

## **Raising Medical Students' Awareness of Nutrition and Fitness in Disease Prevention: Nutrition and Fitness Program at the University of Iowa**

**Linda Snetselaar, Katherine Malville-Shipan, Lois Ahrens, Karen Smith, Cathy Chenard,  
Phyllis Stumbo, Joel Gordon, Alexandra Thomas**

College of Public Health and  
Department of Internal Medicine  
College of Medicine  
University of Iowa

**Abstract:** At the University of Iowa we devised a learning experience, called the Nutrition and Fitness Program, for third-year medical students. The program was designed to raise awareness of the role of nutrition and exercise in the prevention and treatment of disease. Students spent one afternoon learning about their personal health risk factors, such as body mass index, percent body fat, other anthropometric measures such as waist, hip and mid-arm circumference, blood lipids, bone-mass density, dietary analysis, and fitness assessment. Students spent another afternoon visiting the cardiac rehabilitation center. At the end of each rotation, students gathered for a heart-healthy meal that served as a focus for a discussion with dietitians about important nutrition issues.

The literature and our work with medical students support the need and acceptance of a personalized, practical approach to nutrition education. By offering medical students the opportunity to learn about their own nutrition and fitness risk factors, this Nutrition and Fitness Program appears to have played an important role in the students' medical education by narrowing the gap between the "science of nutrition" and the "application of nutrition". Students appreciated learning more about their own health factors and felt that personalizing the information made the learning more valuable and would help in counseling their future patients more effectively.

Good nutrition is an important component in establishing a healthy lifestyle and in preventing major chronic diseases that commonly affect Americans today.<sup>1</sup> Although a majority of medical schools include nutrition as part of their curriculum<sup>2</sup>, research shows that practicing physicians are not transferring this knowledge into their clinical practice.<sup>3</sup> The public health implications of this deficit in the practical application of nutrition principles continue to grow as the prevalence of overweight and obese individuals increases. There is a strong association between physicians' personal dietary behavior and their ability to counsel patients about their diet.<sup>4</sup> Because of this, physicians are uniquely positioned to influence their patients' health behaviors.<sup>5</sup> We believe that by working with students to help them modify and improve their own eating behaviors, we will be increasing the likelihood that they will internalize the importance of nutrition. Thus, as physicians, they will be more likely to address nutrition issues with their patients. If nutritional status becomes an important part of patients' medical evaluation and treatment plans,

costly medications and medical procedures will decline, resulting in improved overall cost effectiveness in our health care system.<sup>6-8</sup>

At the University of Iowa we have devised a learning experience that is part of the Outpatient Internal Medicine Clerkship, a required course for third-year medical students. This experience, called the Nutrition and Fitness Program, has now been in place at the University of Iowa for three years. The program is designed to raise awareness and understanding of the role of nutrition and exercise in the prevention and treatment of disease. It also provides medical students with the opportunity to learn more about their own personal health risk factors.

### **Structure and Methods**

Third-year medical students at the University of Iowa participated in the two-day Nutrition and Fitness Program within their Outpatient Internal Medicine Clerkship. All students at the Iowa City campus rotated through the program over the course of the

year, in groups of 4-10. The program has been ongoing for three years, allowing for continuity as well as regular improvement based on comments from the students' evaluations.

This program was not a research project but an educational program, as determined by the Institutional Review Board (IRB). Although students were not required to participate, the overwhelming majority chose to do so. Students were informed that they could choose not to take part in any of the specific tests or could stop participating in these tests at any time. Refusing the medical and physiological tests would not adversely affect their grade and the course director did not have access to any medical data through this course. Data from measurement of vitals (height, weight, blood pressure, and resting pulse), blood lipids, and DEXA, were entered into the students' permanent medical records because they were performed by GCRC hospital staff; students were informed that they should request not to have these tests performed if they did not wish to have this information included in their charts. Students were also offered the opportunity to have any of their values removed from the group aggregate data.

### Facilities & Schedule

All activities were carried out in the University of Iowa Hospital and Clinics (UIHC). Students divided their time between the General Clinical Research Center (GCRC) and the Cardiovascular Health, Assessment, Management and Prevention Services (CHAMPS) within UIHC.

Each rotation of third-year medical students was divided into two groups. One group spent the afternoon going through a series of self-assessment stations in the GCRC while the other group visited CHAMPS. The following afternoon, the two groups switched places. At the end of the second afternoon, the two groups joined in the GCRC for a dinner and nutrition discussion roundup.

**GCRC Activities** - In the morning, students came to the GCRC nurse's station to have their fasting blood drawn for lipid screening and their vital statistics (blood pressure, resting pulse, height, weight) measured. They returned to the GCRC in the afternoon to participate in a series of stations designed to help them assess their nutrition and fitness risk factors. The GCRC activities were as follows:

- **Blood Lipid Analysis**- Following a 12-hour fast, nurses took a 15ml venipuncture blood draw for a lipid profile of each student.

Blood samples were analyzed for total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglycerides. Results of the lipid analysis were discussed individually with a dietitian during the counseling session later the same day.

- **Dual Energy X-ray Absorptiometry (DEXA)** - We provided students with the opportunity to have a DEXA scan performed by the UIHC DEXA technician. Full body and left hip scans provided information about percent body fat and bone mineral density. Students received a printout of their DEXA results in which the specific information typically reported to a patient's physician was emphasized.
- **Anthropometry** - Fully qualified and experienced GCRC staff performed anthropometric analyses on each student individually in a private room. Skin fold measurements were taken in three sites: triceps, chest, and sub-scapula for men; triceps, super-iliac, and abdomen for women. Students received information about their body mass index (BMI), percent body fat, as well as waist, hip, and mid-arm circumference.
- **Dietary Self-Assessment** - Before coming to participate in the Nutrition and Fitness Program, students were given the assignment of assessing their own diet: they kept a record of everything they consumed for 1-3 days and analyzed their own food record using an online dietary assessment tool called the Interactive Healthy Eating Index. The Interactive Healthy Eating Index (IHEI) website,<sup>9</sup> developed by USDA's Center for Nutrition Policy and Promotion, calculates HEI scores and daily nutrient intakes for the user, as well as providing a graphic depiction of their "personal Food Guide Pyramid". The results of this dietary self-assessment were discussed during the dietary counseling station.
- **Dietary Counseling** - Students had the opportunity to discuss dietary concerns with a registered and licensed dietitian in an individual consultation. Their lipid profile results were discussed in context with their dietary behaviors. Through the counseling session, the dietitian modeled a preventive nutritional counseling format that is typi-

cally used by dietitians in a clinical setting. They also provided practical suggestions for doctor / patient discussions of diet.

- Fitness Assessment** - A trained staff member demonstrated to the student several materials that could be easily incorporated into medical practice to address the importance of physical activity: the Physical Activity Readiness Questionnaire (PAR-Q)<sup>10</sup> and Patient Centered Assessment and Counseling for Exercise (PACE).<sup>11</sup> The PAR-Q serves as a screening tool to quickly and easily identify adults for whom physical activity might not be appropriate. PACE contains a short fitness assessment, designed to be completed by a patient in a waiting room, which determines the patient's current level of physical activity and readiness to change. It also provides three counseling protocols based on the patient's appropriate stage of change: "not ready to change", "ready to change" or "active" (meeting physical activity guidelines).

The staff member also assessed students' fitness level privately, using the YMCA 3-Minute Step Test. The YMCA 3-Minute Step Test is a simple fitness assessment that can be utilized with healthy adults. The test involved stepping up and down at a 24-steps-per-minute rate for three minutes; a tape recording of the correct cadence (96 beats-per-minute) was played to assist the participant in keeping the correct pace. Following the step test, the participant immediately sat down and, within five seconds, the staff member started counting the pulse for one full minute. The score for the test, the total one-minute post-exercise heart rate, reflects the heart's ability to recover quickly. Comparing this value with a standard chart offers an estimated fitness level based on the partici-

pant's gender and age.

**CHAMPS Activities** - Students spent one to two hours visiting the Cardiovascular Health Assessment, Management, and Prevention Services (CHAMPS) located in the UIHC. During this visit, students had the opportunity to tour the facility and to observe what services are available to inpatients and outpatients who are recovering from heart surgery or cardiovascular disease. Students observed patients going through cardiac rehabilitation or taking classes in nutrition, stress reduction or physical activity. They had the opportunity to experience for themselves the process of a standard clinical fitness assessment on the treadmill.

**Meal and Discussion** - On the second afternoon of each rotation, following completion of all activities in the GCRC and CHAMPS, students returned to the GCRC to participate in a healthy meal, discussion, and recap of the program. GCRC staff used colorful tablecloths and decorations to transform the day room into a festive setting. Each year the GCRC kitchen staff designed a different meal, incorporating Mexican, Italian, or Mediterranean foods low in saturated fat and trans fat. The foods served as a focus for a discussion on healthy eating issues. During dinner, a pair of licensed dietitians led a group discussion that covered topics such as fatty acids in the diet, the role of phytochemicals, and recent dieting trends, all in the context of discussing nutrition issues with patients.

**Statistical Analysis** - Results from each station were provided to each student individually. Aggregate group data was also compiled.

**Student Evaluations** - Students filled out evaluations immediately after the meal and discussion in the GCRC. They rated each of the activities

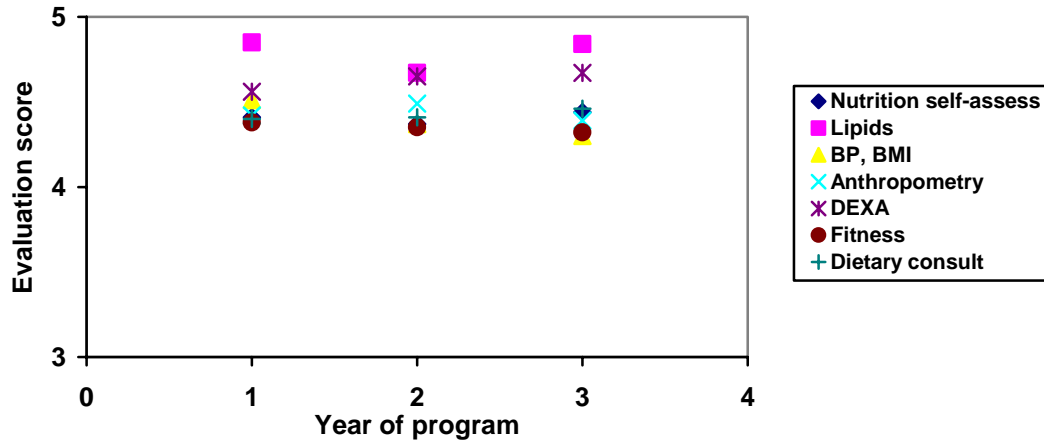
**Table 1**  
**Student Participation in Nutrition and Fitness Program**

Year <sup>a</sup>	Gender	Number of students participating	Student Age <sup>a</sup>
1	Female	48	26.3 ±3.8
	Male	63	25.9 ±2.4
2	Female	44	26.9 ±2.8
	Male	42	27.6 ±5.3
3	Female	41	26.8 ±2.6
	Male	50	26.8 ±2.4

<sup>1</sup>Year 1=2001-2; Year 2=2002-3; Year 3=2003-4.

<sup>2</sup>Mean age + standard deviation.

**Figure 1. Student Evaluation of GCRC Stations:  
Value to self**



according to how the information gained in each station would be of value with future patients or on a personal basis, from 1 (poor) to 5 (excellent). Students listed their most and least favorite aspects of the experience, along with suggestions for improvement.

### Results

Table 1 shows a summary of the number and ages of students from the first three years of the Nutrition and Fitness Program. From 2001 to 2004, a total of 288 students participated.

Figures 1 and 2 summarize the mean of three years of evaluation scores<sup>a</sup> from the medical students: Figure 1 shows students' evaluations of the value of the GCRC stations for themselves and Figure 2 shows their evaluation of the value of the stations for future use with patients. All stations were highly rated during all three years; the mean for each group of students was between 3.7 and 5 for every station. Different stations appealed to different students but, in general, students gave highest ratings to their lipid analyses and DEXA scans.

From the students' comments on their evaluations, it appears that this Nutrition and Fitness program provided them with a much better understanding of their own personal risk factors as well as a better understanding of how to discuss practical nutri-

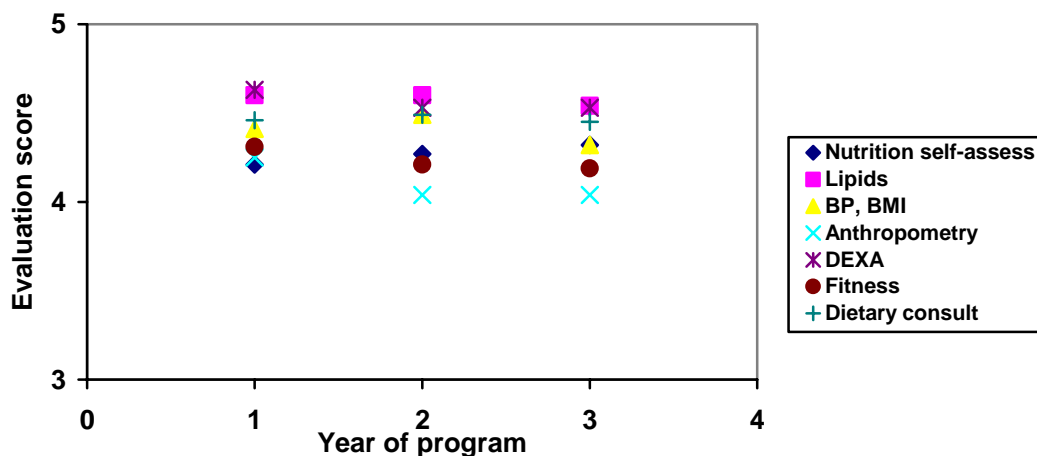
tion and fitness issues with patients. They appreciated having the opportunity to learn more about their own health factors on a one-to-one basis and felt that personalizing the information made the learning more valuable. Many students thanked us for offering the program and felt it was very helpful to go through the experiences themselves to be able to counsel their future patients more effectively.

### Discussion

Today Americans have access to more nutrition information through written media than ever before, especially from the Internet. As a result, the public is becoming more nutrition-conscious and is demanding reliable sources to improve decision-making about their personal health. Physicians were viewed by 70% of adults as their single most credible source of health information.<sup>12</sup> Patients consistently report preventive services as a high priority for their health care and want physicians to provide nutrition counseling.<sup>13</sup> Data from the three-state Health Education and Research Trial revealed that 72% of patients would like their physician to talk to them about diet, and 66% of patients would like their physician to talk to them about weight loss. Rather than being alienated by physician inquiry about lifestyle, patients expect and may even welcome it.<sup>5</sup> Unfortunately, data from the 1995 National Ambulatory Medical Care Survey suggests that less than one in three adults receive diet counseling when seen by primary care providers.<sup>14</sup>

<sup>a</sup> Stations were evaluated by the students on a scale from 1 (poor) to 5 (excellent).

**Figure 2. Student Evaluation of GCRC Stations:  
Value to future patients**



Medical school is the foundation of a physician's medical education. Recent surveys indicate that nutrition education is a part of the curriculum in the large majority of US medical schools.<sup>2,15</sup> However, substantial inconsistencies exist in training between schools, suggesting there is great diversity in the provision of nutrition education. Torti collected data directly from individuals responsible for teaching nutrition in 98 medical schools. He reports that of the 88 schools that require nutrition, slightly more than half offered a stand-alone nutrition course. The remaining institutions integrate nutrition in biochemistry or physiology, not allowing room for a separate class to address the practical application of nutrition. Research shows that practicing physicians who studied nutrition had more favorable attitudes towards nutrition. These physicians, however, did not use clinical nutrition skills in their practice to any greater degree than those who had not studied nutrition during medical school. Medical students have long indicated that they feel their medical curriculum does not provide enough education about clinical nutrition issues.<sup>16</sup> They have indicated that they would like to learn more about how to talk about food with their patients. The missing element is the application of the nutrition knowledge to patient care. Key barriers to conducting nutrition counseling in the physician's office have been identified. These barriers include not enough time, inadequate nutrition training in medical school, and lack of confidence in their ability to change patient behavior.<sup>17,18</sup> Therefore, an education that goes beyond knowledge and focuses on confidence and skill in providing nutrition services is timely.

Primary-care research and social learning theory suggest innovative approaches to integrate nutrition counseling into medical school curriculum. The social learning theory suggests that behavior change is mediated by changes in self-efficacy.<sup>19</sup> For example, physicians who attain high levels of confidence in their nutrition counseling ability are more likely to assist their patients in making dietary changes than those with low levels of confidence. A promising way to build self-efficacy in the minimum time possible and with the least disruption of established medical programs is to increase students' understanding of their own diet and health parameters.<sup>3</sup> For years, experts have found association between physician personal health behavior and counseling practices.<sup>20-22</sup> The two spheres of their personal and professional lives influence each other. Two recent studies report a strong, consistent association between physicians' personal dietary behavior and their practice of performing nutrition counseling. In face-to-face physician surveys, Sciamanna and colleagues reported that 59% of physicians who consistently avoid high-fat foods "very often" assisted patients in making changes in dietary fat and fiber, compared to only 19% of physicians who did not personally avoid high-fat foods.<sup>4</sup> Frank and colleagues show that physicians who have intentionally altered their diets, and thus have a higher awareness of diet, are more likely to counsel patients about nutrition and weight loss.<sup>23</sup>

## Conclusion

For the physician, narrowing the gap between the “science of nutrition” and the “application of nutrition” is critical for the provision of optimal preventive care. The literature and our work with medical students support the need and acceptance of a personalized, practical approach to nutrition education. Dietary counseling has been shown to reduce medical costs.<sup>6-8</sup> Physicians who address risk behaviors are likely to do so with an average of 1000-2000 patients.<sup>4</sup> Therefore, there is the potential for great medical cost savings when we intervene with these learning experiences with health care providers.

By offering medical students the opportunity to learn about their own personal nutrition and fitness risk factors, this Nutrition and Fitness Program appears to play an important role in the students' medical education. In order to counsel future patients on the importance of nutrition and fitness factors, both knowledge and confidence are necessary. Programs in the medical school curriculum like this, that allow students to learn on a very individual level, provide future doctors with the tools to become better health care providers.

## Acknowledgements

The staff at the University of Iowa GCRC provided valuable time and resources; some of the many personnel who helped to carry out this program were Donna Hemingway and Gregory Peak. Kathleen Janz in the Department of Sport, Health, Leisure and Physical Studies developed the fitness station and provided important materials and advice. Patricia Lounsbury, Mindy Fretz, Erik Samuelson, and Jamie Brooks worked with students in CHAMPS. The Nutrition Academic Award grant from National Institute of Diabetes and Digestive and Kidney Diseases at NIH supported the development of this program. The Clinical Research Center is supported by Grant M01-RR-59 from National Center for Research Resources, General Clinical Research Centers Program, at the National Institutes of Health.

## References

1. Walker W. Overview. *Am J Clin Nutr*, 72(suppl):865S-867S, 2000.
2. Reston V. Report of the council on medical education: Nutrition and dietetics education for medical students. American Medical Student Association CME report 1-99, 1999.

3. Levine B, Wigren M, Chapman D, Kerner J, Bergman R, Rivlin R. A national survey of attitudes and practices of primary-care physicians relating to nutrition: strategies for enhancing the use of clinical nutrition in medical practice. *Am J Clin Nutr*, 57:115-119, 1993.
4. Sciamanna C, DePue J, Goldstein M, Parks E, Gans K, Monroe A, Reiss P. Nutrition counseling in the Promoting Cancer Prevention in Primary Care Study. *Prev Med*, 35:437-446, 2002.
5. McBride P, Underbakke G, Massoth K, Brown R, Solberg L, Ellis L, Schrott H, Smith K, Swanson T, Spencer E, Pfeifer G, Know A. Improving prevention systems in primary care practices: the Health Education and Research Trial (HEART). *J Fam Pract*, 49:115-125, 2000.
6. Sikand G, Kashyap M, Wong D, Hsu J. Dietitian intervention improves lipid values and saves medication cost in men with combined hyperlipidemia and a history of niacin non compliance. *J Am Diet Assoc*, 100:218-224, 2000.
7. Sheils J, Rubin R, Stapleton D. The estimated costs and savings of medical nutrition therapy: the Medicare population. *J Am Diet Assoc*, 99:428-435, 1999.
8. Pastors J, Warshaw H, Daly A, Franz M, Kulkarni K. The evidence for the effectiveness of medical nutrition therapy in diabetes management. *Diabetes Care*, 25:608-613, 2002.
9. Interactive Healthy Eating Index. U. S. Department of Agriculture's Center for Nutrition Policy and Promotion. July 2004. <<http://www.cnpp.usda.gov/ihei.html>>.
10. PAR-Q (Physical Activity Readiness Questionnaire). Canadian Society for Exercise Physiology, 1994.
11. PACE (Patient-Centered Assessment and Counseling for Exercise) Physical Activity and Nutrition Manual. The PACE Project, San Diego Center for Health Interventions, 1999.

12. Maheux B, Pineault R, Lambert J, Beland F, Berthiaume M. Factors influencing physicians' preventive practices. *Am J Prev Med*, 5:201-216, 1989.
13. Heywood A, Firman D, Sanson-Fisher R, Mudge P, Ring I. Correlates of physician counseling associated with obesity and smoking. *Prev Med*, 25:268-276, 1996.
14. Centers for Disease Control and Prevention: Missed opportunities in preventive counseling for cardiovascular disease—United States, 1995. *JAMA*, 279:741-742, 1998.
15. Torti F, Adams K, Edward L, Lindell K, Zeisel S. Survey of nutrition education in U.S. medical schools—an instructor-based analysis. *Med Educ Online*, 6:8, 2001. <<http://www.Med-Ed-Online.org>>
16. Walker W. Symposium: Innovative Teaching Strategies for Training Physicians in Clinical Nutrition: The Nutrition Academic Award (NAA) Medical Schools. *J Nutr*, 133:541S-543S, 2003.
17. Havas S, Rixey S, Sherwin R, Zimmerman S, Anderson S. The University of Maryland experience in integrating preventive medicine into the clinical medicine curriculum. *Public Health Rep*, 108:332-339, 1993.
18. Schucker B, Wittes J, Santanello N, Weber S, McGoldrick D, Donato K, Levy A, Rifkind B. Change in cholesterol awareness and action. Results from national physician and public surveys. *Arch Intern Med*, 151:666-673, 1991.
19. Elder J, Ayala G, Harris S. Theories and intervention approaches to health-behavior change in primary care. *Am J Prev Med*, 17(4):275-284, 1999.
20. Schwartz J. Internists' practices in health promotion and disease prevention. *Ann Intern Med*, 114(1):46-53, 1991.
21. Kawakmi M. Relation between smoking status of physicians and their enthusiasm to offer smoking cessation advice. *Intern Med*, 36(3):162-165, 1997.
22. Sherman S, Hershman W. Exercise counseling; how do general internist do? *J Gen Intern Med*, 8(5):243-248, 1993.
23. Frank E, Wright E, Serdula M, Elon L, Baldwin G. Personal and professional nutrition-related practices of US female physicians. *Am J Clin Nutr*, 75:326-332, 2002.

#### Correspondence

Linda G. Snetselaar  
C-21G General Hospital  
Department of Epidemiology  
College of Public Health and Department of Internal  
Medicine, College of Medicine  
University of Iowa  
Iowa City, IA 52242

Phone: (319) 384-5011  
Fax: (319) 335-9200  
E-mail [linda-snetselaar@uiowa.edu](mailto:linda-snetselaar@uiowa.edu)