

Obesity in youth: An overview and call to action

Ross Brownson for the IOM Committee on Prevention of Obesity in Children and Youth

Despite steady progress over most of the past century toward assuring the health of our country's children, we begin the 21st century with a startling set-back—an epidemic of childhood obesity. This epidemic is occurring in boys and girls in all 50 states, in younger children as well as adolescents, across all socioeconomic strata, and among all ethnic groups—though specific subgroups, including African Americans, Hispanics, and American Indians, are disproportionately affected. At a time when we have learned that excess weight has significant and troublesome health consequences, we nevertheless see our population, in general, and our children, in particular, gaining weight to a dangerous degree and at an alarming rate.

The increasing prevalence of childhood obesity¹ throughout the United States has led policy makers to rank it as a critical public health threat. Over the past three decades, its rate has more than doubled for preschool children aged 2 to 5 years and adolescents aged 12 to 19 years, and it has more than tripled for children aged 6 to 11 years. At present, approximately nine million children over 6 years of age are considered obese. These trends mirror a similar profound increase over the same approximate period in U.S. adults as well as a concurrent rise internationally, in developed and developing countries alike.

Childhood obesity involves immediate and long-term risks to physical health. For children born in the United States in 2000, the lifetime risk of being diagnosed with type 2 diabetes at some point in their lives is estimated at 30 percent for boys and 40 percent for girls if obesity rates level off. Young people are also at risk of developing serious psychosocial burdens related to being obese in a society that stigmatizes this condition.

There are also considerable economic costs. The national health care expenditures related to obesity and overweight in adults alone have been estimated to range from approximately \$98 billion to \$129 billion after adjusting for inflation and converting estimates to 2004 dollars. Understanding the causes of childhood obesity, determining what to do about them, and taking appropriate action require attention to what influences eating behaviors and physical activity levels because obesity prevention involves a focus on energy balance (calories consumed versus calories expended). Although seemingly straightforward, these behaviors result from complex interactions across a number of relevant social, environmental, and policy contexts.

U.S. children live in a society that has changed dramatically in the three decades over which the obesity epidemic has developed. Many of these changes—such as both parents working outside the home, longer work hours by both parents, changes in the school food environment, and more meals eaten outside the home, together with changes in the physical design of communities often affect what children eat, where they eat, how much they eat, and the amount of energy they expend in school and leisure time activities. Other changes, such as the growing diversity of the population, influence cultural views and marketing patterns. Use of computers and video games, along with television viewing, often occupy a large percentage of children's leisure time and potentially influence levels of physical activity for children as well as for adults. Many of the social and cultural characteristics that the U.S. population has accepted as a normal way of life may collectively contribute to the growing levels of childhood obesity. An understanding of these contexts, particularly regarding their potential to be modified and how they may facilitate or impede development of a comprehensive obesity prevention strategy, is essential for reducing childhood obesity.

¹Reflecting classification based on the readily available measures of height and weight, this report uses the term “obesity” to refer to children and youth who have a body mass index (BMI) equal to or greater than the 95th percentile of the age- and gender-specific BMI charts of the Centers for Disease Control and Prevention (CDC). In most children, such BMI values are known to indicate elevated body fat and to reflect the presence or risk of related diseases.

DEVELOPING AN ACTION PLAN FOR OBESITY PREVENTION

The Institute of Medicine (IOM) Committee on Prevention of Obesity in Children and Youth was charged with developing a prevention-focused action plan to decrease the prevalence of obesity in children and youth in the United States. The primary emphasis of the committee's task was on examining the behavioral and cultural factors, social constructs, and other broad environmental factors involved in childhood obesity and identifying promising approaches for prevention efforts. The plan consists of explicit goals for preventing obesity in children and youth and a set of recommendations, all geared toward achieving those goals, for different segments of society.

Obesity prevention requires an evidence-based public health approach to assure that recommended strategies and actions will have their intended effects. Such evidence is traditionally drawn from experimental (randomized) trials and high-quality observational studies. However, there is limited experimental evidence in this area, and for many environmental, policy, and societal variables, carefully designed evaluations of ongoing programs and policies are likely to answer many key questions. For this reason, the committee chose a process that incorporated all forms of available evidence—across different categories of information and types of study design—to enhance the biological, psychosocial, and environmental plausibility of its inferences and to assure consistency and congruency of information.

Because the obesity epidemic is a serious public health problem calling for immediate reductions in obesity prevalence and in its health and social consequences, the committee believed strongly that actions should be based on the best *available* evidence—as opposed to waiting for the best *possible* evidence. However, there is an obligation to accumulate appropriate evidence not only to justify a course of action but to assess whether it has made a difference. Therefore, evaluation should be a critical component of any implemented intervention or change.

Childhood obesity prevention involves maintaining energy balance at a healthy weight while protecting overall health, growth and development, and nutritional status. The balance is between the energy an individual consumes as food and beverages and the energy expended to support normal growth and development, metabolism, thermogenesis, and physical activity. Although “energy intake = energy expenditure” looks like a fairly basic equation, in reality it is extraordinarily complex when considering the multitude of genetic, biological, psychological, sociocultural, and environmental factors that affect both sides of the equation and the interrelationships between these factors. For example, children are strongly influenced by the food- and physical activity-related decisions made by their families, schools, and communities. Furthermore, it is important to consider the kinds of foods and beverages that children are consuming over time, given that specific types and quantities of nutrients are required to support optimal growth and development.

Thus, changes at many levels and in numerous environments will require the involvement of multiple stakeholders from diverse segments of society. In the home environment, for example, incremental changes such as improving the nutritional quality of family dinners or increasing the time and frequency that children spend outside playing can make a difference. Changes that lead to healthy communities, such as organizational and policy changes in local schools, school districts, neighborhoods, and cities, are equally important. At the state and national levels, large-scale modifications are needed in the ways in which society promotes healthful eating habits and physically active lifestyles. Accomplishing these changes will be difficult, but there is precedent for success in other public health endeavors of comparable or greater complexity and scope. This must be a national effort, with special attention to communities that experience health disparities and that have social and physical environments unsupportive of healthful nutrition and physical activity.

A NATIONAL PUBLIC HEALTH PRIORITY

Just as broad-based approaches have been used to address other public health concerns—including automobile safety and tobacco use—obesity prevention should be public health in action at its broadest and most inclusive level. **Prevention of obesity in children and youth should be a national public health priority.**

Across the country, obesity prevention efforts have already begun, and although the ultimate solutions are still far off, there is great potential at present for pursuing innovative approaches and creating linkages that permit the cross-fertilization of ideas. Current efforts range from new school board policies and state legislation regarding school physical education requirements and nutrition standards for beverages and foods sold in schools to community initiatives to expand bike paths and improve recreational facilities. Parallel and synergistic efforts to prevent adult obesity, which will contribute to improvements in health for the entire U.S. population, are also beginning. Grassroots efforts made by citizens and organizations will likely drive many of the obesity prevention efforts at the local level and can be instrumental in driving policies and legislation at the state and national levels.

The additional impetus that is needed is the political will to make childhood obesity prevention a national public health priority. Obesity prevention efforts nationwide will require federal, state, and local governments to commit adequate and sustained resources for surveillance, research, public health programs, evaluation, and dissemination. The federal government has had a longstanding commitment to programs that address nutritional deficiencies (beginning in the 1930s) and encourage physical fitness, but only recently has obesity been targeted. The federal government should demonstrate effective leadership by making a sustained commitment to support policies and programs that are commensurate to the scale of the problem. Furthermore, leadership in this endeavor will require coordination of federal efforts with state and community efforts, complemented by engagement of the private sector in developing constructive, socially responsible, and potentially profitable approaches to the promotion of a healthy weight.

State and local governments have especially important roles to play in obesity prevention, as they can focus on the specific needs of their state, cities, and neighborhoods. Many of the issues involved in preventing childhood obesity—including actions on street and neighborhood design, plans for parks and community recreational facilities, and locations of new schools and retail food facilities—require decisions by county, city, or town officials.

Rigorous evaluation of obesity prevention interventions is essential. Only through careful evaluation can prevention interventions be refined; those that are unsuccessful can be discontinued or refocused, and those that are successful can be identified, replicated, and disseminated.

HEALTHY MARKETPLACE AND MEDIA ENVIRONMENTS

Children, youth, and their families are surrounded by a commercial environment that strongly influences their purchasing and consumption behaviors. Consumers may initially be unsure about what to eat for good health. They often make immediate trade-offs in taste, cost, and convenience for longer term health. The food, beverage, restaurant, entertainment, leisure, and recreation industries share in the responsibilities for childhood obesity prevention and can be instrumental in supporting this goal. Federal agencies can strengthen industry efforts through general support, technical assistance, research expertise, and regulatory guidance.

Some leaders in the food industry are already making changes to expand healthier options for young consumers, offer products with reduced energy content, and reduce portion sizes. These changes must be adopted on a much larger scale, however, and marketed in ways that make acceptance by consumers (who may now have acquired entrenched preferences for many less healthful products) more likely. Coordinated efforts among the private sector, government, and other groups are also needed to create, support,

and sustain consumer demand for healthful food and beverage products, appropriately portioned restaurant and take-out meals, and accurate and consistent nutritional information through food labels, health claims, and other educational sources. Similarly, the leisure, entertainment, and recreation industries have opportunities to innovate in favor of stimulating physical activity—as opposed to sedentary or passive-leisure pursuits—and portraying active living as a desirable social norm for adults and children.

Children’s health-related behaviors are influenced by exposure to media messages involving foods, beverages, and physical activity. Research has shown that television advertising can especially affect children’s food knowledge, choices, and consumption of particular food products, as well as their food-purchase decisions made directly and indirectly (through parents). Because young children under 8 years of age are often unable to distinguish between information and the persuasive intent of advertising, the committee recommends the development of guidelines for advertising and marketing of foods, beverages, and sedentary entertainment to children.

Media messages can also be inherently positive. There is great potential for the media and entertainment industries to encourage a balanced diet, healthful eating habits, and regular physical activity, thereby influencing social norms about obesity in children and youth and helping to spur the actions needed to prevent it. Public education messages in multiple types of media are needed to generate support for policy changes and provide messages to the general public, parents, children, and adolescents.

HEALTHY COMMUNITIES

Encouraging children and youth to be physically active involves providing them with places where they can safely walk, bike, run, skate, play games, or engage in other activities that expend energy. But practices that guide the development of streets and neighborhoods often place the needs of motorized vehicles over the needs of pedestrians and bicyclists. Local governments should find ways to increase opportunities for physical activity in their communities by examining zoning ordinances and priorities for capital investment.

Community actions need to engage child- and youth-centered organizations, social and civic organizations, faith-based groups, and many other community partners. Community coalitions can coordinate their efforts and leverage and network resources. Specific attention must be given to children and youth who are at high risk for becoming obese; this includes children in populations with higher obesity prevalence rates and longstanding health disparities such as African Americans, Hispanic Americans, and American Indians, or families of low socioeconomic status. Children with at least one obese parent are also at high risk.

Health-care professionals, including physicians, nurses, and other clinicians, have a vital role to play in preventing childhood obesity. As advisors both to children and their parents, they have the access and influence to discuss the child’s weight status with the parents (and child as age appropriate) and make credible recommendations on dietary intake and physical activity throughout children’s lives. They also have the authority to encourage action by advocating for prevention efforts.

HEALTHY SCHOOL ENVIRONMENT

Schools are one of the primary locations for reaching the nation’s children and youth. In 2000, 53.2 million students were enrolled in public and private elementary and secondary schools in the United States. In addition, schools often serve as the sites for pre-school, child-care, and after-school programs. Both inside and outside of the classroom, schools present opportunities for the concepts of energy balance to be taught and put into practice as students learn about good nutrition, physical activity, and their rela-

tionships to health; engage in physical education; and make food and physical activity choices during school meal times and through school-related activities.

All foods and beverages sold or served to students in school should be healthful and meet an accepted nutritional content standard. However, many of the “competitive foods” now sold in school cafeterias, vending machines, school stores, and school fundraisers are high in calories and low in nutritional value. At present, federal standards for the sale of competitive foods in schools are only minimal.

In addition, many schools around the nation have reduced their commitment to provide students with regular and adequate physical activity, often as a result of budget cuts or pressures to increase academic course offerings, even though it is generally recommended that children accumulate a minimum of 60 minutes of moderate to vigorous physical activity each day. Given that children spend over half of their day in school, it is not unreasonable to expect that they participate in at least 30 minutes of moderate to vigorous physical activity during the school day.

Schools offer many other opportunities for learning and practicing healthful eating and physical activity behaviors. Coordinated changes in the curriculum, the in-school advertising environment, school health services, and after-school programs all offer the potential to advance obesity prevention. Furthermore, it is important for parents to be aware of their child’s weight status. Schools can assist in providing BMI, weight, and height information to parents and to children (as age appropriate) while being sure to sensitively collect and report on that information.

HEALTHY HOME ENVIRONMENT

Parents (defined broadly to include primary caregivers) have a profound influence on their children by fostering certain values and attitudes, by rewarding or reinforcing specific behaviors, and by serving as role models. A child’s health and well-being are thus enhanced by a home environment with engaged and skillful parenting that models, values, and encourages healthful eating habits and a physically active lifestyle. Economic and time constraints, as well as the stresses and challenges of daily living, may make healthful eating and increased physical activity a difficult reality on a day-to-day basis for many families.

Parents play a fundamental role as household policy makers. They make daily decisions on recreational opportunities, food availability at home, and children’s allowances; they determine the setting for foods eaten in the home; and they implement countless other rules and policies that influence the extent to which various members of the family engage in healthful eating and physical activity. Older children and youth, meanwhile, have responsibilities to be aware of their own eating habits and activity patterns and to engage in health-promoting behaviors.

CONFRONTING THE CHILDHOOD OBESITY EPIDEMIC

The committee acknowledges, as have many other similar efforts, that obesity prevention is a complex issue, that a thorough understanding of the causes and determinants of the obesity epidemic is lacking, and that progress will require changes not only in individual and family behaviors but also in the marketplace and the social and built environments. As the nation focuses on obesity as a health problem and begins to address the societal and cultural issues that contribute to excess weight, poor food choices, and inactivity, many different stakeholders will need to make difficult tradeoffs and choices. However, as institutions, organizations, and individuals across the nation begin to make changes, societal norms are likely to change as well; in the long-term, we can become a nation where proper nutrition and physical activity that support energy balance at a healthy weight will become the standard.

Recognizing the multifactorial nature of the problem, the committee deliberated on how best to prioritize the next steps for the nation in preventing obesity in children and youth. The traditional method of

prioritizing recommendations of this nature would be to base these decisions on the strength of the scientific evidence demonstrating that specific interventions have a direct impact on reducing obesity prevalence and to order the evidence-based approaches based on the balance between potential benefits and associated costs including potential risks. However, a robust evidence base is not yet available. Instead, we are in the midst of compiling that much-needed evidence at the same time that there is an urgent need to respond to this epidemic of childhood obesity. Therefore, the committee used the best scientific evidence available—including studies with obesity as the outcome measure and studies on improving dietary behaviors, increasing physical activity levels, and reducing sedentary behaviors, as well as years of experience and study on what has worked in addressing similar public health challenges—to develop the recommendations presented in this report.

As evidence was limited, yet the health concerns are immediate and warrant preventive action, it is an explicit part of the committee's recommendations that all the actions and initiatives include evaluation efforts to help build the evidence base that continues to be needed to more effectively fight this epidemic.

From the ten recommendations presented above, the committee has identified a set of immediate steps based on the short-term feasibility of the actions and the need to begin a well-rounded set of changes that recognize the diverse roles of multiple stakeholders. In discussions and interactions that have already begun and will follow with this report, each community and stakeholder group will determine their own set of priorities and next steps.

The committee was also asked to set forth research priorities. There is still much to be learned about the causes, correlates, prevention, and treatment of obesity in children and youth. Because the focus of this study is on prevention, the committee concentrated its efforts throughout the report on identifying areas of research that are priorities for progress toward preventing childhood obesity. The three research priorities discussed throughout the report are:

- Evaluation of obesity prevention interventions—The committee encourages the evaluation of interventions that focus on preventing an increase in obesity prevalence, improving dietary behaviors, increasing physical activity levels, and reducing sedentary behaviors. Specific policy, environmental, social, clinical, and behavioral intervention approaches should be examined for their feasibility, efficacy, effectiveness, and sustainability. Evaluations may be in the form of randomized controlled trials and quasi-experimental trials. Cost effectiveness research should be an important component of evaluation efforts.
- Behavioral research—The committee encourages experimental research examining the fundamental factors involved in changing dietary behaviors, physical activity levels, and sedentary behaviors. This research should inform new intervention strategies that are implemented and tested at individual, family, school, community, and population levels. This would include studies that focus on factors promoting motivation to change behavior, strategies to reinforce and sustain improved behavior, identification and removal of barriers to change, and specific ethnic and cultural influences on behavioral change.
- Community-based population-level research—The committee encourages experimental and observational research examining the most important established and novel factors that drive changes in population health, how they are embedded in the socioeconomic and built environments, how they impact obesity prevention, and how they affect society at large with regard to improving nutritional health, increasing physical activity, decreasing sedentary behaviors, and reducing obesity prevalence.

The recommendations that constitute this report's action plan to prevent childhood obesity commence what is anticipated to be an energetic and sustained effort. Some of the recommendations can be implemented immediately and will cost little, while others will take a larger economic investment and require a longer time to implement and to see the benefits of the investment. Some will prove useful, either quickly

or over the longer term, while others will prove unsuccessful. Knowing that it is impossible to produce an optimal solution a priori, we more appropriately adopt surveillance, trial, measurement, error, success, alteration, and dissemination as our course, to be embarked on immediately. Given that the health of today's children and future generations is at stake, we must proceed with all due urgency and vigor.