

PROMOTING HEALTHY EATING AND PHYSICAL ACTIVITY FOR A HEALTHIER NATION

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Introduction

This chapter provides a framework for a comprehensive program to address the problems of poor nutrition and physical inactivity on a state or community level. While this framework is broader than any program that would be funded by CDC, it is designed to give state and local guidance in establishing a coordinated, comprehensive nutrition and physical activity program and soliciting a broad coalition of stakeholders and partners. State public health authorities are in a unique position to strengthen and coordinate efforts to improve nutrition and physical activity among Americans.

Burden of Physical Inactivity and Poor Nutrition Overall Magnitude

The importance of proper nutrition and physical activity in reducing rates of disease and death from chronic diseases has been well established.¹⁻³ Poor diet and physical inactivity cause 310,000 to 580,000 deaths per year and are major contributors to disabilities that result from diabetes, osteoporosis, obesity, and stroke. The results of one study showed that 14% of all U.S. deaths in 1990 could be attributed to poor diet and activity patterns,¹ and another study linked sedentary lifestyles to 23% of chronic disease-related deaths in the United States in 1986.²

According to *Healthy People 2010*,⁴ about 75% of Americans do not eat enough fruit, more than half do not eat enough vegetables, and 64% consume too much saturated fat. The diets of many population subgroups contain too much total fat, saturated fat,

and calories but not enough of other important elements such as calcium. Low fruit and vegetable consumption and high saturated fat intake are associated with coronary heart disease, some cancers, and diabetes.^{4,6}

Breast milk is acknowledged to be the most complete source of nutrition for infants and offers many benefits for mothers and babies. According to the *Department of Health and Human Services Blueprint for Action on Breastfeeding*, breastfeeding reduces the incidence or severity of childhood infections and chronic diseases such as type 1 and 2 diabetes, asthma, and childhood cancers.⁷ Additional evidence suggests that breastfeeding may help prevent childhood obesity.⁸ Despite recognition by the American Academy of Pediatrics that breastfeeding is the ideal method of infant feeding,⁹ only 64% of all mothers in the United States initiate breastfeeding, and only 29% continue to breastfeed their infants for 6 months after birth.⁴

Regular physical activity is essential for a healthy life.³ Physically inactive people are almost twice as likely to develop coronary heart disease as people who engage in regular physical activity.³ Thus physical inactivity poses almost as much risk for heart disease as cigarette smoking, high blood pressure, or a high cholesterol level, but is more prevalent than any of these other risk factors.¹⁰ People with other risk factors for coronary heart disease, such as obesity and hypertension, may particularly benefit from physical activity.³ It also

helps older adults remain independent and enhances the quality of life for people of all ages.

Obesity or overweight status is defined by body mass index (BMI), which is derived by dividing weight in kilograms by the square of height in meters. From 1991-2000, the prevalence of obesity (defined as BMI > 30 kg/m²) among adults increased nationally, in every state, and in all segments of the population.¹¹⁻¹⁴ Obesity leads to numerous health problems, including hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gall bladder disease, osteoarthritis, sleep apnea, respiratory problems, and some cancers (e.g., endometrial, breast, prostate, and colon cancers). Because obesity is a risk factor for several chronic diseases, the economic and social consequences of this obesity epidemic could be overwhelming.¹⁵ While many factors have contributed to the obesity epidemic, prevention efforts should focus on helping people reduce their calorie intake and increase their physical activity. The prevalence of obesity is increasing more rapidly among children than among adults. Because a growing body of evidence suggests that breastfeeding offers protection against excessive weight gain in childhood and adolescence,⁸ CDC advocates breastfeeding as a reasonable strategy for reducing children's risk of becoming overweight.

Economic and Social Costs

The economic burden of poor diet, physical inactivity, and obesity is substantial. All are significant risk factors for developing coronary heart disease, certain types of cancer, stroke, and diabetes, conditions that involve considerable medical expense as well as lost work time, disability, and premature death. In one study, the direct medical cost for diet-related manifestations of these four conditions was estimated at \$33.6 billion (in 1995 dollars) and the total cost, including lost productivity because of illness and premature death, was estimated to be \$70.9 billion.¹⁶ In another study based on 1987 medical expenditure data, researchers estimated that if the more than 88 million inactive Americans over the age of 15 began engaging in regular moderate physical activity, annual national medical costs could

be reduced by as much as \$76.6 billion in 2000 dollars.¹⁷ The medical costs associated with obesity are even higher: an estimated \$100 billion annually based on 1995 data.¹⁸ Taken together, inactivity and obesity accounted for 9.4% of the 1995 health care expenditures in the United States.¹⁸ In addition to these economic costs, immeasurable costs due to social and emotional problems, both for those affected and for their friends and families, may result from inactivity- and obesity-related diseases.¹⁹

Disparities

The problems associated with poor diet, physical inactivity, and obesity affect most population segments; however, there are marked disparities in the impact that these problems have on various groups of people, particularly by race/ethnicity and by education level. Data from *Healthy People 2010*⁴ indicate that physical inactivity, vegetable intake, breastfeeding, and weight status vary by race/ethnicity, gender, educational level, and age (Table 1).

Related *Healthy People 2010* Objectives

*Healthy People 2010*⁴ contains 19 objectives directly related to nutrition and breastfeeding and 15 directly related to physical activity. However, because poor nutrition and physical inactivity are associated with increased risk for many health problems, they are also mentioned in almost every other priority area. In fact, physical activity and overweight/obesity are 2 of the 10 "Leading Health Indicators" listed in *Healthy People 2010* as major health concerns in the United States.⁴ The full text of *Healthy People 2010* can be found at www.health.gov/healthypeople.

Prevention Opportunities

Levels of Prevention

Because poor dietary habits and physical inactivity are associated with many adverse health outcomes, most adults and children could benefit from interventions designed to improve their eating habits and increase their activity levels. Such intervention programs fall into three general categories: health promotion, primary prevention, and secondary

Table 1. Percentages of U.S. Adults in Various Physical Activity or Nutritional Categories, Overall and by Select Sociodemographic Characteristics

	No leisure-time physical activity, 1997	Consumption of 3 or more servings of vegetables per day,* 1994–96	Breastfeeding newborn infant for 6 months, 1998	Obese (BMI > 30),† 1999–2000
Overall	40	49	29	31
Race/Ethnicity				
White	38	50	31	29
Black	52	43	19	40
Hispanic	54	47	28	34
Gender				
Men	36	64‡		28
Women	43	49‡		33
Educational level (among people 25 years of age and older)				
Less than 9 th grade	73			
Grades 9–11	59		23	
High school grad	46		21	
Some college or AA	35		21	
College grad	24		40	
Family income level				
≤ 130% poverty threshold		42		
>130% poverty threshold		50		
Age groups				
18–24 years	31			
25–44 years	34			
45–64 years	42			
65–74 years	51			
75 years and older	65			

*People aged 2 years and older.

†People aged 20 years and older.

‡People aged 40–59 years.

Source: *Healthy People 2010*⁴ and NHANES 1999–2000.

prevention. The goal of health promotion is to help people establish an active lifestyle and healthy eating habits early in life and to maintain these behaviors throughout their lives. The goal of primary prevention is to help people who have risk factors for chronic disease (e.g., elevated blood pressure or serum cholesterol levels) prevent or postpone the onset of disease by establishing more active lifestyles and healthier eating habits. The goals of secondary prevention are to help people who already have a chronic disease cope with and control these conditions and to prevent additional disability by increasing their physical activity and establishing more healthful eating patterns.

Socioecological Approach

To be most effective in the long run, public health programs should focus on health promotion as well as disease prevention. For example, by promoting breastfeeding to pregnant women and new mothers and supporting their efforts to breastfeed, public health organizations can help children develop healthy eating habits during infancy. Because appropriate physical activity levels and healthy eating behaviors should be instilled in childhood and maintained throughout life, prevention efforts that target older children and schools are equally important, as are interventions for adults who are inactive or have poor dietary habits even though they have not yet developed chronic diseases. All interventions should be appropriate to the target audience, and different strategies may be required to reach different segments of the population. Interventions may address individuals, institutions, communities, policies, or the environment and can be effectively implemented in various settings, such as schools, work sites, health care facilities, and places of worship.

Whatever population segment is targeted by an intervention, its members are also influenced by a social network consisting of family members, friends, colleagues, and acquaintances. Interventions have the best chance of succeeding if they are directed at all elements of this network simultaneously.^{20, 21}

Increasingly, health promotion professionals are recognizing the dynamic interplay between individuals and their environments. Although lifestyle choices are ultimately personal decisions, they are made within a complex mix of social and environmental influences that can make healthier choices either more or less accessible, affordable, comfortable, and safe.²²⁻²⁵

Research has shown that behavior change is more likely to endure when a person's environment is simultaneously changed in a manner that supports the behavioral change.^{21, 26} Therefore, interventions should address not only the intentions and skills of individuals, but also their social and physical environments, including the social networks and organizations that affect them.²⁷

Essential Strategies

Guidelines for Comprehensive Programs to Promote Healthy Eating and Physical Activity (www.astphnd.org) is a document designed to help state and local health advocates create comprehensive nutrition, physical activity, and obesity control programs.²⁸ These guidelines provide recommendations in seven major areas: 1) leadership, planning/management, and coordination; 2) environmental, systems, and policy change; 3) mass communications; 4) community programs and community development; 5) programs for children and adolescents; 6) health care delivery; and 7) surveillance, epidemiology, and research.

To make the best use of scarce resources for prevention, public health agencies attempting to prevent chronic disease should use strategies that focus on highly prevalent risk factors that are modifiable through behavior change. Following are four behavior change strategies that meet this criterion. Each strategy can target one or more *Healthy People 2010* objectives.

- *Promote increases in physical activity.* Exercise provides numerous health benefits and should be promoted to the most sedentary subgroups of the population.³

- *Promote breastfeeding.* Breastfed children have less risk for acute diseases of infancy and early childhood and a reduced risk of developing childhood obesity.⁸
- *Increase fruit and vegetable consumption.* Higher consumption of fruits and vegetables is associated with lower incidence of several chronic diseases, including cardiovascular disease and some cancers.⁴
- *Reduce television-viewing time.* A reduction in the length of time that children and adolescents watch television may reduce the risk for obesity among young people.²⁹
- *Interventions that provide social support for physical activity in community settings.* Interventions designed to promote physical activity by helping people create, strengthen, and maintain social networks that support their efforts to exercise more; examples include exercise buddy programs and the establishment of exercise contracts or walking groups.
- *Interventions to provide people greater access to places for physical activity.* Examples include building walking or biking trails and making exercise facilities available in community centers or workplaces.

Physical Activity Strategies

The *Guide to Community Preventive Services* (www.thecommunityguide.org/pa) recommends five population-based strategies for increasing a population's level of physical activity.³⁰ These strategies include ways to achieve *Healthy People 2010* objectives that deal with moderate and vigorous lifestyle activities for adults and young people (Chapter 22).⁴

- *Community-wide campaigns.* Large-scale, highly visible, multicomponent campaigns with messages promoted to large audiences through diverse media, including television, radio, newspapers, movie theaters, billboards, and mailings.
- *Individually targeted programs.* Programs tailored to a person's readiness for change or specific interests; these programs help people incorporate physical activity into their daily routines by teaching them behavioral skills such as setting goals, building social support, rewarding themselves for small achievements, solving problems, and avoiding relapse.
- *School-based physical education (PE).* School curricula and policies that require students to engage in sufficient moderate to vigorous activity while in school PE class. Schools can accomplish this by increasing the amount of time students spend in PE class or by increasing their activity level during PE class.

Strategies to Increase Fruit and Vegetable Consumption

High fruit and vegetable intake is associated with low dietary fat intake, and dietary fat is associated with both cancer and heart disease.^{5,6} The *Healthy People 2010* objectives related to fruit and vegetable consumption (Chapter 19) include recommendations to consume at least three servings of vegetables and two servings of fruit per day.⁴ Unfortunately, less than 25% of the U.S. population consumes at least five servings of fruits or vegetables a day. To increase fruit and vegetable consumption, CDC is collaborating with the National Cancer Institute (NCI), the American Cancer Society (ACS) and three Department of Agriculture agencies to expand federal support for the national 5 A Day for Better Health Program. Resources to help health organizations promote fruit and vegetable consumption can be found at www.5aday.gov, www.5aday.com, www.5aday.gov/pdf/masimaxmonograph.pdf, and www.5aday.org/pdfs/research/health_benefits.pdf.

Strategies to Promote Breastfeeding

The *Healthy People 2010*⁴ objective relating to breastfeeding (Chapter 16) states: "Increase to 75% the proportion of mothers who breastfeed their babies in the early postpartum period, increase to 50% the proportion of mothers who breastfeed their babies for at least 6 months, and increase to 25% the

proportion of mothers who breastfeed their babies for at least 12 months.” Specific strategies to promote breastfeeding are outlined in HHS’s *Blueprint for Action on Breastfeeding*, which can be found at www.cdc.gov/breastfeeding/00binaries/bluprntbk2.pdf. These strategies include 1) developing social support resources for breastfeeding women, 2) training health care professionals to promote breastfeeding among their patients, 3) establishing maternity care practices and policies that promote breastfeeding, and 4) establishing workplace programs and policies that promote breastfeeding.

Strategies to Reduce Television Viewing Time

On average, U.S. children 2-17 years old spend approximately 4.5 hours a day watching some kind of electronic screen, with 2.5-2.75 hours of that spent watching television.^{33, 34} National cross-sectional surveys have shown a positive association between the number of hours children watch television and their risk of being overweight.^{29, 31, 32} This correlation probably has several causes: television watching may displace calorie-burning physical activity, children may eat more while watching TV, television advertisements may induce children to consume more high-calorie foods and snacks, and TV viewing may reduce children’s metabolic rate.^{31, 35-40} Based on data from young people in grades 9-12, the *Healthy People 2010* objective regarding TV watching (in Chapter 22) states: “Increase to 75% the proportion of adolescents who view television 2 or fewer hours per school day.”⁴

Few studies have explored strategies for reducing children’s TV viewing, and more testing and development of such strategies is needed before firm recommendations can be made. However, school-based programs have shown promise in helping to reduce children’s TV viewing by providing means for parents and children to monitor and budget the time that the children spend watching TV.^{37, 39}

Interventions

Community-Based Programs

Community-based programs should use multiple approaches to provide people with the knowledge, skills, and attitudes necessary to eat a healthful diet and be physically active. These programs should work with local organizations to identify target populations⁴¹⁻⁵² and should solicit full community participation in a comprehensive approach that addresses the physical, social, political, and cultural environments affecting community members.

Recommendations:

- Conduct community assessments to determine the dietary and exercise habits of residents, identify interventions that might help improve these habits, and identify community resources and potential partners that could help establish these interventions.
- Coordinate efforts to achieve *Healthy People 2010* objectives among various groups and agencies.
- Encourage representatives of the intended population to participate in program planning, design, implementation, and evaluation.
- Identify relevant population subgroups; attempt to understand physical activity, nutrition, and obesity from their point of view; and develop community-based strategies and programs that are relevant and acceptable to them.
- Educate the public and policy makers about the importance of supportive environments.
- Promote broad social and environmental changes that complement individual change efforts. Examples of such activities include
 - Promoting healthy food choices in away-from-home sites such as restaurants; fast-food outlets; school and work site cafeterias; vending machines; and sports, arts, and recreation venues.
 - Encouraging restaurants to label heart-healthy foods on menus and encouraging vending machine operators to include a certain percentage of choices low in fat, sodium, and sugar.

- Coordinating community resources and identifying consistent, convincing, culturally appropriate, and scientifically sound nutrition and physical activity messages delivered through health professionals, grocery stores, places of worship, schools, the media, parks and recreational facilities and programs, food service operations, and other pertinent channels.
- Improving lighting and security in public exercise areas such as walking paths (sidewalks, trails) and bike paths.
- Involving the Department of Agriculture as a key partner through programs such as WIC.
- Recruiting nontraditional partners such as food producers and retailers, bicycle-pedestrian coordinators, transportation planners, local land/urban planners, trail coordinators, violence-prevention advocates, and neighborhood associations.
- Encouraging employers to adopt policies that support physical activity and good nutrition, such as offering flex-time and providing healthy food options at work site cafeterias.
- Demonstrating model physical activity and healthy nutrition policies, procedures, and practices at the work sites of state agencies.
- Ensuring that the public health benefits of both leisure-time and transportation-related physical activity are conveyed to state transportation agencies, urban planners, building designers, and officials responsible for zoning and transportation-investment decisions.

School-Based Programs for Children and Adolescents

Coordinated school health programs have the potential to help young people adopt and maintain healthy eating and physical activity behaviors⁵³⁻⁵⁶ and possibly to prevent and control obesity and other chronic diseases. Data from the National Health and Nutrition Examination Surveys (NHANES) reveal that the prevalence of obesity among U.S. children

6-19 years of age tripled in the past 20 years, to slightly more than 15%.^{57,58} Information gathered through the Youth Risk Behavior Surveillance System (YRBSS) (www.cdc.gov/nccdphp/dash/yrbs/index.htm) indicates that more than a third of young people in grades 9–12 report not regularly engaging in vigorous physical activity. Meanwhile, the percentage that reported daily participation in school physical education classes declined from 41.6% in 1991 to 32.2% in 1999.⁵⁹

School-based programs should use a coordinated school health model to

- Provide students with opportunities to engage in healthy eating and physical activity behaviors.
- Help students develop the knowledge, skills, and attitudes necessary to adopt and maintain these behaviors.
- Integrate school-based physical activity and nutrition programs with family and community life.

CDC's Division of Adolescent and School Health and Division of Nutrition and Physical Activity have helped develop several instruments to assist schools in promoting healthy eating and physical activity. These include the CDC school health guidelines for promoting healthy eating and physical activity (www.cdc.gov/nccdphp/dash/healthtopics/guidelines.htm),^{60,61} the *School Health Index for Physical Activity and Healthy Eating: A Self-Assessment and Planning Guide* (www.cdc.gov/nccdphp/dash/SHI/index.htm),^{62,63} and *Fit, Healthy and Ready to Learn: A School Health Policy Guide* (www.nasbe.org/HealthySchools/fithealthy.mgi).⁶⁴

Recommendations:

- Use state funding to employ a full-time school health coordinator to work collaboratively with the state education department on school health issues related to nutrition and physical activity.
- Collaborate with the state department of education to employ a physical education/activity coordinator at the state department of education.

- Educate policy makers, health advocates, and the general public about the importance of requiring daily physical education classes and state-of-the-art nutrition education in the core curriculum in kindergarten through 12th grade.
- Collaborate with the state department of education to provide support, training, and technical assistance to help schools implement CDC school health guidelines for promoting healthy eating⁶¹ and physical activity⁶⁰ and use the tools that support the implementation of these guidelines (e.g., the *School Health Index*^{62, 63} and *Fit, Healthy, and Ready to Learn*⁶⁴).
- Provide schools with the resources necessary to educate faculty and students about healthy eating and physical activity and implement curricula to promote healthy eating and physical activity.
- Encourage communities and businesses to support physical activity and nutrition programs for young people.
- Provide support, training, and technical assistance to help schools and community organizations achieve the following:
 - Create food service programs that are consistent with USDA school meal program regulations and physical education programs that are consistent with the National Standards for Physical Education.⁶⁵
 - Create a healthy school nutrition environment in which appealing, healthy, and nutritious choices are available whenever and wherever food and beverages are offered to students.
 - Provide before- and after-school extracurricular physical activity opportunities such as physical activity clubs, intramural activities, and interscholastic sports.
 - Integrate physical activity and healthy eating into before- and after-school child care programs (e.g., extended-day programs).
 - Develop effective programs to increase the number of students walking to and from school.
 - Develop and implement school health councils, which include community representation, to guide school health programs.
- Develop and implement effective employee health promotion programs and services.
- Evaluate school programs in healthy eating and physical activity and make improvements where needed.

Health Care Programs

One of the roles of health care programs is to provide effective preventive services, including services related to behavioral risk-factor modification.⁶⁶ To more effectively promote physical activity and healthy eating in the communities they serve, health care systems should collaborate with community partners to create an integrated approach.

Recommendations:

- Work with health care plans to develop and use evidence-based standards of practice for delivering preventive services. At a minimum, health care plans should have standards of practice for assessing physical activity and nutrition and for assessing the effectiveness of clinical interventions. All children and adults enrolled in health care plans should have access to appropriate primary and secondary prevention care services related to physical activity and nutrition.
- Work with health care systems to ensure that their health care professionals are qualified to deliver preventive services related to physical activity and nutrition.^{67, 68}
- Work with plans to develop and evaluate prompts for counseling patients about nutrition, physical activity, and body weight regulation.
- Promote policies that either require or provide incentives for health care systems to include preventive services related to nutrition and physical activity as part of their benefit packages. Examples of policies that provide such incentives include reimbursing providers for preventive care and basing a health care system's quality-of-care rating at least in part on the quality of the preventive care it provides.

- Help health care plans coordinate their preventive care activities with community efforts to promote physical activity and healthy nutrition. The collaboration of the North Carolina Prevention Partners (www.ncpreventionpartners.org) illustrates how such a coordinated effort might function.
- Work with health care systems to include nutrition and physical activity indicators in the surveillance data they collect. These indicators can be used to evaluate the effectiveness of interventions to increase physical activity or improve nutrition among patients in the system.

State and Local Infrastructure Program Management and Administration

State health departments are uniquely positioned to lead efforts to integrate disparate programs related to nutrition, physical activity, and obesity prevention and control. The minimum staff requirements for this effort include a full-time, high-level person to coordinate the crosscutting nutrition and physical activity functions of the health department and its partners, a full-time physical activity coordinator, and a full-time nutrition coordinator. If necessary, in states with a small population, two people may perform these three roles.

Coordinators should be able to identify data sources and compile relevant information, analyze and interpret data, present findings targeted to various audiences, manage and evaluate the effectiveness of programs, make judicious economic and political decisions, and collaborate with various partners and personnel. Coordinators also need to be competent communicators so they can educate the public, their colleagues, policy makers, and the media about the importance of nutrition and physical activity. In states that do not combine coordinator functions, the physical activity coordinator should have at least a master's degree and a substantial amount of experience in a discipline related to physical activity and public health (e.g., exercise science, public health, physical education), and the nutrition coordinator should have at least a master's degree in

nutrition or public health nutrition and expertise in public health nutrition.

To develop comprehensive state nutrition and physical activity programs, the staff coordinators will need regular access to state health department staff or contractors with expertise in qualitative and quantitative data collection, management, and analysis; epidemiology and surveillance; evaluation; communications; social marketing; and behavioral sciences. They should also receive regular professional development training so they can stay abreast of advances in their fields and provide up-to-date training to others.

By serving as key resources for various categorical programs, coordinators will be in a position to ensure that healthy eating and physical activity education is incorporated into all relevant health promotion programs, including those focusing on obesity, cardiovascular disease, cancer, diabetes, oral health, tobacco, arthritis, women's health, men's health, infant health, and child and adolescent health.

Surveillance and Evaluation

Surveillance of a population's dietary practices and physical activity levels is necessary for quantifying problems, understanding the scope of these problems, identifying trends, targeting subgroups for intervention, guiding state planning, evaluating the impact of interventions, informing the public, and influencing public policy.⁶⁹⁻⁷⁹ Validated indicators of nutrition and physical activity and the life stages for which each is appropriate are shown in Table 2. This list is partial and could be modified according to a particular health department's interests.

In addition, program-specific and community-level indicators may be useful in targeting areas for intervention and monitoring progress in meeting specific program objectives. For example, information about the food choices available at various sites in a community could be useful in planning community nutritional interventions.

Table 2. Possible Surveillance Indicators for Nutrition and Physical Activity Programs

Measure	Infants	Youth	Adults	Older Adults
Weight and height (for calculating body mass index: BMI)		X	X	X
Daily fruit and vegetable consumption (at least 5 per day)		X	X	X
Occupational physical activity (at least 4 hours per work day in a nonsitting activity)			X	
Nonoccupational physical activity (at least 1.5 hours per week)			X	X
Moderate-intensity physical activities such as walking and gardening (at least 5 days/week and 30 minutes/day)		X	X	X
Vigorous-intensity physical activities such as some sports and running (at least 3 days/week and 20 minutes/day)		X	X	
Strengthening activities (at least 2 days per week)			X	X
Participation in physical education, sports, and other school-based activities		X		
Television viewing time (less than 2 hours per weekday)		X	X	X
Breast-feeding rates (initiation, 6 months)	X			
Birth weight	X			

Physical activity indicators could include policies related to community use of school facilities after school hours or required physical education classes for high school students.

To establish or increase their capacity to carry out dietary and physical activity surveillance, states should collect data on a regular basis and incorporate existing surveys into their data collection efforts whenever possible. Examples of such surveys include the Behavioral Risk Factor Surveillance System (BRFSS) [www.cdc.gov/nccdphp/brfss] for adults, the Youth Risk Behavioral Survey (YRBSS) [www.cdc.gov/nccdphp/dash/yrbs/index.htm] for adolescents, and the Pediatric Nutrition Surveillance System (PedNSS) [www.cdc.gov/nccdphp/dnpa/pdf/pednss.pdf] for children in the WIC program. States should also consider using state- or local-level surveys

that include nutrition and/or physical activity data. Because surveillance data are so essential to the success of state programs, states should 1) establish standards for data analysis and timely reporting and 2) provide training and technical assistance to help personnel in local programs collect and analyze data.

Evaluations should describe how an intervention was conducted (i.e., process evaluation) as well as how successful it was in meeting its objectives (i.e., outcome evaluation). Because it is often not possible to see a short-term change in the ultimate outcome measure, program planners may need to identify intermediate outcome measures. For example, intermediate outcomes for a nutritional intervention aimed at increasing fruit and vegetable consumption might be increased awareness of the importance of fruit and vegetable consumption. Even when

interventions have been implemented, evaluated, and shown to be successful in a prior setting, ongoing evaluation is essential to ensure that the program is working well in the current setting.

CDC is developing an evaluation plan for state nutrition, physical activity, and obesity programs. The plan focuses on state plan development and state-supported interventions and includes evaluation questions and one or more indicators or measures that will be used to answer each question. The plan also includes details of data sources, methods, and schedules for collecting data; the names of people responsible for data collection and analysis; resources needed to conduct the evaluation; and planned uses for the data collected. CDC has also published the *Physical Activity Evaluation Handbook* to help program managers evaluate physical activity programs or individual program components.⁸⁰

Partnerships

Strategic partnerships that can serve the goals of all partners are very important in leveraging limited resources. State health departments can foster such partnerships by developing coalitions that include local health departments, other health care providers, and various partners capable of providing or supporting programs that promote better nutrition and greater physical activity. These coalitions should be as inclusive as possible and include both traditional partners, such as hospitals and national health organizations, and nontraditional partners, such as restaurants, grocery stores, and transportation agencies.

One example of a successful partnership is a collaborative effort between the New York Division of Public Health and the New York Academy of Medicine that produced *The Pocket Guide to Cases of Medicine and Public Health Collaboration* (www.nyam.org/library/publications). Available in both a print version and an on-line version, the guide describes more than 400 instances of medical and public health collaboration. Another example is

the North Carolina Prevention Partners project, Building Alliances for Health Systems to Integrate Preventive Care Services (BASIC) Benefits (www.ncpreventionpartners.org). This Web-based system coordinates and displays a variety of health-related information and programs that are relevant to North Carolina.

Community coalitions are another type of partnership that proved useful in Missouri, where the Bootheel Heart Health Program provided community-based activities designed to help residents of a rural, medically underserved area of southeastern Missouri decrease their risk for cardiovascular disease by, among other things, exercising more and eating more healthful foods.^{51, 52}

State Plans

A state plan for promoting healthy diets and physical activity should describe how the comprehensive state program will coordinate multiple categorical programs that in any significant way address nutrition, physical activity, or obesity prevention. Key elements should include a surveillance system for monitoring progress; a public communication and education program focusing on all segments of the population; coordination with other programs and services (e.g., cardiovascular health, diabetes, cancer control, minority health, and aging/social services); and strategic partnerships with state and local government entities, CDC Prevention Research Centers, academic institutions, and private organizations. Potential partners for whom nutrition, physical activity, and obesity prevention are relevant underlying issues could include programs or organizations focusing on diabetes, cardiovascular disease, neighborhood safety, or livable communities. The state plan should also identify methods of working with government leaders and establish the organizational support and infrastructure necessary to promote policy-level interventions such as making communities more “activity friendly” (e.g., Safe Routes to Schools legislation in California) or providing healthy food choices (e.g., healthy vending machine policies at schools).

Policy

In addition to convincing people to be more physically active and eat a healthier diet, public health organizations should work to create environments, systems, and policies that

- Serve as passive inducements to being physically active and eating a healthy diet.
- Eliminate barriers to being active and eating a healthy diet.
- Provide explicit support, reinforcement, and inducements to making healthy choices such as taking stairs rather than riding elevators or eating fruits or vegetables instead less healthy foods.
- Change cultural and organizational norms for physical activity and body weight.
- Establish themselves as partners in planning and decision-making on environmental and policy issues that affect people's eating and physical activity habits.

Communications

Health communication efforts should have three main goals: 1) to educate the public about the importance of diet and exercise and motivate them to eat healthier and engage in more physical activity, 2) to motivate relevant groups and policy makers to create policies and environments that support healthy eating and increased physical activity, and 3) to eventually change social norms related to eating and activity. Potential audiences for communications activities might include others within the state health department and other state agencies, decision makers, health care providers, the general public, specific segments of the population, policy makers, the media, business leaders, and partners. Because each audience will have different concerns and "cultures," health communicators will need to be adept at defining their various audiences and at designing culturally appropriate communications strategies and messages for each. The CDCynergy program (www.cdc.gov/cdcynergy) can assist states in planning communication activities.⁸¹

Because eating and exercise habits are complex behaviors linked to larger social, cultural, political, economic, and environmental factors, health communication activities should be part of a larger plan that addresses these other factors. Social marketing provides a useful framework for such a broad approach to health communications. Resources on social marketing can be found at <http://socialmarketing-nutrition.ucdavis.edu/home.htm>, www.turningpointprogram.org/Pages/socialmkt.html, and www.hc-c.gc.ca/hppb/socialmarketing.

Health communication messages should be as specific as possible (e.g., "Eat 5 a Day" rather than "Eat a Healthy Diet"). Because members of the general public cannot be expected to know what terms like "healthy diet" and "moderate physical activity" mean, program planners and health communicators should determine how their audiences perceive such concepts and define them more clearly if research shows this to be necessary. Research should include formative research (e.g., focus groups), pretesting of concepts and messages, and monitoring during the implementation of the program.

The California Nutrition Network (www.dhs.ca.gov/cpns/network/index.html) offers an example of how states can design appropriate materials for specific populations. For several years, this group has produced social marketing campaigns that focus on the dietary habits of various target populations.

On a national level, CDC's Nutrition and Physical Activity Communication Team used market analysis and consumer research to develop the Personal Energy Plan (PEP), a 12-week self-directed work site program to promote healthy eating and moderate physical activity. The program materials include workbooks (which were given only to employees who indicated a desire to change), a coordinator's kit, promotional brochures, and posters. Additional information regarding the PEP program can be found at www.cdc.gov/nccdphp/dnpa/pep.htm.

Professional Development

Staff should be familiar with recent scientific research related to nutrition and physical activity, as well as with current guidelines about what constitutes healthful dietary and physical activity behaviors. At a minimum, those who work with surveillance data should be familiar with current technology related to the measurement of these behaviors and associated environmental indicators. Those who work with programs may require training on behavioral and environmental motivators, program development and partnering strategies, program evaluation, social marketing, and communications. To keep their personnel up to date, states should take maximum advantage of training opportunities provided by CDC, partner agencies, and professional associations. Networking with members of nutrition and physical activity programs in other states is another way for program personnel to stay abreast of new developments in their field.

Examples of training opportunities in physical activity include the Physical Activity and Public Health Courses. This series includes the 6-day Public Health Practitioner's Course on Community Interventions, the 8-day postgraduate course on Research Directions & Strategies conducted annually by the University of South Carolina, and the national 5-A-Day training conducted twice yearly by NCI and CDC. Various national organizations also offer opportunities for professional development in areas related to physical activity and nutrition. Such organizations include the American College of Sports Medicine; the American Alliance of Health, Physical Education, Recreation and Dance; the Society for Public Health Education; the Society for Nutrition and Education; the American Public Health Association; the Social Marketing for Public Health Conference; and the American Dietetic Association. The Web site of CDC's Division of Nutrition and Physical Activity (DNPA) [www.cdc.gov/nccdphp/dnpa] provides information on CDC-funded research and practices in these areas. DNPA also offers monthly nutrition and physical activity teleconferences. National training resources on obesity include health care provider training by the

Centers for Obesity Research and Education (www.uchsc.edu/core/index.htm) and weight management training for dietitians provided by the Commission on Dietetic Registration (www.cdrnet.org/whatsnew/certificateofTraining.htm).

Funding

State health departments need substantial resources to implement and evaluate comprehensive statewide nutrition and physical activity programs. They can do so, however, by using resources creatively and coordinating these programs with related chronic disease programs. The Healthy Hawaii Initiative (HHI), for example, uses tobacco settlement funds not only to control tobacco use but also to address other chronic disease risk factors, including poor nutrition and physical inactivity. Detailed information about the HHI can be found at <http://mano.icsd.hawaii.gov/doh/resource/hhi-plans/index.html>. A breakdown of how the HHI allocated the \$9.6M it received for FY 2001 is presented in Table 3. This program also illustrates how a public health agency can promote public health by funding strategic partners rather than by providing services directly to the public. By focusing on education, using a broad-based approach, and leveraging its resources with the help of capable partners, the HHI was able to reach many segments of the population and ultimately provide more effective long-term preventive services.

National Leadership and Partnerships

CDC is committed to providing national leadership to support state-level public health programs and has developed strategic partnerships with national health agencies and other organizations committed to promoting healthy nutrition and increased participation in physical activities. Web sites for organizations that can serve as partners for nutrition and physical activity programs are listed in Table 4.

Progress to Date and Challenges Ahead

Although CDC's Division of Nutrition and Physical Activity (DNPA) has formally been in existence only

Table 3. Allocation of Resources, Healthy Hawaii Initiative, Fiscal Year 2001

Component	Activities	Amount
School-based programs	Establish health and physical education content standards in schools statewide, K-12.	\$2,850,000
	Fund 16 schools to pilot a coordinated school health program that targets physical activity, nutrition, and tobacco.	\$750,000
Community-based initiatives	Implement various competitive targeted interventions.	\$1,000,000
Professional and public education	Implement a social marketing and public awareness campaign to promote physical activity and good nutrition and to discourage tobacco use.	\$1,000,000
Tobacco counter-marketing	Supplement CDC funding for tobacco counter-marketing.	\$800,000
HI Outcomes Institute	Partner with the University of Hawaii to create a neutral, credible, single point of access to integrate, analyze, and share data and provide professional development in the areas of assessment and evaluation.	\$3,200,000
Total		\$9,600,000

since 1999, it has made substantial progress in developing effective nutrition and physical activity strategies for preventing obesity and other chronic diseases. The physical activity chapter of the *Guide for Community Preventive Services* recommends several evidence-based strategies for increasing physical activity such as placing prompts that encourage people to use stairs rather than elevators, increasing the number and intensity of physical education programs in schools, and providing people with greater access to recreational facilities.

Several major challenges remain. Although the dietary practices of Americans have changed substantially in the past 20 years, none of these

changes has yet been causally linked to the obesity epidemic. Thus the development of effective evidence-based strategies to prevent and treat obesity through dietary changes remains a high priority. In addition, although obesity has been negatively correlated with physical activity levels and breastfeeding history and positively correlated with time spent watching television, we have only limited information about the best way to translate these findings into effective public health strategies. Thus further research and continued monitoring of existing interventions are essential in these areas as well. Furthermore, as state health departments attempt to coordinate the efforts of various categorical programs promoting physical activity and

Table 4. Potential Partners for Comprehensive State Nutrition and Physical Activity Programs

Organization	Web Site
American Academy of Pediatrics	www.aap.org/
American Alliance for Health, Physical Education, Recreation and Dance	www.aahperd.org
American Association of Public Health Physicians	www.aaphp.org
American Cancer Society	www.cancer.org
American College of Sports Medicine	www.acsm.org
American College of Preventive Medicine	www.acpm.org
American Council on Exercise	www.acefitness.org
American Diabetes Association	www.diabetes.org
American Dietetic Association	www.eatright.org
American Heart Association	www.americanheart.org
American Public Health Association	www.apha.org
Association of Schools of Public Health	www.asph.org
Association of Teachers of Preventive Medicine	www.atpm.org
Centers for Disease Control and Prevention	www.cdc.gov
Cooper Institute for Aerobics Research	www.cooperinst.org
HHS Administration on Aging Division	www.aoa.gov
HHS Office of Minority Health	www.omhr.gov
Human Kinetics Publishers	www.humankinetics.com
National Association for Health and Fitness	www.physicalfitness.org
National Heart, Lung, and Blood Institute	www.nhlbi.nih.gov
National Cancer Institute	www.cancernet.nci.hig.gov
National Institute of Diabetes, Digestive, and Kidney Diseases	www.niddk.nih.gov
National Park Service: Rivers, Trails, and Conservation Assistance Program	www.nps.gov/rtca
National Recreation and Park Association	www.nrpa.org
President's Council on Physical Fitness and Sports	www.fitness.gov
Prevention Research Centers	www.cdc.gov/prc
Society for Public Health Education	www.sophe.org
Society for Nutrition Education	www.sne.org
U. S. Department of Agriculture	www.usda.gov
U. S. Department of Education	www.ed.gov
U. S. Department of Energy	www.energy.gov
U. S. Department of Transportation	www.dot.gov
U. S. Food and Drug Administration	www.fda.gov
YMCA of the United States	www.ymca.net

healthful diets, new, more effective strategies are likely to emerge. Through multiple mechanisms and with the help of many partners, CDC stands ready to help state health agencies identify the most effective strategies for comprehensively addressing the obesity epidemic in the United States and the chronic diseases associated with it.

Web-Based Resources

Public Health Policy

www.health.gov/healthypeople: Provides updated information on *Healthy People 2010* objectives, leading health indicators, and national and state programs.

www.cdc.gov/nccdphp/sgr/sgr.htm: *The Surgeon General's Report on Physical Activity and Health* (1996).

www.surgeongeneral.gov/topics/obesity: *The Surgeon General's Call To Action To Prevent and Decrease Overweight and Obesity*. Provides updated information on strategies to reduce the burden caused by obesity.

www.nns.nih.gov: National Nutrition Summit. Provides highlights of accomplishments in the areas of food, nutrition, and health since the landmark 1969 White House Conference on Food, Nutrition, and Health and identifies continuing challenges and emerging opportunities for the nation in these areas; focuses on nutrition and lifestyle issues affecting people of all ages, particularly those related to the nation's epidemic of overweight and obesity.

www.cdc.gov/nccdphp/publicat.htm: A source for various government publications relevant to physical activity and health.

<http://odphp.osophs.dhhs.gov>: Provides information on public health policies and reports and on the Best Practices Initiative of HHS's Office of Disease Prevention and Health Promotion.

Surveillance, Evaluation, and Research

www.cdc.gov/nccdphp/brfss: Provides Behavioral Risk Factor Surveillance System (BRFSS) data, including state and national summaries as well as copies of current and past questionnaires.

www.cdc.gov/nccdphp/dash/yrbs/index.htm: Provides Youth Risk Behavior Survey (YRBS) data as well as copies of current and past questionnaires.

www.cdc.gov/nccdphp/dnpa/pnss.htm: Provides information collected by the Pediatric Nutrition Surveillance System (PedNSS), including data collected from health, nutrition, and food assistance programs for infants and children.

www.cdc.gov/nccdphp/dnpa/physical/handbook/index.htm: *Physical Activity Evaluation Handbook*. Provides tools for state and local agencies and community-based organizations that are evaluating physical activity programs.

For additional information on how to conduct evaluations of health programs, see www.cdc.gov/eval.

Interventions and Program Development

<http://thecommunityguide.org/pa/> Guide to Community Preventive Services. Provides recommendations for effective, evidence-based strategies.

www.cdc.gov/nccdphp/dnpa/kidswalk/kidswalk_guide.htm: Includes information on how communities can implement the Kids Walk to School Program.

www.paceproject.org: Patient-centered Assessment and Counseling for Exercise and Nutrition. Provides information on physician counseling techniques for physical activity and nutrition programs.

www.cdc.gov/nccdphp/dnpa/pahand.htm: Provides access to *For Promoting Physical Activity: A Guide for Community Action*.

www.cdc.gov/nccdphp/dnpa/: The Web site of CDC's Division of Nutrition and Physical Activity.

www.cdc.gov/nccdphp/dnpa/pep.htm: The Web site of CDC's PEP program.

www.cdc.gov/nccdphp/dash/SHI/index.htm: The Web site of CDC's School Health Index.

www.state.hi.us/doh/legrpts2002/tspace_259sec27.pdf: The Web site of the Healthy Hawaii Initiative, which provides examples of community health improvement strategies in the areas of tobacco use prevention and control, physical activity, and nutrition.

www.astphnd.org: Nutrition and Physical Activity Work Group's *Guidelines for Comprehensive Programs to Promote Healthy Eating and Physical Activity*.

<http://thecommunityguide.org/pa>: A systematic review of the effectiveness of selected population based interventions designed to increase levels of physical activity from the Task Force on Community Preventive Services.

www.cdc.gov/breastfeeding/00binaries/bluprntbk2.pdf: *HHS Blueprint for Action on Breastfeeding, 2000*.

Communication and Social Marketing

www.cdc.gov/cdcynergy/: The Web site for CDCynergy, an interactive CD ROM that guides the user through the communications planning process.

www.hsc.usf.edu/CFH/ntcsm/: An on-line training course in social marketing from the University of South Florida.

Partnerships, Alliances, and Coalitions

www.dhs.ca.gov/cpns/index.htm: Describes nutrition-related partnering opportunities in California.

www.ncpreventionpartners.org: Describes how North Carolina used various partnerships to pursue public health goals.

www.cdc.gov/prc/glance: A CDC Web site that lists current Prevention Research Centers and describes some of the projects they have engaged in.

References

1. McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA* 1993; 270:2207-12.
2. Hahn RA, Teutsch SM, Rothenberg RB, Marks JS. Excess deaths from nine chronic diseases in the United States, 1986. *JAMA* 1990; 264:2654-9.
3. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General*. Atlanta: Department of Health and Human Services, Centers for Disease Control and Prevention, 1996.
4. Department of Health and Human Services. *Healthy People 2010. 2nd ed.* 2 vols. Washington, D.C.: U.S. Government Printing Office, 2000.
5. Ness AR, Powles JW. Fruit and vegetables and cardiovascular disease: a review. *Int J Epidemiol* 1997;26:1-13.
6. Ness AR, Powles JW. High costs of poor eating patterns in the United States. In: Frazao E, editor. *America's Eating Habits: Changes and Consequences*. Washington, DC: U.S. Department of Agriculture, Economic Research Service, Food and Rural Economics Division, 1999:5-32. Agriculture Information Bulletin No. 750. Available at www.ers.usda.gov/publications/aib750.
7. Department of Health and Human Services, Office on Women's Health. *HHS Blueprint for Action on Breastfeeding, 2000*. Available at www.cdc.gov/breastfeeding/00binaries/bluprntbk2.pdf.
8. Dietz WH. Breastfeeding may help prevent childhood obesity. *JAMA* 2001;285:2506-7.

9. American Academy of Pediatrics. Policy statement on breastfeeding and the use of human milk. *Pediatrics* 1997;100(6):1035-9.
10. Centers for Disease Control and Prevention. Physical activity and the prevention of coronary heart disease. *MMRW Morb Mortal Wkly Rep* 1993;42:669-72.
11. Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP. The spread of the obesity epidemic in the United States, 1991-1998. *JAMA* 1999;282:1519-22.
12. Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP. The continuing epidemic of obesity in the United States. *JAMA* 2000;284(13):1650-1.
13. Mokdad AH, Bowman BA, Ford ES, Vinicor F, Marks JS, Koplan JP. The continuing epidemics of obesity and diabetes in the United States. *JAMA* 2001;286(10):1195-200.
14. Flegal KM, Carroll MD, Ogden CL, Johnson CL. Prevalence and trends in obesity among US adults, 1999-2000. *JAMA* 2002;288:1723-7.
15. Thompson D, Edelsberg J, Colditz GA, Bird AP, Oster G. Lifetime health and economic consequences of obesity. *Arch Intern Med* 1999;159:2177-83.
16. Colditz GA. Economic costs of obesity and inactivity. *Med Sci Sports Exerc* 1999;31(11):S663-7.
17. Pratt M, Macera CA, Wang G. Higher direct medical costs associated with physical inactivity. *The Physician and Sports Medicine* 2000;28:63-70.
18. Wolf AM, Colditz GA. Current estimates of the economic cost of obesity in the United States. *Obes Res* 1998;6:97-106.
19. Gortmaker SL, Must A, Perrin JM, Sobol AM, Dietz WH. Social and economical consequences of overweight in adolescence and young adulthood. *N Engl J Med* 1993;29:1008-12.
20. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q* 1988; 15:351-77.
21. Abrams DB. Conceptual models to integrate individual and public health interventions: the example of the workplace. In: *Proceedings of the International Conference on Promoting Dietary Change in Communities*. Seattle: The Fred Hutchinson Cancer Research Center, 1991:170-90.
22. Gottlieb NH, McLeroy KR. Social health. In: O'Donnell MP, Harris JS, editors. *Health Promotion in the Workplace, 2nd ed.* Albany, NY: Delmar Publishers, 1994.
23. Green LW, McAllister AL. Macro-intervention to support health behavior: some theoretical perspectives and practical reflections. *Health Educ Q* 1984;1:322-39.
24. King AC. Community intervention for promotion of physical activity and fitness. *Exerc Sport Sci Rev* 1991;19:211-59.
25. King AC, Jeffery RW, Fridinger F, et al. Environmental and policy approaches to cardiovascular and disease prevention through physical activity: issues and opportunities. *Health Educ Q* 1995; 22(4):499-511.
26. Lasater T, Abrams D, Artz L, et al. Lay volunteer delivery of a community-based cardiovascular risk factor change program: the Pawtucket Experiment. In: Matarazzo JD, Weiss SM, Herd JA, editors. *Behavioral Health: A Handbook of Health Enhancement and Disease Prevention*. New York: Wiley, 1984:1166-70.
27. Stokols D. Translating social ecological theory into guidelines for community health promotion. *Am J Health Promot* 1996; 10(4):282-98.
28. Nutrition and Physical Activity Work Group. *Guidelines for Comprehensive Programs to Promote Healthy Eating and Physical Activity*. Champaign, IL: Human Kinetics, 2002. Available at www.astphnd.org.

29. Andersen R, Crespo C, Bartlett S, Cheskin L, Pratt M. Relationship of physical activity and TV watching with body weight and level of fatness among children: results from the Third National Health and Nutrition Examination Survey. *JAMA* 1998;279(12):938-42.
30. Centers for Disease Control and Prevention. Increasing physical activity: a report on the recommendations of the Task Force on Community Preventive Services. *MMWR Recomm Rep* 2001;50(RR-18):1-14.
31. Crespo CJ, Smit E, Troiano RP, Bartlett SJ, Macera CA, Andersen RE. Television watching, energy intake and obesity in U.S. children. *Arch Pediatr Adolesc Med* 2001;155:360-5.
32. Dowda M, Ainsworth BE, Addy CL, Saunders R, Riner W. Environmental influences, physical activity, and weight status in 8- to 16-year-olds. *Arch Pediatr Adolesc Med* 2001;155(6):711-7.
33. Roberts DF, Foehr UG, Rideout VJ, Brodie M. *Kids and Media @ the New Millennium*. A Kaiser Family Foundation Report, 1999 (www.kff.org/content/1999/1535).
34. Woodard EH, Gridina N. *Media in the Home 2000: The Fifth Annual Survey of Parents and Children*. The Annenberg Public Policy Center, 2000. (www.appcpenn.org/mediainhome/survey/survey7.pdf).
35. Clancy-Hepburn K, Hickey AA, Nevill G. Children's behavior responses to TV food advertisements. *J Nutr Educ* 1974;6:93-6.
36. Gortmaker S, Must A, Sobol A, Peterson KI, Colditz G, Dietz W. TV viewing as a cause of increasing obesity among children in the United States, 1986-1990. *Arch Pediatr Adolesc Med* 1996;150:356-62.
37. Robinson, TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA* 1999;282(16):1561-7.
38. Robinson, TN. Television viewing and childhood obesity. *Pediatr Clin North Am* 2001;48(4):1017-25.
39. Gortmaker SL, Cheung LWY, Peterson KE, et al. Impact of a school-based interdisciplinary intervention on diet and physical activity among urban primary school children: eat well and keep moving. *Arch Pediatr Adolesc Med* 1999;153(9):975-83.
40. Gortmaker SL, Peterson K, Wiecha J, et al. Reducing obesity via a school-based interdisciplinary intervention among youth: Planet Health. *Arch Pediatr Adolesc Med* 1999;153(4):409-18.
41. Centers for Disease Control and Prevention. *Promoting Physical Activity: A Guide for Community Action*. Champaign, IL: Human Kinetics, 1999. Information on obtaining a copy is available at www.humankinetics.com.
42. Association of State and Territorial Public Health Nutrition Directors. *Moving to the Future: Developing Community-Based Nutrition Services*, 1996. Available at www.astphnd.org/programs/moving.htm.
43. Centers for Disease Control and Prevention. Community-based programs addressing multiple factors in heart health. In: *Worldwide Efforts to Improve Heart Health: A Follow-up to the Catalonia Declaration*. Atlanta: Department of Health and Human Services, 1997: 3-96.
44. Brownson RC, Housemann RA, Brown DR, et al. Promoting physical activity in rural communities: walking trail access, use, and effects. *Am J Prev Med* 2000;18:235-41.
45. Luepker RV, Murray DM, Jacobs DR Jr, et al. Community education for cardiovascular disease prevention: risk factor changes in the Minnesota Heart Health Program. *Am J Public Health* 1994;84:1383-93.
46. Young DR, Haskell WL, Taylor CB, Fortmann SD. Effect of community health education on physical activity knowledge, attitudes, and behavior. *Am J Epidemiol* 1996;144:264-74.

47. Heath GW, Wilson RH, Smith J, Leonard BE. Community-based exercise and weight control: diabetes risk reduction and glycemic control in Zuni Indians. *Am J Clin Nutr* 1991;53:1642S-6S.
48. Hinkle AJ. Community-based nutrition interventions: reaching adolescents from low-income communities. *Ann NY Acad Sci* 1997;817:83-93.
49. The California Adolescent Nutrition and Fitness Program (CANFit). *CANFit Recipes for Success: Nutrition and Physical Activity Programs for Youth*. Berkeley, CA: CANFit. Available from www.canfit.org.
50. Fortmann SP, Varady AN. Effects of a community-wide health education program on cardiovascular disease morbidity and mortality: the Stanford Five-City Project. *Am J Epidemiol* 2000;152:316-23.
51. Brownson RC, Smith CA, Pratt M, et al. Preventing cardiovascular disease through community-based risk reduction: the Bootheel Heart Health Project. *Am J Public Health* 1996; 86:206-13.
52. Brownson CA, Dean C, Dabney S, Brownson RC. Cardiovascular risk reduction in rural minority communities: The Bootheel Heart Health Project. *Journal of Health Education* 1998;29:158-65.
53. Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Faucette N, Hovell MF. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. *Am J Public Health* 1997;87:1328-34.
54. Luepker RV, Perry CL, McKinlay SM, et al. Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health (CATCH). *JAMA* 1996;275:768-76.
55. Marx E, Wooley SF, Northrop D (eds). *Health is Academic: A Guide to Coordinated School Health Programs*. New York: Teachers College Press, 1998.
56. McKenzie TL, Nader PR, Strikmiller PK, et al. School physical education: effect of The Child and Adolescent Trial for Cardiovascular Health. *Prev Med* 1996;25:423-31.
57. Troiano RP, Flegal KM, Kuczmarski RJ, et al. Overweight prevalence and trends for children and adolescents: The National Health and Nutrition Examination Surveys, 1963 to 1991. *Arch Pediatr Adolesc Med* 1995;149:1085-91.
58. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *JAMA* 2002;288(14):1728-32.
59. Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance, United States, 1999. *MMWR Surveill Summ* 2000;49(SS-5):1-96.
60. Centers for Disease Control and Prevention. Guidelines for school and community programs to promote lifelong physical activity among young people. *MMWR Recomm Rep* 1997;46(RR-6):1-36.
61. Centers for Disease Control and Prevention. Guidelines for school health programs to promote lifelong healthy eating. *MMWR Recomm Rep* 1996;45(RR-9):1-33.
62. Centers for Disease Control and Prevention. *School Health Index for Physical Activity and Healthy Eating: A Self-Assessment and Planning Guide* (elementary school version). Atlanta: Department of Health and Human Services, 2000.
63. Centers for Disease Control and Prevention. *School Health Index for Physical Activity and Healthy Eating: A Self-Assessment and Planning Guide* (middle school/high school version). Atlanta: Department of Health and Human Services, 2000.
64. Bogden JF. *Fit, Healthy, and Ready to Learn: A School Health Policy Guide. Part 1: Physical Activity, Healthy Eating, and Tobacco-Use Prevention*. Alexandria, VA: National Association of State Boards of Education, 2000

- (www.nasbe.org/healthyschools/fithealthy.mgi).
65. National Association for Sport and Physical Education. *Moving into the Future: National Standards for Physical Education. A Guide to Content and Assessment*. Reston, VA: Mosby, 1995.
 66. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services, 2nd ed*. Baltimore: Williams & Wilkins, 1996.
 67. Calfas KJ, Long BJ, Sallis JF, Wooten WJ, Pratt M, Patrick K. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med* 1996;25:225-33.
 68. Long BJ, Calfas, KJ, Wooten W, et al. A multisite field test of the acceptability of physical activity counseling in primary care: Project PACE. *Am J Prev Med* 1996;12:73-81.
 69. Centers for Disease Control and Prevention. Updated guidelines for evaluating surveillance systems: recommendations from the Guidelines Working Group. *MMWR Recomm Rep* 2001;50(RR-13):1-35.
 70. Teutsch SM, Churchill RE, editors. *Principles and Practice of Public Health Surveillance*. New York: Oxford University Press, 1994.
 71. Thacker SB, Berkelman RL. Public health surveillance in the United States. *Epidemiol Rev* 1988;10:164-90.
 72. Thacker SB, Stroup DB. Future directions for comprehensive public health surveillance and health information systems in the United States. *Am J Epidemiol* 1994;140:383-97.
 73. Macera CA, Pratt M. Public health surveillance of physical activity. *Res Q Exerc Sport* 2000; 71:S97-S103.
 74. Department of Agriculture, Department of Health and Human Services. *Nutrition and Your Health: Dietary Guidelines for Americans, 5th ed*. Home and Garden Bulletin No. 232. Washington, DC: Government Printing Office, 2000.
 75. Department of Health and Human Services. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Rockville, MD: National Institutes of Health, 1998.
 76. ACC/SCN. Suggested approaches for nutritional surveillance for the Interagency Food and Nutrition Surveillance Program. *Food Nutr Bull* 1989;11:62-73.
 77. Ballard-Barbash R. Designing surveillance systems to address emerging issues in diet and health. *J Nutr* 2001;131:437S-9S.
 78. Habicht JP, Pelletier DL. The importance of context in choosing nutritional indicators. *J Nutr* 1990;120:1519-24.
 79. Peterson KE, Chen LC. Defining undernutrition for public health purposes in the United States. *J Nutr* 1990;120:933-42.
 80. Centers for Disease Control and Prevention. *Physical Activity Evaluation Handbook*. Atlanta: Department of Health and Human Services, 2002 (www.cdc.gov/nccdphp/dnpa/physical/handbook/index.htm).
 81. Centers for Disease Control and Prevention. *CDCynergy: An Interactive Multi-Media Tool for Planning Health Communication Within a Public Health Framework*. Atlanta: Centers for Disease Control and Prevention, 2001 (www.cdc.gov/cdcynergy).