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## Collaboration Between Dietetics and Dentistry: Dietetic Internship in Pediatric Dentistry

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### Abstract

The American Dietetic Association and the American Dental Association share a common interest in improving the health and quality of life of the population. Dental visits present an opportunity to identify nutrition-related issues for both the pediatric and adult population. Traditionally, dental and nutrition students have had little opportunity to learn and work together since little time was spent on nutrition in the dental curriculum. The purpose of this article is to describe the development of a new collaborative training experience for dietetic interns and pediatric dentistry residents. The oral health rotation for dietetic interns also has several objectives, including experience interacting with a culturally diverse population and participating in community nutrition education (Head Start). In its first 18 months, the collaborative program has been viewed as a success by the pediatric dentistry faculty and residents and the nutrition faculty and interns.

### Keywords

dietetic interns; pediatric dentistry residents

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THE relationship between oral health and chronic disease supports the need for collaboration between dentistry and dietetics. Nutrition-related chronic diseases, such as diabetes, heart disease, and obesity, are among the top 10 leading causes of death in the United States.<sup>1</sup> Dental and nutrition professionals play key roles in the prevention and management of such public health issues. Furthermore, childhood obesity is a growing concern for health practitioners, with national and local prevalence rates reaching epidemic levels.<sup>2</sup> Pediatric dentists are in an excellent position to recognize dietary risks and help prevent nutrition-related problems in children before these escalate to chronic diseases. Dentists are already skilled at detecting oral disease at an early stage, including the onset of dental caries and periodontal disease, and should be similarly trained to identify the early stages of dietary patterns that affect both general and oral health. The purpose of this article is to describe the development of a new collaborative training experience for dietetic interns and pediatric dental residents and the faculty of the respective departments.

### BACKGROUND

The American Dietetics Association, the American Dental Association, and other organizations, such as the American Academy of Pediatric Dentistry, have promoted the idea

that nutrition is an integral part of oral health and have supported the integration of oral health and nutrition services, education, and research.<sup>3–5</sup> The American Dental Association report on the future of dentistry released in 2001<sup>4</sup> includes 2 major relevant recommendations: (1) encouraging “evidence-based practice”; the efficacious combination of research, technology, and goals of individual patients and (2) identifying ways to integrate science, research, practitioner expertise, and patient choice into the delivery of care.

There is a strong incentive at the national level for integration of various healthcare disciplines to develop strategies that promote and explore opportunities for collaboration. The U.S. Surgeon General’s *National Call to Action to Promote Oral Health: A Public-Private Partnership*<sup>7</sup> suggests that we must build the science base and accelerate the science transfer (Action Step 3) and stresses that dental education incorporate curricula and other information and strategies from other health professions. The National Heart, Lung, and Blood Institute, in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases, released the first federal guidelines on the identification, evaluation, and treatment of overweight and obesity. The Centers for Disease Control and Prevention reports that 65% of adults and nearly 20% of children in the United States are overweight.<sup>8</sup> Obesity and overweight substantially increase the risk of morbidity from hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, and endometrial, breast, prostate, and colon cancers. Higher body weight is also associated with an increase in all-cause mortality.<sup>9</sup>

## NUTRITION AND THE DENTAL CURRICULUM

Studies in the past decade have shown a clear link between nutrition and dental caries, type 2 diabetes, and periodontal disease, all of which suggest that dentists should be knowledgeable and actively engaged in promoting healthy lifestyles to their patients.<sup>10–12</sup> Overweight and obesity is one example of a current health problem where dentists could assist with health promotion. Dentists can play a valuable role in screening both the pediatric and adult population for overweight and obesity. Given the 3-fold rise in cases of overweight in children and adolescents in the past 2 decades, it would seem prudent that all healthcare providers, including dentists, screen and refer patients appropriately. Present data reported by the Centers for Disease Control and Prevention show that nearly 16% of children aged 6–11 are overweight.<sup>13</sup>

One step in promoting integration and collaboration between nutrition and other disciplines was the National Heart, Lung, and Blood Institute’s Nutrition Academic Award Program, which resulted in a number of innovative nutrition curricula implemented in medical schools.<sup>14</sup> Among the 21 institutions in the Nutrition Academic Award Program, 5 had predoctoral programs in dentistry. These curricula were built on the foundation of providing a focused approach on nutrition as a risk component and providing the basis for primary healthcare providers to do risk assessment and suggest strategies to effect change. Dentists can easily utilize the strategies suggested.<sup>15–17</sup>

Dentistry is an appropriate site for health-promotion activity on nutrition because dental training provides a broad education in the biomedical sciences and an extensive education in oral medicine, risk assessment, epidemiology, and health promotion.<sup>18</sup> According to the National Center for Health Statistics, 62.8% of adults aged 18–64 visited their dentist or dental clinic at least once in 2002, a rate that has been documented consistently from 1998 until 2002.<sup>19</sup> Given the frequency of dental visits by US adults, there is a strong incentive for dental schools to develop a nutrition program that provides the breadth and depth of experience for graduates to collaborate with and refer to registered dietitians. Clearly, dentists have the

potential to make a broad influence with their choices for health promotion in their practices.  
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## **DESCRIPTION OF THE NEW YORK UNIVERSITY DIETETIC INTERNSHIP PROGRAM**

New York University (NYU) is the largest private university in the United States. The Department of Nutrition, Food Studies and Public Health is in the Steinhardt School of Education (Department of Nutrition) and includes an accredited dietetic internship. The NYU Dietetic Internship educates students to integrate dietetic theory into practice and apply their skills in many settings.

The Department has 2 Dietetic Internship classes in clinical rotations per year, with approximately 15 students in each class. The Dietetic Internship is a year-long program. The first semester focuses on academic graduate coursework: medical nutrition therapy, research methods, nutrition-focused physical assessment, and nutrition counseling theory and practice. The following semester is the 6-month supervised clinical practice component. There are 5 major rotations in the supervised clinical practice component: clinical nutrition therapy, community nutrition, food service management, staff relief, and an elective. The Pediatric Dental Clinic at the NYU College of Dentistry is a new site for the Dietetic Internship elective. Students must complete 13 weeks of nutrition therapy in their core hospital site before they begin their 2-week long dental elective.

## **DESCRIPTION OF THE NYU COLLEGE OF DENTISTRY AND ITS CURRICULUM IN NUTRITION**

The largest dental school in the United States, the NYU College of Dentistry graduates approximately 350 general dentists and 78 postgraduates in 7 dental specialties annually. In 2001, the NYU College of Dentistry implemented a new curriculum that was designed along 6 major themes, one of which was Epidemiology and Health Promotion. Within this theme there are several concentrations, including developing critical thinking skills, application of technology in solving intellectual problems, assessing the scientific literature, professionalism and ethics, and health promotion in a broad context within the overall plan to improve general health and the quality of life of patients. One area of health promotion that was further developed was nutrition.

Health promotion including nutrition is integrated early in the students' education. This is based on the rationale that entering students can become competent in the application of this information early in their education leading to greater sensitivity to health-promotion issues, increased health-promotion activities, and the development of a "health-promotion" mindset. Table 1 describes how nutrition is integrated in the 4-year predoctoral curriculum at the NYU College of Dentistry.

An additional goal of the NYU College of Dentistry nutrition education initiative was to create an active linkage to clinical practice and continuity through the students' education. With nutrition, like other clinical issues, it is important that resources be created to reinforce the core curriculum, reflect current science, and reflect the current needs of the public, new knowledge in the field, and translation of new knowledge into prevention, detection, and interventions. This was accomplished with the help of the following steps: (1) design of a new diagnostic dental chart that emphasized risk assessment rather than detection of active disease, (2) creation of a videotape on how a dentist can do a diet recall and develop an individualized nutrition education plan,<sup>24</sup> (3) provision of recurring faculty training on nutrition, and (4) provision of faculty with training in health promotion to provide support for the clinics.

As the dental students entered their clinical training, it became apparent that there was inadequate clinical faculty guidance and support for health-promotion skills, which included nutrition counseling. Because appointing additional faculty was not possible, other opportunities were explored. The first opportunity was a collaboration of the NYU College of Dentistry with the Dietetic Internship Program at the Department of Nutrition, Food Studies and Public Health in the Steinhardt School of Education. The development of the elective rotation for the dietetic interns was based on the concept that it would provide dental students with valuable opportunities to improve their ability to recognize dietary risk factors for oral and systemic diseases, give basic nutrition education, and help dental students become comfortable referring patients to registered dietitians for medical nutrition therapy as needed. Likewise, dietetic interns would benefit from learning more about the relationship between diet and oral health. By implementing nutrition services in a dental setting, dietetic interns can apply and share their skills, which include dietary assessment, patient education and counseling, and working on an interdisciplinary healthcare team. To facilitate this collaboration, the Clinical Nutrition Program and the NYU College of Dentistry Department of Epidemiology and Health Promotion initiated an interdisciplinary program. Before attempting to implement a program in all of the NYU general care dental clinics, the Pediatric Dentistry Clinic was chosen as an ideal model to test the program. Pediatric dentistry is located in one clinic, combines predoctoral and postdoctoral students, and functions full-time. Prevention and health promotion are of primary importance in the training of pediatric dentists. It was seen as an appropriate setting to pilot test the oral health rotation.

## **DEVELOPMENT OF THE ORAL HEALTH ROTATION IN THE PEDIATRIC DENTISTRY CLINIC**

The oral health rotation was developed in 3 stages. Stage 1, design stage, included the development of the program, its goals, a needs analysis for additional curriculum content, and a timetable for implementation. Stage 2, trial stage, was a trial of the program with a dietetic intern who had just completed the nutrition graduate program but never had a dental rotation. Stage 3, implementation stage, was the implementation of the program with the first dietetic intern, evaluation of the rotation, and refinements to address any deficiencies identified.

### **Stage 1—Design stage**

A small group of faculty members representing both the dietetics and dental education programs met several times and established a list of goals for the oral health internship rotation, such as planning the implementation, designing the evaluation criteria, and setting future research collaboration. Both faculties developed and agreed upon strategies so that the rotation met and achieved important goals for the education of both dietetic interns and pediatric dentistry residents.

The Director of the Dietetic Internship Program and other nutrition faculty members developed nutrition and oral health curriculum objectives based on the dietetic internship competencies, learning activities, and preceptor evaluation strategies to meet the clinical competencies.

An outline of curriculum content for each group (oral health for dietetic interns and nutrition assessment for pediatric dentistry residents) was established. The faculty members in nutrition added an oral health examination in a course titled “Nutrition-Focused Physical Assessment” presented by a faculty member from the NYU College of Dentistry. The pediatric dentistry residents attended a seminar on nutrition assessment, use of assessment tools like the 24-hour dietary recall and determination of body mass index in children, as well as the appropriate vocabulary for each. In-class presentations were supplemented with readings about nutrition and oral health, diet and dental health, and nutrition, diet, and oral infectious diseases.

## Stage 2—Trial stage

Stage 2 began with the placement of a student volunteer who had recently completed the Dietetic Internship but had no prior experience in a dental setting in a 4-week postinternship at the NYU College of Dentistry Pediatric Dentistry Clinic. She provided feedback to the dietetic and dental faculty in pediatric dentistry clinic, issues addressed included the oral health nutrition curriculum, adequacy, quality, and relevance of readings, potential projects, and the importance of a study guide that was developed for the internship. Changes were made on the basis of this feedback and observation by the nutrition and dental faculty.

Specific objectives that met the needs of the dietetic interns and pediatric dentistry residents were developed by the respective faculties to serve as a guideline for development of the program. This rotation aimed to

1. provide interdisciplinary experience for pediatric dentistry residents, dietetic interns, and school health personnel (such as Head Start) to gain a mutual understanding of the contribution of each in a community-based setting,
2. provide nutrition counseling to parents/caregivers/children on making proper food choices to promote healthy eating and good oral health,
3. provide specific counseling to parents/caregivers for the prevention of early childhood caries,
4. conduct general health assessment when a child is identified to have a weight that is not appropriate for her or his height,
5. provide opportunities for dietetic interns and dental residents to collaborate in research and case study presentations,
6. develop nutrition education materials,
7. counsel and interact with a culturally diverse population, and
8. participate in community nutrition education with dental hygienists (Head Start).

During this stage, the dietetic intern collaborated extensively to provide feedback to the Dietetic Internship director and the pediatric dentistry faculty members who were assigned to the project. For example, we learned there was a need for a brief orientation and that it was useful to give dietetic interns time to identify patient education materials and to develop new materials where no existing materials were available. The dietetic intern provided useful insights into the nature of the relationship with the pediatric dentistry residents and how it could be enhanced. Finally, this trial stage opened a useful dialogue between key faculty members who would ensure a successful rotation.

Stage 2 was completed with a pilot test of the oral health rotation with 3 dietetic interns. For their elective rotation, they were assigned full-time for 2 weeks to the Pediatric Dentistry Clinic and worked with the pediatric dentistry residents. They also did an in-service presentation for the residents and faculty members in pediatric dentistry as well as the Dietetic Internship director. Evaluations and ongoing feedback by interns contributed to further refinement of the oral health rotation. One key pediatric dentistry faculty member, a dental hygienist, worked closely with the dietetic interns to organize all the materials, assignments, and assessment forms that would be used in the program. One dietetic intern and the pediatric dentistry faculty member developed a referral system for the pediatric dentistry residents to use to refer patients to the interns. Lecture topics were also identified for the interns to deliver to the residents and the pediatric dentistry faculty.

### Stage 3—Implementation stage

As Stage 3 began, a nutrition doctoral student (MS, RD) volunteered to spend one morning a week in the Pediatric Dentistry Clinic. She worked with a pediatric dentistry faculty member to create a nutrition resource manual for new dietetic interns and pediatric dentistry residents. This manual is a resource for each group and was incorporated into their training seminars.

We implemented the last stage in September 2004. At the present time, all dietetic interns are assigned to the oral health elective. Each semester 13 to 15 dietetic interns are assigned to these 2-week blocks to meet their clinical elective.

### ACTIVITIES DURING THE ORAL HEALTH ROTATION

During the rotation, dietetic interns work closely with patients and their caregivers, pediatric dentistry residents, and school children in a community-based setting. The Nutritional Screening Flow Chart (Fig 1) is a model that has been used in the NYU College of Dentistry program, and it is an effective model to illustrate the decision pathway for referral regardless of the age of the patient. This concept is employed in the rotation.

Specific consultations are arranged on the basis of the following pattern: The dietetic intern provides a consultation to any caregiver who requests it. The pediatric dentistry resident may suggest a consultation with the dietetic intern if she or he recognizes risk factors, such as the presence of chronic diseases, high body mass index, record of caries experience, or if the patient faces treatment, such as for orthodontics, that may increase his or her risk for caries.

The dietetic intern does a nutrition screening and assessment, determines appropriate intervention, and provides nutrition education as it relates to diet and oral health. While promoting oral health and identifying the risk for being overweight are the focuses of this program, the dietetic interns do not do weight reduction therapy. Interventions are limited to education, promoting a deeper understanding of the role of carbohydrates and sugar in oral health; and suggesting strategies to assist in making healthier food choices. At the end of the first week of the rotation, each dietetic intern gives a presentation on a pertinent topic that links oral health and nutrition and delivers a lecture to the dental residents and dental faculty.

Dietetic interns particularly appreciated the community-based experience that is part of the pediatric dentistry program. The schedule for the dietetic interns permitted them to accompany a pediatric dentistry faculty member and dental students to community-based programs, such as Head Start, twice each week. At these outreach sites, the interns had the opportunities to educate public school children on making healthier food choices related to their teeth and their general health.

### QUALITATIVE EVALUATION

As a pilot project for both the Dietetic Internship and the NYU College of Dentistry, we evaluated whether students were adequately prepared for working in an oral health setting, that the proposed competencies and objectives could be adequately achieved, and that both the interns and pediatric dentistry residents would benefit from this initiative. The dietetic interns provided feedback on the value of the assigned readings, study guide questions, assignments, and learning activities. On the basis of this feedback, the Dietetic Internship director and dental faculty made a number of refinements. Multiple levels of evaluation were incorporated into the pilot program, including formative evaluations to identify strengths and weaknesses of the rotation and summative evaluations to assess the value of the dietetic rotation for patients and dental staff at the clinic. Formative evaluation included reviewing the list of Dietetic Internship competencies, dietetic interns' meetings with dental faculty and the Dietetic Internship director to review the success and identify areas of improvement for the dental rotation, and a



comprehensive review of all assignments and projects completed while in the dental clinic by dental and nutrition faculty. Summative evaluations assessed the long-term ability of dental staff to appropriately refer high nutrition-risk clients to a dietetic intern.

Based on the formative evaluation from the dietetic interns and a post-oral health rotation interview with the Dietetic Internship director, this new elective rotation has proven to be a valuable and positive interdisciplinary learning experience. Students have highlighted a number of benefits of training in a dental setting including the following:

- Working with dentists, dental students, dental hygienists, a pediatric population, and their parents/caregivers
- Learning about the relationship between nutrition/diet and oral health
- Participating in community outreach work
- Increasing skill development by providing nutrition education and counseling to diverse patients with positive feedback from patients, their caregivers, and pediatric dentistry residents
- Working in a health-promotion environment
- Developing nutrition education materials and giving presentations to the dental faculty
- Creating models of career opportunities for registered dietitians to work with dentists

The pediatric dentistry residents reacted favorably as well. They thought that the support of dietetic interns was a positive addition to their clinical experience and that the seminars conducted by the dietetic interns were valuable, especially clinical applications of the material addressed. As a result, the calculation of body mass index for children has become the clinical standard in the clinic and residents are comfortable referring the patients/caregivers who need intervention to the dietetic interns.

## SUMMARY

The major goal associated with this project is to develop a collaborative program that will serve as a template for the larger predoctoral program in dentistry. Given the dedication of pediatric dentistry to health promotion and the fact that nutrition assessment has been part of the pediatric dentistry residency, it is seen as the logical site for a demonstration project. As we continue to implement this internship in pediatric dentistry, we expect to incorporate a similar program for patients in the general dental clinics of the college. Prior to this initiative, little formal time in the Dietetic Internship was devoted to oral health in a dental setting. The outcome from the collaboration has been a linkage between clinical dietitians and the health-promotion activity of dentists.

On the basis of the data presented in a recent study evaluating the health-promotion activities in the Special Supplemental Nutritional Program for Women, Infants, and Children (WIC), one can conclude that nutritional counseling was related to an increase in utilization of oral health services.<sup>25</sup> This evidence suggests that increased interaction, awareness, and new skills that emerged from the training provided expanded career support for nutritionists and increased access for patients who can benefit from these services. Another outcome from this nutrition-dentistry partnership is research collaboration. In the first year of the program, 4 research projects have been initiated. Each nutrition-related project was completed by a pediatric dentistry resident supervised by nutrition faculty and presented at a national meeting of pediatric dentists. Two major research projects exploring issues related to nutrition, oral health, and childhood obesity are also underway.

## FUTURE GOALS FOR THE ORAL HEALTH ROTATION AT THE NYU COLLEGE OF DENTISTRY

As the program continues, we plan to extend the oral health rotation of dietetic interns to 3 weeks in length. On the basis of the experience in the first year, we plan to create a nutrition resource manual for new dietetic interns and pediatric dentistry residents that will contain all education materials developed by the interns, copies of the presentations given by interns, and updated journal articles related to nutrition and oral health. An academic goal is to form a partnership between pediatric dentistry residents and dietetic interns to prepare and present case studies of patients from the Pediatric Dental Clinic at seminars. The ultimate goal of the oral health rotation is to extend it into the clinical program of the college and not just one postgraduate program.

The outcome of this process will be to prepare dentists to evaluate patients, identify nutrition-related risks, and make appropriate interventions and referrals. The relationship is bidirectional as dentists are a potential referral source for dietitians in practice. Specific plans for the NYU program are to

1. create a clinical model that can be incorporated into the general dentistry (adult) clinics at the NYU College of Dentistry
2. add a nutritionist as a faculty member to the dental faculty to supervise the dietetic interns
3. expand the oral health rotation of Dietetic Internship from 2 weeks to 3 weeks
4. enhance the nutrition curriculum to include more in-depth lectures on nutrition/diet and oral health
5. increase participation by dietetic interns in the diagnostic data collection part of the oral health examination by the dentists (students, residents)
6. conduct research on outcomes of this collaborative clinical program to provide evidence of improved nutrition status through the early intervention of dental residents and dietetic interns
7. develop a postinternship certificate program in nutrition and oral health
8. develop a shared research agenda between the Clinical Nutrition Program and the Department of Epidemiology and Health Promotion
9. develop an “early intervention model” for the care of the young patient using a multidisciplinary approach including a pediatrician, a pediatric dentist, and a pediatric or oral health nutritionist.

## CONCLUSION

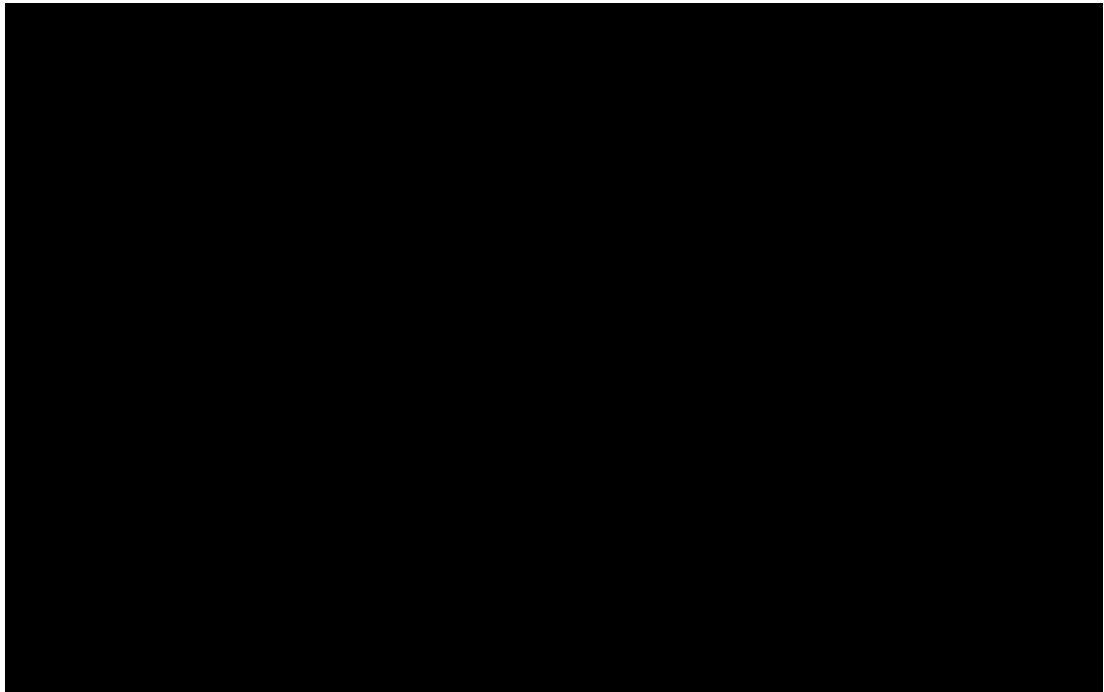
Collaboration between pediatric dentistry residents and dietetic interns is an effective vehicle for implementing clinical education in nutrition for dentists and pediatric dentists, and oral health education for dietetic interns. The curriculum content for nutrition has been identified for dental students and pediatric dentistry residents and is feasible for inclusion in the predoctoral (DDS/DMD) and postgraduate (dental specialties) clinical curricula. An oral health rotation for dietetic interns offers a new perspective for clinical practice and possible new career opportunities.



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**Figure 1.**  
Dietary screening flow chart.

**Table 1**  
Four-year predoctoral curriculum for nutrition at the New York University College of Dentistry

Year	Goals	Activities
First	<p>Gain understanding of nutrition as a health problem</p> <p>Develop strategies for nutritional intake to decrease dietary risks</p> <p>Practice counseling patients</p> <p>Provide strategies used to motivate behavioral change</p>	<p>Reading<sup>21–23</sup></p> <p>Videotape of a case study that includes patient's diet intake, data gathering, analysis, and counseling</p> <p>Guided exercise in a simulation laboratory</p> <p>Independent problem. Students choose a patient and perform dietary risk analysis and patient education</p>
Second	<p>Provide clinical resources for nutrition for screening of risk assessment: 24-Hour Dietary Recall Record form; Sugar Score form</p> <p>Provide online access to Dietary Analyzer of 24-Hour Dietary Recall Record form</p> <p>Provide access to body mass index calculator</p> <p>Learn guidelines of the Dietary Screening Flow Chart—Algorithm of nutrition intervention or referral</p> <p>Provide access to 24-Hour Dietary Recall Record form</p> <p>Video that was used in the first-year simulation laboratory course</p>	<p>Review of the simulated laboratory to give feedback about the strengths and weaknesses of the first year take-home assignments of nutrition-related screening and preventive counseling, as well as additional case-based learning</p> <p>Further development of knowledge about the clinical chart as a tool for risk analysis</p>
Third	<p>Developing skill to incorporate diet and nutrition principles into dental practice</p> <p>Additional reinforcement and recognition of dietary risks with local, systemic, and chronic diseases</p> <p>Developing skill in identifying dietary risks in weight management, understanding the role of complementary medicine, and the need for increased fitness</p> <p>Exposure to nutrition misinformation</p>	<p>Students apply diet risk principles in patient care using data gathering, diet screening, and intake</p> <p>Develop more skill in problem-solving using the nutritional principles that have been taught in the first and second year courses</p>
Fourth	<p>Refine clinical skills applying nutritional principles in patients for diet risk assessment and care</p> <p>Develop skill in recognizing dietary risks in health promotion for issues related to prevention of diseases such as hypertension and diabetes</p> <p>Gain experience referring patients to a nutritionist</p> <p>Develop skill in accessing nutritionists who practice in a community</p>	<p>Develop a health-promotion treatment plan that includes nutrition</p> <p>Refer patients to a dietetic intern who is assigned for predoctoral students (future)</p>