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Interventions in Health Care Settings to Promote Healthful Eating and Physical Activity in Children and Adolescents

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Background. **Physical activity and nutrition are related to multiple health problems during youth and to chronic diseases in adulthood. Health care providers have many opportunities to counsel young people about health behaviors.**

Method. **Policy documents and descriptive data on nutrition and physical activity interventions for youth in primary care were reviewed.**

Results. **U.S. children and adolescents made 29.5 million office visits in 1995, and 6.5 million were for well visits. About 80% of young people have seen a physician during the past year. Many organizations recommend that health care providers counsel children and adolescents about nutrition and physical activity. Many pediatricians counsel patients about physical activity and nutrition, but they have low confidence in the success of these efforts. Bright Futures and Guidelines for Adolescent Preventive Services are two national programs with specific guidelines for counseling. No studies could be located that evaluated youth physical activity or nutrition interventions in primary care. Programs for adults in primary care are sometimes effective, but they must target behavior change and be of sufficient intensity and duration. School programs can be effective, but they are much more intensive than is feasible for primary care. It is likely that effective programs for youth in primary care will require interactions with patients and families beyond the clinic encounter. Barriers to effective counseling include lack of financial incentives, provider knowledge and skills, and tested interventions.**

Conclusion. **There is sufficient promise of public health benefit to justify development and evaluation of youth nutrition and physical activity interventions in primary care. The design of programs should be informed by behavior change theories, knowledge of opportunities within health care settings, research on determinants of health behaviors, and lessons learned from research on similar types of interventions.**

Key Words: **health promotion; pediatrics; family medicine; obesity.**

RELEVANCE OF NUTRITION AND PHYSICAL ACTIVITY TO CHILD AND ADOLESCENT HEALTH CARE

Poor dietary habits and sedentary lifestyle are associated with a range of morbid conditions during youth and, if continued into adulthood, contribute to the development of chronic diseases, such as cardiovascular disease, some cancers, non-insulin-dependent diabetes mellitus, and osteoporosis [*1–4*]. The underlying pathology that leads to some of these diseases begins during childhood and adolescence [*5*]. In the United States, poor dietary habits and sedentary lifestyle together account for an estimated 300,000 deaths per year [*6*], second only to tobacco use among preventable causes of death. Childhood and adolescent health problems related to dietary habits and physical inactivity include obesity, iron-deficiency anemia, dental caries, unsafe weight loss methods, eating disorders, and psychological health [*7,8*]. Obesity in young persons, which has increased dramatically in recent years [*9*], is associated with psychological stress, elevated blood cholesterol, and high blood pressure, as well as increased adult mortality [*7*]. It can be speculated that young people who are actively engaged in physical activity or sports after school are less likely to become involved in drug use, alcohol abuse, sexual experimentation, violence, or delinquent behaviors during this high-risk part of the day. Several of the health benefits of proper nutrition and physical activity habits are experienced during

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youth, so these behaviors should be high priorities for health care providers who serve youth.

Health care providers can be an important part of interventions to promote physical activity and healthy eating among young people. Health professionals have a high degree of credibility on health issues. They also have opportunities to promote physical activity and healthy eating: in 1995, more than 29.5 million office visits were made to pediatricians alone (unpublished data from the 1995 National Ambulatory Medical Care Survey). Furthermore, providers might have an audience highly receptive to counseling on physical activity and nutrition, particularly among adolescents. Because physical attractiveness and acceptance by peers are among adolescents' most highly valued characteristics [*10*], suggestions from a credible source that healthful patterns of diet and physical activity can help achieve these goals may resonate with adolescents. In one study of 257 urban high school students, more than 75% of the respondents agreed with the statement, "If my doctor told me to exercise I would do so" [*11*]. In addition, a survey of 1087 students at a Pacific Northwest high school found that nutrition and weight counseling was the health education service they would most likely use in a school-based clinic [*12*].

In recent years federal agencies, international agencies, and professional organizations have urged health care providers to routinely assess and counsel children and adolescents about nutrition and physical activity (see Table 1). Comprehensive guidelines for providing preventive counseling to young people in the health care setting are available in two documents [*13,14*]. Bright Futures, developed by the National Center for Education in Maternal and Child Health, provides brief, age-specific recommendations that primary care providers can use to counsel children on physical activity and nutrition [*13*]. The Guide to Adolescent Preventive Services, developed by the American Medical Association, is the most comprehensive set of recommendations on how to provide adolescents with health promotion counseling [*14*].

OPPORTUNITIES FOR PROVIDER ASSESSMENT AND COUNSELING

Resources in the Health Care System

The health care system has substantial resources that could be used to deliver nutrition and physical activity interventions, particularly in primary care. Pediatricians and family medicine physicians are most likely to provide primary care to young people [*15*]. Many registered nurses, nurse practitioners, and physicians' assistants also provide primary care services. These disciplines represent a very large work force that could deliver preventive interventions.

The activity of these professionals is overwhelmingly in outpatient settings, primarily private offices, but also community and hospital-based clinics. School nurses can provide health promotion services in schools, either during clinical encounters or in cooperation with health teachers. Comprehensive school-based clinics can combine the advantages of health care-based and school-based interventions [*16*]. Behavior change counseling can be initiated during school- or community-based health fairs.

The ideal time for physical activity and nutrition counseling is during routine checkups or well visits. Other opportunities include follow-up appointments for injuries or illnesses, visits for chronic diseases (e.g., asthma), and physical examinations before participation in sports or camp programs. Individual discussion between the provider and the patient is the most typical mode of intervention. This discussion may include a parent or guardian. Other modalities for interventions in the health care setting include posters or other written materials, videos, and computer-based interventions in waiting rooms or examination rooms.

Child and Adolescent Contacts with the Health Care System

According to unpublished data from the National Ambulatory Medical Care Survey (NAMCS) [*15*], in 1995 children (aged 6 to 12 years) made over 41.6 million visits to ambulatory health care settings, while adolescents (aged 13 to 18 years) made over 34.6 million visits. Children and adolescents made, on average, 1.5 visits to ambulatory health care settings over the course of the year. The 1994 National Health Interview Survey found that 79% of children and adolescents (aged 5 to 17 years) had seen a physician in the past year, 12% had seen a physician 1 to 2 years before the survey, and 9% had not seen a physician in the past 2 years [*17*].

Frequency of visits to physician offices are similar for boys (1.5 visits per year) and girls (1.6 visits per year) aged 6 to 18 years (unpublished data from the 1995 NAMCS). Black children and adolescents made only 0.8 visits per year, while white children and adolescents made 1.7 visits (unpublished data from the 1995 NAMCS). Much of the racial discrepancy may be due to differences in socioeconomic status and access to health care. Children ages 5 to 16 years from families with incomes below the poverty level were less likely to receive preventive care and were 37% less likely to be frequent users of preventive care than children from families with incomes above the poverty level [*18*]. Despite their lower health status, poor adolescents made 13% fewer physician contacts than did non-poor adolescents [*19*].

Children (6–12 years) made more than 4.5 million visits for general medical examinations, i.e., routine checkups, in 1995, while adolescents (13–18 years)

TABLE 1

Position Statements, Recommendations, and Guidelines about Youth Nutrition and Physical Activity Interventions by Health Care Professionals

Organization/agency (ref)	Summary of recommendation
American Academy of Pediatrics [*52,53*]	Recommendations: (a) assess physical activity for children 3 years of age and older, (b) teach the importance of regular moderate physical activity, (c) encourage parents to be active with their children, and (d) serve as active role models themselves
American Heart Association [*54–56*]	Recommends that (a) physicians instruct all patients about adopting healthy life habits that will prevent intensification of risk factors, (b) patient education be family oriented, (c) physical activity for primary prevention of disease begins in the early school years, and (d) physicians and their staff discuss physical activity and provide exercise prescriptions for patients and their families.
American Medical Association [*14*]	Recommends that health care providers deliver (a) annual health counseling to all adolescents about the benefits of proper diet, how to achieve a healthy diet, and how to safely manage weight, and (b) annual health guidance to all adolescents to promote physical fitness
Centers for Disease Control and Prevention [*7,8*]	Recommends that health care providers (a) assess physical activity patterns among young people, (b) counsel them about physical activity and refer them to appropriate programs, and (c) advocate for physical activity instruction among young people.
International Consensus Conference on Physical Activity Guidelines for Adolescents [*47,57*]	Recommends that physicians and other health care professionals (a) assess and counsel adolescents about physical activity during visits for preventive services and (b) advocate for community-based physical activity promotion
National Center for Education in Maternal and Child Health [*13,44,45*]	Recommends that primary care practitioners provide age-specific counseling on nutrition and regular physical activity
National Cholesterol Education Program [*46*]	Recommends that health professionals who care for children identify coronary heart disease risk factors and advise patients and their families on lifestyle
U.S. Department of Health and Human Services [*2*]	Year 2000 health objectives for the nation include (a) increase to at least 50% the proportion of primary care providers who routinely assess and counsel their patients regarding physical activity and (b) increase to at least 75% the proportion of primary care providers who provide nutrition assessment and counseling and/or referral to qualified nutritionists or dietitians
U.S. Preventive Services Task Force [*58*]	Recommends that health care providers (a) counsel patients to incorporate regular physical activity into their daily routines and (b) counsel adults and children over age 2 to limit dietary intake of fat and cholesterol, maintain caloric balance, and emphasize intake of fiber-rich foods
World Health Organization/International Federation of Sports Medicine [*59*]	Recommends educating or reeducating physicians, other health professionals, and teachers about promoting physical activity among young people and setting good examples

made more than 2 million such visits (unpublished data from the 1995 NAMCS). General medical examinations comprised 11% of all medical visits for children and 6% for adolescents. Of all ambulatory visits made by children and adolescents in 1995, 39% were to pediatricians, 27% to general and family practice specialists, and 5% to internal medicine specialists. These same specialties also accounted for 91% of the general medical examinations reported for children and adolescents.

These data indicate some promise and some problems for youth health promotion in health care settings. Although black youth and poor youth are less likely than white youth and affluent youth to visit a provider, school-age children and adolescents make more than 76.3 million annual contacts with health care providers (unpublished data from the 1995 NAMCS). Because most of these contacts are with primary care physicians, training such providers to counsel patients about physical activity and nutrition could influence many young people.

Extent of Provider Assessment and Counseling

The 1995 National Ambulatory Medical Care Survey found that physicians reported having provided counseling on physical activity to children and adolescents during 7% of all visits and 30% of all general medical examinations, and counseling on nutrition during 9% of all visits and 38% of all general medical examinations (unpublished data from NAMCS). In a 1995 national survey of pediatricians who provide preventive care, most reported counseling their patients about physical activity and nutrition, but many did not believe their patients would follow their advice [*19*]. Unfortunately, it was not possible to assess the quantity or quality of counseling that was provided. The survey found that

- 39% of pediatricians strongly agreed and an additional 50% agreed that an emphasis on physical fitness throughout childhood reduces risk for adult lifestyle-related diseases;
- 28% agreed but 33% disagreed that children and

parents would follow their directives on physical fitness;

- 85% said they advise patients on the benefits of regular, moderate to vigorous activity, 79% said they encourage participation in lifetime activities (e.g., tennis, bicycling, swimming), and 58% said they encourage parents to plan physical activities for the entire family;
- 57% said they ask children and 63% said they ask adolescents about the frequency and amount of time spent in physical activity;
- 61% said they ask children and 49% said they ask adolescents about the amount of time they spend watching television or playing video games;
- 89% said they ask children and 86% said they ask adolescents about their eating habits;
- 97% said they counsel patients about nutrition.

Earlier national surveys had also found that many primary care physicians lacked confidence in their ability to help children and adolescents modify physical activity and nutrition behaviors. In a 1987–1988 survey, only 14% of physicians who provided primary care for children said they believed they were very successful in helping children achieve dietary changes, an additional 45% felt somewhat successful, and 22% said they did not believe they were successful [*20*]. These rates were not much different 10 years later [*21*]. In a 1985 survey, only 25% of pediatricians believed that their advice about exercise was likely to be effective in motivating behavior change, 30% believed their dietary counseling was likely to be effective, and 27% believed their advice on maintaining ideal body weight was likely to be effective [*22*]. These data indicate a need for the development of effective and practical counseling approaches that can be taught to providers. Lack of confidence in the effectiveness of counseling needs to be addressed in training programs.

One of the barriers to physician counseling is the limited amount of time spent with patients during office visits. In 1995, 15% of all office visits for children and adolescents involved no physician contact. An additional 59% involved physician–patient contact of 15 minutes or less. Ten percent of visits for a general medical examination involved no physician contact, and an additional 47% involved physician–patient contact of 15 minutes or less (unpublished data from the 1995 NAMCS). Another important barrier to counseling, lack of reimbursement, is discussed later.

NUTRITION AND PHYSICAL ACTIVITY INTERVENTION RESEARCH IN PRIMARY CARE

An extensive search of the literature revealed that the only published studies of youth physical activity and nutrition interventions in health care settings were of family-based behavior change programs for youths with obesity [*23*] and hypercholesterolemia [*24*]. Results of these studies indicate that intensive interventions are needed to produce substantial, long-term changes in behavior. We found no studies that targeted populations without risk factors or that integrated physical activity and nutrition assessment and counseling with primary care for young people. Studies of provider interventions with adults might provide insights on the feasibility of health-care-based interventions for youth and ideas for possible strategies to use in such interventions [*25*,*26*]. However, caution should be used in extrapolating results from adult studies.

There are examples of effective physical activity and nutrition interventions delivered through primary care. In one study, physicians delivered 3 to 5 minutes of structured counseling on physical activity to healthy but sedentary adults, followed by a brief telephone call from a health educator [*27*]. At 4- to 6-week follow-ups, 52% of intervention participants reported having adopted regular physical activity, but only 12% of controls did so. These changes were verified in a subsample by an objective measure of activity. Although other studies documented improvement in patients' physical activity levels following physician intervention, not all studies produced positive results, and even effective interventions have modest effects [*25*,*26*,*28*].

Another study tested the effects of individual, computer-generated messages designed to improve dietary behavior that were mailed to primary care patients [*29*]. While in the office, participants completed a survey that was used to develop a nutrition information packet tailored to their stage of change, dietary intake, and psychosocial characteristics. Over 4 months, total fat intake decreased by 23% in the group that received the tailored messages, 9% in the group that received nontailored messages, and 3% in the control group. A similar study in The Netherlands [*30*] found a significant decrease in fat consumption in an experimental group that received computer-tailored nutrition information. A recent study indicated that brief physician counseling was not sufficient to produce change, but counseling in combination with an office system that supports counseling (e.g., use and availability of reminders, algorithms, and dietary assessment tools) altered dietary habits and weight [*26*]. Despite these promising results, there are numerous examples of interventions with disappointing outcomes, or effects on knowledge but not behavior, so the complexity and barriers to success should not be underestimated [*31–34*]. The necessity of evaluation, monitoring, and follow-up for long-term change is emphasized [*35*].

Ockene and colleagues [*25*] reviewed studies of interventions designed to encourage health care providers to practice preventive services, including counseling on physical activity and nutrition. The authors found that

training programs increased providers' knowledge, attitudes, skills, and confidence to counsel, but training programs alone did not consistently change physicians' behavior. The authors concluded that physicians needed "enabling strategies (e.g., office reminders), reinforcing strategies (e.g., feedback), and predisposing strategies (e.g., insurance coverage, practice guidelines)" [*25*, p. S42] to consistently enhance their provision of counseling. The effect of physician contacts may be extended by the use of print materials, audiovisual media, telephone contact, and referral to other professionals [*31*,*35*].

PRINCIPLES AND RECOMMENDATIONS FOR YOUTH PHYSICAL ACTIVITY AND NUTRITION INTERVENTIONS IN HEALTH CARE SETTINGS

Current thinking by behavioral scientists suggests that interventions to counsel children and adolescents to adopt healthful eating and physical activity behaviors are most likely to be successful if they are developmentally appropriate, grounded in behavioral change theory, systematic, and integrated with a larger, multisector intervention. To achieve behavioral changes, especially with young children, parents need to be a major, if not the primary, focus of interventions. Parents control access to foods and physical activities, and children must be at an advanced level of cognitive development before they have the self-control skills needed to change their own health behaviors. Different approaches should be used to reach the increasingly autonomous adolescent. Health care providers need to tailor guidance strategies over time to the unique needs of adolescents as well as their changing social and environmental settings.

Although there are no published studies of nutrition or physical activity interventions for young people in primary care, there is a large literature on programs for youth implemented in other settings. School-based programs that targeted nutrition change were reviewed by Contento [*36*], who concluded that more effective programs had specific behavioral targets, used strategies focused on changing behavior rather than knowledge, were of sufficient intensity and duration, involved families in programs for younger children, and incorporated a self-evaluation and feedback component for older children. Recent reviews of physical activity interventions for young people have also been published [*37*,*38*], and most of these interventions are delivered through schools. Classroom interventions based on behavior change models are often effective in increasing out of school physical activity, but family interventions have not been successful. These school-based programs show that it is possible to change young people's physical activity and nutrition behaviors, but the primary care setting does not allow for the same intensity of interventions. Therefore, new approaches will need to be developed that are appropriate for delivery through the health care system.

It is likely that effective interventions will have to extend beyond infrequent patient–provider encounters. To achieve sufficient intensity and duration to be effective, there may need to be interactions with the young person before and after the encounter. These interactions could include visits with professionals within the primary care setting, referral to other professionals or agencies, support groups or classes, mail, telephone, e-mail, or internet communications [*39*].

Any new interventions should be based on the most promising theories and models of health behaviors. Two theories that have guided development of effective interventions for many health behaviors are the transtheoretical (stages of change) model [*40*] and social cognitive theory [*41*]. The former posits that an individual's readiness to change a behavior develops along a continuum of stages from precontemplation to contemplation to preparation to action to maintenance [*40*]. Providers can use this theory to assess stages and use the most appropriate intervention for patients at each stage [*27*,*29*]. Social cognitive theory [*41*] places health behaviors in a framework of personal determinants (e.g., biologic, cognitive) and environmental or social influences. Although clinicians ultimately may not be able to change environmental factors, sensitivity to social influences, particularly the family situation, can inform the approach taken with a particular patient. Social cognitive theory emphasizes careful consideration of the patient's self-efficacy or confidence about one's ability to change a behavior, as well as expected benefits of the behavior and barriers to and social supports for behavior change.

The American Medical Association's Guide to Adolescent Preventive Services (GAPS) illustrates a systematic approach to provider counseling [*14*]. The GAPS acronym is also a mnemonic for the steps in the guidance process. The first step is to Gather Information about the health behavior and risk for related medical conditions. The second step is to Assess Further about factors that might influence the behavior and inform an intervention approach. Step three is Problem Identification, which includes assessment of behavior change targets, readiness to change, and barriers and opportunities. Step four is Solutions, which involves the provider, adolescent, and possibly parents agreeing on a plan with specific strategies to change the behavior. Most providers are not currently implementing the GAPS approach, probably due to cost. Payments to physicians in a fee-for-service setting for full implementation of GAPS were estimated at $130 per adolescent per year in 1992 dollars, which would total to more than $5 billion in annual expense if applied to the nation's 40 million adolescents [*42*]. It is not likely that GAPS will

be fully implemented in most settings until insurers are convinced of the effectiveness and cost-effectiveness of this level of service [*43*].

Another initiative aimed at enhancing both the amount and the quality of health care provider assessment and counseling for healthful nutrition and physical activity practices is the Bright Futures initiative. Sponsored by the Health Resources and Services Administration, the aim of Bright Futures is to enable health professionals to put into practice the scientific knowledge critical to the healthy growth and development of infants, children, and adolescents. The original Bright Futures publication [*13*] outlined a series of general health supervision guidelines to be covered during health care visits. Separate guidebooks for nutrition [*44*] and physical activity [*45*] outline by developmental level issues of importance for assessment and counseling in each area. Each guidebook also includes separate chapters focusing on special issues or populations such as eating disorders, obesity, diabetes, behavioral approaches to counseling, and counseling youth with disabilities. A specific intent of the Bright Futures materials is to enable nutrition and physical activity counseling in a broad range of community and public health settings. As such, they are geared as much to nurses and midlevel practitioners as they are to physicians.

Considering the importance of intervening with families, the many competing demands for the attention of young people, and the wide variety of influences on youth behavior that are not likely to be affected by health care providers, a coordinated, multisector approach is likely to be central to the success of interventions to promote physical activity and healthy eating among young people. This could include complementary strategies to involve, in addition to health care providers, schools, government agencies, the food and recreation industries, and the mass media [*46*]. Health care providers can play a role in stimulating broader interventions by being an advocate for school and community programs that encourage young people to be physically active and eat a healthful diet [*47*].

BARRIERS TO HEALTH CARE PROVIDER INTERVENTIONS

The success of health care provider interventions to promote physical activity and healthy eating will inevitably be limited by the substantial proportion of young people who do not interact with health care professionals and the infrequency of contacts. Nonetheless, a great deal can be done to increase the likelihood that health care providers will effectively counsel young people on physical activity and nutrition. The major barriers to counseling that must be overcome include: (a) lack of external incentives and reinforcement (e.g., financial reimbursement, administrative support, licensing, accreditation), (b) lack of provider knowledge and skills, and (c) lack of tested cost-effective intervention strategies.

Primary care providers have long identified lack of payment for time-intensive health promotion counseling as a disincentive [*25,48*]. Another commonly cited disincentive is the typically short time providers spend with patients [*48*]; this barrier has, perhaps, been intensified by financial pressures to maximize productivity. The increase in managed, capitated health care may create an environment more conducive to health promotion counseling. Incentives to providers to monitor the health status of their patients and hold down treatment costs may encourage providers to offer health promotion counseling [*49,50*]. Conversely, managed care environments could intensify time pressures on physicians, making the delivery of health promotion services less likely.

Opportunities for preventive counseling in the health care setting are limited by a lack of office staff support, systems for follow-up intervention after office visits, and management support for counseling. Management support includes training opportunities, availability of patient education materials, availability of appropriate specialists to whom referrals can be made, supervisory encouragement, and accountability for counseling performance. Individual health care providers have little incentive to develop counseling skills in physical activity and nutrition, because such skills are typically not included in licensing requirements. Similarly, health care organizations have little incentive to deliver counseling services, because such services are not assessed by institutional accreditation programs.

Many health care providers may lack essential knowledge and skills related to physical activity and nutrition counseling, including information about the health benefits of adopting these behaviors, strategies for counseling and follow-up, and how to respond to patients' concerns. This lack contributes, in turn, to a low level of self-efficacy, i.e., a lack of confidence in their ability to motivate behavior change. Personal attitudes and practices related to nutrition and physical activity can influence a provider's motivation to counsel patients on these topics. For example, a survey of internists found that respondents who were themselves physically active were more likely than those who were not physically active to counsel their patients about exercise [*51*].

Perhaps the greatest barrier to promoting youth physical activity and nutrition in health care settings is the lack of carefully designed, rigorously evaluated studies of the effectiveness of different intervention strategies. Little progress is likely to be made in overcoming health care provider and institutional barriers

until the effectiveness of interventions is clearly demonstrated and cost-effective strategies are developed and tested.

STRATEGIES FOR OVERCOMING BARRIERS TO HEALTH CARE PROVIDER INTERVENTIONS

Three types of strategies are recommended for overcoming barriers to nutrition and physical activity interventions in primary care. External incentives are needed to motivate health care providers to deliver counseling. More education is needed to equip providers with the knowledge and skills needed to counsel effectively. Perhaps the greatest need is for research on all intervention approaches to demonstrate their efficacy and effectiveness. Specific suggestions in each category are proposed to guide research and practice.

External Incentives and Reinforcement

- Health care purchasers can advocate for the inclusion of health promotion services in their health plans to counteract the pressure to maximize profits by limiting provider time spent on health promotion services.
- State and federal payers of Medicaid can establish reimbursable indicators for youth nutrition and physical activity counseling.
- Managed care administrators can develop guidelines on how to "dose" provider interventions so that they are timed to meet patients' needs and desires, and on quality control mechanisms to ensure delivery of all types of health promotion counseling.
- Health care administrators can develop and implement office support systems that facilitate and reinforce provider counseling. These systems might include reminder notes with age-specific or patient-relevant health guidance suggestions, generated either by computer or by office staff, that can be attached to patients' charts; appropriate patient education materials; reinforcement of messages by other providers in the office; and follow-up contact.
- Organizations that work with health care purchasers can include physical activity and nutrition counseling in report card and quality measurement criteria.
- Entities that accredit health care organizations, and state and federal health care regulators, can emphasize the need for a clinical preventive services infrastructure to support preventive counseling (e.g., health educators and educational materials in clinics, regular continuing education for providers on prevention issues).
- Professional certification and licensing organizations can require health care providers to demonstrate physical activity and nutrition counseling knowledge and skills.
- Professional organizations, such as the American Academy of Family Physicians, the American Nursing Association, and the American Academy of Pediatrics, can encourage and support their members' attainment of physical activity and nutrition counseling skills.

Provider Knowledge and Skills

- Physicians, nurses, health educators, office support staff, and allied health personnel can become more knowledgeable about and proficient with strategies for nutrition and physical activity counseling.
- Persons responsible for the undergraduate, graduate, professional, and continuing education of the health care workforce can develop curricula and teaching strategies for physical activity and nutrition counseling.

Tested, Cost-Effective Interventions

Researchers need to test a variety of intervention strategies to identify how health care providers can effectively and cost-effectively promote physical activity and healthy eating among young people as part of their daily practices. Other research questions that need to be addressed include the following:

- What are providers' perceptions of barriers to youth physical activity and nutrition counseling and of proposed interventions to overcome these barriers?
- How should interventions be tailored to the age, sex, ethnicity, and stage of change of the patient?
- How can parents and guardians be effectively involved?
- How are physical activity and nutrition interventions best integrated with other health-care-based health promotion interventions?
- How are health-care-based interventions best integrated with multicomponent, community-based health promotion interventions?
- Which health care providers provide which types of physical activity and nutrition counseling most effectively?
- What types of training and support are needed to help health care providers implement effective interventions?
- How can interactive technologies be most effectively used to support provider counseling?
- What is the minimum dose of follow-up intervention needed to maintain behavior change?
- Can effective counseling strategies be developed for visits made for purposes other than health promotion?

Any effort to develop health-care-based interventions should be supported by strong surveillance systems that monitor the nature and extent of eating and physical activity behaviors of young people and providers' nutrition and physical activity counseling.

CONCLUSIONS

Conclusions are difficult to draw due to the lack of published evaluations of youth physical activity and nutrition interventions in health care settings. There is, however, sufficient promise of public health benefit to justify development and evaluation of such interventions, particularly if they are implemented as part of a coordinated multisector approach. The design of physical activity and nutrition interventions among young people should be informed by behavior change theories, knowledge of opportunities within health care settings, research on determinants of health behaviors, and lessons learned from research on similar types of interventions among adults. Until interventions with known effectiveness are available, primary health care providers are encouraged to

- model healthful lifestyles;
- consider guidance about healthful nutrition and physical activity an essential part of health maintenance visits;
- follow existing guidelines (Bright Futures, GAPS) for counseling about physical activity and nutrition;
- involve parents in counseling sessions, as appropriate;
- provide education materials that will help patients and parents change behaviors;
- refer to professionals (such as dietitians, exercise physiologists, health psychologists) who can provide more assistance, if needed;
- be an advocate for school and community programs [*39,47*].

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