

## Prevention Conference VII

### Obesity, a Worldwide Epidemic Related to Heart Disease and Stroke

#### Group IV: Prevention/Treatment

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**O**besity is a worldwide problem, not just an issue for industrialized nations. Therefore, we need to examine opportunities for prevention and treatment from a global perspective.

#### Global Perspective

The prevalence, or epidemic, of obesity is increasing in most countries throughout the world. The issues for addressing both its prevention and treatment will differ from one country to another, according to the stage of the epidemic, cultural and economic circumstances, and the commitment of the public and politicians. In some less-affluent countries the conditions that promote the positive energy balance that leads to obesity have yet to be identified. In such instances, true primordial prevention (ie, preventing the environmental conditions for obesity from occurring) may be possible. These conditions could include promoting traditional eating patterns, preserving opportunities for active transport (walking, cycling, public transport), and protecting environments against the expansion of automobile travel. In most countries, however, those conditions are present already, and therefore the response to the epidemic will involve both primary prevention (preventing the incidence of new cases of obesity) and secondary prevention (treatment of obesity to reduce complications and prevent further weight gain).

#### High-Risk and Population-Based Approaches

High-risk and population-based approaches are complementary strategies that provide a continuum of interventions. Supportive environments will increase healthy food and activity choices and promote the adoption of these behaviors for the whole population, including overweight persons who are attempting to make

behavioral changes. Supportive environments will increase consumer pressure for those goods, services, and environments and ensure that they will continue to be provided.

#### Epidemiological Triad

The epidemiological triad (host, vector, environment; Figure) was used originally to address infectious disease epidemics, but other, noncommunicable diseases also have benefited from this broad approach.<sup>1</sup> Mortality from tobacco-caused diseases, cardiovascular diseases, injuries received in traffic accidents, cervical cancer, and cot death all have decreased in countries that have instituted broad medical and public health programs to prevent and treat these diseases. The lessons learned from these successful programs can be applied to the prevention of obesity.

Although the treatment of obesity occurs commonly in healthcare settings, many settings and sectors need to be engaged for optimal effectiveness in the prevention of obesity. The use of a settings/sectors framework is useful for conceptualizing and planning interventions and actions. Within each setting/sector, a broad view is needed, and the epidemiological triad helps identify strategies for action. The agent (final common pathway) for obesity is positive energy balance. Some host factors are not modifiable. These factors include genetic makeup, age, and gender. Other factors are modifiable, such as behaviors and individual attitudes. The vectors for reduced energy expenditure are time- and energy-saving devices such as cars, computers, power tools, and appliances, and devices and activities that consume time, such as watching television and videos and playing computer games. The vectors that contribute to passive overconsumption of total energy may include energy-dense

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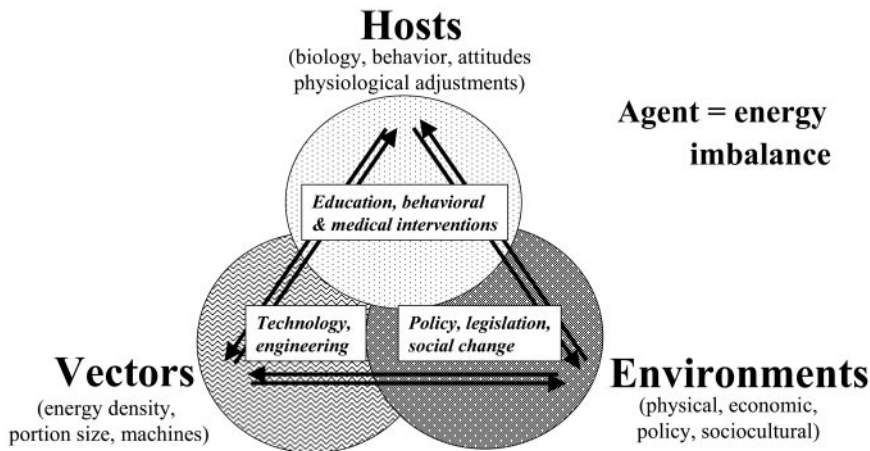
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The epidemiological triad as it applies to obesity. The “agent” is positive energy balance. The corners of the triad are interconnected, and the circles refer to the predominant strategies that are available to address each corner. Reproduced with permission from Swinburn et al.<sup>1</sup>

foods and drinks and large portion sizes. Environments can be physical, economic, or sociocultural or they can be policies established by governmental agencies or other entities. Environments provide the “structure” within which people live and as such are powerful determinants of behaviors.

The components of the epidemiological triad are interconnected, but intervention strategies differ somewhat for each aspect of the triad. Host-related strategies tend to be educational (one-on-one education, behavioral interventions, public education) or medical (pharmaceutical, surgical). Vector-related solutions often are based in technology or engineering or otherwise modify the carrier or agent. Environment-related solutions can be physical (changing structures and availability of goods, services, amenities), economic (influencing cost of goods and services and incomes to pay for them), policy oriented (altering the rules), and sociocultural (influencing attitudes, beliefs, and perceptions). Historically, physical activity and nutrition intervention strategies have been dominated by the education-based approach or individual/small behaviorally based interventions; environmental options have been used to a more limited extent.

### Settings for Prevention and Treatment

The following settings (ie, places where people gather) have been identified as key to instituting programs to influence behaviors that affect energy balance. Beyond these settings, a number of sectors have exerted profound influences on activities at the settings level. For example, reimbursement schedules for the treatment of obesity limit the potential of healthcare providers to meet recommended management guidelines, and policy requirements for physical education in schools affect practice at the school level. In addition, a number of sectors, including the food industry, media, transportation, and urban development, produce general effects, or effects over several settings.

#### Home/Family

Physical activity and eating often take place in the family-unit setting. Interactions among family members determine leisure-time activities and types of food purchased as well as the timing, setting, preparation, size, and composition of meals. Thus, the family setting that is conducive to healthy weight maintenance is equally applicable to family members of all ages. Promoting energy balance for all family members is a fundamental goal. Ensuring that all family

members participate in daily physical activity and helping individual family members consume an adequate diet will achieve or maintain energy balance. At least 30 min/d of moderate-intensity physical activity such as walking and a dietary pattern that emphasizes fruits, vegetables, whole grains, and other plant-based dietary components are reasonable recommendations for all family members based on current evidence.

The division of responsibility between parents and children related to physical activity and diet is the final common pathway that determines children’s behaviors and energy balance. A growing body of evidence suggests that parents supervise the choices available to their children so that children can choose their behaviors from within these choices. For example, children’s choices often influence where a family decides to eat away from home and the foods selected for purchase. Children’s choices may be influenced by television advertising and other programming. The duration of television viewing is associated with obesity. Whether the relationship between obesity and television viewing is a consequence of diminished physical activity or the result of increased food consumption while watching television is unclear. Nonetheless, a reduction in television viewing time provides an important avenue to diminishing both of these detrimental influences on the energy balance equation.

Families play an important role in the physical activity of children. The more time that children are outdoors, the more likely they are to be physically active. Furthermore, parental support for physical activity is associated with a greater likelihood that children will be more physically active. Although parental modeling of physical activity also is likely to influence the levels of children’s physical activity, the effect of parental modeling on physical activity independent of parental support of children’s physical activity remains uncertain. Because of the direct benefits of physical activity to the parents, however, modeling of physical activity by parents is a recommended strategy.

#### Schools

Schools are an important channel for obesity prevention programs because most children and adolescents are enrolled in school and spend a large part of most days in school. Furthermore, schools are a major setting for eating and physical activity. In the United States opportunities for eating at school include breakfast, lunch, and after-school snacks;

classroom snacks; snacks at school parties and sporting events; and foods and beverages sold through vending machines, snack bars, school stores, and canteens. Opportunities for physical activity include physical education, recess, classroom fitness breaks, interscholastic sports, intramural sports, and after-school programs. Schools also provide strong links to families and community-based organizations.

The scientific literature on evaluations of school-based interventions that have measured the impact on adiposity is limited, with <24 such studies published in the past 2 decades. Most of the studies in the literature have evaluated interventions based in the United States, but a few have been based in European countries. Most studies have targeted changes in physical activity, dietary intakes, or school practices as the primary study outcomes, with adiposity measured as a secondary outcome. Although the results of most of these evaluations found at least some significant effects on the primary study outcomes, most found no significant effect of the interventions on adiposity. Some school-based interventions have had significant effects on adiposity, however. Interventions to reduce television viewing and the use of electronic media seem to be effective in reducing body mass index (BMI). Barriers to school-based obesity prevention programs include an already crowded curriculum and emphasis on academic subjects, the placement of low priority on health and high priority on test scores, modest intervention effects, and dissemination challenges.

#### **Work Sites**

Work sites are fruitful settings for the prevention of obesity because of their broad population reach into many diverse economic and ethnic subgroups. Work site strategies include addressing physical activity and healthy food choice behaviors by increasing opportunities for healthy behavior and reducing barriers to these behaviors. Work sites can alter the physical, social, and educational environments to facilitate healthy behaviors. A brief list of possible strategies in each of these areas follows.

- Structure the physical environment in the following ways to promote greater physical activity and healthy food choices:
- Improve stairwell access, appearance, and safety
- Decrease access to elevators
- Provide bicycle storage facilities
- Provide locker room/shower facilities
- Provide fitness centers (eg, track, exercise equipment)
- Provide classes/organized physical activity opportunities (eg, yoga, aerobics, weight lifting, dance)
- Increase the availability of healthy food choices in cafeterias and vending machines
- Create a work site environment that supports and encourages greater physical activity and healthy food choices in the following ways:
  - Offer walking, running, bicycling, and dance clubs
  - Offer weight control clubs and classes
  - Provide peer-led recruiters to encourage participation in physical activity, nutrition, and weight control programs
  - Provide the following education and health-promotion programs at the work site to increase awareness of and motivation for healthy physical activity, eating behaviors, and weight control:
    - Provide educational and motivational seminars on weight management, physical activity, eating habits, and bicycle repair
    - Offer physical activity intervention programs and cooking classes
    - Provide a health behavior consultant (eg, personal trainer, nutrition consultant, behavioral change consultant) to work with employees
    - Provide a food promotion and labeling program for cafeteria and vending machine foods

Important issues to consider include who will pay for these programs and interventions, whether such programs result in a healthier work force with lower healthcare costs and improvements in absenteeism and other measures of productivity, and what percentage of employees will participate. A wide range of programs and interventions is recommended. The focus should be on behavioral skill building in participants so that they can make lasting lifestyle changes in diet and physical activity.

#### **Health Care**

Overweight and obesity are significant health problems in children, adolescents, and adults. Prevention and treatment of overweight and obesity should be addressed as part of routine healthcare measures. Children are more likely than are adults to have biochemical markers of risk factors rather than the diseases themselves; 60% of obese children have a detectable increase in at least 1 cardiovascular risk factor and 25% have at least 2 risk factors. Obese adults are more likely than are normal-weight adults to develop chronic diseases such as type 2 diabetes mellitus and cardiovascular disease.

Physicians and their patients both have unduly stigmatized obesity. Many patients refuse to be weighed, and many physicians do not address weight issues with their patients because they believe treatment approaches are ineffective. Given the overwhelming increase in the prevalence of obesity, physicians and healthcare professionals should reevaluate their office practice to ensure that adequate facilities are available to both measure weight and evaluate the impact of obesity on the health status of patients. At a minimum these facilities should include a scale that is adequate to weigh patients and appropriate-size blood pressure cuffs.

In the healthcare setting, body weight and physical activity should be considered vital signs that should be assessed at every visit. Children's height and weight measurements should be recorded on a growth chart that plots percentile of BMI by age and sex. In children and adolescents a BMI >95th percentile for age and sex is defined as overweight and warrants further evaluation of comorbidities and more intensive therapy for weight control. Children and adolescents with a BMI between the 85th and 95th percentiles are considered at risk for overweight and warrant further evaluation for comorbidities and, possibly, therapy for weight control. Complete recommendations for evaluation and treatment are available.<sup>2</sup>

In adults height and weight measurements should be translated into BMI; the assessment also should include waist circumference. Adults with a BMI of 25.0 to 29.9 kg/m<sup>2</sup> are considered overweight; those with a BMI ≥30 kg/m<sup>2</sup> are considered obese. A waist circumference of >40 inches in men and >35 inches in women increases risk. Space limita-



tions preclude a thorough presentation of how to evaluate and treat obesity in this report, but these recommendations are readily available in the *National Heart, Lung and Blood Institute's Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adult: Evidence Report* as well as in *The Practical Guide*. Both can be found at the "Aim for a Healthy Weight" website ([http://www.nhlbi.nih.gov/health/public/heart/obesity/lose\\_wt/index.htm](http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm)). Brief summaries of these recommendations follow:

- Measure the patient's height and weight and calculate BMI.
- Measure the patient's waist circumference.
- Review the patient's medical condition:
  - How many comorbidities are present? How severe are they?
  - Should comorbidities be treated in addition to weight loss?
  - Look for causes of obesity, including the use of medications known to cause weight gain.
- Determine whether the patient should be treated by asking whether the patient is ready and motivated to lose weight:
  - If the patient is not ready to lose weight, urge weight maintenance and manage complications.
  - If the patient is ready to lose weight, agree on reasonable weight and activity goals and put them in writing.
- Use this information to develop a treatment plan.
- Involve other professionals as necessary.
- Remember that a supportive, empathetic approach is necessary throughout treatment.

Weight loss is recommended for patients with a BMI  $\geq 30$  kg/m<sup>2</sup> or a BMI of 25.0 to 29.9 kg/m<sup>2</sup> or a high waist circumference and 2 or more comorbidities. Prevention of inappropriate weight gain with lifestyle therapy is indicated in any patient with a BMI  $>25$  kg/m<sup>2</sup>, even without comorbidities. Weight loss is not necessarily recommended for those with a BMI of 25 to 29.9 kg/m<sup>2</sup> or a high waist circumference unless they also have 2 or more comorbidities. Combined intervention with a reduced-calorie diet, increased physical activity, and behavior therapy is the most successful therapy for weight loss and weight loss maintenance.<sup>3</sup>

Reimbursement and development of effective therapeutic strategies represent major policy challenges to treating obesity in the clinical setting. Medicare and Medicaid are the 2 major federal programs that should be targeted for policy change. The *CMS Manual* does not classify obesity as a disease. Revision of the manual to acknowledge obesity as a disease will alter the focus on obesity as a cosmetic problem to a focus on obesity as a health problem that requires care. Medicaid costs now account for an average of 20% of state budgets. Although no state Medicaid program offers reimbursement for drug therapy for obesity, the costs of obesity or related diseases will account for an increased proportion of Medicaid costs. As the proportion of Medicaid costs attributed to obesity increases, reimbursement for effective obesity prevention and care will become increasingly attractive.

### **Communities and Neighborhoods**

Reliance on the automobile has increasingly replaced walking and bicycling as modes of transportation in both developed

and developing countries. For example, in the United States, although 25% of all trips are  $<1$  mile, 75% of these trips are made by car. Furthermore,  $<30\%$  of children who live  $<1$  mile from school walk to school. Although the specific factors that account for these shifts have not been explicitly identified, changes in community shape, busy lifestyles, and concern about neighborhood safety are likely contributors.

Neighborhood design, safety, and zoning regulations all may have an impact on the lifestyle and physical activity of children, adolescents, and adults. The absence of neighborhood schools or central shopping facilities or neighborhoods that lack sidewalks make it more difficult for children to walk to school or for adults to perform errands on foot. In some states zoning regulations require that schools be built on large tracts of land that are available only on the periphery of communities. These regulations make it more difficult for children to walk to school.

Nevertheless, publication of evidence-based recommendations for the promotion of physical activity identify numerous strategies that can be used to increase physical activity.<sup>4</sup> These recommendations include point-of-decision prompts for stair use, physical education in schools, support for physical activity, access to and promotion of facilities for physical activity, and retrofit of the community to enable individuals to integrate more physical activity into their daily routines. The major challenge is for states and communities to apply these strategies in various settings and demonstrate their impact on obesity and its comorbidities.

Community-based interventions to promote healthy dietary patterns offer a promising but relatively unexplored strategy to control obesity. For example, a campaign in West Virginia to promote the use of low-fat milk produced significant changes in people's consumption of low-fat milk. Likewise, the promotion in African American churches of vegetable and fruit consumption produced substantial changes in the consumption of fruits and vegetables. As dietary strategies for the prevention and control of obesity become available, community campaigns can be used to help change behavior through presentations to community-based organizations, advocacy for policy change contests, media events, or in-store promotions.

### **Sector-Based Changes to Support Obesity Prevention Efforts**

Although little research exists on the effectiveness of broad-based policies to influence the prevention of obesity, it seems clear that such programs should be developed and extensively evaluated. Policies to be considered should include changes in physical and social environments, financial incentives and tax policies, factors related to the delivery of health care, and school and work site policies.

It is important to engage industry in efforts to develop and evaluate policies designed to prevent obesity. Mass media, food companies, and sporting goods companies are obvious industry partners that should be engaged in obesity prevention with medical and public health groups. In addition to promoting behaviors to maintain energy balance, industry, especially mass media, can help by promoting realistic body image expectations. Messages and images that promote a diversity of body sizes and shapes as being "normal" should

be implemented. The focus should be on health, not strictly on body size. Heavy marketing of fast food outlets and energy-dense foods and beverages to young children may be a contributor to energy overconsumption. Reducing this kind of marketing, especially television advertising as a strategy to prevent obesity in young children, is an important topic and should be evaluated in controlled research studies.

Policies promoting healthy dietary patterns must take into account consumer factors such as taste, variety, convenience, and enjoyment. These factors must be considered when promoting healthy eating. Diets that are lower in fat and energy can be more costly than high-fat, high-energy diets; therefore, people in lower socioeconomic groups are often at a dietary disadvantage. All consumers want to minimize price and maximize taste and convenience. Advertising for healthy foods should focus on these factors.

Sporting goods companies and other groups with a focus on physical activity and fitness products and services should help develop policies that promote moderate-intensity physical activity that can be performed by all persons rather than the current emphasis on competitive athletics.

In summary, the following creative approaches to broad policy recommendations need to be developed and rigorously evaluated for effectiveness:

- All aspects of the epidemiological triad need to be addressed (environmental approaches to obesity have not yet been well developed or evaluated).
- The obesity epidemic needs to be taken seriously by professionals, the public, and politicians (obesity is often still seen either as a cosmetic issue or one of lack of personal willpower).
- A serious investment in intervention programs, monitoring, and evaluation is needed.
- Knowledge alone has a weak influence on behavior, and public messages need to be unambiguous, specific, and action related (eg, obesity is widely known to be unhealthy, but the messages designed for the public often have been vague and/or misinterpreted).
- Environmental changes are central to a broad approach and can have a powerful and sustainable influence on behaviors.
- Better strategies need to be developed, implemented, and evaluated because current strategies are not working.

Policy changes (such as smoke-free public places and seatbelt legislation) often have led to changes in public attitudes about healthy environments and behaviors, and the same is likely to be true for obesity prevention.

### Research Recommendations

Much additional research is needed to address both sides of the energy balance equation and the efficacy and effectiveness of various policies and intervention strategies:

- The evaluation of long-term, setting-specific or whole-of-community obesity prevention programs
- The specific dosage of physical activity necessary to prevent obesity in children, adolescents, and adults

- The effect of physical activity on obesity comorbidities, including coronary heart disease risk factors and disease outcomes
- The value of incentives for parents and children to reduce time spent watching television/using electronic media or to increase physical activity
- The relationship of changes in the physical environment to changes in physical activity
- The specific mediating variables and behaviors related to both sides of the energy balance equation that need to be targeted to have the greatest effect on the prevention and treatment of obesity
- The effective dissemination of efficacious dietary and physical activity interventions
- The evaluation of the cost-effectiveness of intervention and dissemination programs
- The evaluation of whether specific foods or dietary components are related to the risk of developing obesity or affect intervention and maintenance success
- The evaluation of the possible effect of increased portion sizes on increased energy intake and development of obesity
- The determination of which factors influence consumer choices

### Summary

The primary prevention and treatment of obesity will require the involvement of many sectors of society. A concerted and sustained effort that focuses on broad environmental changes; community supports for healthy behaviors in schools, work sites, churches, and other venues; and the commitment of families to healthy behavior will be needed. The healthcare sector will need to play a key role in identifying overweight individuals and treating those at risk. Supports from these other sectors will be needed, however, to ensure the prevention of weight gain and the maintenance of healthy weight. This will require a long-term fundamental shift in the way health is valued in our society but if implemented can result in reducing the global epidemic of obesity.

### References

1. Swinburn BA, Egger G. Preventive strategies against weight gain and obesity. *Obes Rev.* 2002;3:289–301.
2. Barlow SE, Dietz WH. Management of child and adolescent obesity: summary and recommendations based on reports from pediatricians, pediatric nurse practitioners, and registered dietitians. *Pediatrics.* 2002; 110:236–238.
3. National Heart, Lung, and Blood Institute and the North American Association for the Study of Obesity. *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults.* Bethesda, Md: National Institutes of Health; 2000. NIH publication 00–4084.
4. US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity. *Promoting Physical Activity: A Guide for Community Action.* Champaign, Ill: Human Kinetics; 1999.