



Planet Health: Methods and Results of a School-based, Interdisciplinary Intervention to Reduce Obesity in Youth

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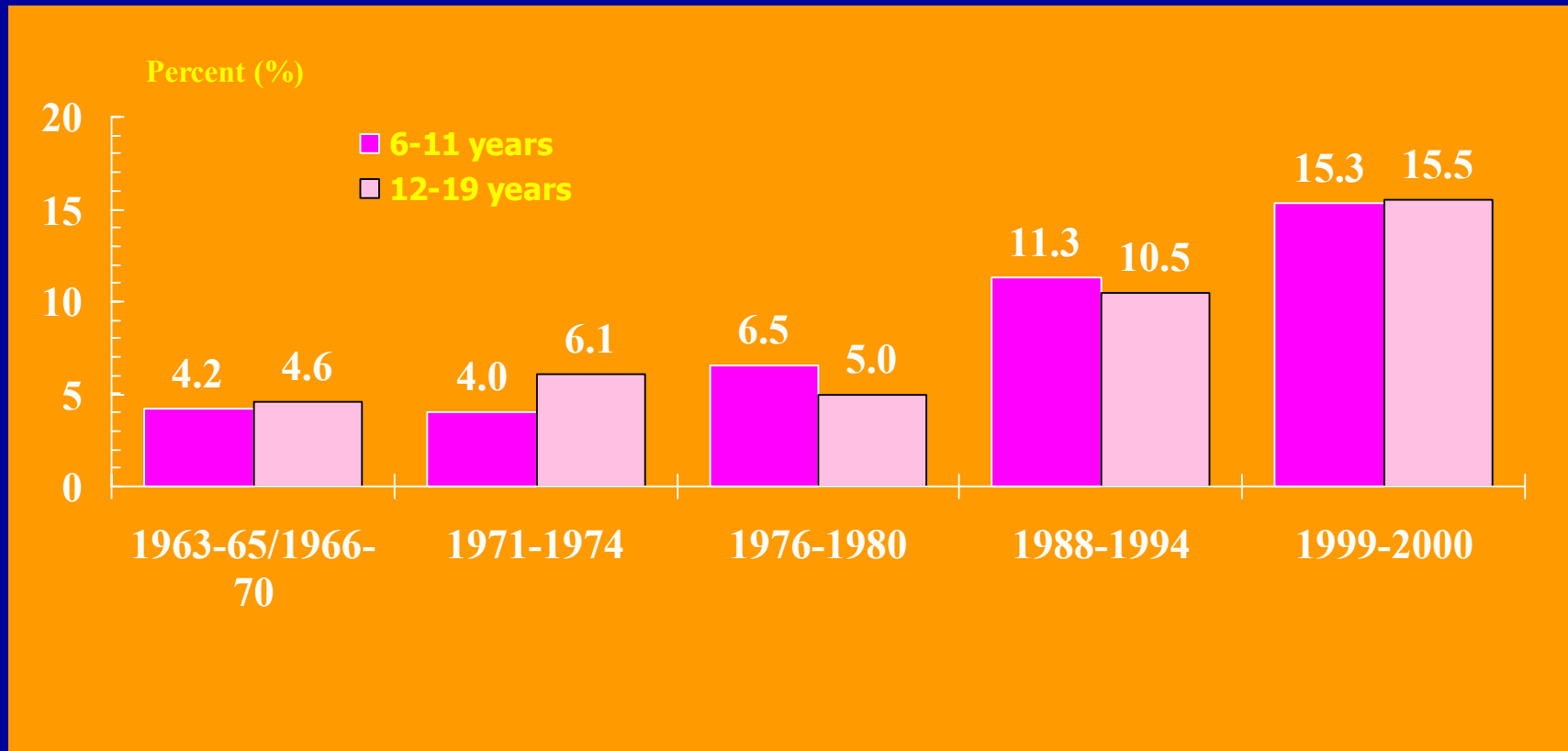
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What do we know?

- Magnitude of obesity (prevalence, trends) demands universal approach
- Prioritize prevention, early treatment
- Monitor trends in children & youth
- Organizational settings that provide avenues for intervention

WHO. Obesity: Preventing and Managing the Global Epidemic. WHO Technical Report Series No. 894. Geneva: WHO, 2000

Secular Changes in Overweight (BMI \geq 95%tile) Among Children 6-19 years Old NHES & NHANES: 1963-2000



The Consequences?

- **Obesity *per se* is a chronic condition**
- **Increased risk of cardiovascular disease, diabetes, adult obesity, social and economic outcomes**
- **Magnitude unknown: never before have our children and youth been so overweight**

Freedman DS, Dietz WH, Srinivasan SR, Berenson GS . The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. *Pediatrics* 1999 Jun;103(6 Pt 1):1175-82

Must A, Spadano J, Coakley EH, Field AE, Colditz G, Dietz WH. The disease burden associated with overweight and obesity. *JAMA*. 1999 Oct 27;282(16):1523-9.

WHO. Obesity: Preventing and Managing the Global Epidemic. WHO Technical Report Series No. 894. Geneva: WHO, 2000

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- **Steven L. Gortmaker, PhD PI**
- **Karen E. Peterson, RD, ScD Co-PI**
- **Jean L. Wiecha, PhD Project Director**
- **Nan Laird, PhD Co-Investigator**

- **Funding NICHD HD 30780**

Why Schools?

- **Most children and youth are in schools**
 - **Schools are major settings for learning, physical activity, dietary intake**
 - **A caveat: strategies must be compatible with the primary educational aims of schools**
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Interdisciplinary Curriculum

- **A strategy in which health promotion materials are incorporated into existing school structure and core curricula, such as math, social studies, science, language arts and physical education**
- **Emphasizes participation by regular classroom teachers**

Clark DC, Clark SN. Interdisciplinary curriculum: meeting the needs of young adolescents. *Schools in the Middle*. 1994;3:4-7.

Carter J, Wiecha J, Peterson KE, Gortmaker SL. Planet Health. Champaign, Illinois: Human Kinetics Press, 2001.

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- **6th-8th grade students**
- **10 ethnically diverse public schools, Boston Massachusetts metropolitan area**
- **Schools randomly assigned; 5 Intervention, 5 control**
- **Primary endpoint: obesity.**

Behavioral Targets

- **Reduce TV viewing to less than two hours per day**
- **Increase moderate and vigorous activity**
- **Increase consumption of fruits and vegetables to five or more per day**
- **Decrease consumption of foods high in fat and saturated fat**

Behavioral Choice Theory

- **Reducing sedentary time coincident with a dietary intervention can decrease obesity among obese youth**
- **Provision of choice can enhance motivation and maintenance of behavior change**

Social Cognitive Theory

- **Emphasizes social and environmental factors influencing psychosocial and behavioral risk**
- **Focus on cognitive and behavioral skills to enable change in target behaviors; practice using skills to strengthen perceived competence**
- **Provide environmental supports for targeted behaviors in classrooms and physical education.**

Intervention Components

- **Teacher training workshops**
- **Classroom lessons (16/year) in Math, Science, Language Arts, Social Studies**
- ***Power Down* 2-week TV reduction campaign**
- **Physical Education Micro-units (30 five minute units) and Fit-checks**
- **Wellness sessions for teachers (3)**

Planet Health: Classroom Lessons

- **Reinforces 4 health behaviors; messages consistent with national guidelines**
- **Incorporates subject-specific learning standards, middle school skills & competencies**
- **Introductory lesson (student self assessment) plus 32 units in 4 subject areas**

Lesson Plans

- **Summary paragraph**
- **Behavioral & learning objectives**
- **Materials**
- **Teaching procedure**
- **Student activity sheets**
- **Teacher resources**

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Physical Education Micro-Units

- 30 five- minute units: fitness tip, fitness lesson, How-to, questions for students
- Introduced by PE teacher in warm-up or cool-down period
- Motivation to work to personal fitness potential
- “Make space for activity” by reducing TV time
- Fit Checks 2-3 times per yr

Planet Health: Study Design

Randomized, controlled field trial

Baseline *Fall 1995*

5 intervention schools (n=1203 eligible students)

5 control schools (n=1210)

Planet Health, usual curriculum *Fall 95-Spring 97*

Complete follow-up *Spring 1997*

n=641 intervention, n=654 controls

Behavioral Outcome Measures

- 11-item Television & Video Measure (TVM)
- Youth/Adolescent Activity Questionnaire (YAQ)
 - 16 items, moderate-to-vigorous activities
- Youth Food Frequency Questionnaire (YFFQ)
 - daily servings of fruit and vegetables
 - total and saturated fat

Obesity Definition

- **Obesity defined as both:**
 - **body mass index (BMI) \geq 85th age & sex-specific percentile**
 - **triceps skinfold \geq 85th age- sex-specific percentile**
- **Distinguish individuals who are overweight but not overfat from the truly obese**

Process Results: Planet Health

- **87% of classroom teachers (n=86) and 100% of PE teachers completed training sessions**
- **Classroom teachers completed on average 3.4 (out of 4) lessons**
- **PE teachers completed on average 8.2 (out of 15) micro-units**
- **Increases in student knowledge (I vs C) $P=0.02$**

Statistical Analysis

- Interventions took place in schools, students unit of measurement
- Intention to treat protocol
- SUDAAN to account for clustering
- Analyses stratified by sex
- Controlled for baseline obesity, BMI, TSF, age, race/ethnicity, intervention condition

Summary



- Obesity among females in intervention schools was reduced compared to controls (OR 0.48; P=0.03)
- Remission greater in intervention schools among girls (OR 2.4; P=.04)
- TV reductions in boys & girls; each hour of TV => reduced obesity in girls (OR 0.86/hour; P=0.02)
- Increases in fruit and vegetable intake and smaller increment in total *kcal* in girls (P=0.003 and P=0.05)
- Gortmaker SL, Peterson K, Wiecha J, Sobol AM, Dixit S, Fox MK, Laird N. Reducing obesity via a school-based interdisciplinary intervention among youth: *Planet Health*. *Archives of Pediatrics and Adolescent Medicine*. 1999;153:409-18.

Intervention Impact by School

Females:

Evidence for intervention impact in 4 of 5 schools. If the one ineffective site is dropped, intervention effect on obesity is: OR 0.31; P=0.0002

Males:

If the same school is dropped, intervention effect on obesity is OR 0.70; P=0.05

Change in Obesity in Females by Race/Ethnicity

Evidence for intervention impact by ethnic group (minimum cell size = 5):

- Afro-American (**OR 0.14**; 95% CI 0.04-0.51)
- White (**OR 0.48**; 95% CI 0.20-1.13)
- Hispanic (**OR 0.38**; 95% CI 0.03-5.3)

Safety: Females

- **At baseline, similar rates of extreme dieting behavior:**
 - **Intervention: 3% vomiting or taking laxatives to lose weight, 2% diet pills**
 - **Control: 4% vomiting or laxatives, 2% diet pills**
- **At follow-up:**
 - **Intervention: 3% vomiting or laxatives; 2% diet pills**
 - **Control: 5% vomiting or laxatives, 5% diet pills**

Limitations

- Participation rate 65% at baseline (parental consent, school absence)
- Randomization by cluster, controlled in analysis
- Unmeasured confounding variables
- Potential measurement error; no evidence for bias due to interviewer variability
- TV change only partial explanation for effect

Conclusions: Planet Health

- Well liked by teachers, well implemented
- Increased student knowledge of healthy diet
- Reduced TV viewing
- Among girls, reduced obesity & improved diet
- Intervention effect on obesity mediated by TV viewing
- Further implementation/sustainability studies ongoing (Boston Public Schools, Massachusetts Partnership for a Healthy Weight)

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An Interdisciplinary Curriculum for Teaching Middle School Nutrition and Physical Activity

Jill Carter, Jean Wiecha, Karen Peterson, Steven
L. Gortmaker

Human Kinetics, Champaign, IL 2001

- **63 lessons, 30 micro-units**
- **www.humankinetics.com**