improve cardiovascular outcomes, physicians have been inadequately trained to impart this knowledge to patients and families. However, calls for better nutrition education during medical school and training are being heard. New web-based curricula are being developed and used. Also, unlikely partnerships between medical and culinary schools are moving nutrition education out of the classroom and into the kitchen, possibly the perfect place to blend together the related fields of nutrition science, behavioral medicine and the culinary arts.

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