

Obesity in youth: An overview and call to action

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of Medicine's Committee on Prevention of
Obesity in Children and Youth

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Objectives

1. To provide a brief overview of the problem.
2. To describe the action plan set forth by the IOM Committee on Prevention of Obesity in Children and Youth

An Epidemic of Childhood Obesity

- Since the 1970s, obesity prevalence has
 - Doubled for preschool children aged 2-5 years
 - Doubled for adolescents aged 12-19 years
 - Tripled for children aged 6-11 years
- More than 9 million children and youth over 6 years are obese
- Similar trends in U.S. adults and adults internationally



*“Remember when we used to
have to fatten the kids up first?”*

Economic Costs

- Obesity-associated annual hospital costs for children and youth increased from \$35 million to \$127 million from 1979-1981 to 1997-1999
- National health-care expenditures related to obesity and overweight for U.S. adults range from \$98 billion to \$129 billion annually (2004 dollars; adjusted for inflation)

Implications for Children and Society:

Physical, social, emotional health consequences

Physical Health

Glucose intolerance and insulin resistance
Type 2 diabetes
Hypertension
Dyslipidemia
Hepatic steatosis
Cholelithiasis
Sleep apnea
Orthopedic problems

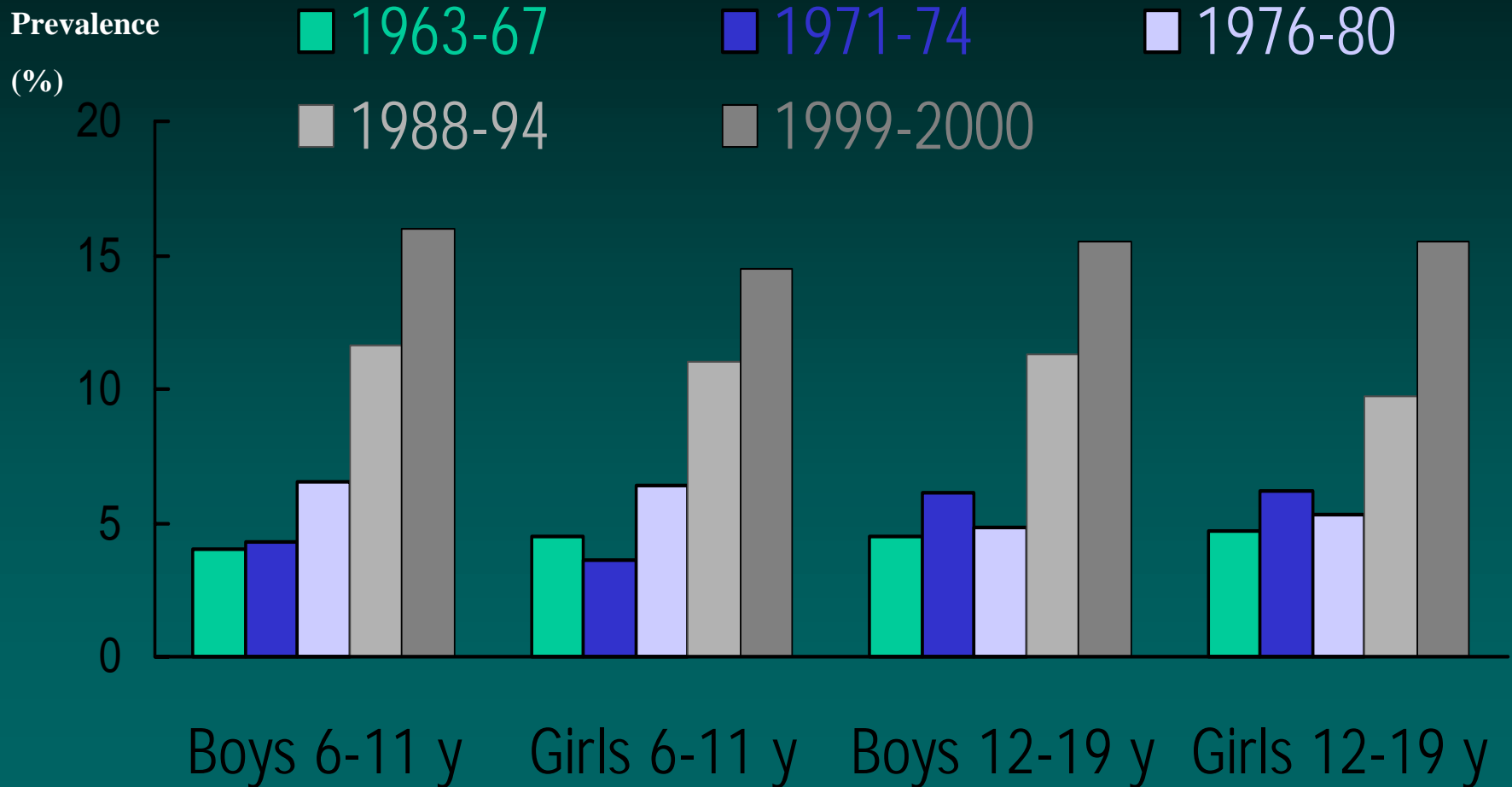
Emotional Health

Low self-esteem
Negative body image
Depression

Social Health

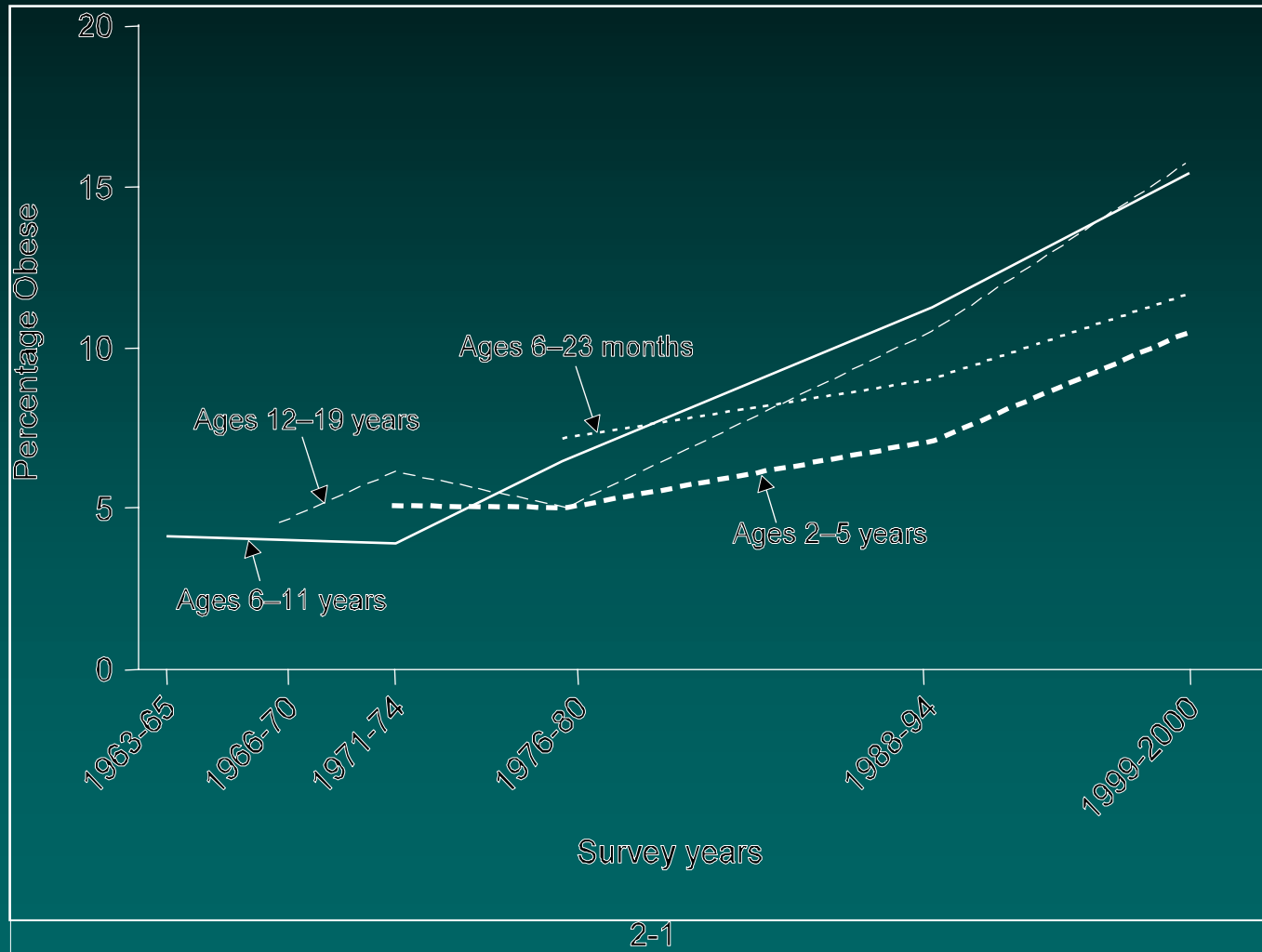
Stigma
Negative stereotyping
Discrimination
Teasing and bullying
Social marginalization

Trends in Childhood Obesity Prevalence



SOURCE: Ogden et al.. *J Am Med Assoc.* 2002; 288(14):1728-1732.

Age-Specific Trends in Obesity



2-1

Framework for Understanding Obesity in Children and Youth



Energy Balance

Energy intake =
Energy expenditure

For children, *maintain energy balance at a healthy weight* while protecting health, growth and development, and nutritional status



Dietary Intake Trends in Children and Youth

Portion Sizes of Foods

(Nielsen and Popkin, 2003)

1977 – 1996: Portion sizes for children 2 y and older ↑ for most foods consumed both at home and away-from-home

Total Energy Intake Derived from Away-From-Home Sources

(Lin et al., 1999b)

1977 – 1996: Children's total energy intake ↑

- 1977-1978: 20%
- 1994-1996: 32%

Total Energy Intake

(Enns et al., 2003)

1977 – 1996: Total calories consumed by adolescents has increased

- Boys 12 to 19 years – intake ↑ 243 calories
- Girls 12 to 19 years – intake ↑ 123 calories

Dietary Intake Trends in Children and Youth

Added dietary sweeteners

(USDA, 1996; Enns et al., 2002)

1994-1996 and 1998: Children 6-11 y added sugar ↑

- 21-23 tsp added sugars in a 1,800-2,000 calorie diet
- Exceeds Food Guide Pyramid recommendation:
6-12 tsp for a 1,600-2,200 calorie diet

Dairy and milk consumption among Children and Adolescents

(French et al., 2001)

1977-1978: Milk ↑ , other beverages ↓

- Children: 4 times as much milk as other beverages
- Adolescents: 1.5 times as much milk as other beverages

1994-1996 and 1998: Soft drinks ↑ , milk ↓

- Children: 1.5 times as much milk as soft drinks
- Adolescents: 2 times as much soft drinks as milk

Dietary Intake Trends in Children and Youth

Fruit and vegetable consumption

(Enns et al., 2002; USDA, 2000)

1977-1978: Children 6-11 y consumed more total vegetables than children in 1994-1996, 1998

1994-1996 and 1998: Children in compliance with Food Guide Pyramid recommended fruit servings

- 24% of girls
- 23% of boys

Beverage consumption

(Guthrie & Morton, 2000; French et al., 2003)

1977-1978 and 1994: Soft drink consumption nearly tripled among adolescent boys from 7 to 22 ounces per day

Physical Activity Trends in Children and Youth

Available Leisure Time (Sturm, 2005a)	1981– 1997: Children 3 – 12 y Weekly free time ↓ 7 hrs/wk
Leisure Time Physical Activity (CDC, 2003a)	2002 YMCLS: Children 9 – 13 y 61.5% report no organized physical activity during non-school hours
Moderate To Vigorous Phys. Act. (CDC, 2003b, 2004c)	YRBS: High school students (9 th – 12 th grades) Not meeting physical activity recommendations (moderate or vigorous)

NOTE: YMCLS=Youth Media Campaign Longitudinal Survey.
YRBS=Youth Risk Behavior Survey.

Physical Activity Trends in Children and Youth

Daily Physical Education Classes

1991– 2003: Enrollment ↓ among H.S. students

- 42% in 1991 (DHHS, 1996)
- 25% in 1995 (DHHS, 1996)
- 28.4% in 2003 (CDC, 2004c)

Travel To and From School (Sturm, 2005b)

1977– 2001: Marked ↓ in walking to school among children 5 – 15 y (as % of total trips)

- 20.2% in 1977
- 12.5% in 2001

Major Interventions

Program: CATCH (Child and Adolescent Trial for Cardiovascular Health) (Luepker et al., 1996).

Population: 96 elementary schools in California, Louisiana, Minnesota, and Texas

Purpose: Prevention of cardiovascular disease

Design: Randomized field trial; health behavior interventions: food service modifications; physical education interventions; teacher and personnel training; curricula addressing eating behaviors, physical activity, and smoking

Results: ↓ fat intake; ↑ physical activity

Major Interventions

Program: Pathways (Caballero et al., 1998; Davis et al., 1999)

Population: American Indian students in 3rd – 5th grades
41 schools in Arizona, New Mexico, and South Dakota

Purpose: Reduce obesity in American Indian students

Design: Randomized trial; multicomponent program:
higher-energy activities in PE classes and recess; food service training, nutritional educational materials; classroom curricula enhancements; family-based efforts

Results: ↓ fat intake; ↑ self-reported physical activity

Major Interventions

Program: SPARK (Sports, Play and Active Recreation for Kids) (McKenzie et al., 1997)

Population: 7 elementary schools in So. California 3-year study

Purpose: Improve the quantity and quality of physical education, the evaluation involved

Design: School-based intervention; improve physical education curriculum, implement a self-management curriculum, and teacher in-service training programs

Results: ↑ physical activity levels

Major Interventions

Program: Planet Health (Gortmaker et al., 1999)

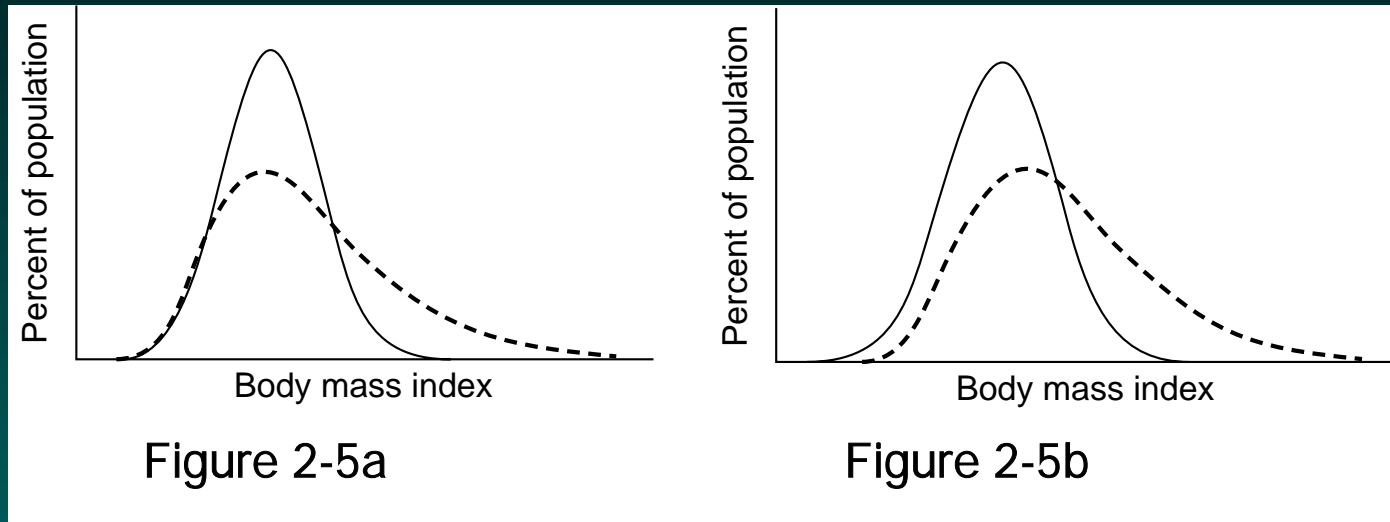
Population: Students in 6th – 8th grades
5 intervention and 5 control schools in Boston area

Purpose: Teaching better dietary habits, promoting physical activity, and reducing television viewing

Design: Curriculum-based health intervention; lessons integrated into math, language arts, social studies, science, and PE curricula

Results: ↓ TV viewing; ↓ obesity in girls

Schematic Representations of BMI Distribution Models



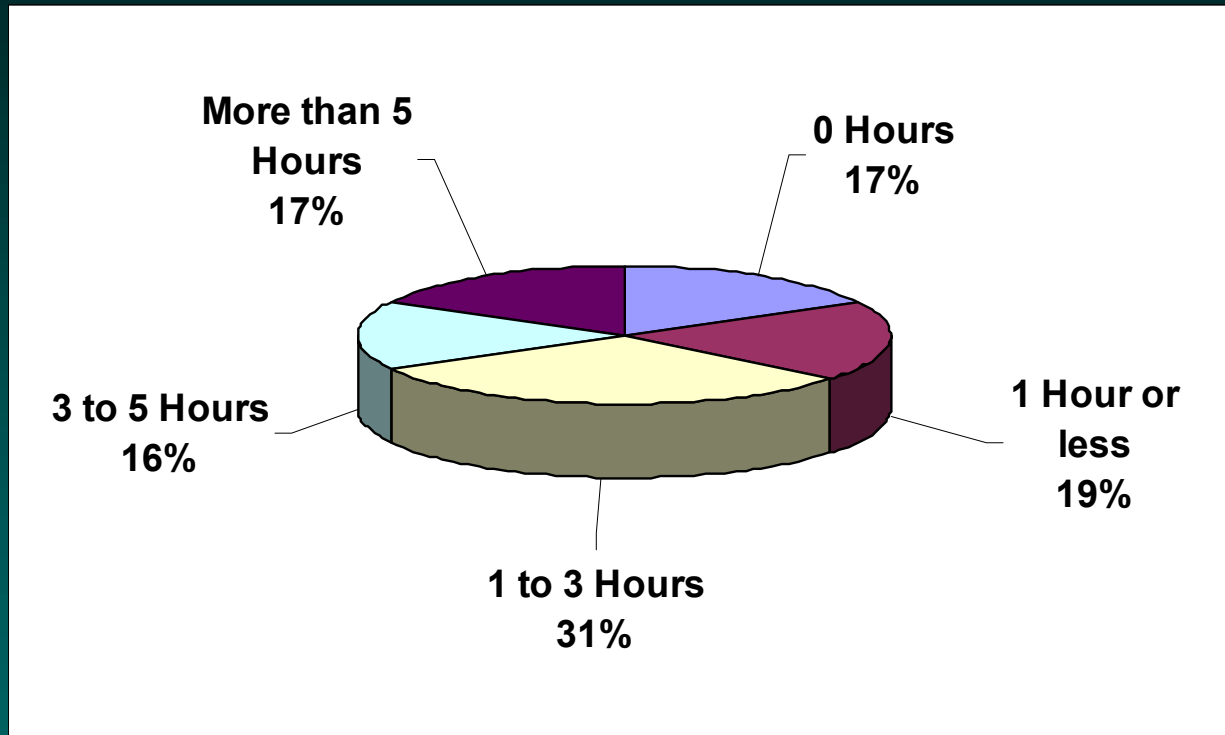
NOTE:

Figure 2-5a shows a schematic representation of increased skewness (lack of symmetry) at the upper end of the BMI distribution with little change at the lower end, as has been observed in U.S. children and adolescents.

Figure 2-5b shows a schematic representation of both a rightward shift in the distribution and increased skewness at the upper end of the distribution, as has been observed in U.S. adults.

SOURCE: Reprinted, with permission, from Flegal and Troiano, 2000. Copyright 2000 by the *International Journal of Obesity and Related Metabolic Disorders*.

Daily Television Viewing by Children and Youth



SOURCE: Rideout et al., 1999. Reprinted with permission from the Henry J. Kaiser Family Foundation

Review of the Evidence

- The committee strongly endorsed an action plan based on the best *available* evidence instead of waiting for the best *possible* evidence
- Integrated approach to the available evidence
 - Limited obesity prevention literature upon which to base recommendations
 - Parallel evidence from other public health issues
 - Dietary and physical activity literature

Terminology

- In report, *obesity* refers 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

Obesity Prevention Goals

For the *population* of children and youth, create an environmental-behavioral synergy that:

- Reduces the incidence and prevalence of childhood and adolescent obesity
- Reduces the mean population BMI levels
- Improves the proportion of children meeting Dietary Guidelines for Americans
- Improves the proportion of children meeting physical activity guidelines
- Achieves physical, psychological, and cognitive growth and developmental goals

Obesity Prevention Goals (cont.)

For *individual* children and youth

- A healthy weight trajectory, as defined by the CDC BMI charts
- A healthful diet (quality and quantity)
- Appropriate amounts and types of physical activity
- Achieving physical, psychosocial, and cognitive growth and developmental goals

What is Needed?

- Leadership
- Evaluation
- Resources
- Efforts at all levels
- Change in societal norms

**Obesity Prevalence
Increasing**



**Healthful Eating
Behaviors and
Physical Activity
are the Norm**

Changing Social Norms

Public Health Precedents

- Tobacco control
- Underage drinking
- Highway safety
- Use of seatbelts and child car seats
- Vaccines
- Fluoridation

Key Stakeholders to Involve

- Children, youth, parents
- Schools
- Communities
- Health care
- Industry
- Mass Media
- Government

Key Conclusions

- Serious nationwide health problem requiring a population-based prevention approach
- The goal is energy balance – healthful eating behaviors and regular physical activity
- Societal changes at all levels are needed – multiple sectors and stakeholders

Action Plan for Obesity Prevention

- National Public Health Priority
- Healthy Marketplace and Media Environments
- Healthy Communities
- Healthy School Environment
- Healthy Home Environment

A few examples by sector

School Environment

- Promote consistent school environment with healthy choices
- Other areas to address
 - Increase and enhance wellness curriculum
 - Reduce advertising in schools
 - Engage school health services
 - Annually assess student BMI and provide information to parents
 - Enhance after-school programs
 - Use schools as community centers
 - Evaluate school programs and policies

Walking and Biking to School

- **1969** – 48% of all students walked or biked, among those within a mile 90% walked or biked
- **1999** – 19% walked and 6 % biked at least once a week
- **Current barriers**
 - Schools sited at distances from neighborhoods
 - Parental concerns about safety, time, weather
 - Lack of sidewalks, safe street crossings
- **Recommendations**
 - Promote walking/biking to school programs
 - Evaluate interventions

Healthy Communities

Promote Healthful Eating and Regular Physical Activity

- Mobilize communities
 - Build diverse coalitions
 - Address barriers for high-risk populations
 - Develop and evaluate community programs
- Enhance built environment
 - Revise city planning practices
 - Prioritize capital improvement projects
 - Improve opportunities for walking and bicycling to school
 - Improve access to healthful food (e.g., farmers' markets, supermarkets)

Healthy Marketplace and Media

*Food and Beverage, Restaurant, Entertainment, and
Recreational Industries*

- Products, meals, and opportunities
 - Healthful products and meals, innovative packaging,
 - Physical activity opportunities
- Labeling
 - Total calorie information, nutrient and health claims
- Advertising and marketing
 - National conference to set guidelines
 - Industry self-regulation
 - FTC authority to monitor compliance
- Multi-media and public relations campaign

National Priority

Government at all levels to provide coordinated leadership

- Federal coordination
- Program and research efforts to prevent childhood obesity in high-risk populations
- Resources for state and local grant programs, support for public health agencies
- Independent assessment of nutrition assistance programs and agricultural policies
- Research and surveillance efforts

Research Priorities

- Evaluation of interventions
- Behavioral research – factors involved in changing dietary and physical activity behaviors
- Community-based research

Summary

- Epidemic of childhood obesity is upon us
- Many sectors need to be mobilized to make positive changes
 - Comprehensive approaches are key
- Several aspects of the built environment are likely to be key
 - School & community
- Should rely in existing evidence-based strategies and new, innovative approaches should be evaluated
- It will take years to decades to reverse this trend

“Preventing childhood obesity is a collective responsibility... The key will be to implement changes from many directions and at multiple levels.”

Thanks

- Cathy Liverman
- Vivica Kraak
- Jeff Koplan
- IOM Committee

*Preventing
Childhood Obesity:
Health in the Balance*

www.nap.edu

Executive summary
available for free
download

For more information:
www.iom.edu/obesity

