Strategies for Combating the Epidemic of Obesity in American Youth

Nieman DC. Professor, Health and Exercise Science, ASU-NCRC Human Performance Lab. Childhood Obesity.
RESEARCH STUDY RESULTS ON 762 MIDDLE-SCHOOL AGED STUDENTS, CHARLOTTE, NC

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Middle school students (N=458 boys, N=304 girls over a 3-year period) from school districts in the greater Charlotte, NC, area were given a battery of physical fitness tests including:

- muscular strength (lower back and leg dynamamometer)
- anaerobic peak and sustained power (Wingate 30-second test)
- treadmill VO_{2max}
- percent body fat
Results

• Body mass index (BMI):
  – 22.2±5.2 and 22.9±5.2 kg/m² in boys and girls, respectively

• Body fat %:
  – 19.8±11.0 and 24.6±8.7% in boys and girls, respectively

• 37% of boys and 36% of girls were overweight or obese using CDC BMI-for-age growth charts.
Higher body fat predicted lower aerobic fitness

Boys

R = -0.65, P < 0.001

Girls

R = -0.56, P < 0.001

39% boys below adequate level (42 ml/kg/min)

60% girls below adequate level (36 ml/kg/min)
Anaerobic capacity (i.e., 30-second sprint power) was lower in boys and girls with more body fat.
Conclusions

• Over one-third of the middle school-aged boys and girls tested (N=458 males, N=304 females) were classified as overweight or obese.

• 39% boys and 60% girls below adequate aerobic fitness levels.

• Percent body fat was inversely related to aerobic and anaerobic fitness.
31%

Overweight/Obese

• Nearly one in three youth (31 percent), ages 2 to 19 years, is now overweight or obese.

Scientific Report of the 2015 Dietary Guidelines for Americans, USDA.

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Prevalence of Overweight/Obese for U.S. Youth

Hispanic | Black | White | Asian

2-5 y
- Hispanic 29.8
- Black 21.9
- White 20.9
- Asian 9

6-11 y
- Hispanic 46.2
- Black 38.1
- White 29.4
- Asian 19.9

12-19 y
- Hispanic 38.1
- Black 39.8
- White 31.2
- Asian 24.6

1 in 5 U.S. youth obese

Obese = ≥95% BMI for age and sex based on year 2000 growth charts.
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Childhood obesity is reaching alarming proportions in many countries (prevalence expected to double in next decade).

WHO, 2016
41 million children under 5 years of age affected by overweight or obesity
World Obesity Projections for Adults, 2025

A pooled analysis of 1698 population-based measurement studies with 19.2 million participants.
• Has the potential to negate gains in life expectancy.
• Obesogenic environment encourages weight gain.
• Requires a whole-of-government approach.

WORLD HEALTH ORGANIZATION 2016

WHO: Childhood obesity is reaching alarming proportions in many countries, with prevalence expected to double in the next decade.
Childhood Obesity: Critical Threat to Public Health

• According to the Institute of Medicine:
  • Childhood obesity involves significant risk to physical and emotional health.
  • About six in 10 obese children ages 5 to 10 years have at least one heart disease risk factor.
Medical Complications of Obesity

46% higher inpatient costs, 27% more physician visits and outpatient costs, 80% higher spending prescription drugs = $147 billion/year (Circulation 2014;129:S102-138)

- Stroke
- Pulmonary disease
- Pancreatitis
- Fatty liver disease
- Gallstones
- Cancer: breast, uterus, cervix, ovary, prostate, kidney, colon, esophagus, pancreas, gallbladder, liver
- Skin disorders
- Phlebitis
- Gout
- Cognitive dysfunction; Depression, anxiety
- Cataracts
- Coronary heart disease
- Diabetes
- Dyslipidemia
- Hypertension
- Gynecologic abnormalities
- Osteoarthritis

Obesity
Not just an adult concern anymore…

Conditions Seen in Children

- High Cholesterol
- Type 2 Diabetes/Impaired Glucose Tolerance
- High Blood Pressure
- Social Problems and Poor Self-Esteem
- Sleep Disturbances
- Orthopedic Problems
A 6-week diet and exercise intervention alters metabolic syndrome risk factors in obese Chinese children aged 11-13 years.


Risk Factor Change (%) in N=167 Obese Children After 6 Weeks

- **Control girls (N=43)**
- **Control boys (N=38)**
- **Lifestyle girls (N=43)**
- **Lifestyle boys (N=52)**

*Lifestyle* = 1600-2000 kcal/day, high volumes of moderate exercise (6 days/week, twice daily, 2-3 h brisk walking, jogging, swimming in morning, and 2-3 h table tennis or badminton in the afternoon) (emphasis on fun, play).
What Factors Best Explain The Obesity Epidemic In America?

- In general, 3 factors are most responsible for weight gain leading to obesity:
  - genetic and parental influences
  - high calorie, high fat diets
  - insufficient physical activity.
“The decline in daily activity that came from industrialization, mechanized transportation, urbanization, and other aspects of technology created the largest decline in activity and created the right conditions under which an increase in food access, availability, and decreased cost could have a major impact on body weight.”

James O. Hill, PhD.
Circulation. 2012;126:126-132
Genetic and Parental Influences

• Inheritance accounts for 25% of variance in fatness, with lifestyle/environment 45%.

• Genetic makeup can make an individual prone to obesity if the lifestyle is poor.

Nutr Rev 1997;55:S21-S30
The Risk of Adult Obesity is High for Obese Adolescents

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OBESE GROUPS


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Odds of Obesity in Young Adulthood

High before the age of 10 if parents obese; High after age 10 if child/teen is obese

WHO 2016: Ending Childhood Obesity

- Physical activity declines from the age of school entry.
- Globally, 81% of adolescents aged 11–17 years are insufficiently physically active.
- Adolescent girls are less active than adolescent boys.
- Low physical activity is rapidly becoming the social norm in most countries.
The 2008 Physical Activity Guidelines for Americans recommend that youth engage in ≥1 h/day or more physical activity.

Activity should be appropriate for age, enjoyable, and varied.

Youth should have <2 h/day screen time from TV, computer games, etc. (separate from school tasks).
High-Calorie, High Fat and Sugar Foods and Beverages

• The most important reason for obesity in America is that children and adults are eating too much relative to their physical activity and total energy expenditure (including RMR).

• Studies show that obese compared to lean people choose high fat foods more often, tend to binge eat, and eat faster.

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THE RISE IN CHILDHOOD OBESITY

• The rise in childhood obesity is due to complex social, environmental, and policy interactions that have led to excessive eating relative to physical activity and growth energy demands.

MEDIA

GOVERNMENT AGENCIES

FAITH-BASED ORGANIZATIONS

YOUTH-SERVING ORGANIZATIONS

SCHOOLS

POSTSECONDARY INSTITUTIONS

EMPLOYERS

FAMILY

HEALTH CARE PROVIDERS

YOUTH

YOUTH
Important steps to confront the epidemic of childhood obesity include:

1. **The federal government** should develop nutrition standards for foods and beverages sold in schools, and develop guidelines regarding advertising and marketing to children and youth.

2. **Industry and media** should develop healthier food and beverage product and packaging innovations, and expand consumer nutrition information.

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• 3. **State and local governments** should expand and promote opportunities for physical activity and access to healthful foods within communities.

• 4. **Health-care professionals** should routinely track BMI in children and youth and offer appropriate counseling and guidance.

• 5. **Schools** should improve the nutritional quality of foods and beverages served and sold in schools, and increase opportunities for frequent, more intensive, and engaging physical activity during and after school.

• 6. **Parents and families** should engage in and promote more healthful dietary intakes and active lifestyles.

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FOCUS ON SCHOOLS

Policies and Practices

Use a coordinated approach to develop, implement, and evaluate healthy eating and physical activity policies and practices.
Policies and Practices

Assess* 
Develop and Implement 
Evaluate

* Using the School Health Index (www.cdc.gov/HealthyYouth/SHI)
School Environments

Establish school environments that support healthy eating and physical activity.
School Environments

Selected Strategies to Encourage Healthy Eating and Physical Activity

- Promote access to healthy foods and physical activity at school.
- Provide suitable facilities for healthy eating.
- Establish safe spaces and facilities for physical activity.
- Avoid using physical activity as punishment.
- Avoid using food items to reward students.
Nutrition Services

Provide a quality school meal program and ensure that students have only appealing, healthy food and beverage choices offered outside of the school meal program.
Nutrition Services

GUIDELINE 3

1. Promote access to and participation in school meals.
2. Make all foods nutritious and appealing.
3. Align all foods with *Dietary Guidelines for Americans*.
Physical Education and Physical Activity

Implement a comprehensive physical activity program with quality physical education as the cornerstone.
Physical Education and Physical Activity

Comprehensive School-Based Physical Activity Program

- Walk- or Bike-to-School Programs
- Classroom-Based Physical Activity Breaks
- Daily Recess for Elementary Schools
- Quality Physical Education
- Interscholastic Sports
- Intramural and Physical Activity Clubs

GUIDELINE 4
1. Pediatricians: identify children early on the path to obesity.
2. Base prevention efforts on family dynamics and reduction in high-risk dietary and activity behaviors.
3. Promote a diet free of sugar-sweetened beverages, of fewer foods with high caloric density, and of increased intake of fruits and vegetables.
4. Promote a lifestyle with reduced sedentary behavior and with 60 minutes of daily moderate to vigorous physical activity.
Understandable nutrition guidelines and labels, tax sugar beverages, better access to healthy foods, control marketing.

Ensure adequate activity facilities, spaces, and guidance.

Monitor and manage gestational weight gain and hyperglycemia.

Promote breastfeeding, whole-of-community support to promote healthy lifestyles for young children.

Healthy school standards for meals and beverages, health and P.E. in curriculum, food prep classes for families.

World Health Organization 2016
Battle of the Bulge

Two Weapons

Exercise

DIET CONTROL
Intake of added sugars as a percent of calories is particularly high among children, adolescents, and young adults.
“Implement an effective tax on sugar-sweetened beverages… limit the consumption of foods and beverages high in fat, sugar and salt by infants and young children.”

WHO, 2016
8 Healthy Eating Goals for Children

http://www.fitness.gov/eat-healthy/how-to-eat-healthy/

- Drink water instead of sugary drinks
  - Limit soda, energy drinks, sports drinks
- Cut back on solid fats and foods containing solid fats
  - Limit cakes, cookies, desserts, pizza, sausages, hot dogs, bacon, ice cream
- Make half the plate fruits and vegetables
- Make half the grains eaten whole grains
- Switch to fat-free or low-fat milk
- Choose a variety of lean protein foods
  - More turkey and chicken breast, dry beans, eggs, nuts, seeds
- Compare sodium in foods
  - Limit foods with visible salt like chips; reduce processed foods
- Eat some seafood

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“Childhood obesity undermines the physical, social, and psychological well-being of children and is a known risk factor for adult obesity and chronic diseases. There is an urgent need to act now to improve the health of this generation and the next.” WHO, 2016.