

Childhood Obesity Strategies for Prevention

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The incidence of overweight children aged between 6 and 11 years has more than doubled while the incidence for adolescents from age 12 to 19 has tripled between 1980 and 2000. The prevalence is highest among minorities and children belonging to low socioeconomic classes. Because overweight children tend to become obese adults, the future economic burden on the American healthcare system will be significant. This article examines the prevalence of the problem, highlights research and best practice models, and reviews policy trends related to childhood obesity.

Key words: *childhood obesity, competitive foods, physical education, public policy*

THE American Academy of Pediatrics defines a child with a body mass index (BMI) at or above the 95th percentile for age and gender as overweight or obese. Children with a BMI between the 85th and 95th percentiles are considered to be at risk for being overweight.¹⁻³ Although genetics has been shown to be a determinant of obesity, the increased obesity among children and adolescents is typically attributed to taking in more calories than utilized.^{1,3} Children's caloric intake⁴ escalated by 80 to 230 calories per day from 1989 to 1996 whereas levels of their physical activity declined.⁵ A complex interaction of social, environmental, and policy factors has influenced both eating habits and levels of physical activity resulting in an environment in which it is difficult for a child to maintain an ideal or healthy body weight.^{2,3,6} Recognition of these contributing factors is an important component of identification of best practice methods for future prevention.

One factor influencing childhood obesity is the change in eating habits over recent decades. The family meal has been replaced

by fast food or restaurant food, which is high in fat and calories but low in fruit and vegetables.^{1,3} Competitive foods, foods available outside the school meal program, have been introduced into the school environment. Ninety percent of public schools sell competitive foods that are not required to meet US Department of Agriculture (USDA) nutrition standards.⁴ In a school environment where competitive foods are available, students have been shown to consume fewer fruits and vegetables.⁷ Also, nearly 20% of schools give students less than 20 minutes to eat lunch, which may further promote vending machine use.⁸ Finally, snacking has become more prevalent. Children's caloric intake from snacks increased 30% between 1977 and 1996.⁹

The effects of changes in eating habits and environments on childhood obesity are compounded by a decrease in physical activity. More than one third of high school students do not participate in strenuous physical activity on a regular basis.^{5,10} Many factors, including lowered physical education requirements in schools, contribute to this decline in physical activity.¹¹ The Robert Wood Johnson Foundation estimates that less than 10% of elementary students participate in physical education.¹² Technology also contributes to the decline in physical activity.⁶ On average, children spend 4 hours daily in front of some type of screen—television, computer, or video game.^{12,13} A correlation

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between watching television and obesity has been demonstrated from preschool through adult age groups.⁶

Other societal factors have contributed to inactivity among children. For example, unsafe neighborhoods, especially in low socioeconomic areas, have forced children indoors.¹ In addition, with both parents working, children often spend after-school time home alone and may not be allowed outdoors.¹⁴ Furthermore, communities are not designed to promote physical activity.³ In fact, although almost one quarter of all excursions made from home are less than 1 mile, nearly three quarters of the trips are made in an automobile.¹³

Obesity places children at risk of physical, mental, and social health disorders. Obese children are at risk for diseases such as hypertension, hypercholesterolemia, type 2 diabetes, and coronary artery disease.¹⁵ Once considered rare conditions in children, these diseases are seen with increasing frequency by pediatricians.¹⁶ In addition to physical consequences, obese children suffer from emotional health problems. Poor self-esteem and depression are common.^{2,3,15} In fact, poor self-esteem has been noted in overweight girls as young as 5 years.¹⁷ Social health of children also suffers as a result of obesity. Obese individuals are stigmatized in American society. These children are often the victims of negative stereotyping, discrimination, teasing, and bullying.^{2,3}

Given the current trends in obesity, health-care costs related to obesity can be expected to escalate. Currently, obesity accounts for 4.3% to 9.1% of total direct healthcare costs in the United States. According to the Department of Health and Human Services, an obese individual's annual Medicare expenditure is 37% higher than that of a normal weight person. Estimates of both direct and indirect costs of obesity and overweight in the United States are from \$69 billion to \$117 billion annually.¹⁸

Obesity also accounts for significant costs to business. Obese and overweight employees utilize more sick leave than employees of

a normal weight. Nearly 40 million workdays were lost in 1994 because of obesity-related conditions at a cost of approximately \$2.4 billion for sick leave. Close to 1 billion dollars was paid for disability insurance that same year. Total costs of health problems related to obesity were estimated to be nearly \$13 billion.¹⁸ The need for culturally appropriate prevention practices that target children of various ages is evident.

STAKEHOLDERS

Although obese children suffer from higher levels of physical and mental health problems, and are stigmatized in American society, they are not the only stakeholders in this growing epidemic. Parents and families also deal with the consequences of their children's obesity. The stress and busyness of normal life may make providing healthy diets and increased physical activity a challenge for them.^{3,19} In addition, if their children suffer from health problems, parents may have to take time off work for physician visits or when the child misses the school because of illness. The economic hardship of medication purchases for diseases such as diabetes or asthma may stress family finances. Because childhood obesity is more prevalent in lower socioeconomic classes,¹² the economic impact may be especially significant. Finally, the emotional toll of having a child who suffers from obesity-related mental conditions such as depression may alter family dynamics.

Schools are also primary stakeholders in the childhood obesity issue. The most obvious issues arise with trying to meet the academic and social needs of children who may have higher absenteeism and who may be the victim of bullying. However, the school environment has actually benefited from the milieu that has contributed significantly to obesity, particularly through the sales of competitive foods. Typically, school food programs are self-supporting. Their need for revenue to cover operating expenses may cause the school to seek additional revenue through the sale of competitive foods.^{3,20} The financial

gains from such programs help offset shortfalls in federal and state funding.²¹⁻²³

Another challenge for schools is to provide adequate physical activity in the form of either physical education or recess. Some schools use competing academic demands as a reason for elimination of physical education.²⁴ Others cite mixed research results that show that physical education that does not meet high standards is of little value.²⁵ Still other schools state that the reduction in physical education programs is due to budget constraints and the lack of program evaluation by physical education instructors.¹¹ Because the majority of children attend school, schools can have a significant impact on both the eating and activity habits of students.²⁶ However, school administrators, teachers, and board members must be informed of practices to prevent the problem and to support children who are obese.

In addition to schools, the entire community has a tremendous stake in the health and well-being of its children. The design of neighborhoods is an important determinant in the amount of physical activity children receive.^{3,27} The presence of sidewalks, bicycle paths, and parks is conducive to physical activity. The perceived level of safety may determine whether parents allow their children to play outdoors.¹⁴ The presence of community-based youth organizations, faith-based organizations, and recreation centers offer alternatives to sedentary activities.^{3,27}

At the state level, stakes are high in the childhood obesity issue. Families who live in poverty, and who have a disproportionate share of obese children, are dependent on the state for allocation of Medicaid funding for healthcare.¹² For example, in the state of Florida, Governor Jeb Bush's Task Force on the Obesity Epidemic reported that obesity-related healthcare expenditures were \$3.9 billion in 2000, half of which was paid for by Medicare or Medicaid.²⁸ Not only is Medicaid a state issue, schools are also funded and regulated at the state level.²¹ Communities seek financial assistance in development of the infrastructure to promote physical activity as well as funding for public health resources to

provide care. In addition to financial support, various groups look to the state government to mandate interventions to reduce obesity.²⁸

At the federal level, not only must the burgeoning costs of healthcare be addressed, but the federal government also has primary responsibility for nutrition in public schools. Voluntary school meal programs provided by the National School Lunch Act and the School Breakfast Programs are administered by the USDA. The federal government establishes minimum standards that states may further regulate.²¹ Some groups recommend federal control of advertising and availability of competitive foods in public schools.^{9,29}

A variety of business interests has a stake in childhood obesity. For example, fast food and other restaurants have contributed to, and benefited from, the epidemic of obesity. Soft drink companies clearly benefit financially from the availability of their products in schools. In addition, the amount of marketing designed specifically for children increased from \$6.9 billion in 1992 to \$15 billion in 2002, a substantial amount of which are television commercials for food. Marketing within schools has been recognized as an easy access to the majority of children in the United States in an environment that lends credibility to the advertisements' message.³⁰

Pharmaceutical companies are also impacted by the current childhood obesity epidemic. They stand to reap profits on drugs used to treat medical problems associated with obesity such as diabetes and asthma. Currently, billions of dollars for research are being spent in efforts to develop drugs that promote weight loss. A reported 200 potential drugs for obesity are under development.³¹

The media, especially television, is another stakeholder in the obesity epidemic. Food advertising on television alone was valued at more than \$6.6 billion in 2002.³⁰ Ninety-nine percent of adolescents have a television in their home, and 65% have a television in their bedroom.³² The amount of time children spend watching television daily coupled with the amount of corporate advertising money spent to reach these children makes television

a key player in either the promotion of obesity or its prevention and cure.

REVIEW OF BEST PRACTICES TO CHILDHOOD OBESITY

As previously stated, childhood obesity results from utilizing fewer calories than taken in. In a 2000 study by Berkey et al, a larger 1-year increase in BMI was reported for 9- to 14-year-olds who had more screen time and who reported increased calorie intake and less physical activity. The authors concluded that prevention of childhood obesity would best be accomplished by methods to decrease caloric intake, reduce screen time, and increase physical activity.³³ Research on treatment and prevention of childhood obesity has focused primarily on decreasing sedentary activities while increasing physical activity and promotion of healthy dietary habits. Because almost all children spend significant amounts of time at school, much of the research focuses on interventions in the school.

Project EAT (Eating Among Teens) was a "school-based survey examining personal, behavioral, and socioenvironmental factors associated with nutritional intake among adolescents."^{32(p1298)} Data were collected from 1476 middle and high school students in 1998-1999. Results showed that high usage of television and video games was positively correlated with unhealthy eating habits but higher levels of time spent reading and doing homework were positively correlated with healthy eating behaviors. The authors posit that the unhealthy eating habits associated with television time are due to advertising influences that promote junk food consumption.

School physical education programs can increase physical activity among children and adolescents. Data from the Early Childhood Longitudinal Study—Kindergarten Class (ECLS-K) collected from a nationally representative group of children entering kindergarten in 1998 were analyzed. Findings indicated that increased physical education time

had a "strong negative effect on BMI" for overweight girls or girls at risk for becoming overweight. The effect on overweight boys or boys at risk for overweight was not statistically significant. The authors suggested that if every kindergartner received a minimum of 5 hours of physical education weekly, the prevalence of overweight girls could be lowered by 4.2% and the risk for becoming overweight among all children could be lowered by 9.2%.²⁵

Schools cite competing academic demands and budget constraints as reasons for the decrease in physical education programs.^{11,24} In response to these concerns, a review of literature was conducted to determine the effectiveness of noncurricular approaches in promoting physical activity among schoolchildren.²⁴ Noncurricular approaches were considered any approach to increasing physical activity that did not require modification of existing health or physical education programs. School break times were identified as one time during which activity could be increased from 17% to 60% with minimal expense. One benefit noted from such a program was increased "habitual activity level," which continued even when breaks were discontinued.

In an intervention project to improve heart health among third- and fourth-grade students in North Carolina, Harrell et al implemented an 8-week program that combined classroom education and a physical activity intervention. Topics included in the didactic component included heart healthy food selection, the importance of physical activity, and smoking avoidance. The physical activity intervention consisted of an aerobic program 3 times weekly. In this randomized, controlled field trial, the investigators found that both health knowledge and physical activity were increased and that the children in the intervention group had a higher loss of body fat and greater gains in aerobic strength than did the control group. The authors concluded that this type of classroom approach is easily implemented, uses positive peer pressure, and avoids stigmatization.³⁴

Another area of research is soft drink consumption. Mrdjenovic and Levitsky found that 6- to 13-year-olds who consumed more than 12 oz of sweetened drinks per day experienced greater weight gain than children who consumed less than 12 oz daily. In addition, the sweetened drinks replaced milk in the children's diets but did not reduce the consumption of food.³⁵ This study confirmed the findings of Ludwig, Peterson, and Gortner. In their prospective, observational analysis of the relation between sugar-sweetened drinks and obesity in 548 public school children, they found that additional servings of sugar-sweetened drinks above their baseline level was associated with increased BMI and frequency of obesity.³⁶

Since the association between sugar-sweetened drinks and obesity has been demonstrated, James, Thomas, Cavan, and Kerr conducted a study to determine whether school-based education would be effective in reducing soft drink consumption and preventing obesity in children. The Christchurch Obesity Prevention Project in Schools (CHOPPS) was conducted between August 2001 and October 2002 in the United Kingdom with children between the ages of 7 and 11 years. In this cluster-randomized, controlled trial, baseline and postintervention measures of soft drink consumption were compared. The intervention consisted of an educational program that discouraged soft drink consumption and promoted a balanced diet. At 12 months, the intervention group maintained a decrease in carbonated drink consumption. Furthermore, the percentage of obese and overweight children in the control group increased by 7.5, whereas the intervention group had a decrease of 0.2%. The investigators concluded that school-based educational programs may be an effective way to decrease soda consumption and prevent obesity in children.³⁷

Access to sugar-sweetened drinks in the school environment may be responsible for increased consumption. In fact, competitive foods sold in the school environment account for an increasing share of the food that chil-

dren eat while at school.³⁸ In a study of nearly 600 seventh graders in 16 schools, availability of a la carte foods was found to be inversely related to fruit and vegetable consumption. In addition, the availability of snack-vending machines was associated with lower fruit consumption.⁷

In a study designed to evaluate the opinions of parents and teachers about the school food environment, Kubik, Lytle, and Story found that less than 20% of parents and less than one third of teachers thought that schools place sufficient emphasis on student nutrition. Even fewer, 12% and 11% respectively, felt that students ate healthy diets. Ninety percent of teachers and parents agreed that healthier foods and drinks should be accessible in the vending machines and a la carte food lines. Three fourths of both groups thought that vending and a la carte choices should be limited to healthy selections while only 20% of parents and 12% of teachers believed that candy and soft drinks should even be available at schools. The authors conclude that the support of parents and teachers should be solicited to effect changes in the school food environment.³⁹

POLICY INITIATIVES

The epidemic of childhood obesity has been acknowledged only in recent years. Both healthcare and educational organizations have issued a variety of position statements that have successfully brought the epidemic to the attention of national, state, and local policy makers.⁴⁰⁻⁴⁴ National organizations, both public and private, have also promoted action at the various levels of government.^{3,5,12,14,45,46} The result has been a flurry of legislative activity aimed at the treatment and prevention of childhood obesity. Because 95% of all children attend school,¹² many of the policy recommendations and initiatives have been directed toward modification of the school environment particularly in the areas of food and physical activity or both.

Controlling School Food Environment

The Centers for Disease Control and Prevention (CDC) recommends that public schools prohibit the "sale and distribution of foods of minimal nutritional value and other foods of low nutritive value anywhere on school property until after the end of the last lunch period."^{47(p3)} In addition, the CDC recommends that fund-raising activities sell only healthy foods and that rewards of foods with low nutritive value be prohibited. This recommendation is supported by the Institute of Medicine (IOM).^{3,20,45}

The Child Nutrition and WIC Reauthorization Act of 2004 requires that local education districts that participate in the federal school lunch program develop a "local school wellness policy" by the beginning of the first school year after June 30, 2006.⁴⁸ This law requires that the local school agency establish nutritional guidelines that promote health and reduce obesity with the involvement of parents, members of the public, students, the school board, school nutrition representative, and school administrators.

In addition to these initiatives at the federal level, some states are making incremental changes in the school food environment. In September 2005, Governor Arnold Schwarzenegger signed laws restricting the sale of soft drinks in high schools, setting nutritional standards for foods sold in schools, including vending machines, and appropriated additional funds for school meal programs to serve fruits and vegetables. These laws will be phased in over a 2-year period beginning in 2007.⁴⁹ South Carolina passed a bill in the 2005 legislative session that would not only establish minimal nutritional requirements for school meals, including low-fat entrees, but also prohibit the sale or provision of foods of minimal nutritive value in elementary schools.⁵⁰

Some local school districts have accepted the challenge to improve nutrition for students. For example, in California, the Los Angeles Unified School District has banned unhealthy snacks in all 720 schools in the district.⁵¹ In Florida, Lake County has banned

soft drinks in public schools. Individual schools in Orange and Volusia Counties have pilot programs which have eliminated soft drinks and revised food offerings in an effort to promote better eating habits among students.⁵²

While such incremental initiatives are a step in the right direction, they fall short of making the necessary changes in the school food environment. Some organizations support federal legislation to give the USDA the authority to regulate food and beverage sales during the school day on all campuses of schools that participate in the National School Lunch Program.^{4,9,42} Other organizations, such as the American Dietetic Association, support state-level legislation to limit the sale of competitive foods in the school environment.⁵³ Whether achieved at the local, state, or federal level, a ban on the availability of nonnutritive foods in public schools is needed.

Promoting Physical Activity

In June 2000, President Clinton directed the Secretaries of Health and Human Services and Education to recommend mechanisms to promote the health of children and adolescents through fitness and physical activity. The resulting report recommended that all public school children receive quality physical education daily.¹³ Subsequent CDC guidelines for school health programs recommended implementation of a quality physical education program, which provides a minimum of 150 minutes weekly for elementary students and 225 minutes weekly for students in middle and high school. The CDC further suggested that such programs should be designed to provide moderate to vigorous activity for at least half of the class.⁴⁷ These recommendations are consistent with those of many national fitness-related organizations.⁵ The IOM recommends a minimum of 30 minutes of moderate to vigorous activity daily in addition to expanded opportunities for physical activity such as sports and clubs.^{3,20}

Recently, policy makers at various levels have mandated physical education in varying degrees in public schools. For example,

in March 2002, the Texas State Board of Education ruled that elementary students must participate in physical activity for at least 135 minutes per week.⁵ In May, 2004, as part of the Middle Grades Reform Act, Florida enacted a law requiring every school board to develop a physical education plan "that stresses physical fitness and encourages healthy, active lifestyles and to encourage all students in prekindergarten through grade 12 to participate in physical education" by December 1, 2004.⁵⁴ If a school board was unable to meet the deadline, the district was, at a minimum, required to implement 30 minutes of physical education 3 days per week for elementary students. The statute has no requirements for higher grade levels. South Carolina House Bill 3499, passed in 2005, requires that elementary schools incrementally increase the amount of mandated physical education from 75 minutes per week to the recommended 150 minutes per week over a 2-year period. The bill does not address physical activity at the middle or high school level.⁵⁰

Florida's Capacity Building Initiative

The CDC's state-based Nutrition and Physical Activity Program to Prevent Obesity and Other Chronic Diseases focuses on nutrition and physical activity. Twenty-three states are funded in amounts varying between \$300,000 and \$450,000 for capacity building in 2004-2005. Five additional states are funded \$800,000 to \$1.5 million for basic implementation. During capacity-building, states gather data, establish partnerships, and create plans for nutrition and physical activity implementation.⁵⁵ The Florida Obesity Prevention Program's strategic planning is guided by the Florida Partnership for Promotion of Physical Activity and Healthful Nutrition (FPPPAHN), whose mission is "to reverse the epidemic of overweight and obesity in Florida through collaborative efforts and unified leadership of many individuals and organizations, effective education, and advocacy on the political front."⁵⁶

Although the FPPPAHN addresses the issue of obesity among all age groups, many of its strategies are directed toward obesity in childhood and adolescence. For example, as part of its goal to decelerate the upward trend in overweight and obesity, the FPPPAHN recommends collaboration with local school boards to increase activity and physical education for all grade levels through the distribution of fact sheets, establishment of a speaker's bureau, letters and meetings with school boards, and presentations to teachers during their in-service week. FPPPAHN also recommends the selection and implementation of age-appropriate curricula for nutrition and physical education. FPPPAHN is partnering with the Florida Dietetic Association and the Florida School Nurses Association in addition to other professional organizations to support school policies that permit only healthful food availability in school. The development of student-driven programs to promote healthy nutrition and active lifestyles is advocated. The FPPPAHN is in the process of providing information about the CDC's VERB campaign to schools, parent-teacher associations, and partner organizations. In addition, FPPPAHN supports policies that provide certified physical education instructors and expand athletic programs in public schools. This strategy includes providing school boards with opportunities for funding and educating teachers about the association between increased physical activity and less classroom disruption. FPPPAHN is seeking empirical measures of the association between physical activity and Florida Comprehensive Achievement Test (FCAT) scores and the grade schools receive. The partnership also supports statewide legislation that promotes physical activity in schools.⁵⁷

STRATEGIES FOR INFLUENCING CHANGE

Numerous opportunities exist for health-care professionals to influence policy initiatives related to childhood obesity and for direct involvement in best practice prevention

activities. At the federal level, these opportunities include

- demanding policy statements and lobbying by professional organizations;
- communicating the need for placing the childhood obesity issue on the agendas of elected officials;
- requesting increased authority of the USDA to mandate minimum nutritive levels of all foods made available in public schools; and
- becoming involved in nonprofit initiatives such as the American Heart Association/Clinton Foundation Alliance initiative, Creating a Healthier Generation, which has a goal of decreasing the incidence of childhood obesity by 10% in the next decade.⁵⁸

At the state level, healthcare professionals can

- volunteer with state programs such as FPPPAHN and encourage their professional organizations to partner with these programs in their strategic plan to combat childhood obesity;
- conduct research to demonstrate the correlations among physical activity, achievement test scores, and school grades;
- support legislation that mandates physical education and nutritious foods in the schools; and
- provide data about the epidemic and ex-

amples of well-written legislation dealing with the epidemic to elected officials.

At the local level, healthcare professionals must

- work to focus public attention on the epidemic through letters to the editor of newspapers and presentations to community organizations;
- notify members of the local school board and school principals of the need for increased physical activity through physical education and recess and the need to promote healthy nutrition by elimination of junk food options in the school environment;
- solicit the support of Parent Teacher Associations (PTA) and teachers' organizations⁵⁹; and
- work with community groups such as the Chamber of Commerce to implement social marketing campaigns such as "5 A Day,"⁶⁰ "Mooove to Low-Fat Milk,"^{61,62} "VERB It's What You Do,"⁶³ and "Step Up, Florida."⁶⁴

In conclusion, the current epidemic of childhood obesity threatens the health and life span of our nation. Environmental and societal changes that have promulgated this epidemic are reversible but require a coordinated effort by all the stakeholders. Healthcare professionals in the community are in ideal positions to spearhead such an effort, using the best practice initiatives described.

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