

The Role of Schools in Obesity Prevention

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Summary

Mary Story, Karen Kaphingst, and Simone French argue that U.S. schools offer many opportunities for developing obesity-prevention strategies by providing more nutritious food, offering greater opportunities for physical activity, and providing obesity-related health services.

Meals at school are available both through the U.S. Department of Agriculture's school breakfast and lunch programs and through "competitive foods" sold à la carte in cafeterias, vending machines, and snack bars. School breakfasts and school lunches must meet federal nutrition standards, but competitive foods are exempt from such requirements. And budget pressures force schools to sell the popular but nutritionally poor foods à la carte. Public discomfort with the school food environment is growing. But can schools provide more healthful food options without losing money? Limited evidence shows that they can.

Although federal nutrition regulations are inadequate, they permit state and local authorities to impose additional restrictions. And many are doing so. Some states limit sales of nonnutritious foods, and many large school districts restrict competitive foods.

Several interventions have changed school food environments, for example, by reducing fat content of food in vending machines and making more fruits and vegetables available. Interventions are just beginning to target the availability of competitive foods.

Other pressures can also compromise schools' efforts to encourage physical activity. As states use standardized tests to hold schools and students academically accountable, physical education and recess have become a lower priority. But some states are now mandating and promoting more physical activity in schools. School health services can also help address obesity by providing screening, health information, and referrals to students, especially low-income students, who are at high risk of obesity, tend to be underinsured, and may not receive health services elsewhere.

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Poor diets and physical inactivity are pushing rates of overweight and obesity among the nation's children to record levels.¹ Indeed, since 1960, U.S. childhood and adolescent overweight prevalence rates have more than tripled.² The health risks associated with childhood obesity pose a critical public health challenge for the twenty-first century.³

Schools can play an important part in a national effort to prevent childhood obesity. More than 95 percent of American youth aged five to seventeen are enrolled in school, and no other institution has as much continuous and intensive contact with children during their first two decades of life. Schools can promote good nutrition, physical activity, and healthy weights among children through healthful school meals and foods, physical education programs and recess, classroom health education, and school health services.

In this article we discuss the role of schools in preventing obesity. We analyze schools' food and physical activity environments and examine federal, state, and local policies related to food and physical activity standards in schools. We conclude by discussing promising and innovative obesity-prevention strategies.

Are Obesity, Nutrition, and Physical Activity Linked with School Performance?

Some observers have noted a worrisome correlation between weight problems and poor academic achievement.⁴ One research study found that severely overweight children and adolescents are four times more likely than their healthy-weight peers to report "impaired school functioning." Overweight children are also more likely to have abnormal scores on the Child Behavior Checklist (a

commonly used measure of children's behavior problems) and are twice as likely to be placed in special education and remedial classes than are children who are not overweight.⁵ A study involving 11,192 kindergartners found that overweight children had significantly lower math and reading test scores at the beginning of the year than did their healthy-weight peers and that these differences persisted into first grade.⁶ But such findings must be interpreted with caution. Because overweight is linked with poor academic performance does not mean that it causes poor performance. Low academic achievement can have many underlying causes, including low socioeconomic status, lower parental education, poor nutrition, and parental depression. Overweight should be considered a marker for poor academic performance and not the cause itself.

Overweight can impair school performance in many ways, including health-related absenteeism.⁷ Among the medical conditions linked with overweight in school-aged children are asthma, joint problems, type 2 diabetes, depression and anxiety, and sleep apnea.⁸ Social problems—such as being teased or bullied—loneliness, or low self-esteem can also affect how well children do in school.⁹

Although the evidence that child obesity affects school performance is limited, nutrition clearly affects academic performance. Poor nutritional status and hunger interfere with cognitive function and are associated with lower academic achievement. Iron deficiency is linked to shortened attention span, irritability, fatigue, and difficulty with concentration.¹⁰ A recent review of studies of breakfast habits and nutritional status in children and adolescents found that breakfast consumption may improve cognitive function related

to memory, test grades, and school attendance.¹¹ Studies have also found that children participating in the federal School Breakfast Program show increases in daily attendance, class participation, and academic test scores and decreases in tardiness.¹²

Research has also recently begun to elucidate the relationship between physical activity and student performance at school. Among the findings are that physical activity programs help school-aged children develop social skills, improve mental health, and reduce risk-taking behaviors.¹³ Evidence also suggests that short-term cognitive benefits of physical activity during the school day adequately compensate for time spent away from other academic areas.¹⁴ This evidence suggests that efforts to improve nutrition and increase physical activity in school may have the twin benefits of reducing obesity and improving the academic performance of all children, whether they are at risk of obesity or not.

The School Food Environment

Not only do most U.S. school-aged children attend school, they eat a large share of their daily food while they are there—estimates range from 19 to 50 percent or higher.¹⁵ Food is typically available through the U.S. Department of Agriculture’s (USDA) school breakfast and lunch programs and through “competitive foods” sold in vending machines, as à la carte offerings in the cafeteria, and at snack bars, school stores, and fundraisers.¹⁶

National School Breakfast and Lunch Programs

Ninety-nine percent of all public schools and 83 percent of all public and private schools participate in the National School Lunch Program.¹⁷ The School Breakfast Program is

Table 1. Select Federal Child Nutrition Programs, 2003–04 School Year

<i>School Breakfast Program</i>	
Average daily student participation	8,680,178
Free and reduced-price	7,118,313
Paid	1,561,865
Increase in free and reduced-price participation in past 10 years	41.9 percent
Number of schools participating	78,118
Federal reimbursement	\$1,740,181,232
<i>School Lunch Program</i>	
Average daily student participation	28,426,911
Free and reduced-price	16,508,440
Paid	11,918,471
Number of schools participating	98,375
Federal reimbursement	\$6,527,731,630
<i>Summer Food Service Program (July 2003)</i>	
Average daily July participation	1,791,821
Number of sites	29,193
Federal funding	\$215,805,038

Sources: Food Research and Action Center, “State of the States, 2005: A Profile of Food and Nutrition Programs across the Nation” (www.frac.org, [October 28, 2005]); USDA Food and Nutrition Service (FNS), “Nutrition Assistance Programs” (www.fns.usda.gov/fns/ [October 28, 2005]).

offered in 78 percent of the schools that offer the lunch program.¹⁸ On an average school day, about 60 percent of children in schools offering the lunch program eat school lunch, and about 37 percent of children in schools in the breakfast program eat school breakfast (see table 1).

Meals in both programs must meet federally defined nutrition standards (see box) for schools to be eligible for federal subsidies, both cash and commodities. Federal school lunches must provide approximately one-third of the recommended dietary allowance (RDA) for key nutrients; school breakfasts offer one-fourth of the RDA. A 1998–99 national study found that federal school lunches generally meet standards for the key nutrients protein, vitamins A and C, calcium, and

Summary of Regulations and Funding for the National School Breakfast and National School Lunch Programs

Regulations

School meals must meet the applicable recommendations of the *Dietary Guidelines for Americans*, which recommend that no more than 30 percent of an individual's calories come from fat and less than 10 percent from saturated fat. School lunches must provide one-third of the recommended dietary allowance (RDA) for protein, calcium, iron, Vitamin A, Vitamin C, and calories. School breakfasts must provide one-fourth of these RDAs. Local school food authorities decide which specific foods to serve and how to prepare them.

"Foods of minimal nutritional value" as defined by federal regulations cannot be sold in school food service areas during the meal periods. Four categories of prohibited foods are soda pop, water ices, chewing gum, and certain candies, including hard candy, jellies and gums, marshmallow candies, fondant, licorice, spun candy, and candy-coated popcorn.

Funding

The National School Lunch and School Breakfast Programs are entitlement programs. As long as they follow regulations, enrolled public and nonprofit private schools are guaranteed funds to offer free or reduced-price meals. Both programs have a three-tiered system to determine the reimbursement rates. Children in families at or below 130 percent of the poverty line receive free meals. Children in families between 130 and 185 percent of the poverty line receive reduced-price meals. Children in families above 185 percent of the poverty line receive a small per-meal subsidy for full-price ("paid") meals, as set by the school.

The per-meal subsidies are indexed for inflation. For the 2005–06 school year, the per-meal reimbursement rate for school breakfasts is \$1.27 for free breakfast, \$0.97 for reduced-price breakfast, and \$0.23 for the paid breakfast. Schools where at least 40 percent of the lunches served during the second preceding school year were free or reduced price may qualify for extra "severe need" school breakfast reimbursements if their costs exceed the standard federal reimbursement. For severe need, the reimbursement rate for free breakfast is \$1.51, that for reduced-price breakfast is \$1.21, and that for paid breakfast is \$0.23.

For school lunches, the reimbursement rate for free lunch is \$2.32, the rate for reduced-price lunch is \$1.92, and the rate for paid lunch is \$0.22. For schools where 60 percent or more lunches served during the second preceding school year were free or reduced price, the reimbursement rate for free lunch is \$2.34, the rate for reduced-price lunch is \$1.94, and the rate for paid lunch is \$0.24. In addition to these rates, institutions may also receive 17.5 cents in commodities (or cash in lieu of commodities) as additional assistance for each lunch served.

Sources: *Code of Federal Regulations* 210.10; *Code of Federal Regulations* 220.8; *Code of Federal Regulations* appendix B to Part 210; *Federal Register* 70, no. 136 (July 18, 2005): 41196–200; Food Research and Action Center, Income Guidelines and Reimbursement Rates for the Federal Child Nutrition Programs (www.frac.org/pdf/rates.PDF [August 15, 2005]).

Note: Reimbursement rates are higher for Alaska and Hawaii.

iron.¹⁹ The average calorie content of elementary school lunches was somewhat higher than the RDA while that of secondary school lunches was slightly lower.²⁰ Since 1995, federal school lunches and breakfasts have had to meet the requirements set in the *Dietary Guidelines for Americans*, which include limits on total and saturated fat (no more than 30 percent of calories from fat, with less than 10 percent from saturated fat). Schools reduced the average share of calories from fat in lunches from 38 percent in 1991–92 to 34 percent in 1998–99, but more than 75 percent of schools have not met the recommended share of 30 percent. Elementary schools are doing better than high schools.²¹ The nutritional profile of school meals has improved over the past fifteen years but is not yet what it should be.

Impact of school meals on child nutrition. School meal programs significantly improve school-age children's diets.²² Children who eat school lunches and breakfasts have higher mean intakes of micronutrients, both at mealtime and over twenty-four hours, than those who do not.²³ For the 59 percent of children eating school meals who come from low-income families, the meals provide a necessary safeguard against hunger.²⁴ Participation in the program declines drastically with age. It also declines as competing options to school meals become available.²⁵

Commodity foods. Schools participating in the lunch program are eligible to receive commodity foods as well as bonus commodities. The commodity foods support American farmers by providing price supports and removing surpluses. Commodity foods must be of domestic origin, and 60 percent of the commodities purchased for schools must be from surplus stocks.²⁶ Commodity foods make up about 20 percent of the food schools use,

with local school districts buying the rest on the open market or through purchasing cooperatives.²⁷ During the 2005–06 school year, schools can receive donated commodity foods from the USDA, valued at 17.5 cents for each lunch served.²⁸ More than 94,000 schools receive commodities. During the 2004 school year, the USDA purchased more than \$7.7 million worth of commodities for schools, totaling more than 1.1 billion pounds.²⁹ The states administer the commodities program, with each state selecting from a list of foods purchased by the USDA. Changes are needed in the commodity food program. The USDA should revise specifications to procure commodity foods that are consistent with those outlined in the *Dietary Guidelines*. The program should also offer more fresh produce and healthful lower-fat foods and make more connections with local farmers.

Financial issues. Budget pressures complicate schools' efforts to provide nutritious meals.³⁰ School food service programs, once regular line items in local school budgets, now must often be completely self-supporting and cover costs of food, labor, and other expenses, such as equipment, utilities, and trash removal.³¹ Federal reimbursements and revenue from food sales are their principal sources of funds. In the 2005–06 school year, the USDA will reimburse participating schools \$2.32 for every free lunch provided, \$1.92 for every reduced-price lunch sold, and \$0.22 for every other ("paid") lunch meal sold.³² A recent analysis, however, found that expenses covered by federal reimbursements fell from 54 percent in 1996–97 to 51 percent in 2000–01.³³ Schools can enhance revenues in three ways: by increasing the number of students who eat federal meals, by increasing prices for full-price meals, and by expanding à la carte and catering sales.³⁴ The first two

options—increasing school meal participation and raising prices of school meals—are difficult because many competing options are available from which students can purchase food at school. To try to break even, many food service directors thus choose the third option: selling popular but nutritionally poor foods à la carte.³⁵ In one analysis in 2000, total revenue from à la carte foods was 43 percent.³⁶ Not surprisingly, sales of à la carte items are inversely related to sales of school

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lunch meals.³⁷ In states that restrict the sale of competitive foods, such as Mississippi, Louisiana, West Virginia, and Georgia, school meal participation rates exceed the national average.³⁸

To encourage more students to participate in the school meal program, some schools are hiring culinary experts to develop healthful, tasty meals; are making cafeterias more youth friendly; and are enhancing the cafeteria's atmosphere. Indeed, the cafeteria itself can be a barrier to healthy eating. In some schools, lunch is served as early as 10:00 a.m. or as late as 1:30 p.m. Long cafeteria lines send students to vending machines or school stores. Insufficient time for lunch, cramped and unattractive cafeterias, and noise can also discourage participation in school meals. All these issues have financial implications, and structural issues, such as the cafeteria space

or time allowed for lunch, are not under the school food service's control.

School food services, facing difficult times, are using a variety of expense-containment and revenue-producing strategies to try to manage school food service finances. Serving reimbursable meals that are more appealing to students and offering more healthful à la carte items would help students eat more healthfully. For this change to happen, however, schools need to curtail foods sold outside the cafeteria that compete with school meals. Limiting competitive foods during school mealtimes could increase meal participation and increase revenues.

Full funding for the school meal programs could also relieve pressure on schools' food services to generate extra funding through competitive food sales. Schools that participate in the federal meal programs receive a fixed reimbursement for each meal served. Federal reimbursement rates are typically nine to ten times higher for free meals than for reduced-price or paid meals.³⁹ Although some states contribute supplemental funds and most schools receive donated USDA commodity foods, federal reimbursements are inadequate to cover the remainder of the meals' costs.

Competitive Foods

Competitive foods are all foods offered for sale at school except federal school meals.⁴⁰ They include à la carte foods offered in the school cafeteria as well as foods and beverages sold in snack bars, student stores, vending machines, and fund-raisers.⁴¹ Current law tightly limits the Agriculture Department's authority to regulate competitive foods, which fall into two categories. The first category, called foods of minimal nutritional value, is defined in federal regulations as

foods that provide less than 5 percent of the RDA per serving for each of eight key nutrients. They include soft drinks, water ices, chewing gum, and certain candies made largely from sweeteners, such as hard candy and jelly beans. These foods, which the USDA regulates, cannot be sold in food service areas during meal periods, but they may be sold anywhere else in the school at any time.⁴² A vending machine with soft drinks and candy, for example, could be placed in the hall outside the cafeteria and be available to students all day. The second category of competitive foods, which is not under USDA authority, consists of all other foods offered for individual sale. This category, which includes candy bars, potato chips, cookies, and doughnuts, may be sold in the cafeteria during meal periods as well as anywhere else in the school. Although reimbursable school meals must meet federal nutrition and dietary guidelines, competitive foods have no such requirements. The federal definition of “foods of minimal nutritional value” is thirty years old and narrow in scope. It should be expanded to include additional foods with limited nutritional value. Further, although the federal school meal programs set appropriate portion sizes, competitive foods follow no size guidelines. Twenty ounces of soda, for example, is the standard size in many school vending machines.

Availability of competitive foods. The availability of high-fat, high-sugar foods and beverages in schools creates a food environment that invites excess energy intake and excess weight gain.⁴³ The national School Health Policies and Programs Study (SHPPS) 2000 found that 43 percent of elementary schools, 74 percent of middle schools, and 98 percent of high schools have vending machines, school snack bars, or other food sources outside of the school meal programs.⁴⁴ The most

common competitive foods are carbonated beverages, fruit drinks that are not 100 percent juice, salty snacks, and high-fat baked goods. Only 18 percent of the foods available through vending machines, school stores, or snack bars are fruits or vegetables. Most schools (58 percent of elementary schools, 84 percent of middle schools, and 94 percent of high schools) sell soft drinks, sports drinks, or fruit drinks.⁴⁵ In one study, the mean number of soft drink machines available to high school students was 5.3 (ranging from two to eleven).⁴⁶ Another study found that nearly nine out of ten schools offered competitive foods through à la carte cafeteria lines, vending machines, and school stores during the 2003–04 school year. The sale of competitive foods has increased over the past five years, with schools often selling them in or near the cafeteria and during lunch. High schools and middle schools were more likely to sell such foods than elementary schools.⁴⁷

In the SHPPS 2000 survey, nearly all (83 percent) schools offered food à la carte.⁴⁸ And the wide availability of high-fat foods in cafeteria à la carte options has been documented.⁴⁹ In one study, Simone French and her colleagues found that only a third of foods in high school à la carte areas and in vending machines met the lower-fat guideline of less than 5.5 fat grams per serving.⁵⁰ The average number of à la carte food items typically available per school was 80 (ranging from 39 to 156), with chips and crackers making up the largest share of items. Fruits and vegetables were available à la carte in 85 percent of the schools, but they made up only 4 percent of total à la carte foods available.⁵¹ School districts have also established contracts with fast-food vendors. In the 2003 California High School Fast Food Survey, roughly one-fourth of 173 districts reported selling brand-name products from Taco Bell,

Subway, Domino's, and Pizza Hut in high schools.⁵²

School fundraisers often involve the sale of food or beverages. In the SHPPS 2000 survey, 82 percent of the schools reported that school clubs, sports teams, or the parent-teacher association (PTA) sold food at school or in the community to raise money.⁵³ According to the California fast-food survey, 74 percent of school food service directors re-

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ported that student clubs sell food during school mealtimes.⁵⁴ Other groups selling food at mealtimes in high schools are booster clubs (33 percent), the PTA (31 percent), and the physical education (PE) department (28 percent). Food fundraisers directly compete with the food service department and are subject to no nutritional standards. Student groups could instead raise funds by selling nonfood items, such as gift wrap, magazines, and plants, and by hosting walk-a-thons and auctions.

Impact of competitive foods on child nutrition. Competitive foods sold to students are displacing fruits and vegetables and other healthful foods and contributing to excessive fat and saturated fat intake. One study examined the diets of 598 seventh- and eighth-grade students and found that the greater the

availability at school of à la carte foods, the lower the daily intake of fruits and vegetables and the higher the intake of daily total fat and saturated fat. The greater the availability of snack vending machines, the lower the intake of fruit.⁵⁵ Karen Cullen and Issa Zakeri found that when elementary school students entered middle school and gained access to school snack bars, they consumed fewer fruits and non-starchy vegetables, less milk, and more sweetened beverages and high-fat vegetables than they did when they were in elementary school and had no option but the school lunch.⁵⁶ In a study of 743 sixth-grade students aged eleven to thirteen in three public middle schools in Kentucky, one-third who purchased the regular school lunch also bought competitive food items—mostly chips, fruitades or sport beverages, and cakes and cookies—in the lunchroom.⁵⁷ These students reduced their school lunch servings, resulting in lower intakes of minerals and vitamins and higher intakes of energy and fat. All these studies highlight the importance of school lunch program meals to fruit, vegetable, and milk consumption among children and adolescents.

School funding issues and competitive foods. As noted, competitive food sales generate an important revenue stream for schools in a climate of funding constraints. Many schools have come to rely on profits from competitive food sales to support food service operations, academic programs, cocurricular activities, and after-school activities.⁵⁸ Schools that are under financial pressure are more likely to make low-nutrition foods and beverages available to their students, have soft drink contracts, and allow food and beverage advertising to students.⁵⁹ A 2005 Government Accountability Office (GAO) report found that many schools, particularly high schools and middle schools, generated substantial

revenues through competitive food sales—more than \$125,000 apiece each year for the top 30 percent of high schools.⁶⁰ Food services generally spent their revenue on food service operations while school groups put theirs toward student activities.

School districts nationwide have also negotiated contracts for product sales, primarily soft drinks.⁶¹ These “pouring rights” contracts typically involve substantial lump-sum payments to school districts and additional payments over five to ten years in return for exclusive sales of one company’s products in vending machines and at all school events.⁶² Companies also advertise on scoreboards, in hallways, on book covers, and elsewhere. Many contracts increase the share of profits schools receive when sales volume increases, further encouraging schools to promote consumption.

These practices contradict the nutrition and health messages students receive in the classroom and contribute to poor dietary habits. They also give soda companies unfettered access to youth and the chance to develop lifetime brand loyalty.⁶³ Despite increased public attention to food in schools and to the eroding quality of diets among youth, many schools hesitate to restrict competitive food for fear of losing income.

In August 2005, in response to growing pressure from parents and public health advocates, the American Beverage Association announced voluntary restrictions on sales of soft drinks in elementary and middle schools. The companies will encourage school districts and bottlers to provide only bottled water and 100 percent juice in elementary schools and to provide lower-calorie beverages in middle schools until after school. But because the new policy will apply only to new

contracts, it will take several years to phase high-calorie beverages out of elementary and middle schools.⁶⁴ And high schools, which have many more vending machines, will be unaffected.

Public discomfort with the school food environment is growing. The question is whether schools can provide more healthful food options without losing sales revenue.⁶⁵ Evidence about how reducing the sale of unhealthy foods and beverages or offering more healthful options would affect revenue is limited. But some studies have found that school food service staff reported no loss of revenue when they offered students more healthful à la carte choices.⁶⁶ And schools in Maine, California, Minnesota, and Pennsylvania replaced soft drinks with more healthful beverages without losing revenue.⁶⁷

Surprisingly few national data are available on schools’ income from vending machines.⁶⁸ A 2003 Texas Department of Agriculture survey found that total annual revenue from vending contracts for all 1,256 state schools was about \$54 million.⁶⁹ It also found that food service departments lose \$60 million a year in federal reimbursable meal sales to competitive foods, resulting in a net loss. During the 2001–02 school year, the total deficit for Texas school food service operations was \$23.7 million, which had to be subsidized from other district sources.

Because many schools generate substantial revenue through competitive food sales, making changes entails financial risks.⁷⁰ Some school districts, however, have taken steps to mitigate potential revenue changes, such as substituting healthful foods for less healthful ones instead of removing all competitive foods, getting students involved in promoting healthful foods, using marketing

approaches to encourage students to make healthful choices, offering alternate means for fundraising, and implementing changes gradually or at the beginning of the school year. Without support from the groups that use the revenue from competitive food sales, districts can see their policy changes curtailed.⁷¹ Also, getting student suggestions about what types of nutritious foods would be offered will promote acceptance.

Policy implications. Federal rules governing the availability, content, and sale of competitive foods and setting schoolwide nutrition standards are inadequate.⁷² Congress should grant the secretary of agriculture broader authority to regulate the availability, content, and sale of competitive foods during the school day and set nutrition standards for all foods and beverages sold. Such actions would not only enhance children's health and nutrition but also protect the federal investment in child nutrition through the national school meal programs.⁷³ Limiting the sale of competitive foods during school meals would increase participation in school meals and help ensure that children receive a nutritious meal.

Model School Nutrition Programs

Advocates, administrators, parents, educators, and health professionals across the country are promoting grassroots nutrition initiatives. *Making It Happen! School Nutrition Success Stories* showcases thirty-two schools that are offering and selling more nutritious foods and beverages. The schools carried out their reforms by setting nutrition standards for competitive foods, changing food and beverage contracts, making more healthful foods and beverages available, using marketing techniques to promote healthful choices, limiting access to competitive foods, and using fundraising activities and rewards that support rather than undermine student health.⁷⁴

The message from *Making It Happen!* is that, given the opportunity, students will buy and consume healthy foods and beverages and, more important, that schools can maintain a profitable bottom line at the same time. Of the seventeen schools and school districts that reported income data, twelve increased revenue and four reported no change.

The School Physical Activity Environment

Schools are unique in their ability to promote physical activity and increase energy expenditure—and thereby help reduce childhood obesity.⁷⁵ A comprehensive school physical activity program should consist of PE, health education that includes information about physical activity, recess time for elementary school students, intramural sport programs and physical activity clubs, and interscholastic sports for high school students.⁷⁶ Schools can also encourage brief bouts of physical activity during classroom time—as in the Michigan Department of Education's "Brain Breaks" program and the International Life Sciences Institute's "Take 10!"—and walking and bicycling to school.⁷⁷

Physical education—a formal, school-based educational program that uses physical activity to achieve fitness, skills, health, or educational goals—is at the center of a comprehensive school-based physical activity program.⁷⁸ It is an important but undervalued curricular area that aims to help all students develop the knowledge, skills, and confidence to be physically active both in and out of school and throughout their lives.⁷⁹

Physical Activity Recommendations

Current guidelines recommend that children engage in at least sixty minutes of physical activity on most, preferably all, days of the week.⁸⁰ The Institute of Medicine's *Prevent-*

ing *Childhood Obesity: Health in the Balance* report recommends at least thirty minutes of activity during each school day.⁸¹ The National Association for Sport and Physical Education recommends 150 minutes a week of PE for elementary school children and 225 minutes a week for middle- and secondary-school children.⁸² Nationally, only 8 percent of elementary schools and 6 percent of middle schools and high schools meet these recommendations.⁸³

Physical Education Classes and Barriers to Expanding PE

Physical education requirements decline drastically as a student's grade level increases. The share of schools requiring PE drops from around 50 percent for grades 1 through 5, to 25 percent in grade 8, to only 5 percent in grade 12.⁸⁴ Although the share of high school students enrolled in PE classes appears to have increased from 1991 to 2003 (49 percent to 56 percent), the share of students attending PE daily fell from 42 percent to 28 percent.⁸⁵ The quality of PE classes is also crucial to their effect on child and adolescent overweight. Only a third of adolescents were physically active in PE class for more than twenty minutes three to five days a week.⁸⁶

Schools must fit many subjects and activities into the school day and must balance state and local resources, priorities, and needs for education. In recent years, however, the comprehensive curriculum has been eroding, especially in the wake of the federal No Child Left Behind Act of 2001, which focuses on student achievement in defined core academic subjects.⁸⁷ As states develop or select standardized tests to hold schools and students accountable, content that is not tested, such as physical education, has become a lower priority.⁸⁸ But, as noted, time devoted to physical education does not lessen per-

formance in other areas and can in fact enhance both students' readiness to learn and academic achievement.⁸⁹

Recess

Unstructured physical activity during recess allows children to have choices, develop rules for play, release energy and stress, and use skills developed in physical education.⁹⁰ It may also help in the classroom. Uninterrupted instructional time may cause attention spans to wane as restless children have difficulty concentrating on specific classroom tasks. One study found that fourth-graders had concentration problems on days without recess.⁹¹

The SHPPS 2000 survey found that 29 percent of elementary schools schedule no recess for students in kindergarten through fifth grade.⁹² The National Association for Sport and Physical Education, by contrast, recommends that schools provide supervised, daily recess for students up to grades 5 or 6; that, if possible, recess not be scheduled back-to-back with physical education classes; that recess be viewed not as a reward but as a necessary educational support; that students not be denied recess to punish misbehavior or to make up work; and that recess complement, not substitute for, structured PE.⁹³

Extracurricular Programs

Interscholastic sports programs, intramural activities, and physical activity clubs also keep children active in school. Intramural sports and clubs offer students with a wide range of abilities opportunities to engage in physical activity. But only 49 percent of schools offer intramural sports and sports clubs, and only 22 percent provide transportation home for students who participate in interscholastic sports, a problem for lower-income students who may need transporta-

tion.⁹⁴ To help prevent obesity, the Institute of Medicine calls for partnerships between schools and public and private sectors to enhance funding and opportunities for intramural sports and other activities in school and after-school programs.⁹⁵

Health Curriculum

Health education is an essential part of a coordinated school health program, as recommended by the Centers for Disease Control and Prevention. By highlighting the importance of both nutrition and physical activity, health education can help students adopt and maintain physically active and healthful-eating lifestyles.⁹⁶ Key elements of health education include a planned and sequential educational program for students in grades K–12; behavioral skills development; instructional time at each grade level; instruction from qualified teachers; involvement of parents, health professionals, and other community members; and periodic curriculum evaluation and updating.⁹⁷ Research supports the effectiveness of behavioral-oriented curriculums in promoting healthful food choices and physical activity.⁹⁸ To maximize classroom time, nutrition and physical activity instruction could also be integrated into the lesson plans of other school subjects, such as math, biology, and the language arts.

Only six states do not require schools to provide health education.⁹⁹ Nearly 70 percent of states require health education curriculums to include instruction on nutrition and dietary behavior, and some 62 percent require content on physical activity and fitness.¹⁰⁰ But health education teachers at all levels average only about five hours a year teaching about the former and four hours a year about the latter—not nearly enough to affect children’s behavior.¹⁰¹ Competing time demands, a lack of resources, and the increased focus

on meeting state academic standards all chip away at teaching time.¹⁰² Integrating health education into the existing curriculum is one way to overcome these problems.

School Health Services

School health services can play a central role in addressing obesity-related issues among students by providing screening, health information, and referrals to students. Services and settings vary widely, ranging from traditional, school-based basic core services to comprehensive primary care either in school-based health centers or in off-campus health centers.¹⁰³

School-based health centers offer students primary care, including diagnostic and treatment services.¹⁰⁴ Their number is growing rapidly, from some 200 in 1990 to about 1,500 today.¹⁰⁵ A 2002 national survey found 61 percent of the centers in urban settings, 37 percent in elementary schools, and 36 percent in high schools. More than half of the students in schools with such health centers are African American or Hispanic.¹⁰⁶ The centers are typically open twenty-nine hours a week, and 39 percent are open during the summer. Survey participants cited nutrition as their most important prevention-related service.¹⁰⁷ The centers are an untapped resource for preventing obesity, because the students they serve are at high risk of obesity, tend to be underinsured, and may not receive health services elsewhere.¹⁰⁸

Height, weight, and BMI screening and reporting. School health services are an ideal way to collect height, weight, or body mass index (BMI) information about children. These measurements are traditionally taken in a physician’s office, and some observers think they should not be taken in schools.¹⁰⁹ But an estimated 9.2 million U.S. children

and youth lack health insurance and therefore may not get regular medical care.¹¹⁰ Because nearly all children attend school, these preventive screening measures would be available to all families at no cost. And collecting height and weight measures is already an established practice in schools. In 2000, 26 percent of states required schools to screen students for height and weight or body mass; of these, 61 percent required them to notify parents of the results. Among school districts, 38 percent required such screening, of which 81 percent required parental notification.¹¹¹ Taking these measures annually and converting them to an age- and gender-specific BMI percentile for each child makes it possible to monitor individual children over time. It also provides an opportunity for early intervention in obesity prevention.

A newer strategy is parental notification by health “report cards.”¹¹² Family involvement in obesity interventions is considered integral, and sharing children’s weight through report cards may help raise family awareness of children’s weight status and health risk.¹¹³ Concerns about this practice include privacy issues, the problem of labeling and stigmatizing certain children, risks that parents will place children on diets without consulting a physician, and risks of causing eating disorders.¹¹⁴ Some also question whether BMI reporting can be effective if a school has an unhealthy food environment and lacks a good PE program.¹¹⁵

The Institute of Medicine endorses BMI reporting. It also recommends that schools measure each student’s weight, height, and gender- and age-specific BMI percentile each year and make the information available to parents and also to the students when age-appropriate.¹¹⁶ The institute acknowledges

concerns about BMI reporting and emphasizes that student data must be collected and reported validly and appropriately, with attention to privacy concerns and with information on referrals available if follow-up health services are needed.

Three school districts—Cambridge, Massachusetts; Allentown, Pennsylvania; and Citrus County, Florida—have adopted school-based BMI reporting measures.¹¹⁷ They send

School health services can play a central role in addressing obesity-related issues among students by providing screening, health information, and referrals to students.

home each year a health report that includes the child’s BMI percentage and a description of his or her risk category. The first study of this school-based practice, conducted with elementary school children and their parents in Cambridge, was promising.¹¹⁸ Parents of overweight children who received health reports were more aware of their child’s weight status and were more likely to consider looking into medical help, dieting, and physical activities for their child than parents who received general or no health information.

Arkansas also recently created a comprehensive program to combat childhood obesity. Major provisions include: conducting annual BMI screenings for all public school students, with results reported to parents; restricting access to vending machines in public

elementary schools; disclosing schools' contracts with food and beverage companies; creating district advisory committees made up of parents, teachers, and local community leaders; and establishing a Child Health Advisory Committee to recommend additional physical activity and nutrition standards for public schools.¹¹⁹ In 2004 Illinois required the state's Department of Health to collect height and weight measurements as part of the mandatory health exam for students. In 2005 West Virginia, Tennessee, and New York enacted legislation requiring student BMI reports.¹²⁰

Schools as Work Sites

Schools are one of the nation's largest employers, with approximately 4 percent of the total U.S. workforce.¹²¹ In 2001, nearly 6 million teachers and staff worked in the public school system.¹²² The school setting thus holds great promise for their health promotion. Built-in advantages in this setting include fitness facilities, food service personnel, nursing and counseling staff, and health and physical education staff.¹²³ Work site health promotion could encourage staff and teachers to value nutrition and physical activity more highly and to heighten their commitment to adopting and implementing related programs for their students.¹²⁴ Faculty and staff who practice health-promoting behaviors could also be role models for students.¹²⁵

Work site health promotion for faculty and staff is also part of the coordinated school health program recommended by the Centers for Disease Control and Prevention (CDC). It can include health screenings, health education, employee assistance programs, and health care.¹²⁶ But school districts lag behind other major employers in offering work site programs.¹²⁷ In schools, as in other

work sites, successful programs require an involved, committed, and supportive administration.¹²⁸

The SHPPS 2000 survey provides the first comprehensive data on work site programs.¹²⁹ Not one state requires districts or schools to fund or sponsor nutrition and dietary counseling, physical activity and fitness counseling, or programs such as walking or jogging clubs for teachers and staff. More districts and schools should implement or strengthen work site health promotion. And researchers should seek out interventions conducted in these settings to identify and replicate best practices.¹³⁰

State and Local School Nutrition and Physical Activity Policies

While in many respects inadequate themselves, especially regarding competitive foods, USDA nutrition regulations permit state agencies and local school food authorities to impose additional restrictions on all food and beverage sales at any time in schools participating in the federal school meal programs. In recent years, many states, local school districts, and individual schools have taken up the challenge. States are also becoming more active in promoting physical activity.

Twenty-three states have adopted additional restrictions, including policies that limit the times or types of competitive foods available for sale in vending machines, cafeterias, and school stores and snack bars.¹³¹ Most states restrict access to competitive foods when school meals are being served. Five restrict access all day long.¹³² During the first six months of 2005, forty states introduced some 200 bills that provide nutritional guidance for schools. Eleven states—Arizona, California, Hawaii, Kansas, Kentucky, Louisiana, Maine,

New Mexico, South Carolina, Texas, and West Virginia—mandated nutritional standards for competitive foods.¹³³ See the legislative activity box for highlights of nutrition- and physical activity–related legislation enacted during the first half of 2005.

Several school districts have also taken action. More than half of the nation's ten largest school districts restrict competitive foods beyond federal and state regulations. The New York City Public School District, the nation's largest, eliminated candy, soda, and other snack foods from all vending machines starting in fall 2003. Vending machines on school grounds can sell only water, low-fat snacks, and 100 percent fruit juices.¹³⁴ The Los Angeles Unified School District passed a soda vending ban that went into effect in January 2004. A further ban on fried chips, candy, and other snack foods in school vending machines and stores went into effect in July 2004.¹³⁵ The Chicago public schools announced in 2004 a plan to ban soft drinks, candy, and high-fat snacks from school vending machines and to replace them with more healthful offerings. The Philadelphia School District recently passed a comprehensive school nutrition policy that includes nutrition education, guidelines for all foods and beverages sold in schools, family and community involvement, and program evaluation.

A 2005 report surveyed principals and found that 60 percent of schools in the 2003–04 school year had written policies in place that restricted competitive foods accessible to students, and most often school districts developed and enacted the policies. A recent study examined associations between high school students' lunch patterns and vending machine purchases and the schools' food environment and policies.¹³⁶ In schools with established policies, students reported making fewer

snack food purchases than students in schools without policies. Students at schools with open-campus policies during lunchtime were significantly more likely to eat lunch at a fast-food restaurant than students at schools with closed-campus policies. These findings suggest that school food policies that decrease access to foods high in fats and sugars are associated with less frequent consumption of these items during the school day.

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The Trust for America's Health recently examined state statutes and administrative codes for physical activity policies.¹³⁷ Only two states, South Dakota and Oklahoma, have no PE requirement for elementary and secondary schools. Twenty-seven states require PE in elementary, middle, and high school. Two states, Arizona and Mississippi, have no PE requirement for high school, and twenty-seven require only one-half credit or one credit of PE for graduation. Illinois is the only state that requires daily PE in every grade, although its duration is not specified. State requirements, however, are often not enforced. Amidst many other mandated curriculum requirements and tight school budgets, PE is often viewed as a low priority.¹³⁸

Moreover, the SHPPS 2000 nationwide survey found that 17 percent of elementary

Highlights of 2005 State Legislative Activity

Nutrition-Related Legislation

Arizona has mandated the state Department of Education (DOE) to develop minimum nutrition standards that meet or exceed federal regulations for all foods and beverages sold or served at elementary and middle or junior high schools or at school-sponsored events. It also prohibits foods of minimal nutritional value from being sold or served during the school day at any elementary, middle, or junior high school campus. Finally the law forbids school administrators from signing food and beverage contracts that include the sale of sugared, carbonated beverages and all other foods of minimal nutritional value on elementary and middle or junior high school campuses.

In Kentucky the Board of Education must issue regulations that set minimum nutrition standards for all foods and beverages that are sold outside the National School Breakfast and National School Lunch Programs. State legislators also banned the sale of competitive foods and beverages, except those sold à la carte, from the first student's arrival at the school building until thirty minutes after the last lunch period. They allow only "school day-approved beverages"—defined as water, 100 percent fruit juice, low-fat milk, and any other beverage containing no more than 10 grams of sugar per serving—to be sold in elementary school vending machines, school stores, canteens, or fundraisers during the school day. The state will assess financial penalties for schools that violate the new state requirements.

Maine's legislators have asked the DOE to work with public schools to encourage nutrition education as part of a coordinated school health program. The law requires schools' food service programs to post caloric information for prepackaged à la carte items made available for purchase. In addition, the DOE must adopt policies that establish nutritional standards for food and beverage items sold outside the federal meal program. The standards must include maximum portion sizes that are consistent with the single-serving standards established by the Food and Drug Administration. It also establishes a pilot program to install vending machines that sell only flavored or unflavored milk, containing no more than 1 percent fat. Finally it mandates the DOE, in collaboration with the Department of Agriculture, Food and Rural Resources, to implement the National Farm to School Program. This program will provide locally grown fruits and vegetables to public schools.

West Virginia now prohibits the sale of soft drinks through vending machines, school stores, or on-site fundraisers during the school day in areas accessible to students in elementary and middle or junior high schools. During the school day, these schools are permitted to sell only "healthy beverages," defined as water, 100 percent fruit and vegetable juice, low-fat milk, and other juice beverages with at least 20 percent real juice. For high schools that permit the sale of soft drinks, the law also requires that "healthy beverages" must account for at least 50 percent of the total beverages offered and must be located near the vending machines containing soft drinks.

Physical Education and Physical Activity Legislation

In Kentucky each school council with grades K through 5 must develop and implement a wellness policy that includes moderate to vigorous physical activity each day. It may allow physical activity up to thirty minutes a day or 150 minutes a week to be part of instructional time. Legislators also

mandated the state Board of Education to develop a physical activity environment assessment tool for school districts.

A new South Carolina law requires 150 minutes a week of physical education and physical activity for students in grades K through 5 beginning in the 2006–07 academic year. It sets student-to-certified physical education teacher ratios for elementary schools to be phased in from 700:1 for the 2006–07 academic year to 600:1 for the 2007–08 academic year and to 500:1 for the 2008–09 academic year. As the ratio is phased in, the amount of time in PE must increase from a minimum of sixty minutes a week to a minimum of ninety minutes a week, scheduled every day or on alternate days. Each elementary school must also appoint a physical education teacher to serve as its PE activity director to coordinate additional physical activity outside of PE instruction times. In addition, the DOE must provide each school district with a coordinated school health model while each school district must establish and maintain a Coordinated School Health Advisory Council to develop, implement, and evaluate a school wellness policy.

Texas legislators authorized the state Board of Education to extend its policy requiring elementary school students to engage in 30 minutes of physical activity a day or 135 minutes a week to apply to middle and junior high school students as well. Their legislation calls for health education to emphasize the importance of proper nutrition and exercise and adds reporting requirements for statistics and data related to student health and physical activity. It also establishes a state-level School Health Advisory Committee within the Department of State Health Services to provide assistance in developing and supporting coordinated school health programs and school health services.

In West Virginia each student in grades K through 5 must participate in at least thirty minutes of physical education, including physical exercise, at least three days a week. Students in grades 6 through 8 must participate in at least one full period of PE, including physical exercise, every day for one semester of the academic year. Those students in grades 9 through 12 must take at least one full PE course, including physical exercise, for high school graduation and be given the opportunity to enroll in an elective lifetime physical education course. In addition, the state Board of Education must establish a program within the existing health and PE program that incorporates fitness testing, reporting, recognition and fitness events, and incentive programs. The program will test cardiovascular fitness, muscular strength and endurance, flexibility, and body composition.

Source: Health Policy Tracking Service, a Thomson West Business, *State Actions to Promote Nutrition, Increase Physical Activity, and Prevent Obesity: A Legislative Overview*, July 11, 2005 (www.netscan.com/outside/HPTSServices.asp [August 22, 2005]).

schools, 25 percent of middle and junior high schools, and 40 percent of high schools exempt from required PE courses those students who participate in community or school sports or in other school activities or who have high physical competency test scores.¹³⁹ And few states and districts require skill performance tests, fitness tests, or written knowledge tests.

Recent legislative activity, however, as seen in the legislative activity box, demonstrates promising attention to this area of children's development. Several states are encouraging, not mandating, state and local education officials to enhance PE and physical activity in schools. During the first half of 2005, six states—North Dakota, Montana, Utah, Colorado, Tennessee, and Washington—adopted

such resolutions.¹⁴⁰ In April 2005, the North Carolina State Board of Education voted to require thirty minutes of daily physical activity for all students in grades K–8 beginning in the 2006–07 school year.

Federal Policy Initiatives

The most recent federal policy initiatives for preventing childhood obesity are found in the Child Nutrition and Women, Infants, and Children (WIC) Reauthorization Act of 2004,

Several interventions have shown that the availability, promotion, and pricing of foods in schools can be changed to support more healthful food choices.

which requires each school district that participates in the federal school meal program to enact a wellness policy by the day the 2006–2007 school year opens. School districts must set goals for nutrition education and physical activity, write nutrition guidelines for all foods available at school, ensure that school meal guidelines are not less restrictive than federal requirements, and evaluate how well the new policy is implemented. Parents, students, the school food service, and school administrators must be involved in developing the new policy. The Food Research and Action Center and the National Alliance for Nutrition and Activity are developing information and guidelines to assist states and school districts.

The Child Nutrition and WIC Reauthorization Act also expanded a USDA pilot pro-

gram begun by the 2002 Farm Act that provided fresh fruits and vegetables at no cost to children in 107 elementary and secondary schools in four states and on one Indian reservation. A 2003 evaluation found that most participating schools considered the pilot program successful and felt strongly that it should continue.¹⁴¹ The expanded program will serve children in four more states and two more Indian reservations, with special emphasis on low-income children.¹⁴²

School-Based Obesity-Prevention Interventions

Many school-based interventions in recent years have promoted healthful eating and physical activity among children and adolescents, but relatively few interventions have specifically targeted obesity prevention. Several comprehensive reviews have summarized the research analyzing obesity-prevention, nutrition, and physical activity intervention.¹⁴³ Overall, the findings of studies that targeted eating and physical activity behaviors have been positive. School-based obesity-prevention interventions have also shown some success in changing eating and physical activity behaviors but have been less effective in changing body weight or body fatness.¹⁴⁴ A recent report by the Task Force on Community Preventive Services concluded that insufficient evidence existed to determine the effectiveness of combined nutrition and physical activity interventions to prevent or reduce obesity in school settings. The limited number of qualifying studies, for example, report noncomparable outcomes.¹⁴⁵

In one such study, T. N. Robinson found that a school-based intervention to decrease television and video viewing reduced the prevalence of obesity among third and fourth graders.¹⁴⁶ Planet Health, a school-based intervention to decrease television viewing and

increase physical activity and healthful eating among students, decreased obesity among girls but not boys.¹⁴⁷ A third intervention, which reduced soft drink consumption in England, lowered the number of overweight and obese children aged seven to eleven.¹⁴⁸

Several interventions have changed food environments in schools, reducing the fat content of school lunches and modifying the prices of fruits and vegetables in the school cafeteria and in vending machines.¹⁴⁹ They have shown that the availability, promotion, and pricing of foods in schools can be changed to support more healthful food choices. Interventions are just beginning to target the availability of competitive foods and beverages. Little research has been done on the effects of school, district, or state policy changes regarding the school food environment or changes in student dietary outcomes or in body mass indexes.

Studies have also shown that school PE classes can be changed to make them much more active and increase the time spent in PE and in moderate to vigorous activity.¹⁵⁰ One recent analysis found that an extra hour of PE per week in first grade (compared with time spent in PE in kindergarten) lowered BMI in girls who had been overweight or at risk for overweight in kindergarten.¹⁵¹ No effect was seen in boys. Interventions to increase energy expenditure through increased physical activity and decreased consumption of high-calorie, low-nutrition foods offer promising strategies for preventing obesity.

The few existing school-based obesity-prevention studies suggest that interventions hold promise.¹⁵² For future studies, researchers should strengthen interventions and should target the school environment, the home environment, and student and par-

ent behaviors.¹⁵³ Interventions could modify the home environment by installing devices to monitor television time or by increasing the availability of healthful foods and limiting energy-dense, low-nutrition foods. School environment changes could include more frequent required PE classes, more interesting and fun physical education choices, and school-wide guidelines about food and beverage availability and sales.¹⁵⁴

Research can also help reveal whether specific forms of interventions have different effects on children of different age, gender, or ethnic groups. For example, targeting particular behaviors may be more successful with one age group than with another. Younger children may respond better to reducing television viewing while adolescents may benefit from more structured and diverse PE opportunities. Changing à la carte and vending machine food and beverage availability may be more effective for high school students than for elementary school students. More research is also needed to identify obesity prevention's most potent behavioral targets, such as limiting screen time, sugar-sweetened beverages, and portion sizes.

School Links with Communities and Families

Although most physical activity and nutrition programs directed at youth are conducted in school, communities can also provide important resources. And family involvement is often crucial.

Farm-to-School Programs and School Gardens

Some schools are offering new farm-to-school programs that link local farmers with school cafeterias. The programs provide high-quality local produce, support locally based agriculture, and often directly connect

farmers and children with reciprocal visits. Some schools also sponsor gardening programs. The Martin Luther King Junior Middle School in Berkeley, California, offers the Edible Schoolyard, a nonprofit program that allows students to participate in all aspects of organic gardening and cooking, from seed to table.¹⁵⁵ Such hands-on experience may encourage children to eat more healthfully. A recent study at three schools in California examined fourth graders' knowledge of nutrition and their preference for certain vegetables.¹⁵⁶ Students at one school received nutrition education, those at a second school received nutrition education and planted and harvested a vegetable garden, and those at a third served as a control group. Children who received nutrition education alone and those who received nutrition education combined with gardening had much higher scores than the control group. Children who gardened also increased their preferences for certain vegetables.

Walking and Biking to School

In recent decades, dramatically fewer children have been walking or biking to school. In 1969, 48 percent of students walked or biked to school. By 2001, less than 15 percent of students aged five to fifteen walked to or from school, and just 1 percent biked.¹⁵⁷ Today roughly one-third of students ride a school bus, and half are driven in a private vehicle.¹⁵⁸ Because the trip to and from school happens daily, active commuting (walking or biking) can provide substantial caloric expenditures over the school year.¹⁵⁹ One study used accelerometers, small electronic devices worn around the waist that capture minute-by-minute recordings of activity level, to measure physical activity among fourteen- to sixteen-year-old students. It found that boys who walked to school expended forty-four more calories a day and

girls expended thirty-three more calories a day than did their peers who were driven.¹⁶⁰ Projected over the course of a school year, or 200 days, this additional physical activity could account for a two- to three-pound difference between those who walk to school and those who do not, all other things held constant.

To examine why most children do not walk or bike to school, the CDC analyzed data from the annual national HealthStyles Survey.¹⁶¹ Households with children aged five to eighteen were asked if their children walked or biked to school and about any barriers they faced in doing so. Reported barriers included long distances (55 percent), traffic danger (40 percent), bad weather (24 percent), crime (18 percent), opposing school policy (7 percent), and other reasons (26 percent). Sixteen percent of respondents reported no barriers; notably, within this group, 64 percent reported children walking and 21 percent reported children biking to or from school at least once a week in the preceding month.

One major cause of active commuting's decline is the trend toward constructing schools away from the center of communities.¹⁶² Students with shorter walk and bike times to school are more likely to walk and bike. Recent nationwide trends toward bigger schools have also led to the decline of the "neighborhood" school. Since World War II, the number of schools has declined 70 percent, while the average size has grown fivefold. Today, however, communities are increasingly concerned about school siting decisions as they relate to children's health and overweight status. Communities, families, school districts, and governments at all levels have begun mobilizing to facilitate active commuting by improving pedestrian and biking safety, adding bike racks and crossing guards, mapping safe

routes to schools, building new schools or renovating older schools in residential neighborhoods, and forming such programs as the Walking School Bus, Bike Trains, Safe Route to School, National Walk Our Children to School Day, and the federal Kids Walk-to-School Campaign.¹⁶³ Programs that involve adult volunteers—such as the Walking School Bus, which organizes neighborhood chaperones to supervise children as they walk to school—also increase physical activity among adults.¹⁶⁴

After-School Programs

After-school programs in child care centers, schools, and community centers also offer opportunities to implement obesity-prevention strategies. The 1990s saw a substantial increase in after-school programs serving children of low-income families.¹⁶⁵ One of the best known is the federally funded 21st Century Community Learning Centers, a school-based after-school program providing academic enrichment and youth development opportunities. Federal funding grew from \$40 million in 1997 to almost \$1 billion in 2005. In 2001, 1.2 million elementary and middle school students in 3,600 schools participated.¹⁶⁶ Implementing obesity-prevention strategies in the 21st Century Community Learning Centers would not only reach many young people directly but also offer a model for other such programs.

A recent survey found that most after-school programs do not address physical activity and healthful eating, and that staff at many after-school programs are untrained.¹⁶⁷ But some programs are leading the way. For example, the Girls Health Enrichment Multi-Site Studies (GEMS) program aimed to prevent obesity among eight- to ten-year-old African American girls. In a set of four pilot interventions, girls and their parents were recruited

through schools and other community channels to participate in after-school programs, such as ethnic dance, that targeted healthful eating, physical activity, and reduced television viewing.¹⁶⁸ The results of the GEMS pilot interventions were promising, demonstrating the feasibility and potential effectiveness of incorporating obesity-prevention efforts into after-school programs.

Federal funds are available to provide after-school snacks to children up to age eighteen

A recent survey found that most after-school programs do not address physical activity and healthful eating, and that staff at many after-school programs are untrained.

in after-school programs operated by schools, nonprofit organizations, and public agencies. Both the federal school lunch program and the Child and Adult Care Food Program (CACFP) offer cash reimbursements to after-school programs for snacks. Subsidies vary by the child's family income, as they do for breakfasts and lunches. Subsidies are provided with CACFP funds to provide free snacks in programs located in areas where 50 percent or more of the children enrolled in school are eligible for free or reduced-priced school meals. Participation in the after-school snack program has increased dramatically, from some 645,000 children in 1999 to about 1.2 million in 2003.¹⁶⁹ Reimbursable snacks must follow the CACFP's snack requirements, but more research is needed to assess the nutritional value of the snack foods being

offered and to find ways to serve more fruits and vegetables.

Congress has recently allowed after-school programs in seven states—Delaware, Illinois, Michigan, Missouri, New York, Oregon, and Pennsylvania—to serve suppers as well as snacks to children in areas where more than 50 percent of the children qualify for free or reduced-price school meals.¹⁷⁰ Some low-income children may thus eat three meals and a snack every weekday during the school year from federal food programs—a fact that highlights both the growing importance of the federal child nutrition programs for children in low-income families and the need to ensure that the foods these programs serve are consistent with the recommendations in the *Dietary Guidelines for Americans*.

Family Involvement

Parents and caregivers provide the primary social environment in which children form attitudes and behaviors regarding eating and physical activity. Parents create an environment conducive to active or sedentary lifestyles, they select foods brought into the home, they determine how often and what types of meals are eaten outside the home, and they model eating and physical activity behaviors. Thus, to achieve maximal and sustained behavior change, parents and caregivers must be involved in obesity prevention.

Reviews of efforts to prevent youth high-risk behaviors, such as school failure, aggressive behaviors, and substance abuse, have found that combined school and family programs deliver more benefits than those managed separately.¹⁷¹ Most obesity-prevention programs, however, have focused almost exclusively on school programs. Actively involving

parents is not always easy, but some programs that included families achieved high rates of recruitment and retention (around 80 percent) by using such incentives as food, child care, transportation, and rewards for homework completion or attendance.¹⁷² Community organizations and other local resources can also help schools connect with low-income and minority parents.¹⁷³ One creative and effective way to involve parents is to make school gyms and swimming pools available to students and their families after school and on weekends.

Recommendations for Schools

Schools can become one of the nation's most effective weapons in the fight against obesity by creating an environment that is conducive to healthful eating and physical activity. Health and success in school are interrelated; schools cannot achieve their primary educational mission if their students and staff are not healthy and physically, mentally, and socially fit. Each school can follow ten key strategies, taken from CDC guidelines for its coordinated school health program, to promote lifelong physical activity and healthful eating for its population:

- address physical activity and nutrition through a Coordinated School Health Program approach,
- designate a school health coordinator and maintain an active school health council,
- assess the school's health policies and programs and develop a plan for improvement,
- strengthen the school's nutrition and physical activity policies,
- implement a high-quality health promotion program for school staff,

- carry out a high-quality course of study in health education,
- implement a high-quality PE course,
- increase opportunities for students to engage in physical activity,
- offer a quality school meals program, and
- ensure that students have appealing, healthful choices in foods and beverages offered outside of the school meals program.¹⁷⁴

The Institute of Medicine report, *Preventing Childhood Obesity: Health in the Balance*, also offers comprehensive recommendations regarding school efforts to advance obesity prevention and outlines immediate steps schools can take to improve healthful eating and physical activity.¹⁷⁵ Among those steps are improving the nutritional quality of foods and beverages served and sold in schools and as part of school-related activities, increasing opportunities for physical activity during and after school, implementing school-based interventions to reduce children's screen time, and developing, implementing, and evaluating innovative pilot programs for both staffing and teaching about wellness, healthful eating, and physical activity.

Conclusion

Research consistently shows that the diets of most U.S. children fail to meet national nutrition guidelines. Nor do most U.S. children get the recommended levels of daily physical activity. As a result, today a larger share of the nation's children is overweight than at any time in history. The prevalence of obesity, having increased dramatically over the past forty years, now threatens the immediate and long-term health of children and youth.

With more than 54 million children in attendance daily, the nations' schools offer many opportunities for developing strategies to prevent childhood obesity. Children spend roughly a third of every weekday in school. While they are there, they can consume up to two meals, sometimes even three, plus snacks. They have many different avenues for recreation and physical activity. They also take courses in health education and receive health services of various kinds at school. If schools can work together with policymakers, advocates, parents, and communities to create an environment where children eat healthfully, become physically fit, and develop lifelong habits that contribute to wellness, the nation will be well on its way to preventing obesity.

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