

# Catalyzing Communities to Reduce Obesity

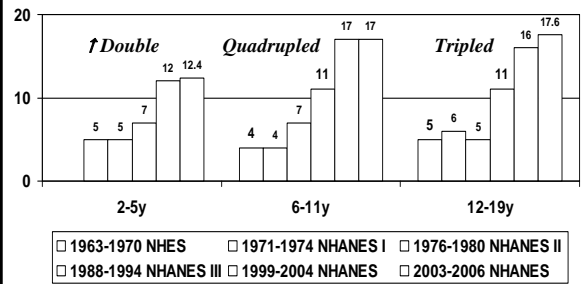
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November 24, 2008

Gerald J. and Dorothy R.  
 Friedman School of  
 Nutrition Science and Policy

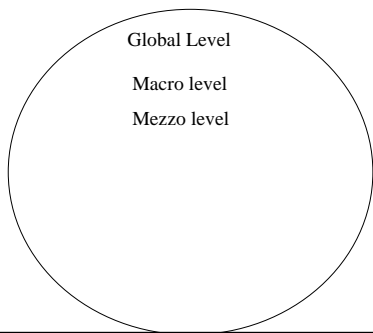


## U.S. Childhood Obesity National Trends



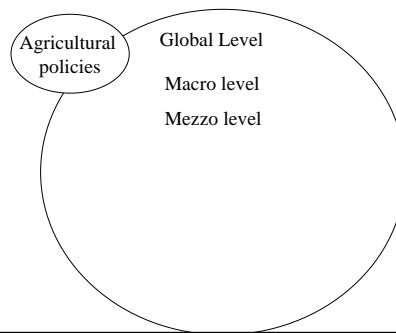
## Ecological Systems Model

All systems that influence human behavior must contribute and change to influence future obesity rates



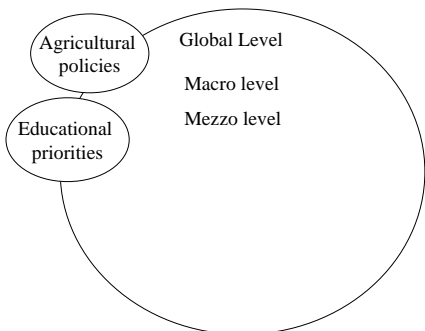
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## Ecological Systems Model

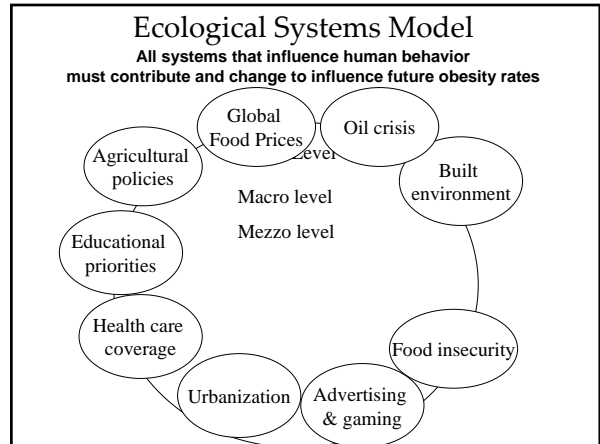
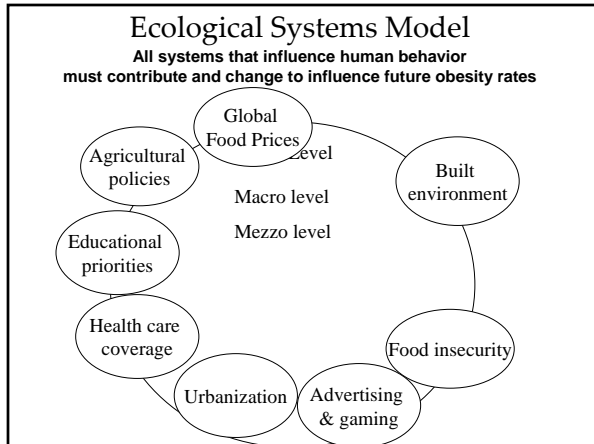
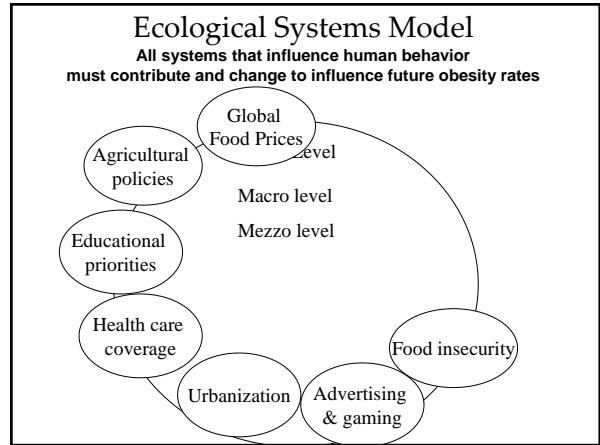
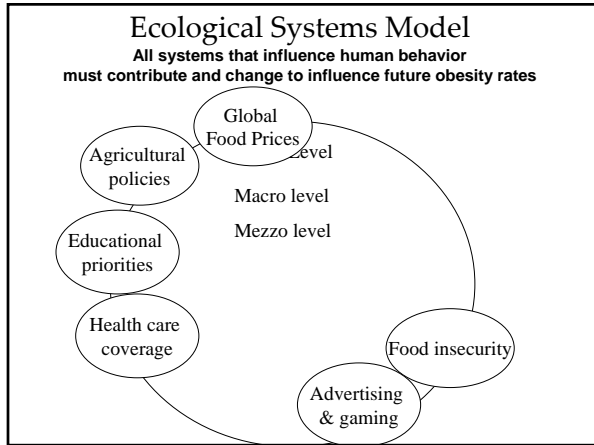
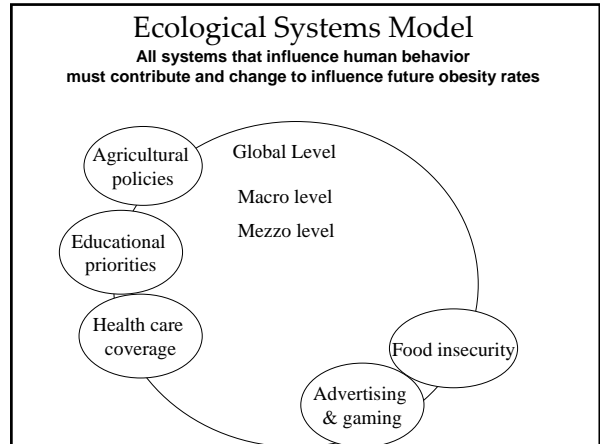
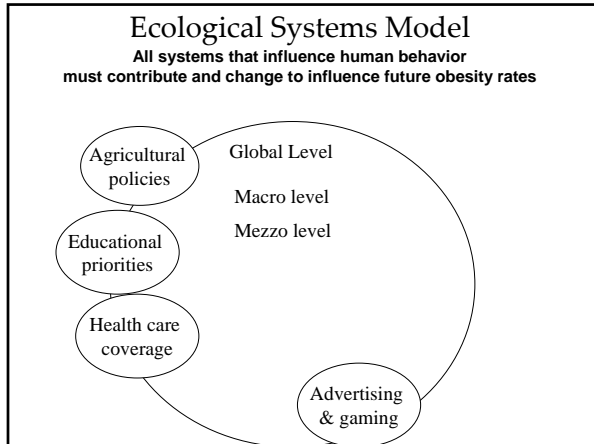
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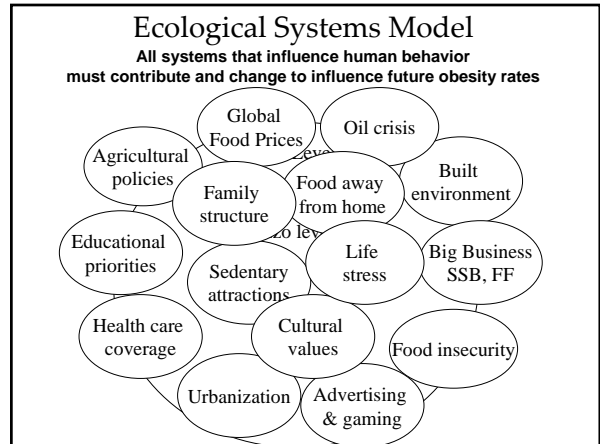
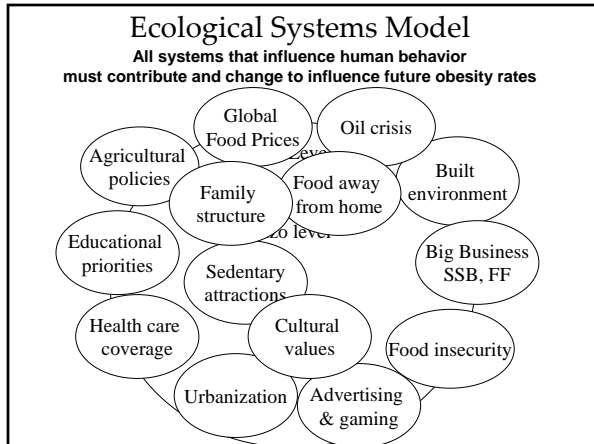
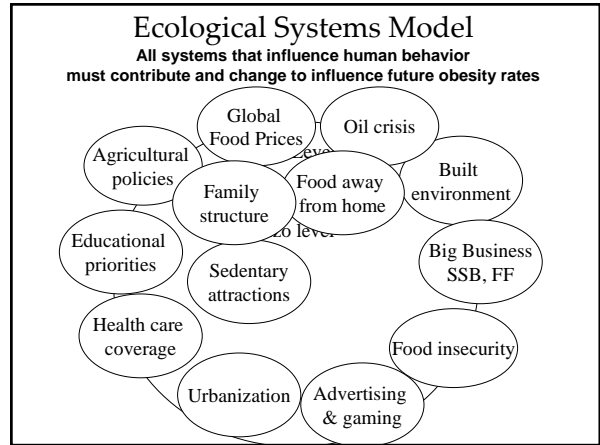
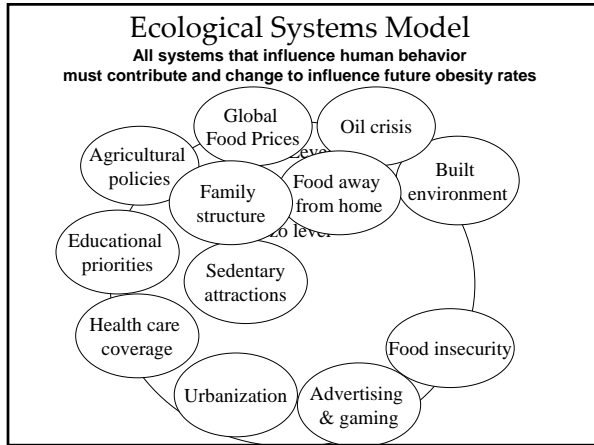
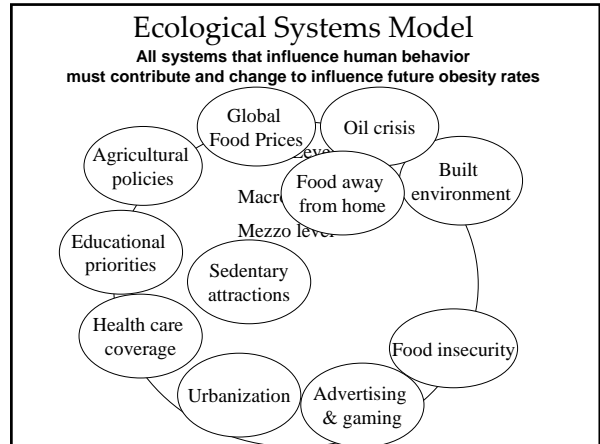
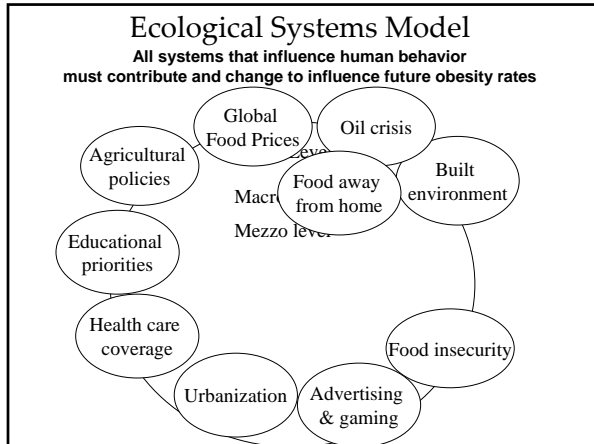


## Ecological Systems Model

All systems that influence human behavior must contribute and change to influence future obesity rates







## BACKGROUND

- Proactive strategies required to prevent childhood obesity
- Individual behaviors must be addressed in the context of societal and environmental influences
- Most prevention studies target school environments
- Learn from other movements (tobacco, recycling, seat belts, breastfeeding) to spark social change
  - Economos, C, et al. What Lessons Have Been Learned From Other Attempts To Guide Social Change? *Nutrition Reviews* 2001; 59(3):40-56
- Community-based interventions that have a theoretical framework and are multi-level and participatory in nature are needed: SUS, Be Active Eat Well, EPODE
  - Huang TT and Glass TA. Transforming research strategies for understanding and preventing obesity. *JAMA*. 2008 Oct 15;300(15):1811-3

## What can we do?

### Work in Communities

*There's strength in numbers!*



Source: Institute of Medicine, Preventing Childhood Obesity: Health in the Balance, 2005

## Shape Up Somerville: Eat Smart. Play Hard.



- A community-based, participatory, environmental approach to prevent childhood obesity
- A 3 year controlled trial to study 1st – 3rd grade culturally and ethnically diverse children and their parents from 3 cities outside Boston
- Goals:
  - To examine the effectiveness of the model on the prevention of undesirable weight gain in children
  - Transform a community and inform social change at the national level

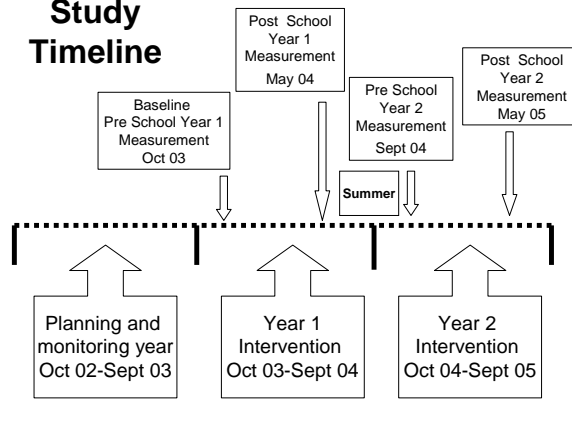
R06/CCR121519-01 from the Centers for Disease Control and Prevention. Additional support by Blue Cross Blue Shield of Massachusetts, United Way of Mass Bay, The US Potato Board, Storeyfield Farm, and Dole Foods

## CBPR

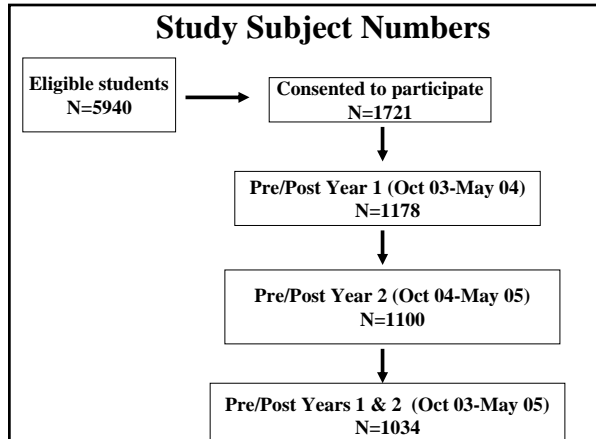
- Community-based participatory research (CBPR) includes a collaborative partnership with the community in all phases of the research:
  - identifying the problem
  - designing, implementing and evaluating the intervention
  - building community capacity
  - identifying how data informs actions to improve health within the community

**Potential to influence cultural and social norms**

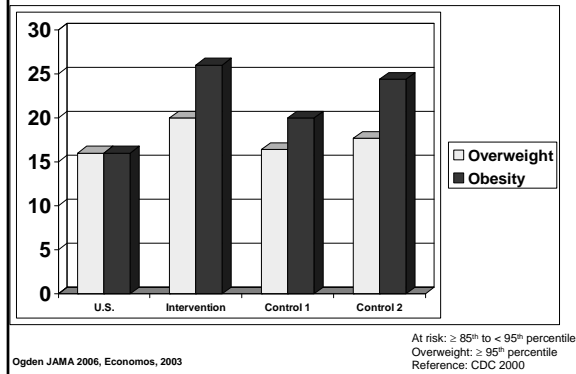
## Study Timeline



## Study Subject Numbers

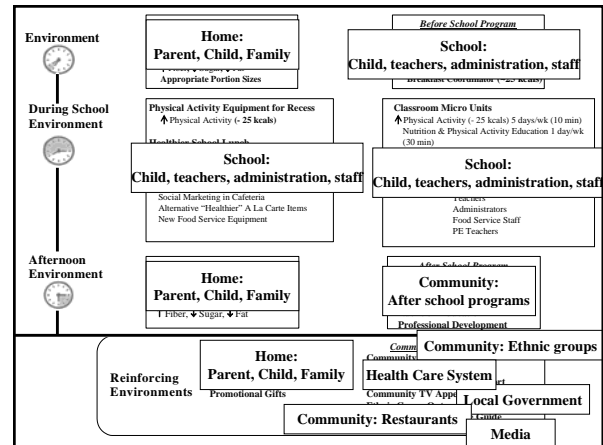
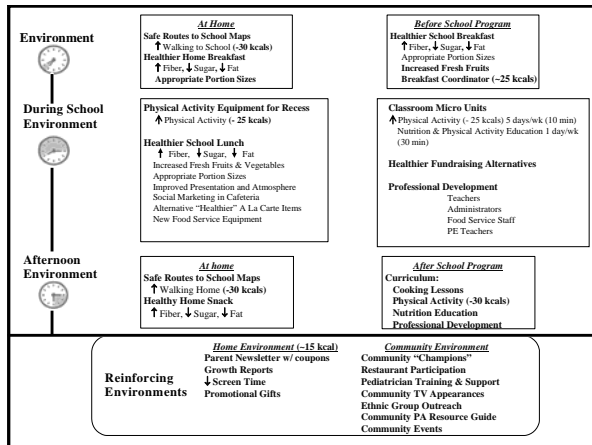


## Baseline Overweight/Obesity



## INTERVENTION

- Designed to increase energy expenditure (EE) of up to 125 kcals per day beyond the increases in EE and energy intake that accompany growth
  - Variety of increased opportunities for physical activity
  - $< 2$  hr. per day of Screen Time, No TV in bedroom
  - Increased availability of foods of lower energy density, emphasizing fruits, vegetables, whole grains, and low-fat dairy
  - Foods high in fat and sugar were discouraged
  - Family Meals encouraged – structure, modeling, education, emotional connection: practice as often as possible
- Multi-level approach:
  - Before, during, after school, home, community



## Skills Development



## Experiential Learning



## Demonstrations



## A La Carte Options: Before Shape Up....



## After...Improved A La Carte Options



## HEAT Club: After School Program



## Before school : *Walking School Bus*



## Support from Community Champions



### Visible role models

- Mayor Joe Curtatone
- Aldermen
- School Committee Members

**Growing food, knowing food**  
**School Gardens and Nutrition Education**



**SUS Approved Restaurants**



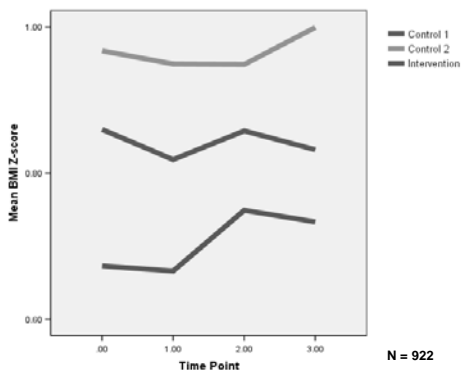
**Shape Up Somerville : Results**

- Engaged **90** teachers in 100% of 1-3 grade classrooms (N=81)
- Participated in or conducted **100** community events and **4** parent forums
- Trained **50** medical professionals
- Recruited **21** restaurants
- Reached **811** families through 9 parent newsletters, and **353** community partners through 6 community newsletters
- Reached over **20,000** through a monthly media piece (11 months)
- Recruited all **14** after-school programs
- Developed community-wide policies to promote and sustain change

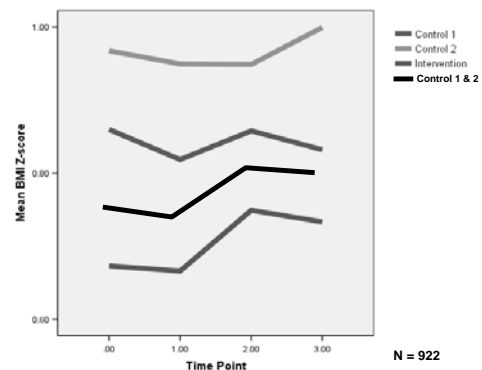
**City Wide Policy Changes**

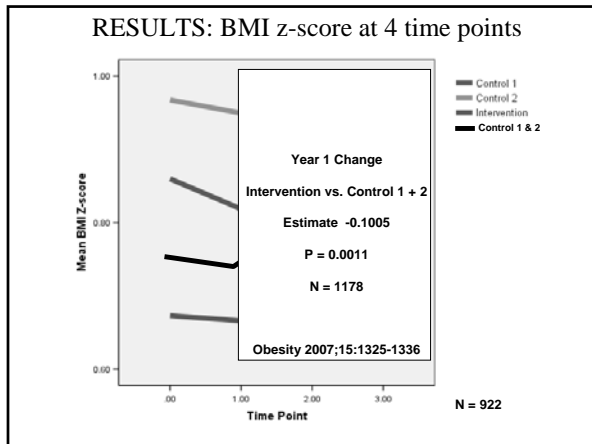
- **School Department**
- **Food Service Department**
- **Classroom Curriculum**
- **Walkability**
- **Research**
- **City Employee Wellness**
- 

**RESULTS: BMI z-score at 4 time points**



**RESULTS: BMI z-score at 4 time points**





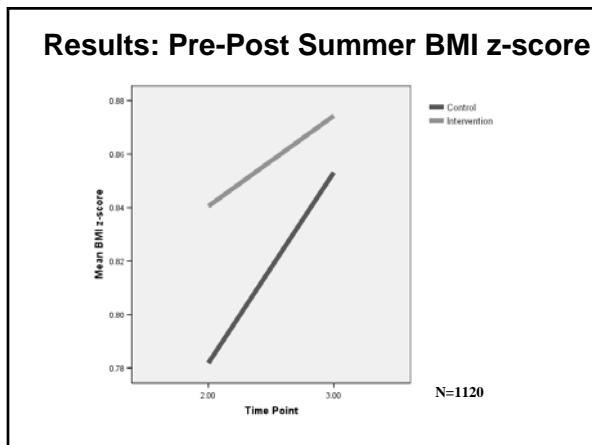
### First Year Results

Table 7. Estimated intervention effect over 8 months on a child at the 75th percentile BMI z-score

|                              | Boys               |   |                                      | Girls              |   |                                      |
|------------------------------|--------------------|---|--------------------------------------|--------------------|---|--------------------------------------|
|                              | Baseline (8 years) | Without intervention (8 years 8 months) | With intervention (8 years 8 months) | Baseline (8 years) | Without intervention (8 years 8 months) | With intervention (8 years 8 months) |
| Height (inches) <sup>†</sup> | 50.35              | 51.85                                   | 51.85                                | 50.23              | 51.66                                   | 51.66                                |
| BMI <sup>†</sup>             | 17.00              | 17.40                                   | 17.17                                | 17.27              | 17.70                                   | 17.45                                |
| Weight (lbs) <sup>‡</sup>    | 61.43              | 66.50                                   | 65.68                                | 61.97              | 67.18                                   | 66.24                                |
| BMI z-score <sup>†</sup>     | 0.68               | 0.68                                    | 0.58                                 | 0.68               | 0.88                                    | 0.58                                 |
| BMI z-score change           | 0.00               | -0.09                                   | -0.09                                | 0.00               | -0.09                                   | -0.09                                |
| Weight change (lbs)          | 5.07               | -0.25                                   | -0.25                                | 5.21               | -4.26                                   | -4.26                                |
| Intervention effect (lb)     |                    | -0.82                                   |                                      |                    | -0.05                                   |                                      |

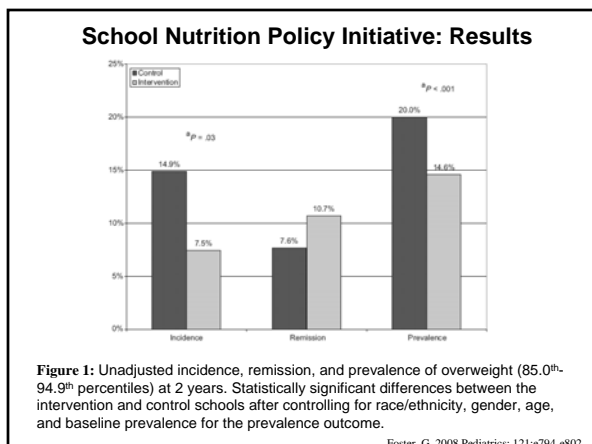
<sup>†</sup> Height is 50th percentile at each age, baseline, and without intervention.  
<sup>‡</sup> BMI and BMI z-score are 75th percentile.  
<sup>‡</sup> Weight at baseline is calculated from baseline BMI and height (44,47.48).

Economos C, Hyatt R, Goldberg J, Must A, Naumova E, Collins J, Nelson M. A Community-Based Environmental Change Intervention Reduces BMI z-Score in Children: Shape Up Somerville First Year Results. Obesity. 2007;15:1325-1326.



### Overweight and Obesity Over 2 Years (N=1034)

Described data have not been published yet.



### Weight status in Children by Birth Place of Mother

Described data have not been published yet.

## Implications / Future Directions

Comprehensive strategies with changes in multiple environments reinforced with policies that ensure healthy living are a viable and necessary direction for the future

## Beyond Somerville

**Replicating** the intervention across the country through a RCT with 6 urban communities. The BALANCE Project

**Adapting and implementing** the intervention through a RCT in 8 communities in rural America (CA, MS, KY, SC) with Save the Children. The CHANGE Project

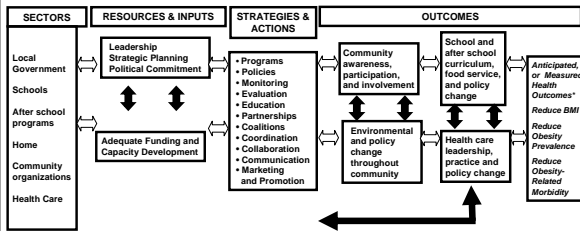
**Distributing** the HEAT Club after school curriculum through live and online trainings throughout the U.S. (>200 ASPs in 20 states) including a RCT

**Expanding the work to target new immigrants** through a new NIH grant

[www.childreninbalance.org](http://www.childreninbalance.org)



## IOM Evaluation Framework for Obesity Prevention Adapted for Shape Up Replication



**Cross-Cutting Factors that Influence the Evaluation of Policies and Interventions**  
Age; sex; socioeconomic status; race and ethnicity; culture; immigration status and acculturation; biobehavioral and gene-environment interactions; psychosocial status; social, political, and historical contexts.

\* Health outcomes will not be measured as part of the replication project, but are the proximal outcomes of interest

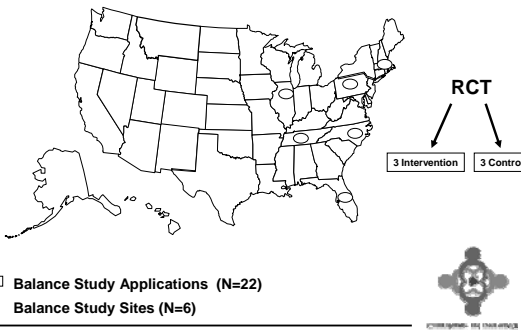
## The BALANCE Project:



### Goals & Objectives:

- Replicate the *Shape Up Somerville* (SUS) model in underserved, urban communities in the US with similar community characteristics (i.e. size, SES) and level of community readiness
- Nationwide RFP process
- Two year study – Spring 2008-Spring 2010
- Community and school-level environmental & policy outcomes

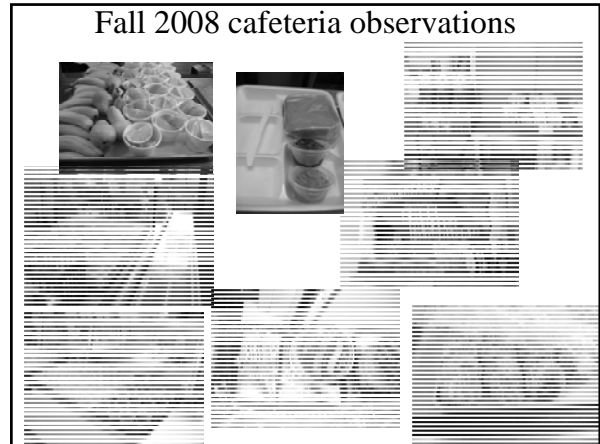
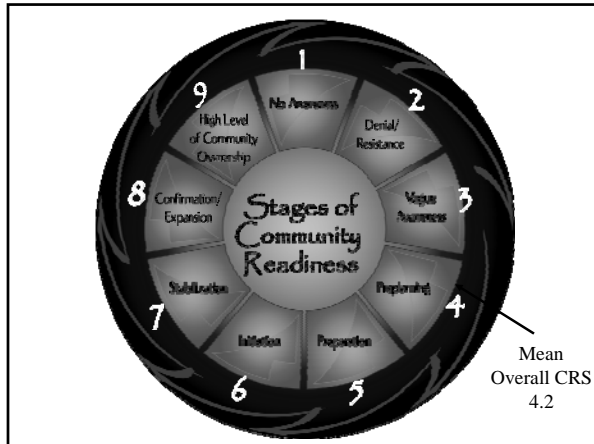
## Balance Study Sites



### Outcome Evaluation: BALANCE

Measurable end results that will allow comparison between the intervention and control communities (n=6) in order to identify a program's impact.

| Outcome   | Evaluation Tool  | Timeline   |
|---|--|--|
| <b>Community Readiness</b>  | •Community Readiness Model   | •Spring 2008, Spring 2009, Spring 2010   |
| <b>Built Environment/Community Policy</b>   | Completion of community assessment tool.   | •Fall 2008, Spring 2009, Spring 2010   |
| <b>Food Service</b><br>Benchmark: National Guidelines: 2005 Dietary Guidelines for Americans and 2008 Healthier US Schools Guidelines | •Direct Observation<br>•Income and expenditure data<br>•Nutrient analysis done by school<br>•Participation rates<br>•Production records /Recipes<br>•Food Service Director Interview | •Fall 2008, Spring 2009, Spring 2010<br>•same as above<br>•same as above<br>•same as above<br>•Same as above |
| <b>Wellness Policy</b>  | •Yale Tool for evaluating existing policies<br>•Wellness Policy Checklist/Survey Tool<br>•Abbreviated interview with school principals   | •Fall 2008, Spring 2009, Spring 2010<br>•same as above<br>•same as above                                     |



**CHANGE Study**  
Background: Rural America

- Difficult to define
- Chronic, entrenched poverty
- Declining job opportunities and population loss
- Low education and literacy
- Racism
- Less developed transportation infrastructure
- Lack of access to services and amenities
- Safety concerns
- Isolation and Stigma

**Rural Population Weight Status**

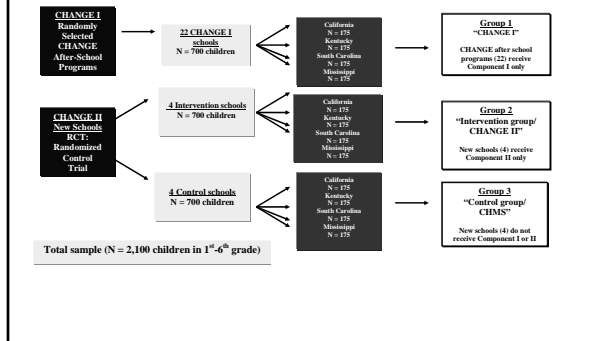
| <u>Child Weight Status</u><br>N=99      | <u>Parental weight status</u><br>N=99  |
|---|--|
| 39.4% Healthy weight                    | 6.1% Underweight                       |
| <b>22.2% Overweight</b>                 | 17.2% Healthy weight                   |
| <b>38.4% Obese</b>                      | <b>24.2% Overweight</b>                |
|   | <b>33.3% Obese</b>                     |
|   | 19.2% Extremely obese                  |
| 61% of children are overweight or obese | 77% of parents are overweight or obese |

Hennessy 2008

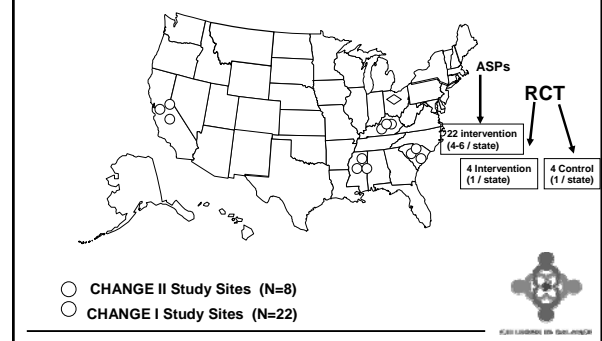
**The CHANGE Study**  
Creating Healthy, Active, and Nurturing Growing-up Environments

- Adapt and implement elements from the Shape Up Somerville model
- Test for effectiveness in a rural setting through a RCT with an ASP comparison
- 2100 1st- 6th grade children in four rural regions of the US
  - 22 randomly selected after school programs CHANGE I
  - 8 new schools/communities CHANGE II
- Individual, family, community and school-level environmental & policy outcomes
- Long term goal: to disseminate childhood obesity research that will empower individuals and communities to catalyze change in rural environments

## CHANGE Research Study Design



## CHANGE Study Sites



| <i>Outcome Evaluation: CHANGE</i><br><i>Measurable end results that will allow comparison between the intervention and control communities (n=8) in order to identify a program's impact.</i> |   |  |
|---|---|--|
| <b>Outcome</b>  | <b>Evaluation Tool</b>  | <b>Timeline</b>  |
| <b>Individual (child) Level</b>   | <ul style="list-style-type: none"> <li>BMI (Height and Weight)</li> <li>Child Survey: Diet, Physical Activity, Screen time, and Perceived Parental Support                             <ul style="list-style-type: none"> <li>Younger child version (grades 1-2)</li> <li>Older child version (grades 3-6)</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Spring 2008, Fall 2008, Spring 2009</li> </ul>  |
| <b>Family Level</b>   | <ul style="list-style-type: none"> <li>Family Survey</li> </ul>   | <ul style="list-style-type: none"> <li>Fall 2008, Spring 2009</li> </ul>   |
| <b>Community Readiness</b>  | <ul style="list-style-type: none"> <li>Community Readiness Model</li> </ul>   | <ul style="list-style-type: none"> <li>Summer 2008, Spring 2009</li> </ul>   |
| <b>Built Environment/<br/>Community Policy</b>  | <ul style="list-style-type: none"> <li>Completion of community assessment tool.</li> </ul>  | <ul style="list-style-type: none"> <li>Fall 2008, Spring 2009</li> </ul>   |
| <b>Food Service</b><br><i>Benchmark: National Guidelines: 2005 Dietary Guidelines for Americans and 2008 Healthier US Schools Guidelines</i>  | <ul style="list-style-type: none"> <li>Income and expenditure data</li> <li>Nutrient analysis done by school</li> <li>Participation rates</li> <li>Production records /Recipes</li> <li>Interview: What changes did/did not occur with food service this year?</li> </ul>   | <ul style="list-style-type: none"> <li>Fall 2008, Spring 2009</li> <li>same as above</li> <li>same as above</li> <li>same as above</li> <li>Spring 2009</li> </ul> |
| <b>Wellness Policy</b><br><ul style="list-style-type: none"> <li>Quality of policy language</li> <li>Extent of Implementation</li> </ul>  | <ul style="list-style-type: none"> <li>Yale Tool for evaluating existing policies</li> <li>Wellness Policy Checklist/Survey Tool</li> <li>Abbreviated interview with school principals</li> </ul>   | <ul style="list-style-type: none"> <li>Fall 2008, Spring 2009</li> <li>same as above</li> <li>same as above</li> </ul>   |

## Weight Status

Described data have not been published yet.

## Dietary Intake: Total Calories

Described data have not been published yet.

## Dietary Intake: Food Groups

Described data have not been published yet.

## Dietary Intake: Fat

Described data have not been published yet.

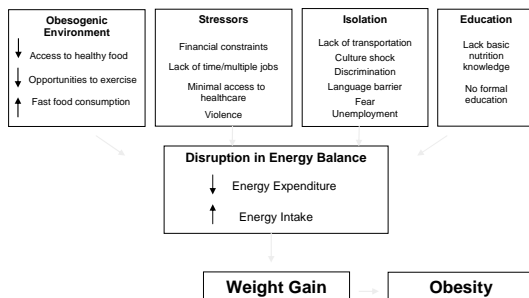
## Assessing and Preventing Obesity in New Immigrants

**Goal:** To create household and individual level change within a new immigrant population to alter and prevent behaviors associated with obesity and to prevent weight gain among this population.

### Mother-Child dyads (N=435 dyads, 870 subjects)

- Mothers aged 20-55 years, not pregnant; Child aged 5-12
- Haitian, Latino, or Brazilian origin
- 2 year intervention
  - Lifestyle coaching sessions that address knowledge, self-efficacy, existing behaviors, behavioral skills, and intentions to act
  - Check in calls to provide motivation and schedule appointments
  - Group sessions

## Assessing and Preventing Obesity in New Immigrants



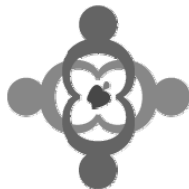
## New Directions

**Community-based interventions that have a theoretical framework and are multi-level and participatory in nature allow for inherent community assets and resources to be tapped and enable researchers to better pinpoint the specific needs of the community.**

Advancing community-based research approaches to address childhood obesity will require:

- training of future leaders in community research methodology
- increased funding to conduct rigorous trials
- enhanced design, measurement, and analysis approaches
- development of sustainability frameworks
- economic analysis studies
- demonstration of efficacy and effectiveness

Thank you



CHILDREN IN BALANCE

[www.childreninbalance.org](http://www.childreninbalance.org)