School-based Obesity Prevention Studies in Perspective

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Interventions for Preventing Obesity in Children: A Review

Cochrane Database of Systematic Reviews (Campbell K, Waters E, O'Meara S, Kelly S, Summerbell C, Jan 2002)

- Purpose: To assess the effectiveness of interventions that focused on diet, physical activity and/or lifestyle and social support, and were designed to prevent obesity in childhood.
- Search strategy: Several databases from 1985-2001
- Selection criteria: RCTs and non-randomized trials with concurrent control group that observed participants for a minimum of 3 months were included.
- Data collection and analysis: 2 reviewers independently extracted data
- Results: 10 studies; 8 were school-based interventions.

Cochrane Review: Campbell et al., 2002

School-based Interventions for Obesity Prevention

Long-term studies (≥ 1 yr)	Difference in Overweight
Simonette et al, 1986 (Italy)	No
Donnelly et al, 1996 (US)	No
Mo-Suwan et al, 1998 (Thailand)	No
Gortmaker et al, 2001 (US)	Among girls only
Mueller et al, 2001 (Germany)	No
Sahota et al, 2001 (England)	No
Short-term Studies	
Flores et al, 1995 (US)	Yes
Robinson et al, 1999 (US)	Yes

School-based obesity intervention trials since the Cochrane Review in 2002

	Difference in Overweight
Cabellero et al, 2003 (US)	No
Neumark-Sztainer et al, 2003 (US)	No
Kain et al, 2004 (Chile)	Boys only
James et al, 2004 (UK)	No change in mean BMI or Z score; mean % of overweight children↑ in control group

School-based obesity treatment interventions for overweight students

- 12 controlled experimental studies between 1966-96
- In 11 of the 12 studies, the intervention group had a significantly greater reduction in percentage of overweight compared with the control group
- Many methodological problems (small sample sizes, short-term, non-randomized control groups)
- Major Issue: potential for harmful effects of intervention such as stigma, labeling, teasing

Why don't school interventions show more results?

- Obesity prevention interventions are complex and difficult to implement and are only "first generation."
- We should not abandon school-level interventions.
- Need for further improvements:
  - greater articulation of theory
  - interventions based on modifiable determinants of overweight (risk & protective factors)
  - more family involvement
  - environmental and policy change interventions
  - improved or different methods or designs
  - increased sensitivity of diet and PA measures
  - smaller scale innovative studies

Advantages of school-based interventions

- 95% of American youth (5-17 y) are enrolled in school. Ability to reach a large portion of children.
- No other institution has as much continuous and intensive contact with children
- Children eat 1-2 meals per day in school for 5 days of the week (about (30% of their total daily energy)
- Schools have resources, such as gyms, equipment, outdoor playing fields, PE programs
- Leverage peer influence and change social norms
- Way to reach parents

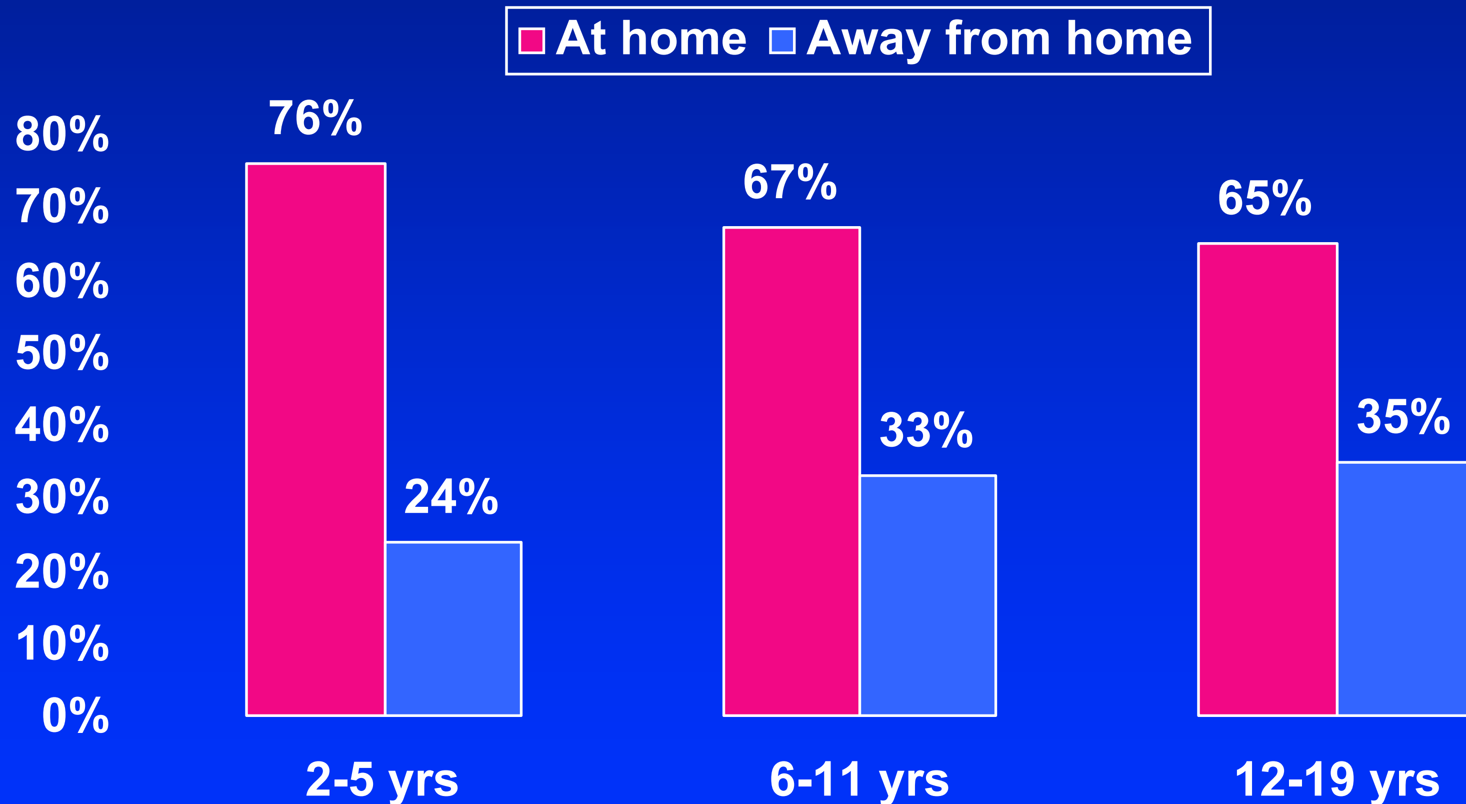
Disadvantages of school-based interventions

- “One size fits all” intervention
- Interventions may function differently by gender
- May be difficult to tailor interventions to specific cultural/ethnic groups
- Universal prevention programs may not be of sufficient dosage or targeted enough to have an impact on higher risk children.
- Focus on academic achievements and standardized testing. Difficult to get sufficient classroom health time.
- Structural issues (e.g., space or time for PE)
- Difficult to involve families

Major limitations of school-based obesity prevention studies

Efforts have been “school-centric” in the sense that they focus exclusively on in-school programs

Calorie distribution by eating location by age (1994-96 USDA CSFII)



Lin, Guthrie, Frazao, Food Review, 1999

Family involvement in school-based intervention studies has been limited

Findings from youth health promotion and prevention literature across content areas (substance abuse, risky sexual behavior, school, failure, juvenile delinquency and violence *(Weissberg et al, American Psychologist, 2003)*

- Family-focused prevention efforts have a greater impact than strategies that focus only on parents or on children
- Combined school and family programs deliver more benefits than those managed in isolation from each other
- Community programs that include policy changes and media campaigns are more effective when coordinated with family, peer, and school components

Need for greater parental involvement in school-based obesity prevention studies

<u>Challenges</u>

- What are the most effective ways to involve parents?
- Parental involvement in schools decreases markedly during middle school and high school.
- Low income and poorly educated, single and minority parents have relatively low rates of involvement in their children's schools (IOM, Engaging Schools, 2003)

Research recommendations for school-family obesity interventions

Research is needed on:

- Engagement, recruitment and retention strategies, such as prior relationship-building, removing attendance barriers (incentives, childcare, transportation)
- Types of family involvement that lead to the best program implementation and outcomes (behavioral parent training, family workshops, telephone counseling, take home activities, events at school)
- Intensity and dose of the intervention

Principles of effective family-focused interventions ***(Kumpfer and Alvardo, American Psychologist, 58:2003)***

- Comprehensive multi-component interventions are more effective in modifying behavior in children than single-component programs
- Address strategies for improving parental monitoring, communications, family relations
- Produce behavioral, cognitive, affective changes in the family environment and family dynamics
- Increased dosage or intensity (25-50 hrs) of the intervention is needed with higher risk family with more risk factors than low-risk families (5-24 hours)
- Need to be age and developmentally appropriate

Principles of effective family-focused interventions ***(Kumpfer and Alvardo, American Psychologist, 58:2003)*** **[continued]**

- Tailoring the intervention to the cultural traditions of the families improves recruitment, retention and sometimes outcome effectiveness
- High rates of family recruitment and retention (80-85%) are possible with incentives, including food, childcare, transportation, graduation.
- Effectiveness of the program is highly tied to the trainer's/staff personal efficacy and confidence, personal characteristics, ability to structure sessions and be directive
- Interactive skills training, methods (e.g., activity modeling, role-plays) vs didactic lecturing, increase program effectiveness particularly with low SES parents
- Empower parents to identify their own solutions

Environmental strategies and policy change at the school level

Environmental strategies include:

- Working with school food service staff to change the foods available in the school meals and a la carte
- Limiting access to sweetened beverages and other high calorie vending machines and school stores
- Modifying food prices to promote the purchase of healthy foods
- Use of student advisory councils (peer promotion) and school advising boards for environmental and policy changes
- More daily physical education classes, active recess time

School Walking Programs

School- based health centers (SBHC)

- SBHCs provide on-site medical and mental health and preventive services
- Approximately 1500 SBHCs across the country
- SBHCs typically open 29 hrs/wk
- 39% open during summer
- 62% serve students in urban communities; 25% rural
- 51% of students in schools with SBHCs are African American or Hispanic
- 46% of SBHCs serve high school students

Data from 2001-02 SBHC Census Survey, 2004 (www.nsbhc.org)

School-community connections

School-based intervention studies can develop close connections to after-school and other youth-serving programs.

Study design and evaluation issues

- Group randomized trials (GRIs)
  - Large number of schools needed
  - Expensive to fund
  - Difficult to conduct with good fidelity to intervention implementation and outcome evaluation
- New designs need to be developed which enable fewer schools to be included yet provide adequate statistical power when the analyses control for individual clustering with group
- Need alternatives to RCTs and GRTs

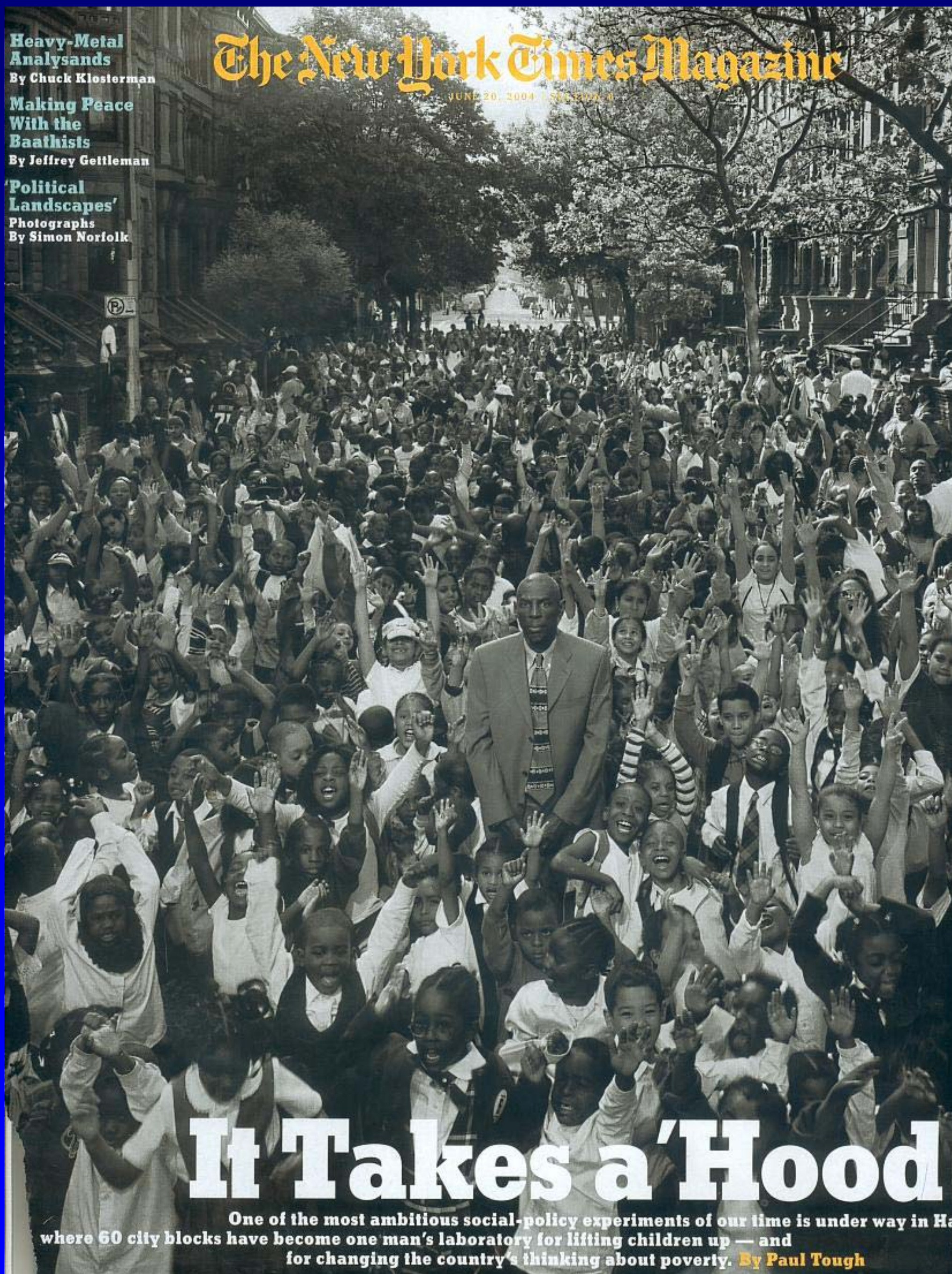
What works in prevention? A look at other fields

Nation et al *(American Psychologist 58:2003)* conducted a systematic analysis of youth risk behaviors and prevention literature

1. Program characteristics
   - Comprehensive
   - Varied teaching methods
   - Sufficient dosage
   - Theory driven
   - Positive relationships
2. Matching program to the target group
   - Appropriately timed and developmentally relevant
   - Socioculturally relevant
3. Program implementation and evaluations
   - Outcome evaluation
   - Well-trained staff

Future research directions

- Smaller scale, more intensive interventions are needed
- More school-family-focused connections
- Environmental intervention strategies and individual-level strategies implemented in tandem
- More intervention studies on school policy changes
- New design and evaluation methods
- Our understanding of mediating and moderating variables that influence program effects is limited. Need greater attention to process measures of program quality and fidelity



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