

What Works to Prevent Obesity in Children? Findings from a Comparative Effectiveness Review and Meta-Analysis

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Agenda

- AHRQ and the Effective Health Care Program
- What Works to Prevent Obesity in Children? A review of findings from Dr. Wang
- Questions and Answers

Web Conference Logistics

- Audio lines have been muted to minimize background noise.
- To ask a question:
 - **Use the WebEx Q&A function:** You may ask a question for the presenter at any time. Questions will be answered midway through and at the very end of the presentation.
 - If you are experiencing technical issues, you may also use the WebEx Q&A function to request help.
- Let us know what you think! Complete the evaluation form at the conclusion of the presentation. Look for the “Evaluation” pop-up.

Agency for Healthcare Research and Quality (AHRQ)

- **Mission:** To improve the quality, safety, efficiency, and effectiveness of health care for all Americans
- **Research:** ~80 percent of AHRQ's budget is invested in grants and contracts focused on improving health care
- **The AHRQ Effective Health Care (EHC) Program:**
 - Provides current, unbiased evidence on clinical effectiveness of health care interventions
 - Focuses on patient-centered outcomes
 - Helps consumers, providers, and policy-makers make informed choices
 - Does not make treatment recommendations
 - Long-term goal: Improve health care quality and patient health outcomes through informed decision making by patients, providers, and policymakers

What is Comparative Effectiveness Research (CER)?

- Comparative effectiveness research — a type of patient-centered outcomes research — compares drugs, medical devices, tests, surgeries, or ways to deliver health care, so that patients and their families can make more informed choices.
- Findings are descriptive, not prescriptive, and are intended as tools for informed decision making, not recommendations.
- Findings highlight current evidence about effectiveness, risks, and side effects.

What Works to Prevent Obesity In Children?

Findings from a Comparative Effectiveness Review and Meta-Analysis



Disclaimer

- Some of what will be presented is not included in the original 800-page AHRQ report.
- Some is based on further analysis, unpublished results.

Outline

- Introduction
- Objectives
- Methods
- Results
- Conclusions

Wang Y, Wu Y, Wilson RF, et al. AHRQ Comparative Effectiveness Review No. 115.
Available at www.effectivehealthcare.ahrq.gov/child-obesity-prevention.cfm.

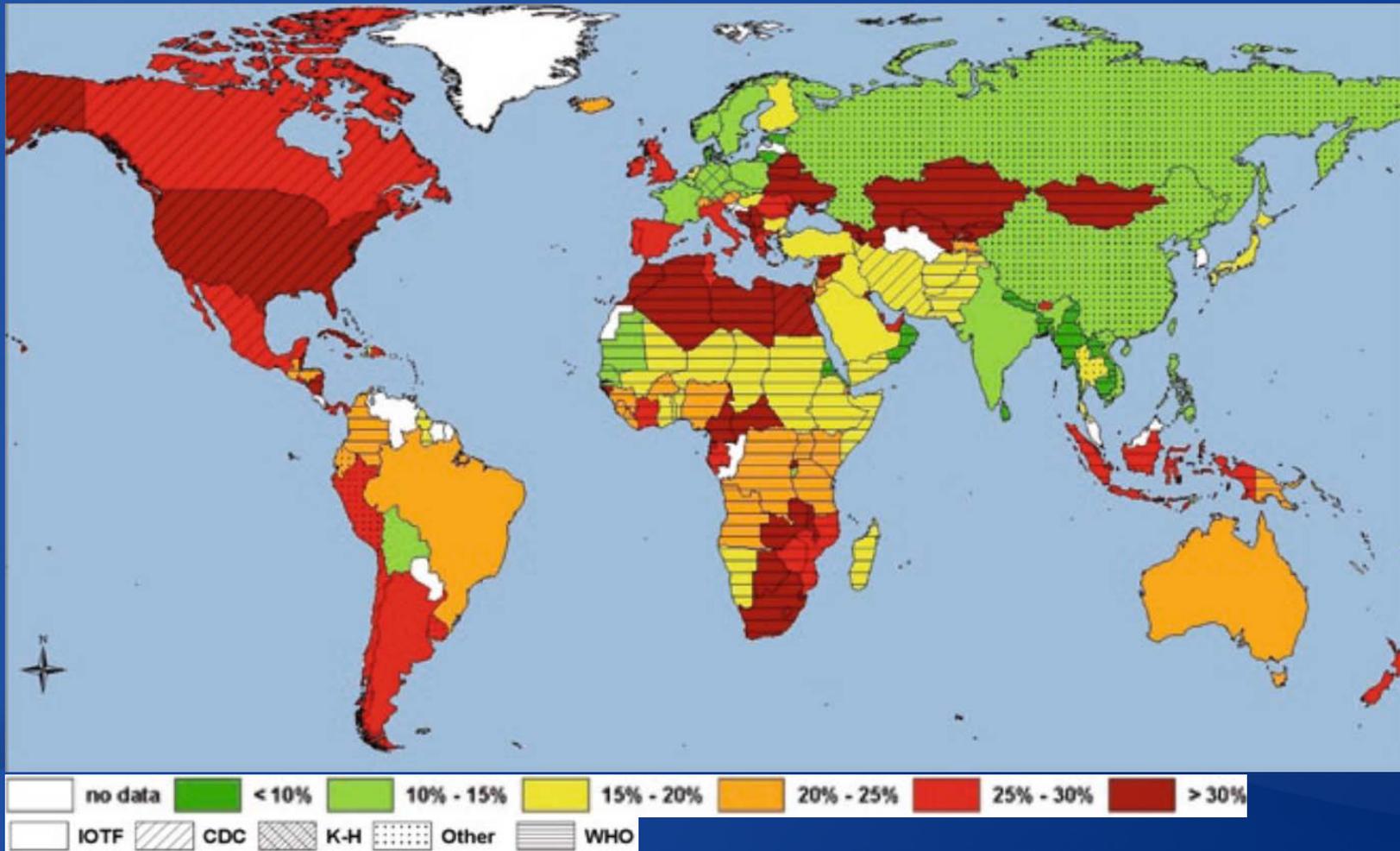
Conclusions/Take Home Message

- Obesity is a serious public health problem
- The evidence is moderate about the effectiveness of school-based interventions for childhood obesity prevention
- Physical activity interventions in a school-based setting with a family component or diet and physical activity interventions in a school-based setting with home and community components have the most evidence for effectiveness
- More research is needed to test interventions in other settings, such as policy, environmental, and consumer health informatics strategies

I. Background: Prevalence of Childhood Obesity

- Childhood overweight and obesity are highly prevalent in the United States and many other countries
- The risk of obesity is higher among minority and underserved populations in the U.S.

Worldwide Prevalence of Combined Prevalence of Overweight and Obesity in Children and Adolescents*



* The prevalence estimates were calculated as the arithmetic mean of the age-specific estimates (Data Source: Pigeot et al. 2011)

Trends in the prevalence (%) of obesity (BMI \geq 95th percentile) in US children and adolescents, by age: 1971-74 to 2009-10*

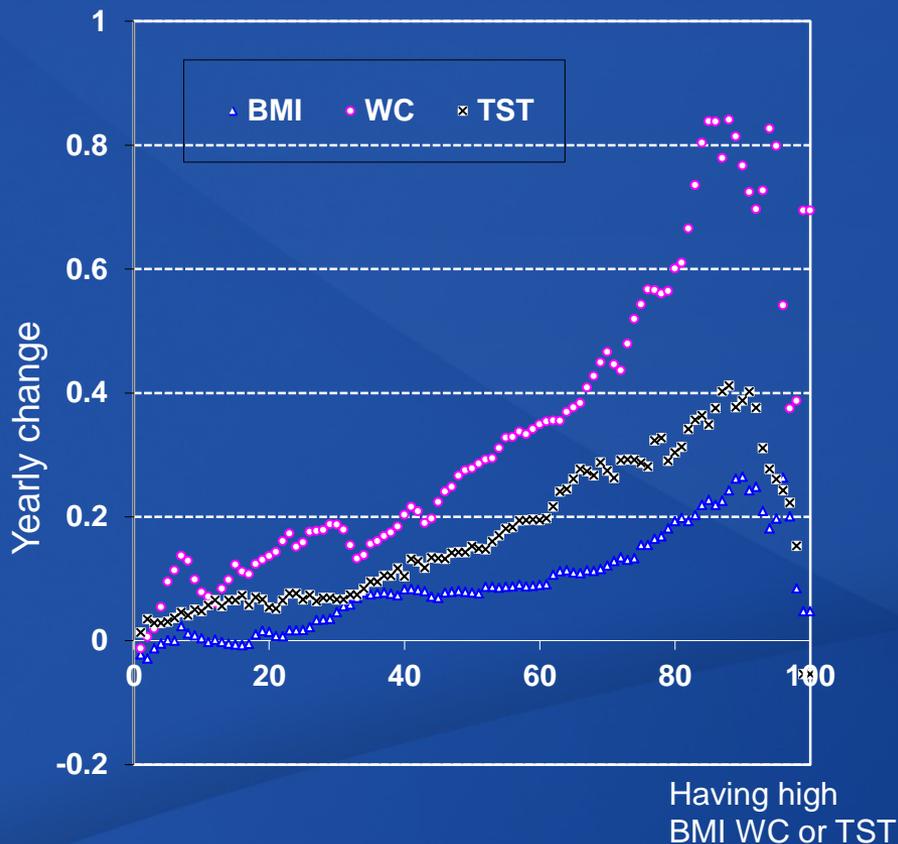


* Based on national data collected in NHANES. (Wang and Beydoun, 2007; Ogden et al, 2012)

What prevalence may not show—U.S. adolescents:

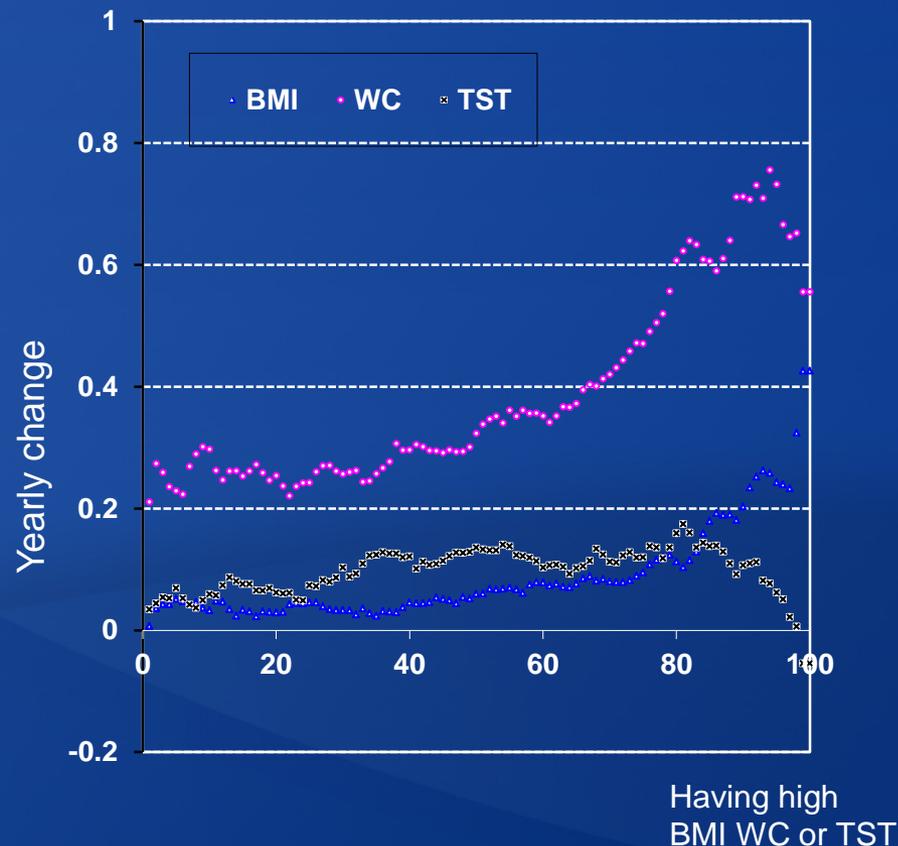
Yearly average change in BMI (kg/m²), WC (cm) and TST (mm) by their percentile distributions: 1988-94 to 1999-04

Boys, 12-19 y



Cumulative proportion/Percentile

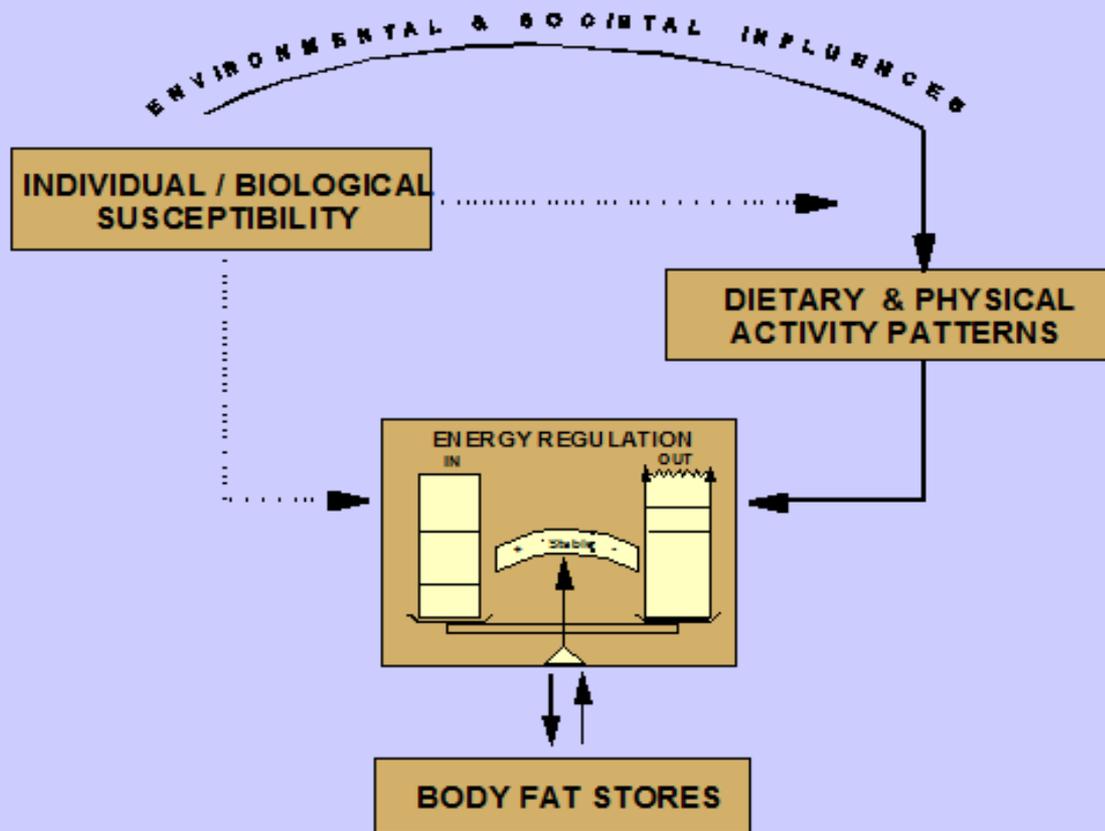
Girls, 12-19 y



Cumulative proportion/Percentile

* OLS estimate of average yearly shift within percentile groups based on NHANES III and 1999-2004 data (Beydoun and Wang, IJPO 2010)

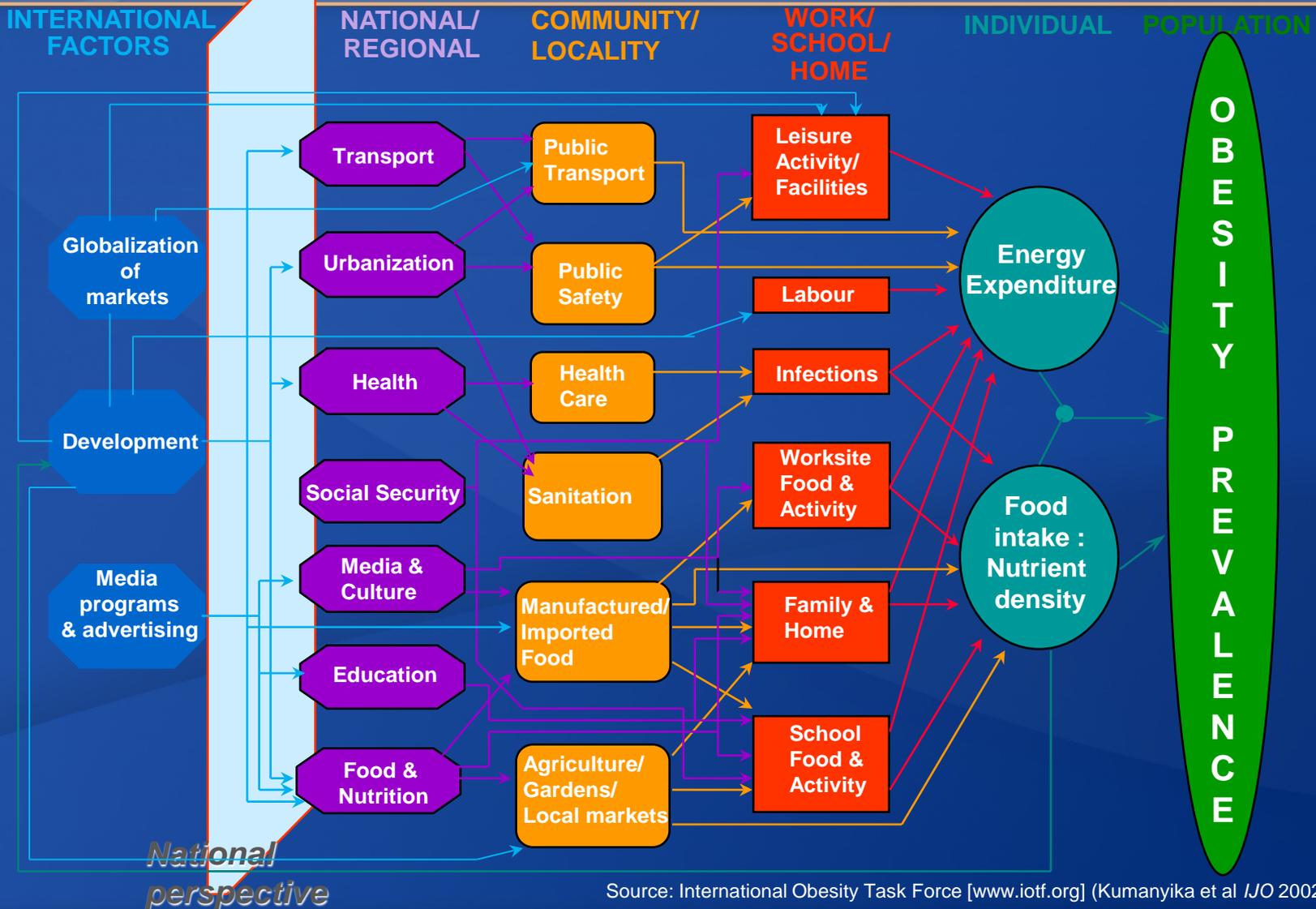
The Biological Basis of Obesity



Factors Contributing to Childhood Obesity

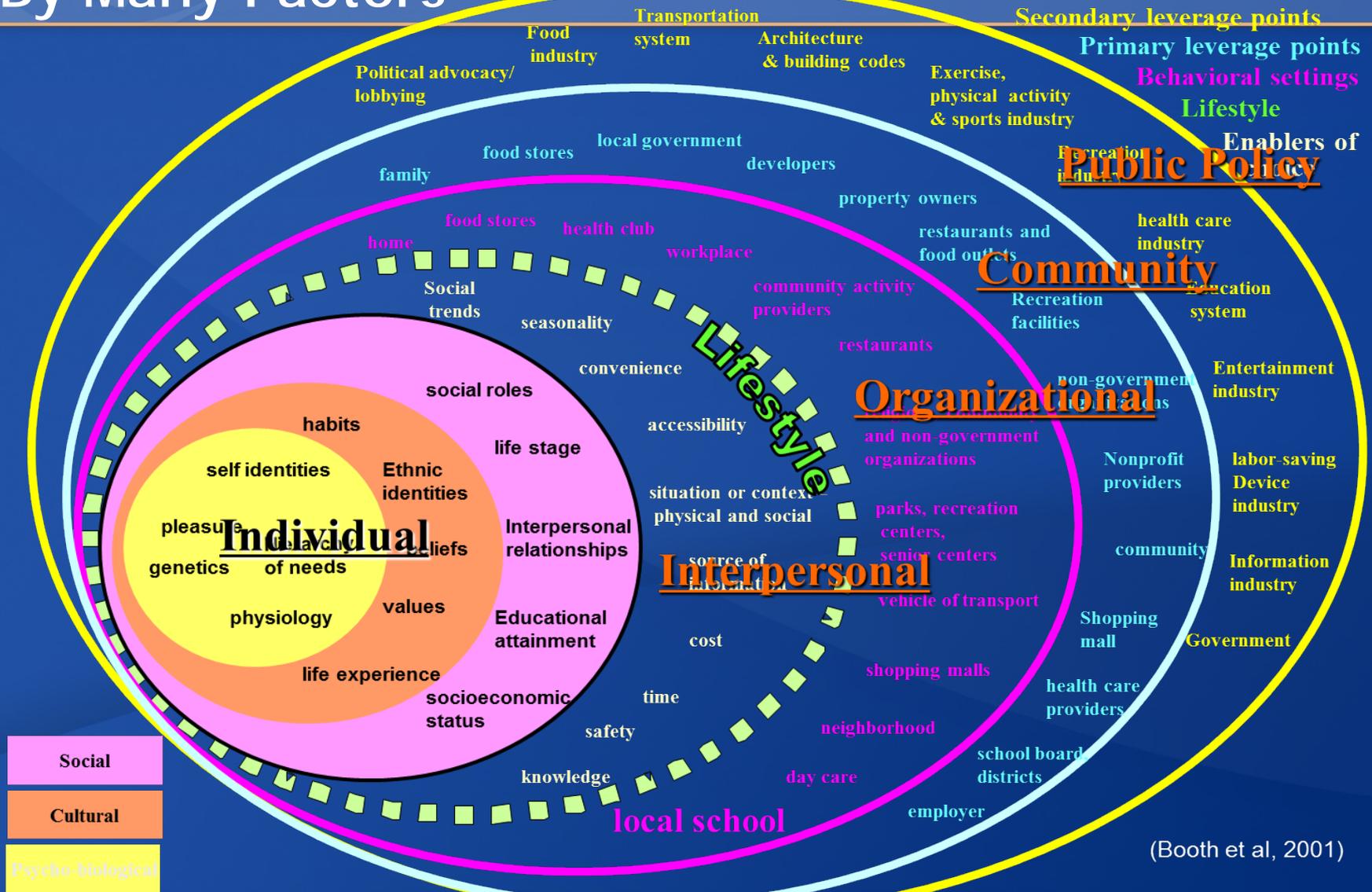
- Many factors interact to contribute to obesogenic environments, and affect children's weight, e.g.,
 - Genetic and other individual factors
 - Home influences
 - School environment
 - Local community
 - Regional, national policy
 - Globalization
 - More ...

IOTF Causal Web of Societal Processes Influencing the Population Prevalence of Obesity



Source: International Obesity Task Force [www.iotf.org] (Kumanyika et al *IJO* 2002;26:425-36)

Physical Activity and Eating Behaviors Are Affected By Many Factors



(Booth et al, 2001)

Childhood Obesity Prevention

- Obesity is difficult to treat, and prevention of childhood obesity is key
- It's been of debate who should play a more important role, e.g., individual/parents vs. society/government
- Leading health organizations have recommended comprehensive interventions to fight obesity, and argue that government should play an important role

How to Prevent Childhood Obesity?

Intervention strategies

Population-oriented

Individually-oriented

**Environmental
and
Policy
Approaches**

Educational,
High Risk
and Clinical
Preventive
Services
Approaches

Treatment

Upstream

Downstream

Source: Daniels SR, et al. Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment. *Circulation*. 2005;11:1999-2012.

U.S. National Initiatives

- *Let's Move!*
- Childhood Obesity Task Force
- HHS Healthy Weight Task Force
- National Action Plan for Physical Activity
- Healthy People 2020
- Dietary Guidelines for Americans 2010
- Communities Putting Prevention to Work (CPPW)
- Child Nutrition Reauthorization – Healthy Hunger-free Kids Act
- Surgeon General's Call to Action on Breastfeeding
- FTC Guidelines for Foods Marketed to Children

(Dietz, 2011.2)

II. Objectives of Our Review/Study

- Assess the effectiveness of childhood obesity prevention programs conducted in high-income countries
- All kinds, in any of the following settings:
 - School
 - Home
 - Primary care clinic
 - Childcare center
 - Community setting
 - Consumer health informatics
 - A combination of the above

Key Questions (KQ) Addressed

- **KQ1.** What is the comparative effectiveness of school-based interventions for the prevention of obesity or overweight in children?
- **KQ2.** What is the comparative effectiveness of home-based interventions for the prevention of obesity or overweight in children?
- **KQ3.** What is the comparative effectiveness of primary care-based interventions for the prevention of obesity or overweight in children?
- **KQ4.** What is the comparative effectiveness of childcare setting-based interventions for the prevention of obesity or overweight in children?
- **KQ5.** What is the comparative effectiveness of community-based or environment-level interventions for the prevention of obesity or overweight in children?
- **KQ6.** What is the comparative effectiveness of consumer health informatics applications for the prevention of obesity or overweight in children?
- **KQ7.** What is the comparative effectiveness of multi-setting interventions for the prevention of obesity or overweight in children?

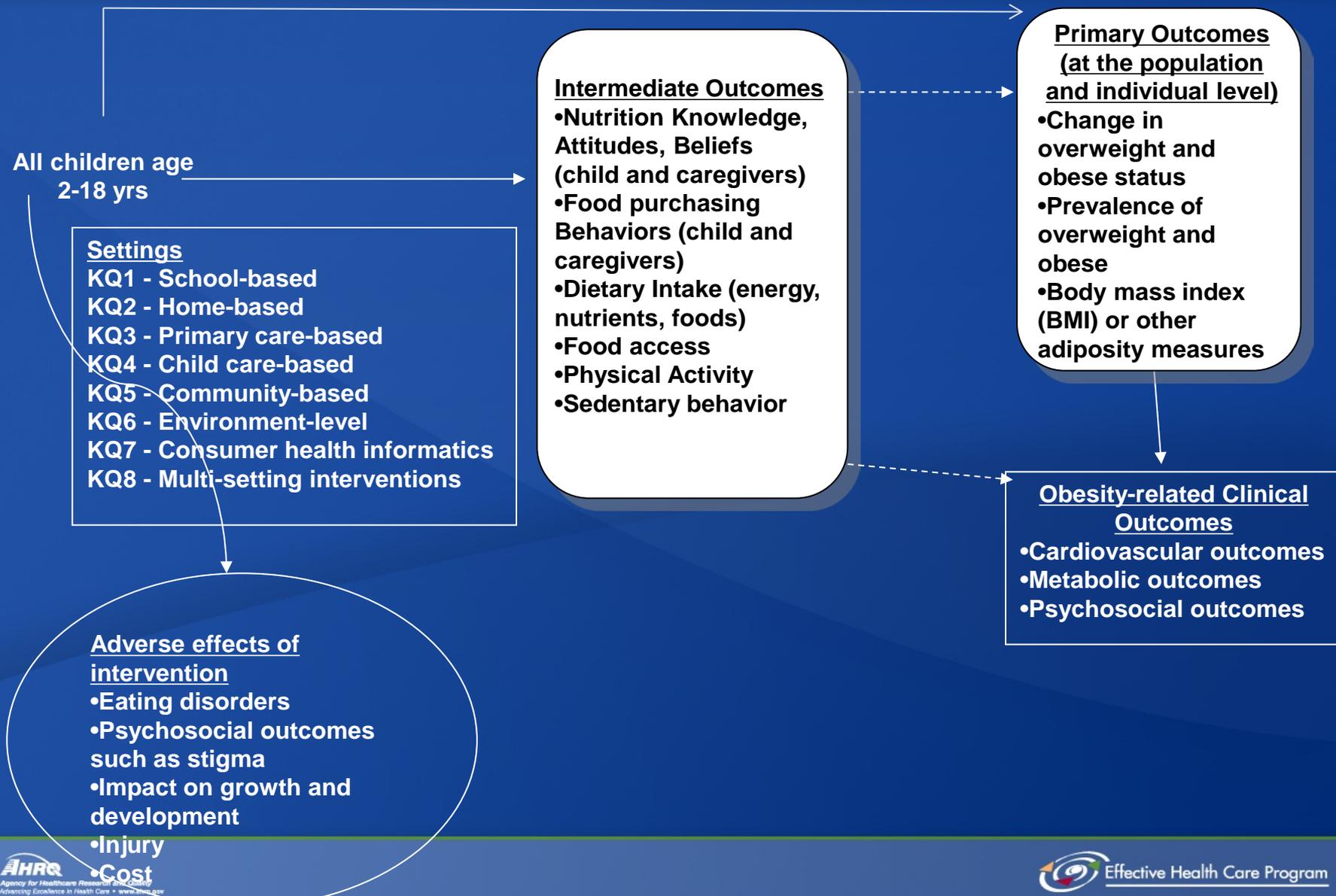
III. Methods

- The study was conducted following the standard process of the AHRQ EHC Program
- A wide range of experts and stakeholders from academic institutions, government agencies, and parent stakeholders provided feedback throughout the study process

Study Process

- Topic (study protocol) refinement
- Literature search & data abstraction
- Data analysis
- AHRQ research report development
- Public review/comment
- Revisions of report
- Publication(s)—report and papers

Figure 1. Analytic framework: Evaluation of Childhood Obesity Intervention Programs



Literature Search

- **Data sources.** We searched MEDLINE[®], Embase[®], PsycInfo[®], CINAHL[®], clinicaltrials.gov, and the Cochrane Library through August 11, 2012.
- Randomized controlled trials, quasi-experimental studies, or natural experiments conducted in high-income countries enrolling healthy children aged 2-18 and following participants for at least one year (or six months for school-based studies) were included.

Data Abstraction

- Two reviewers independently reviewed each article for eligibility. For each study, one reviewer extracted the data and a second reviewer verified the accuracy.
- Both reviewers assessed the risk of bias for each study.
- Together, the reviewers graded the strength of the evidence (SOE) supporting interventions—diet, physical activity, or both—in each setting for the outcomes of interest.

Analysis—Qualitative Analysis

Rate The Strength Of Evidence (SOE)

- SOE was classified into four broad categories:

High	Further research is very unlikely to change the confidence in the estimate of effect.
Moderate	Further research may change the confidence in the estimate of effect and may change the estimate.
Low	Further research is likely to change the confidence in the estimate of effect and is likely to change the estimate.
Insufficient	Evidence either is unavailable or does not permit a conclusion.

Meta-analysis—'Quantitative Analysis'

- When ≥ 3 comparable studies were available for a given intervention and setting(s), we conducted meta-analyses
 - Using STATA (version 11.0; Stata Corp.)
- We used random effect models with the method of DerSimonian and Laird due to heterogeneity among studies
- Outcomes:
 - BMI—report
 - BP
 - blood lipids

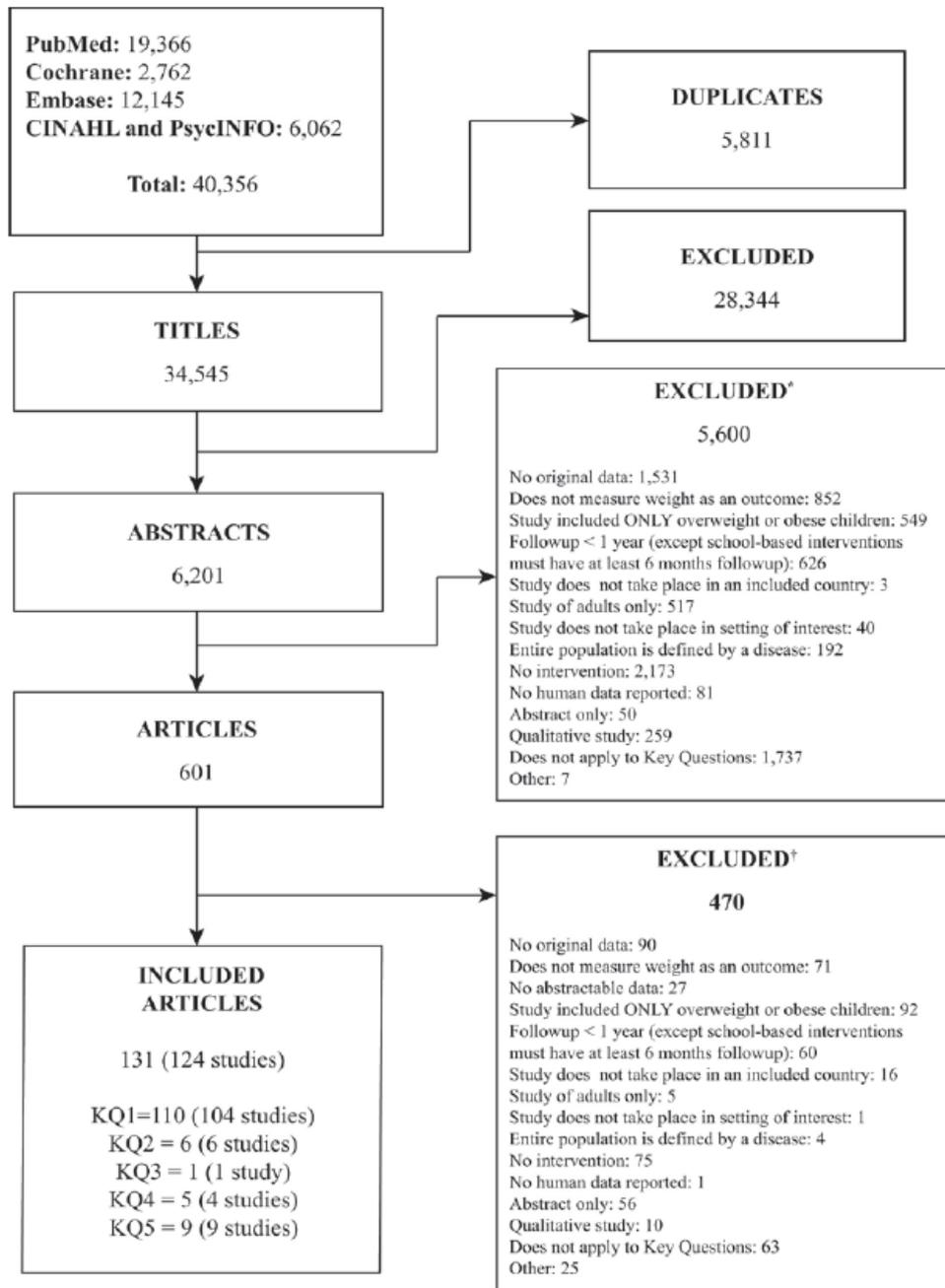
QUESTIONS & ANSWERS



Results

- We identified 34,545 unique citations and included 131 articles describing 124 interventional studies.
- The majority of the interventions (104 studies) were school-based, although many of them included components delivered in other settings.
- Most were conducted in the United States and in the past decade.

Figure 2. Results of the literature search



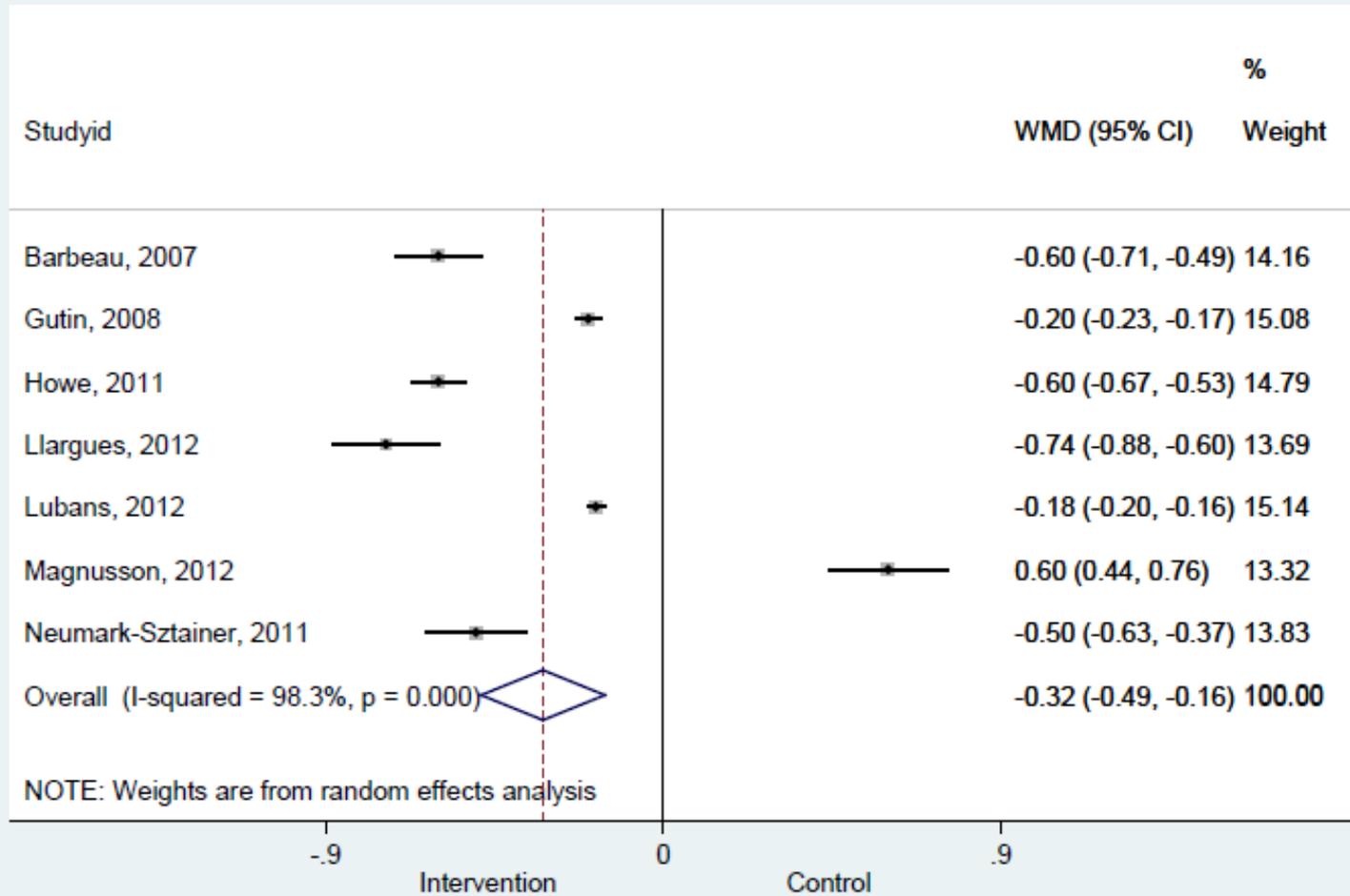
Total: 131 (124 studies)

KQ1 - School-based – 110 (104 stud)
KQ2 - Home-based – 6 (6 studies)

KQ3 - Primary care-based – 1 (1 stud)
KQ4 - Child care-based – 5 (4 stud)
KQ5 - Community- Env – 9 (9 stud)

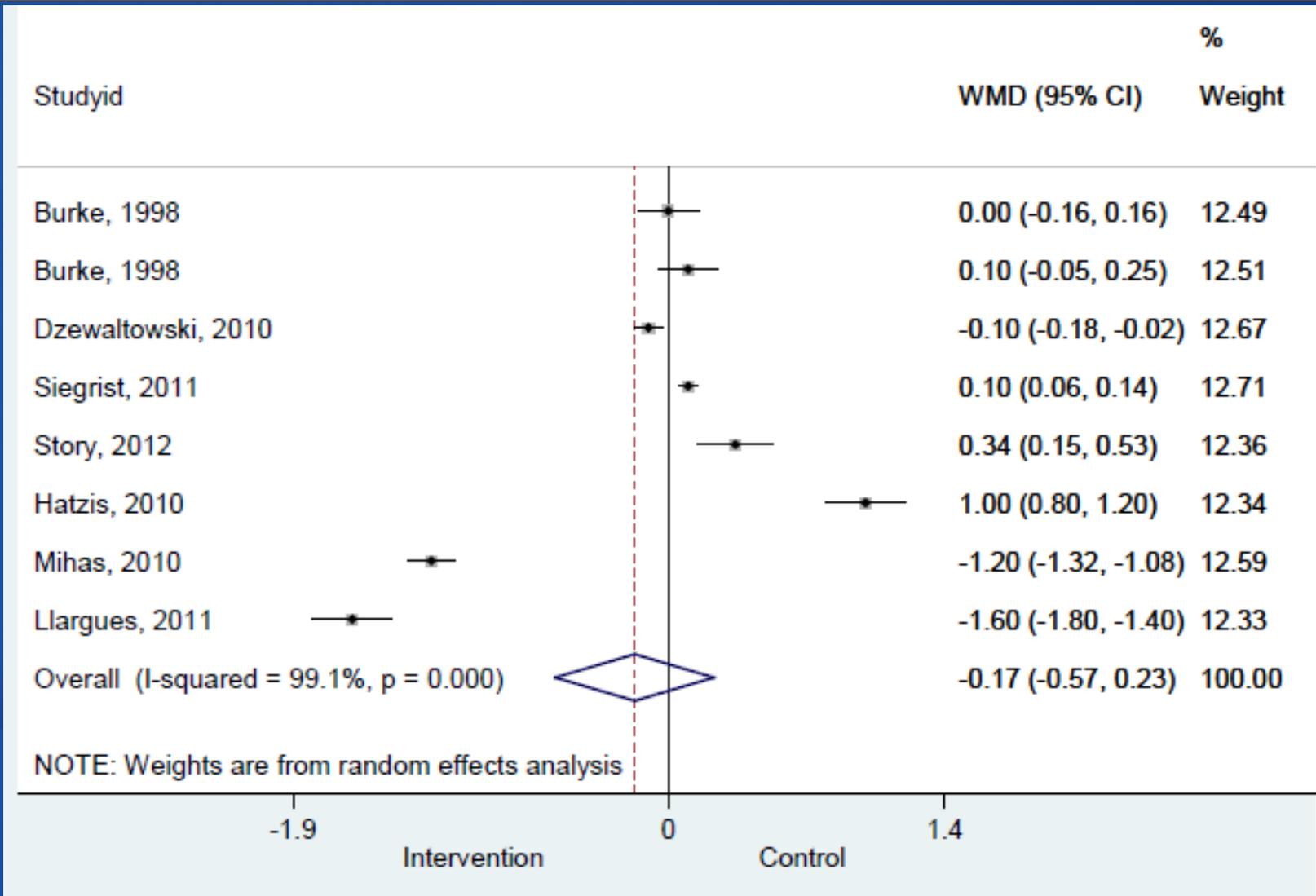
KQ6 - Consumer health informatics
KQ7 - Multi-setting interventions

Figure 3. Meta-analysis: Change in BMI between the control and combined diet and physical activity intervention groups in school-only settings



WMD = weighted mean difference

Figure 4. Meta-analysis: Change in BMI between the control group and combined diet and physical activity interventions in a school setting with a home component



Evidence for the Benefits of School-Based Interventions (1 of 3)

■ School-Based Interventions Only

- School-based diet or physical activity interventions prevent obesity or overweight in children. □

Strength of Evidence: Moderate

- School-based combination diet and physical activity interventions prevent obesity or overweight in children.

Strength of Evidence: Insufficient

■ School-Based Interventions With a Home Component

- Physical activity interventions within school-based settings with a home component prevent obesity or overweight in children.

Strength of Evidence: High

- Combined diet and physical activity interventions in a school-based setting with a home component prevent obesity or overweight in children.

Strength of Evidence: Moderate

School-Based Interventions (2 of 3)

■ School-Based Interventions With a Community Component

- Combined diet and physical activity interventions in a school-based community setting prevent obesity or overweight in children. □

Strength of Evidence: Moderate

■ School-Based Interventions With a Home and Community Component

- Combined diet and physical activity interventions in a school-, home-based community setting prevent obesity or overweight in children. □

Strength of Evidence: High

School-Based Interventions (3 of 3)

- School-Based Interventions With a Consumer Health Informatics Component
 - Evidence is insufficient to determine if physical activity or combined diet and physical activity interventions in a school setting with a consumer health informatics component prevent childhood obesity or overweight. □

Strength of Evidence: Insufficient

Home-Based or Childcare-Based Interventions

■ Home-Based Interventions Only

- Home-based combination (diet and physical activity) interventions prevent obesity or overweight in children.

Strength of Evidence: Low

■ Childcare Center-Based Interventions Only

- Combined diet and physical activity interventions in a childcare center setting showed no beneficial effect on childhood obesity or overweight prevention. □

Strength of Evidence: Low

Community-Based or Primary Care-Based Interventions

■ Community-Based Interventions With a School Component

- Combined diet and physical activity interventions in a community setting with some school involvement prevent childhood obesity or overweight. □

Strength of Evidence: Moderate

■ Primary Care-Based Interventions Only

- Evidence is insufficient to determine if combined diet and physical activity interventions in a primary care setting prevent obesity or overweight in children. □

Strength of Evidence: Insufficient

- This does not mean that interventions do not work in the primary care setting, but more research is needed.

Additional Results—Unpublished

- Effects of the intervention on blood pressure
- Effects of the intervention on blood lipids



Conclusions

- A large number of intervention studies have been conducted, but the majority are school-based, and are in the U.S.
- School-based programs involving dietary or physical activity interventions are effective in preventing childhood obesity.
- Combining a home or community component with a school-based program also works.
- Evidence is limited regarding the effectiveness of interventions in other settings, more research is needed.

Gaps in Knowledge (1 of 2)

- A lack of research on the effectiveness of the following types of obesity interventions:
 - Environment-based and policy-based interventions
 - Interventions tested in the primary care or childcare settings
 - Consumer health informatics interventions

Gaps in Knowledge (2 of 2)

- Lack of good understanding of the contexts and challenges associated with implementing prevention programs in different settings
- A paucity of information on the effects of various interventions in preventing childhood obesity in populations stratified by gender, age, ethnicity, demographic, or socioeconomic status
- System-science guided interventions
- Cost effective analysis

What to Discuss with Your Patients and Their Caregivers (1 of 2)



- The patient's BMI and how to diagnose overweight/obesity in children
- Health consequences of overweight/obesity in children
- The possible factors contributing to obesity in children
 - e.g., Lack of physical activity, sedentary/screen time, unhealthy diet, inappropriate use of food rewards, eating when not hungry, portion size
- The importance of monitoring total daily caloric intake as opposed to total daily food intake
- Important things that can be done at home
- What clinicians are concerned about childhood obesity and care patients

What to Discuss with Your Patients and Their Caregivers (2 of 2)

- Effectiveness of the various prevention programs
- The programs and resources that help children maintain a healthy weight that are available at school or in the community
- What can be done if healthy food or safe locations for physical activity are not easily accessible to patients and their families
- Take actions today (e.g., A B C D...)
 - CLOCC's: *5-4-3-2-1 Go!*



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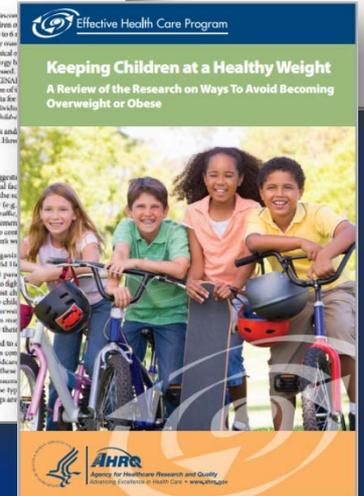
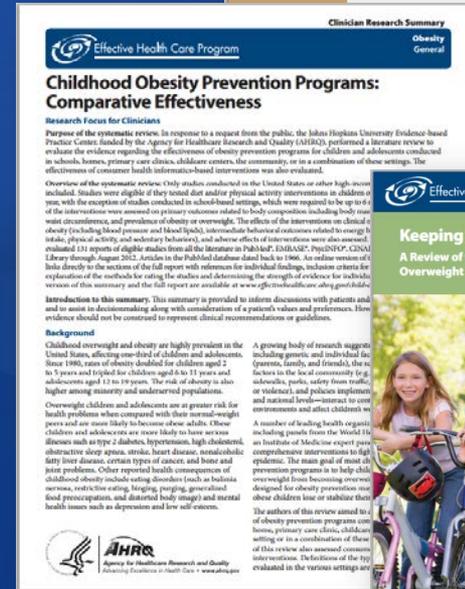
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Resources

- **Original Report:** Wang et al., *Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis*
- **New!**
 - Clinician and Consumer Summaries
 - CME/CE activity, and
 - Slide talk
- All can be found on AHRQ Effective Health Care Program's Website:
<http://www.effectivehealthcare.ahrq.gov>



Childhood Obesity Prevention Programs: Comparative Effectiveness Review and Meta-Analysis



AHRQ's Health Care Innovations Exchange

- The Health Care Innovations Exchange contains more than 800 searchable innovations and 1500 quality tools. Visit us at www.innovations.ahrq.gov.
- Access innovations, tools and resources related to Childhood Obesity at http://innovations.ahrq.gov/innovations_qualitytools.aspx?search=childhood%20obesity.

Questions and Comments?

