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## Status of nutrition education in medical schools,<sup>2,3</sup>

Kelly M Adams, Karen C Lindell, Martin Kohlmeier, and Steven H Zeisel<sup>4</sup>

Department of Nutrition, School of Public Health, School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC.

### Abstract

**Background:** Numerous entreaties have been made over the past 2 decades to improve the nutrition knowledge and skills of medical students and physicians. However, most graduating medical students continue to rate their nutrition preparation as inadequate.

**Objective:** The objective was to determine the amount and type of nutrition instruction at US medical schools, especially including the instruction that occurs outside designated nutrition courses.

**Design:** A 12-item survey asked nutrition educators to characterize nutrition instruction at their medical schools (required, optional, or not offered) and to quantify nutrition contact hours occurring both inside and outside designated nutrition courses. During 2004, we surveyed all 126 US medical schools accredited at that time.

**Results:** A total of 106 surveys were returned for a response rate of 84%. Ninety-nine of the 106 schools responding required some form of nutrition education; however, only 32 schools (30%) required a separate nutrition course. On average, students received 23.9 contact hours of nutrition instruction during medical school (range: 2–70 h). Only 40 schools required the minimum 25 h recommended by the National Academy of Sciences. Most instructors (88%) expressed the need for additional nutrition instruction at their institutions.

**Conclusion:** With the move to a more integrated curriculum and problem-based learning at many medical schools, a substantial portion of the total nutrition instruction is occurring outside courses specifically dedicated to nutrition. The amount of nutrition education in medical schools remains inadequate.

### Keywords

Nutrition education; medical education; nutrition; Nutrition in Medicine; medical school curriculum; medical students; education; nutrition curriculum

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<sup>4</sup>Reprints not available. Address correspondence to SH Zeisel, Department of Nutrition, University of North Carolina at Chapel Hill, CB#7461, Chapel Hill, NC 27599-7461. E-mail: steven\_zeisel@unc.edu.

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## INTRODUCTION

The adequacy of nutrition instruction in undergraduate medical education remains an issue of concern (1-3). Although the scientific principles related to nutrition have been taught in medical schools since the early 20th century, the latter part of that century was characterized by increasing concern over the amount of nutrition education provided to medical students. Early pioneers in this field made great strides in incorporating nutrition into undergraduate medical education (4). However, in its 1985 survey, the National Academy of Sciences (NAS) found that, overall, an average of 21 h of nutrition instruction was required in medical schools, but only 34 of the surveyed US medical schools (27%) had a separate, required nutrition course (3). The NAS report concluded that “Nutrition education programs in US medical schools are largely inadequate to meet the present and future demands of the medical profession.” This report has been called groundbreaking because it was the first comprehensive and systematic assessment of the status of nutrition education at medical schools that helped to identify the deficiencies. Publication of the report prompted the inclusion of medical education in the National Nutrition Monitoring and Related Research Act of 1990 and emphasized the need for physicians to be educated on nutrition topics.

Patients routinely seek physicians' guidance about diet, and the relation of nutrition to the prevention and treatment of disease is well known. However, practicing physicians continually rate their nutrition knowledge and skills as inadequate (5). It also is no surprise that more than one-half of graduating medical students report that the time dedicated to nutrition instruction is inadequate (6).

Nearly 20 y have passed since the NAS issued its landmark report. Although the status of nutrition education in medical schools has undergone some change over the past 2 decades, it remains unclear whether this change has increased the hours of nutrition instruction. Some surveys of this topic report the number of nutrition courses at US medical schools. However, an exclusive focus on nutrition courses misses a large amount of nutritional science that is integrated into other courses—a trend that appears to be increasing. Indeed, with the widespread movement to more integrated curricula and problem-based learning, the pressure currently is to reduce the number of hours that students spend in traditional lectures. Thus, an increase in the total number of dedicated nutrition courses is not likely to be seen now or in the foreseeable future. Documenting any improvement in the number of nutrition contact hours must attempt to quantify the hours of all nutrition instruction.

To help guide further content development and delivery, Nutrition in Medicine (NIM) periodically conducts a survey of US medical school instructors to obtain information about: 1) required nutrition instruction in the curriculum, and 2) use of the NIM series. We have a database of contacts at each medical school; in most cases our contact is the person who is actually providing nutrition instruction to medical students.

Our survey is unique in that it quantifies the hours of nutrition instruction that are provided across the entire 4-y curriculum. Furthermore, rather than rely on curriculum administrators or deans, we surveyed the nutrition educators, who are most knowledgeable about the required nutrition content of the curriculum. Indeed, some researchers have found contradictory information regarding the extent of nutrition instruction in the curriculum when the same questions were posed to administrators and nutrition educators (3).

## METHODS

Surveys we developed and administered in 1999–2000 and in 2001 served as pilot tests (7). In February 2004 we e-mailed our current survey to all of our medical school contacts. Our database contains one designated contact person at each US medical school; in most schools,

this is the person who actually teaches nutrition. In the few instances in which we did not have the name of the nutrition instructor, we contacted the dean's office or the medical curriculum office. Follow-up calls, faxes, and e-mails continued through September 2004 until we had contacted all 126 US medical schools accredited by the Association of American Medical Colleges (AAMC) at that time (8). [Note that there are now 125 schools with AAMC accreditation. The Duluth and Twin Cities campuses merged under the umbrella of the University of Minnesota in 2004.]

The 2-page survey contained 12 questions. Respondents were asked to estimate the number of contact hours of required nutrition education at their medical schools, to indicate in which years (1st-2nd or 3rd-4th) and in what type of course nutrition was taught (nutrition, physiology, biochemistry, etc), and to provide specific information about course titles, instructors, hours, and year in the curriculum. In addition, respondents were asked their opinion as to whether students needed more nutrition instruction. Other questions covered issues relating to computer-assisted instruction and implementation of the NIM curriculum.

Recipients returned the survey via regular mail, fax, or online. Eighty-eight respondents (83%) chose to fill out the survey directly by using the website form. The rest were entered manually. We generated a data set from the entries and used standard spreadsheet software (EXCEL 2003; Microsoft Corp, Redmond, WA) for all calculations.

## RESULTS

Representatives from 106 medical schools responded, resulting in an 84% response rate. A total of 103 surveys (97%) were filled out by the person who was responsible for nutrition education of medical students at the time. Academic administrators completed the other 3.

According to the 106 respondents, the curricula of 99 schools (93%) provided required nutrition instruction. Five schools (5%) offered optional instruction only, and another 2 (2%) reported that they did not offer any nutrition instruction. The schools requiring nutrition instruction provided an average of 23.9 (range: 2–70) contact hours. Remarkably, less than one-half (41%) of the responding schools provided the minimum 25 h or more recommended by the NAS in 1985 (3). Also surprising was the finding that 17 schools (18%) required only  $\leq 10$  h of nutrition instruction (Figure 1).

Analysis of the data to determine where the instruction was occurring in the curriculum showed that most of these contact hours occurred during the first and second years of undergraduate medical training (Table 1). On the basis of the responses from the 32 schools indicating that instruction occurred, at least in part, in a required nutrition course, students received an average of 17.7 contact hours of nutrition instruction taught in a dedicated nutrition course (Table 2). The nutrition hours that are integrated into the basic science courses, such as physiology or biochemistry, accounted for  $< 7$  h each of required nutrition on average.

In US medical schools, the bulk of nutrition education continues to be taught in the basic science courses or in an integrated format (Figure 2). This means that three-quarters of the nutrition instruction in medical schools is not specifically identified as nutrition in the curriculum. In the clinical years (3rd-4th), 38/106 schools (36%) offered  $\geq 5$  h of nutrition teaching. Five schools provided us with details documenting nutrition teaching during clerkship rotations in pediatrics and family medicine.

An overwhelming majority (93/106, or 88%) of instructors indicated that students at their medical schools need more nutrition instruction, whereas only 8/106 (8%) said that they did not. Six of these 8 were at schools offering much more than the national average number of

nutrition hours. The remaining 4% of schools responded that they did not know whether their students needed more nutrition instruction.

## DISCUSSION

Is the national average of 23.9 h found in our survey adequate to properly train future physicians about nutrition? We realize that the definition of *adequate* is open to interpretation, but we used 2 major recommendations reported in the literature as a benchmark. The current 23.9 h fall just short of the NAS 1985 minimum recommendation and far short of the American Society for Clinical Nutrition (ASCN) 1989 recommendations. The ASCN recommendations were based on a survey of curriculum administrators and nutrition educators; the former group suggested 37 h (median: 32), whereas the latter suggested 44 h (median: 40) be devoted to nutrition instruction (9).

By either criterion, less than one-half of the surveyed medical schools (41%) provided the minimum of 25 h of medical nutrition education; compared with the later recommendations of 37–44 h, the percentage of schools meeting the recommendation falls below 20%. This means that roughly 60–80% of schools are teaching far less nutrition than is recommended. In addition, nutrition education typically occurs during the first 2 y of medical school when the basic sciences are being emphasized; nutrition does not appear to get much emphasis during the clinical years when nutrition concepts and skills could be applied more directly to clinical problem-solving. Because the number of schools requiring a nutrition course (32 versus 34) and the overall number of hours of nutrition teaching (23.9 versus 21) has changed little over the past 2 decades, it is not surprising that most medical students continue to assess the time devoted to nutrition as inadequate. From our surveys, it seems that instructors are even more dissatisfied with the hours of nutrition in the curriculum than medical students are. Thus, it appears that we are producing a pool of physicians who feel largely unprepared to counsel their patients about nutrition (6,10-12) and to make appropriate clinical decisions on nutrition-related issues. Surveys in the literature show that practicing physicians feel inappropriately prepared to address the growing problem of obesity, particularly in children (13,14). With the rising epidemic of obesity in the US population and the knowledge that prevention is more likely to be successful than treatment, it is clearly imperative to ensure that medical students are adequately prepared.

### Limitations

Does our survey present an accurate picture? We believe it to be a representative snapshot. Although 16% of the US medical schools were unaccounted for, our response rate of 84% is high compared with many surveys of this type. Another strength of our method is that we surveyed nutrition educators at medical schools in an attempt to assess the total picture of nutrition instruction. It is possible that the instructors who are most likely to respond to our survey are those who we have established a relationship with through correspondence about our curriculum. Instructors who are not using our instructional materials may feel no obligation to complete the survey; if anything, however, this selection bias should overestimate the hours devoted to nutrition. Furthermore, in schools in which nutrition is not well established, instructors may have felt insufficiently knowledgeable about the number of nutrition contact hours and may have been less likely to respond to our survey. Again, this potential bias would probably overestimate the amount of nutrition education in medical schools. On the other hand, despite our best efforts to capture nutrition taught outside any dedicated course, it is possible that we are still missing some data in areas that are not readily identified as nutrition instruction. Indeed, instructors of first- and second-year students admitted that they may not know about all the instruction occurring during later years. We acknowledge that estimating nutrition contact hours in the required curriculum is difficult; what constitutes “nutrition education” can

be open to interpretation. It can be argued, for example, that teaching the role of niacin in energy production is biochemistry—not nutrition—because it says nothing about dietary needs, food composition, or clinical applications. Given the current constraints, however, our findings may still be the most comprehensive to date.

## Conclusion

With the move to an integrated curriculum and problem-based learning at many medical schools and the pressure to teach more in the same time, a substantial portion of total nutrition instruction is occurring outside designated nutrition courses. The results of our recent survey show that most medical schools are not providing adequate nutrition instruction.

## Acknowledgements

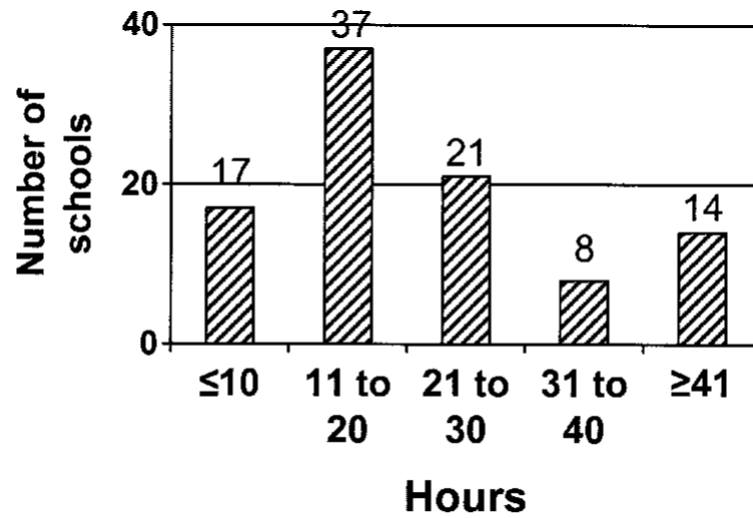
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KMA participated in all aspects of the survey, including design, distribution, collection, and analysis of data; KMA and KCL were primarily responsible for drafting the manuscript. MK guided the development of the survey instrument, data interpretation, and preparation of the manuscript. SHZ is a principal investigator of the NIM project and contributed to a critical analysis of the data and revising the manuscript. SHZ has some financial interest in a small publishing company that offers some of the *Nutrition in Medicine* content for continuing education. KCL served as a paid consultant for one of the *Nutrition in Medicine* funders on an unrelated project.

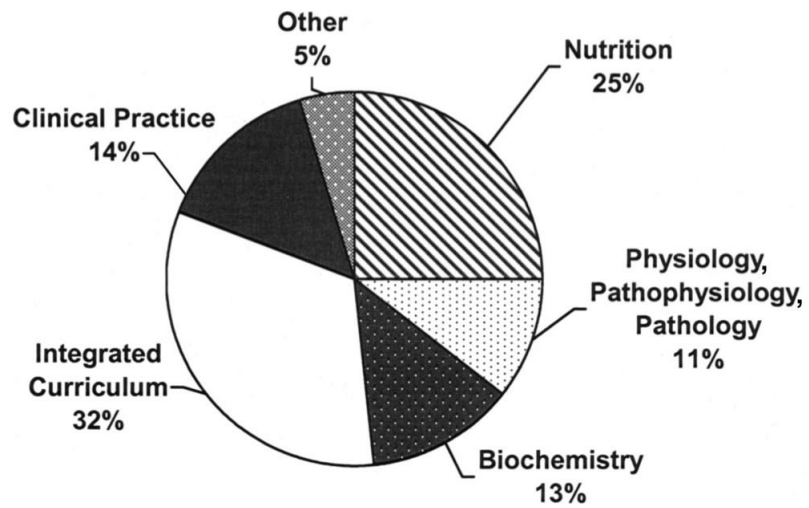
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**FIGURE 1.** Distribution of the total number of hours of required nutrition education at US medical schools. US medical schools responded to a survey conducted in 2004. Ninety-seven schools responded to this question (2 other schools did not indicate the number of hours).



**FIGURE 2.** Distribution of contact hours in nutrition among types of medical school courses. US medical schools responded to a survey conducted in 2004. Ninety-seven schools responded to this question (2 other schools did not indicate the number of hours).



**TABLE 1**Average contact hours of required nutrition instruction<sup>1</sup>

Curriculum year	Contact hours
Years 1 and 2	<sup>h</sup> 18.9 ± 1.2
Years 3 and 4	5.1 ± 0.7
Total	23.9 ± 1.5

<sup>1</sup> All values are  $\bar{x} \pm SE$ ;  $n = 97$ .

**TABLE 2**Course distribution of required nutrition contact hours<sup>1</sup>

Type of course	Number of schools providing part of their required nutrition instruction in this format	Contact hours of nutrition teaching provided in this format
	<i>n</i>	<i>h</i>
Nutrition	32	17.7 ± 1.8 <sup>2</sup>
Physiology, pathophysiology, pathology	36	6.9 ± 1.0
Biochemistry	44	6.8 ± 0.7
Integrated curriculum	58	13.1 ± 1.4
Clinical practice	42	8.0 ± 1.0
Other <sup>3</sup>	13	8.4 ± 1.9

<sup>1</sup> *n* = 97; note that schools could offer nutrition in >1 type of course.

<sup>2</sup>  $\bar{x} \pm \text{SE}$  (all such values).

<sup>3</sup> For example, complementary alternative medicine courses (*n* = 2), clerkship lectures (*n* = 2), clinical foundations, reproduction, endocrinology, systems course, preventive medicine and genetics, pharmacology, metabolism.