

# **Strategic directions in environmental and policy research on physical inactivity and diet for child and adolescent obesity prevention**

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# Strategic Directions for Research

- Dichotomy of environmental and policy approach versus individual behavior change approach
- Contrasting research paradigms:
  - etiologies of disease and risk factors
  - research paradigm versus prevention and health promotion research paradigm
  - Study design
  - Hypotheses and research questions
  - Improving health
- Priority research questions
- A proposed “litmus test”

# **Environmental and policy approach versus individual behavior change approach**

- **A false dichotomy**
  - Different targets of intervention not theory.
  - All depend on individual behavior change.
  - Theories of individual behavior change still apply.
  - “If we build it they will come.”

# Current Research Paradigm (biomedical/reductionist model)

- Identifying etiologies of disease and risk factors
- Identifying environmental and policy correlates of physical activity, sedentary behaviors, energy intake and obesity
- Assumption: must first know the cause before intervening to treat or prevent
- Most comfortable for researchers
- **RESPONSIBLE FOR DELAYING OUR ABILITIES TO PREVENT OBESITY AND IMPROVE POPULATION HEALTH.**
- **HAS LEFT MANY OF THE MOST IMPORTANT AND RELEVANT RESEARCH QUESTIONS UNANSWERED.**
- **WHAT WORKS? WE DON'T KNOW!**

# Alternative Research Paradigm (prevention intervention research model)

- Identifying etiologies of improved health
- Testing the effects of environmental and policy interventions on physical activity, sedentary behaviors, energy intake and obesity
- Assumption: known cause is not required to intervene
- Perceived to be higher risk by researchers
- **SUBTLE CONCEPTUAL SHIFT, BUT SIGNIFICANT IMPLICATIONS FOR GENERATING NEW HYPOTHESES AND STUDY DESIGNS.**
- **EMPHASIZES THE MOST IMPORTANT AND RELEVANT RESEARCH QUESTIONS**
- **DRAMATICALLY SHORTENS THE CYCLE FROM RESEARCH TO REDUCED OBESITY AND IMPROVED POPULATION HEALTH**

# Contrasting research paradigms

<b>Current “Disease &amp; Risk Factors” Paradigm</b>	<b>Alternative “Prevention” Paradigm</b>
Focus on causes of disease and risk factors and who/what to blame (past orientation)	Focus on causes of health - no need to prove causes of disease or to place blame (present and future orientation)
Observational studies limited to demonstrating correlations - incapable of proving causality (ironic)	Experimental and quasi-experimental studies can prove causality
Limited to interventions on identified causes of poor health	Freedom to test creative solutions (stealth interventions)

## **Example: vending machines in schools**

- **Soft drink and snack food industries (and HHS) say not proven to cause obesity.**
- **Correlational studies unable to prove cause so no amount of data will satisfy critics.**
- **Prevention model avoids that hurdle because not limited to causes of obesity.**
- **Experimental study: Will removing vending machines reduce weight gain?**
- **Justification: any intervention that produces a negative change in energy balance will reduce weight gain.**

# Contrasting research paradigms

<b>Current “Disease &amp; Risk Factors” Paradigm</b>	<b>Alternative “Prevention” Paradigm</b>
<b>Measure both “exposure” and outcome. More prone to effects of measurement errors -- at best weakens true relationships, at worst produces spurious relationships (e.g., HRT)</b>	<b>Manipulate “exposure” then measure resulting outcome Less sensitive to error, especially if outcome is objectively measured</b>
<b>Mechanisms: relevance of identified moderators and mediators unknown (may not be in the causal pathway)</b>	<b>Moderators and mediators only meaningful once cause and effect (efficacy) is demonstrated</b>
<b>Even if a strong argument for cause could be made, still no closer to knowing how to implement a solution (e.g., sickle cell)</b>	<b>After an experimental intervention study, you know what works, or what doesn’t work, to improve health</b>



## **Example: television viewing & obesity**

- **Observational studies depend on validity of measures of television viewing.**
- **Associations attenuated or biased by measurement error.**
- **Even an experimental study of proving that increased TV watching causes obesity would not tell us what to do about it (and how).**
- **Alternative prevention research paradigm: RCT of effects of an intervention to reduce TV viewing on weight gain.**

# Contrasting research paradigms: summary

<b>Current “Disease &amp; Risk Factors” Paradigm</b>	<b>Alternative “Prevention” Paradigm</b>
Causes and correlates of disease and risk factors	Solutions (etiologies of health)
Observational (epidemiological) studies (measure exposures)	Experimental and quasi-experimental studies (manipulate exposures)
Places blame (past orientation)	Causes of poor health and blame not needed (future orientation)
Must first know the cause before intervening	Freedom to test creative solutions (stealth interventions)
Moderators/mediators may not be in causal pathway	Moderators and mediators relevant to changes in health
Easier, less expensive, but less potential to improve health (less cost-effective)	More difficult, more expensive, but greater potential to improve health (more cost-effective)

## Low Hanging Fruit Physical Activity

- Do interventions to increase walking to school increase total daily physical activity?
- Do interventions to increase outdoor play/recess increase total daily physical activity?
- Does daily PE increase total daily physical activity?
- Do after school programs increase total daily physical activity?

## **Low Hanging Fruit Sedentary Behaviors**

- Do after school programs reduce screen time?
- Do interventions to remove TV's from children's bedrooms reduce screen time?
- Do interventions to remove TV advertising influence food intake?

## Low Hanging Fruit Energy Intake

- Does removing vending machines reduce total daily energy intake?
- Does substituting water, diet soda and milk for other energy containing beverages reduce total daily energy intake?
- Do interventions to remove a la carte foods from schools reduce total daily energy intake?
- Does increasing water fountains reduce total daily energy intake?

## Low Hanging Fruit Weight Gain

- Do interventions that increase total daily physical activity reduce weight gain?
- Do interventions that reduce screen time reduce weight gain?
- Do interventions that reduce total daily energy intake reduce weight gain?

## A proposed litmus test

- **Clinical medicine:** Do not order a test unless (1) you know what you will conclude from any possible result and (2) the result will change the care of the patient.
- **Prevention research:** Do not perform a study unless (1) you know what you will conclude from any possible result and (2) the result will change how you intervene to address a clinical or public health problem.

## **Example: neighborhood safety, physical activity and obesity**

- **Current model: cross-sectional or prospective observational study of objective or subjective measures of neighborhood safety, physical activity and obesity.**
- **What will you conclude from a null result? What will you conclude from a significant result? Would either result change what you would do?**
- **The prevention paradigm: an experimental study of a neighborhood safety intervention.**



# Where do we go from here?

#1. Prevention Intervention Research

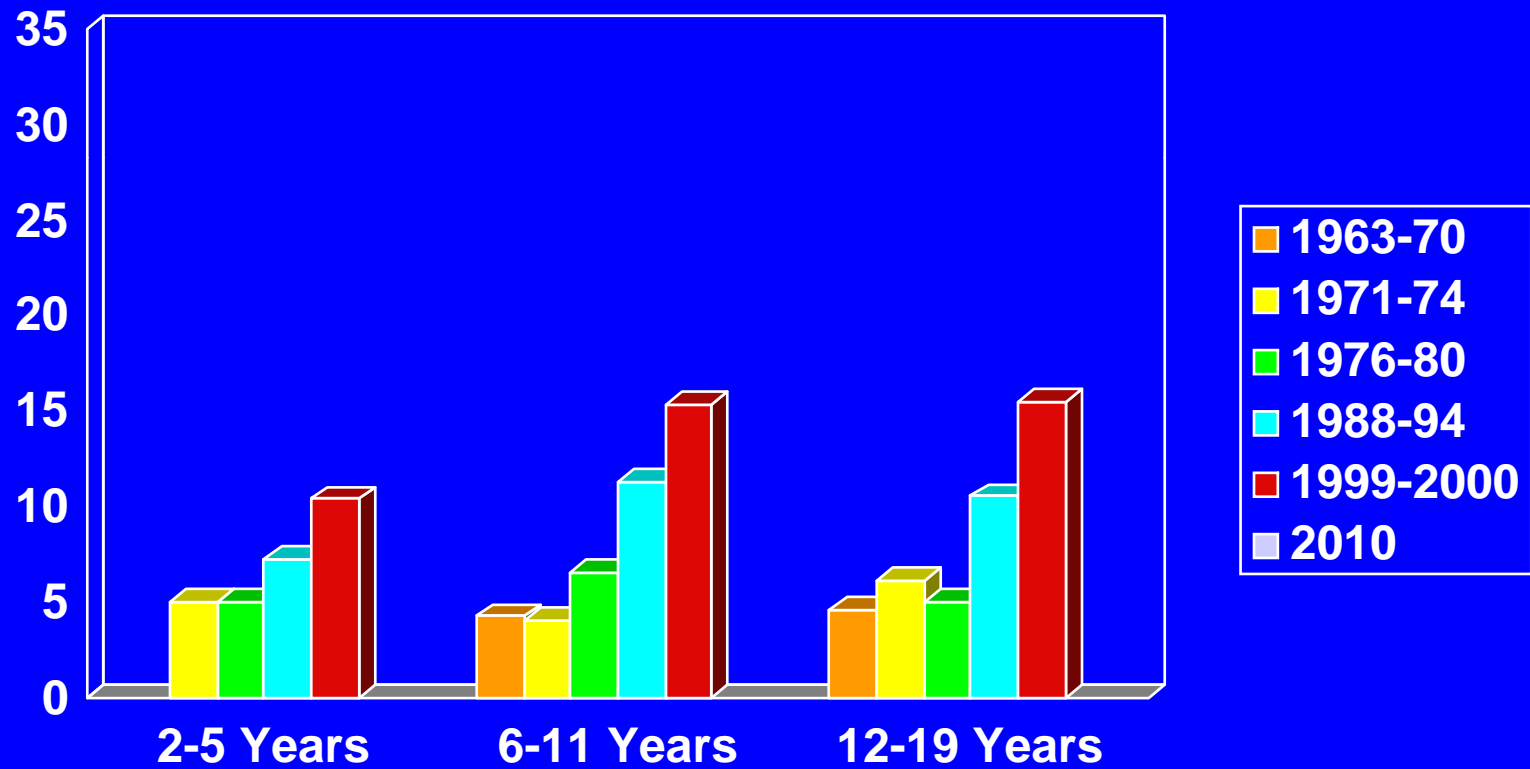
#2. Prevention Intervention Research

#3. Prevention Intervention Research

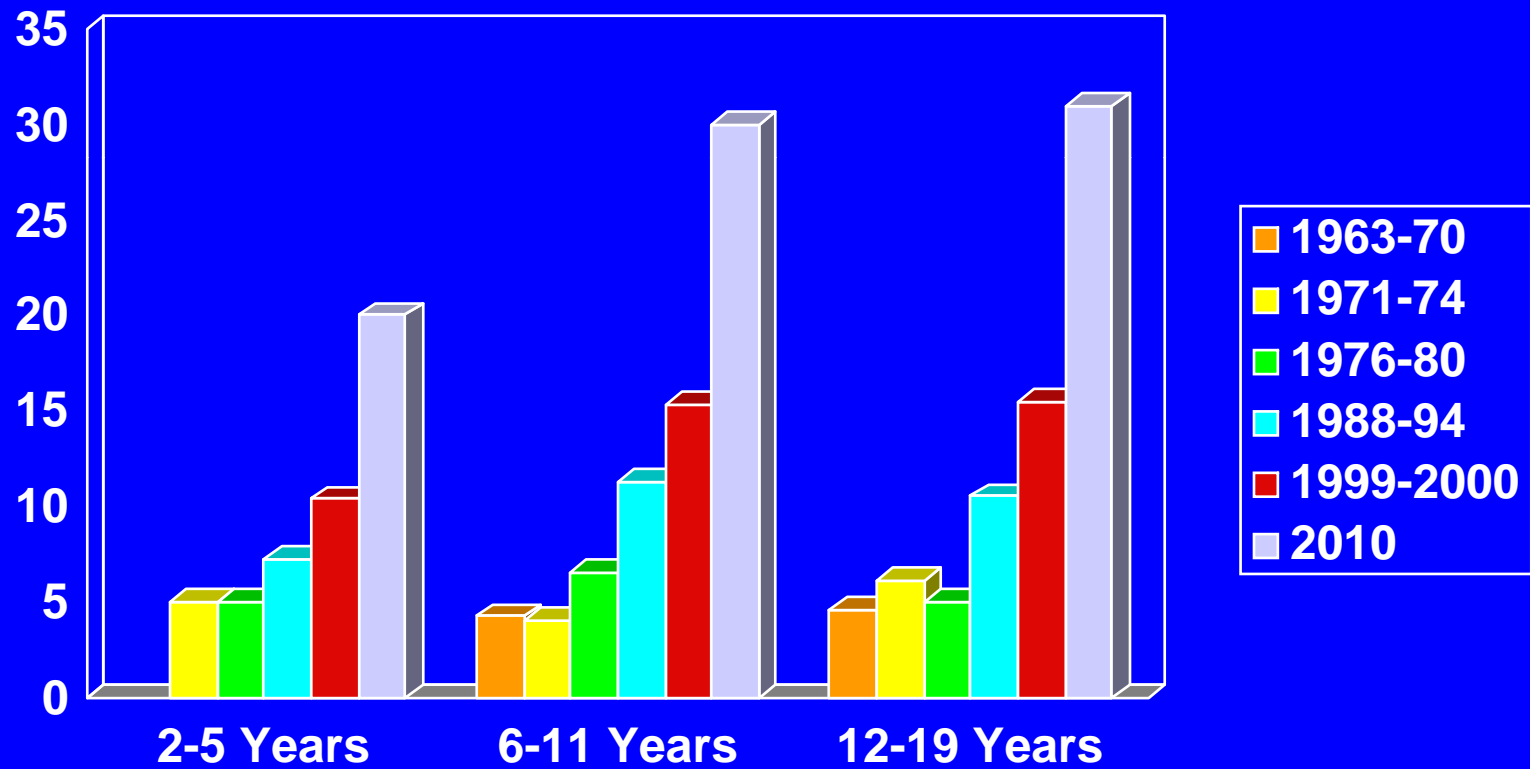
Studying the “causes” of Improved Health and Healthful Behaviors

- **Small-scale experimental “pilot,” “demonstration” and “efficacy” trials to test specific environmental and policy interventions**
- **Large-scale “effectiveness” trials to learn to translate efficacious methods into public health interventions**
- **Stealth (indirect) interventions - where obesity prevention is a “side effect” of the intervention.**

# Childhood Overweight



# Childhood Overweight



# Childhood Overweight

