THE NEXT STEPS IN OBESITY PREVENTION

7th Annual DELL CENTER Lectureship in Child Health
Honoring Guy S Parcel, Ph D
University of Texas School of Public Health Austin Regional Campus
February 28, 2013

Altering Early Life Systems to Support Healthy Parents, Infants and Toddlers

Philip R Nader MD
Professor Emeritus of Pediatrics
University of California, San Diego
Prevention of Obesity and Overweight

**Historical and Current**
- Disease prevention
- Individual behavior change only
- Environmental/Policy change only
- Focus on school-age children and above

**Next Steps**
- Broad population support that increases demand for healthy lifestyles and healthy weight
- Family + Individual behavior change
- Simultaneous behavior change and environmental change interventions
- Focus on adults and young children (pregnancy-toddler ages)
Design and Evaluation of Interventions directed towards unhealthy weight

**Historical and Current**

- Reductionist – testing effectiveness of a single-level intervention in a randomized controlled manner
- Unable to match evaluation and design to complex determinants of outcome

**Next Steps**

- Problem solving in real-life conditions, with multiple interacting systems
- Using knowledge of systems operating in a given community to determine intervention
- Combining CBPR with RCT methods to evaluate community effectiveness
Obesity Prevention: The Next Steps

- 2010 IOM: Called for systems perspective to account for complex, multi-level nature of obesity causation
- 2011 IOM: Need for interventions early in life to prevent obesity
- 2012 IOM: Accelerating Progress: strategy 4-4:”Encourage healthy weight gain during pregnancy, promote breastfeeding”
- A Framework is proposed to test
  - a place-based, systems approach using simultaneously delivered environmental and behavioral change interventions
  - promoting optimal weight in families, mothers (before, during and after pregnancy) and their infants and toddlers.
Objectives

- Review evidence from basic science, prevention, public health, epidemiology, and clinical experience supporting intervention at the earliest life stages.
- Provide a framework to address systems impacting the complex causes of obesity.
- Feedback and discussion on how research can impact the family, primary health care, public health, and community to prove the concept and safety of intervention at the earliest life stages.
The incidence of childhood obesity:

The good news: First indications that we may be reaching a turn-around in the 30 year escalation from 10% to 30%, even in some high risk urban populations

The bad news: Evidence of increasing health disparities, with greater improvements noted among higher income communities

NYTIMES DEC 2012
1. During pregnancy and before
2. In early childhood – infancy and toddlers
3. During school-age, just before adolescence
4. During adolescence
Understand the Snowball Effect At Work

Accumulating factors affect child obesity

- Prenatal factors
- Infant factors
- Toddler factors
- School age factors
- Teen factors

Snowball drawing modified from www.sobriquetmagazine.com/2009_04_01_archive.html
Half of all overweight children in a clinical population were overweight by what age?

1. Age 3
2. Age 5
3. Age 7
4. Age 9
How many extra pounds makes an average-height 3 year old girl “overweight”? “Obese”?

1. 2 lbs, 4 lbs
2. 4 lbs, 6 lbs
3. 6 lbs, 8 lbs
4. 8 lbs, 10 lbs
Weight gain in infancy and preschool (the snowball effect)

- Half of all overweight children were overweight by age 3
- How many extra pounds makes you overweight at age 3?
- 5-fold increase in risk of overweight at age 11 among preschool aged children who were overweight only once compared to age-mates who were not overweight
- Rapid weight gain in first year of life predicts later childhood obesity
- Study of nutrition in infants reveals many “empty calorie” foods consumed as young as age one year
- Parents as role models and environmental control
- Reducing screen time in preschool children holds promise
Significant inter-stage events include: 1. Intrauterine Programming; 2. Breastfeeding, early food exposure, attachment stage; 3. Early childhood growth, childcare, habit formation; 4. Brain maturation, self-management, puberty, health behavior change, increased salience of peer effects and school effects; 5. Independence, increasing life stress; 6. Pre-conception health, parental health status, prenatal care
The Evidence

- Pregnancy and before
  - Parental long term overweight strongest single predictor of childhood obesity (Jaaskelainen et al Int J Obes. 2010)
  - Excessive gestational weight gain is an independent risk factor for obesity in the child (Oken et al Obstet Gynecol. 2008)
Pre-pregnancy maternal weight

- Maternal pre-pregnancy obesity increases risk of child obesity at 2-4 years by ~40% (controlling for other factors)
- Maternal obesity in 1st trimester raises risk of obesity in 2-4 year olds by ≥2X (controlling for other factors)
- For mothers with 2 pregnancies in 8 years
  - Overwt & obese moms ~2x as likely to have LGA babes
  - When overwt changed from preg 1 to 2
    - More overwt in preg 2: more likely to have LGA baby
    - Less overwt in preg 2: less likely to have LGA baby

Pregnancy weight gain

- More maternal wt gain, higher child BMI
- Mothers with adequate or excessive wt gain: 4X more likely to have overwt children at 3 years of age than those with inadequate wt gain
- IOM guidelines for wt gain

Oken et al 2007
Figure 1. Predicted prevalence of adolescent overweight and obesity by race-ethnicity and whether the mother initiated prenatal care in first trimester.

Pregnancy glucose tolerance

- Gestational Diabetes Mellitus (GDM) raises risk for high birth weight (LGA)
  - LGA babies and babies of mother with GDM are at high risk for childhood obesity
- Maternal obesity raises the risk of GDM
  - Overweight: 2X; Obese 3.5X; Very obese 8.5X

Breastfeeding

• The effect is consistent, significant, modest
  • Across multiple studies, breastfeeding reduces risk of obesity in children/adolescents by ~25%
    • Some studies find more, or don’t find an association
  • Each month of breastfeeding reduces risk by 4%

Koletzko et al 2009
## Duration of breastfeeding

<table>
<thead>
<tr>
<th>Breast Feeding in 9357 German Children</th>
<th>Obese* At Age 5y in 1997 (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>5.6</td>
</tr>
<tr>
<td>&lt; 2 months</td>
<td>4.8</td>
</tr>
<tr>
<td>3-5 months</td>
<td>2.9</td>
</tr>
<tr>
<td>6-12 months</td>
<td>2.1</td>
</tr>
<tr>
<td>&gt; 12 months</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* 97th %ile BMI  
Von Kries et al BMJ 1999; also see Taveras et al 2006
Next Steps in Obesity Prevention

- In Summary, current evidence supports increased emphasis on:
  - Optimal pre-conceptual weight
  - Avoiding excessive gestational weight gain
  - Returning towards a healthy post-partum weight
  - Breastfeeding promotion
  - Monitoring infant growth for rapid weight gain
  - Promotion of healthy weaning foods
  - Limiting screen time
  - Policies for healthy food and activity in child care
HEALTHY START BEHAVIORAL GOALS

• Pregnancy
  • Engage in early pre-natal, post-natal, and inter-conceptual care
  • Achieve healthy gestational weight gain
  • Post-partum return towards a healthy weight
  • Prepare to breast feed
Healthy Start Behavioral Goals

• **Infancy**
  • Initiate and maintain breast feeding
  • Appropriate introduction of other beverages and foods
  • Support for healthy sleep patterns
  • Support for appropriate soothing, not always using food
  • Support for motor development
  • Avoid rapid, excessive weight gain in infancy
  • Avoid screen time
Healthy Start Behavioral Goals

- **Toddler Years**
  - Active Play at least one hour per day
  - Limitation of screen time
  - Consumption of healthy foods, snacks, and un-sweetened beverages in appropriate portion sizes
  - Healthy nutrition and activity standards in childcare settings
**POLICY, PROFESSIONAL, COMMUNITY EDUCATION TARGETS**

In addition to policies and built environments supporting safety, walkability, access to healthy foods and water, and active transportation

<table>
<thead>
<tr>
<th>POLICY, PROFESSIONAL, COMMUNITY EDUCATION TARGETS</th>
<th>Pregnancy</th>
<th>Infancy</th>
<th>Toddler</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POLICY</strong></td>
<td>• Baby friendly policies in prenatal care and birthing institutions</td>
<td>• Work site and service site lactation support policies</td>
<td>• Day care food and activity policies and certification</td>
</tr>
<tr>
<td></td>
<td>• Incorporate most recent IOM/ACOG guidelines in local prenatal care</td>
<td>• Monitor infant growth with appropriate infant nutrition recommendations</td>
<td>• Creation of children’s zones to encourage healthy behaviors</td>
</tr>
<tr>
<td></td>
<td>• Consistent health recommendations regarding breast feeding and infant nutrition from prenatal and post-natal health providers</td>
<td>• Provider encouragement and reinforcement of family activity behavior and home environment change, parenting, sleeping and infant soothing techniques other than feeding</td>
<td>• Day care and health provider encouragement and reinforcement of family health behavior changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
</tr>
<tr>
<td></td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider encouragement of daily activity/play time</td>
</tr>
<tr>
<td></td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for healthy day care environments</td>
</tr>
<tr>
<td><strong>PROFESSIONAL</strong></td>
<td>• Community support systems for timely prenatal care and breast feeding preparation</td>
<td>• Same current health messages from all infant care providers</td>
<td>• Community support systems support ability of families with infants to achieve a healthy home environment</td>
</tr>
<tr>
<td></td>
<td>• Community support for and awareness of maintaining a healthy maternal weight before, during, and after pregnancy</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Same current health messages from all infant care providers</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Day care encouragement and modeling of changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
</tr>
<tr>
<td></td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Community systems support ability of families with infants to achieve a healthy home environment</td>
<td>• Community systems support ability of families with infants to achieve a healthy home environment</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Day care encouragement and modeling of changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
</tbody>
</table>

**POLICY, PROFESSIONAL, COMMUNITY EDUCATION TARGETS**

In addition to policies and built environments supporting safety, walkability, access to healthy foods and water, and active transportation

<table>
<thead>
<tr>
<th>POLICY, PROFESSIONAL, COMMUNITY EDUCATION TARGETS</th>
<th>Pregnancy</th>
<th>Infancy</th>
<th>Toddler</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POLICY</strong></td>
<td>• Baby friendly policies in prenatal care and birthing institutions</td>
<td>• Work site and service site lactation support policies</td>
<td>• Day care food and activity policies and certification</td>
</tr>
<tr>
<td></td>
<td>• Incorporate most recent IOM/ACOG guidelines in local prenatal care</td>
<td>• Monitor infant growth with appropriate infant nutrition recommendations</td>
<td>• Creation of children’s zones to encourage healthy behaviors</td>
</tr>
<tr>
<td></td>
<td>• Consistent health recommendations regarding breast feeding and infant nutrition from prenatal and post-natal health providers</td>
<td>• Provider encouragement and reinforcement of family activity behavior and home environment change, parenting, sleeping and infant soothing techniques other than feeding</td>
<td>• Day care and health provider encouragement and reinforcement of family health behavior changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
</tr>
<tr>
<td></td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider encouragement of daily activity/play time</td>
</tr>
<tr>
<td></td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for work site lactation support</td>
<td>• Provider advocacy for healthy day care environments</td>
</tr>
<tr>
<td><strong>PROFESSIONAL</strong></td>
<td>• Community support systems for timely prenatal care and breast feeding preparation</td>
<td>• Same current health messages from all infant care providers</td>
<td>• Community support systems support ability of families with infants to achieve a healthy home environment</td>
</tr>
<tr>
<td></td>
<td>• Community support for and awareness of maintaining a healthy maternal weight before, during, and after pregnancy</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Same current health messages from all infant care providers</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Day care encouragement and modeling of changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
</tr>
<tr>
<td></td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• WIC support and incentives to continue breast feeding</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Community systems support ability of families with infants to achieve a healthy home environment</td>
<td>• Community systems support ability of families with infants to achieve a healthy home environment</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
<tr>
<td></td>
<td>• Day care encouragement and modeling of changes in food and snack choices, sweetened foods and beverages, portion size and screen time</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
<td>• Family and community resource centers reinforce same targeted health behaviors</td>
</tr>
</tbody>
</table>
A Systems Approach

- Explicitly designs intervention strategies to focus on interactions and connections between different sectors in a community, and between the individuals and their environment in that community.
- Accounts for the context and characteristics of a community in designing interventions and in order to see the whole picture so that intended and unintended consequences of intervention strategies can be immediately recognized and strategies altered if required.
- Includes community and multidisciplinary experts to oversee and propose interactions among systems and sectors, and to assure that feasible interventions result in sustainable changes made with ongoing adoption of new ones; can be brought to scale to impact many settings; and reach across cultural and language population sub-groups.
A Systems Framework of Childhood Obesity with Feedbacks between Individuals and the Environment

Local, State, and National Policies

1. Physical Environment Support
   - Design of Childcare Centers & Schools
   - Food Access
   - Regional & Urban Planning

2. Social Environment Support
   - Peer & Family Networks
   - Institutional Norms
   - Culture

3. Individual Agents of Change
   - Primary Care Advocacy

4. Family Practices

5. Health Care System Prevention & Treatment
   - Nader et al., Child Obes, 2012
Policies related to urban planning, housing, transportation, parks & recreation, food availability, access, financing & marketing, and education.
Policies on media and information, housing (e.g. segregation), industry practices, labor, individual incentives (tax, insurance, etc.).
A Systems Framework of Childhood Obesity with Feedbacks between Local, State, and National Policies and the Environment

Policies on health care infrastructure, financing, delivery mode.

Physical Environment Support
- Design of Childcare Centers & Schools
- Food Access
- Regional & Urban Planning

Social Environment Support
- Peer & Family Networks
- Institutional Norms
- Culture

Individual Agents of Change
- Primary Care Advocacy

Family Practices

Individual Behavior

Health Care System
Prevention & Treatment
Interplay between social and physical environment.
Social and physical environments enable and/or constrain family & individual behavior. Individuals also shape their environment.
A Systems Framework of Childhood Obesity with Feedbacks between Individuals and the Environment

Local, State, and National Policies

Physical Environment Support
- Design of Childcare Centers & Schools
- Food Access
- Regional & Urban Planning

Social Environment Support
- Peer & Family Networks
- Institutional Norms
- Culture

Individual Agents of Change
- Preventive & curative services to families and individuals.
- Primary Care Advocacy

Family Practices

Individual Behavior

Health Care System Prevention & Treatment
Health care providers and practices as advocates of social & environmental changes to promote healthy lifestyles.
Individual empowerment and community mobilization to effect policy change.
Key Components of Next Steps

- Behavioral and policy interventions are enjoyable, easily understood, culturally compatible, and vetted by community participants, delivered by trusted family health advocates, supported by health care providers
- Begins with public awareness of same health messages from pre and postnatal care providers
- Motivational rather than informational dialog with families
- Include goal setting and monitoring, problem solving of personal and environmental barriers encountered, relapse prevention, and maintenance of changes
- Build in social, neighborhood, health care and other institutional supports
- Mechanisms to sustain, scale up and reach subsets of the community built in from the start
- Build in evaluation mechanisms to assess ultimate and intermediate outcomes, and to account for changes in expert guidance over time