Healthy Caregivers, Healthy Children (HC2): A Childcare Center-Based Obesity Prevention Program

Principal Investigators:
Sarah E. Messiah, Ph.D., MPH
Ruby Natale, Ph.D., Psy.D.
Development of Program through Phases

- **Pilot Phase** (Healthy Inside, Healthy Outside/HiHo, 2007-2009)
- **Phase 1** (Healthy Caregivers, Healthy Children Efficacy RCT)
- **Phase 2** (Healthy Caregivers, Healthy Children Effectiveness RCT)
- **Phase 3** (Planning now)
Miami-Dade County

- Minority Majority-63% Hispanic, 19% NHB, 18% NHW
- Rates of childhood obesity are 5-15% higher than national rates depending on ethnicity
- 76% of all 3-to-6 year olds are in some form of nonparental care
- Many children consume 50-to 100% of their Recommended Dietary Allowances in child care
- Caregivers typically consumed no food or ate fast food instead of the meal being served
- 1/3 of snacks and breakfast meals offered did not include any (fresh) fruit or vegetable item
Focus is on **health equity** and **young children** to advance (1) policies and (2) practices with the ultimate goal of reducing health and other disparities young children experience.

- **Purpose:** Development of a childcare center-based healthy weight development program targeting high risk inner-city children.
- **Goals:**
  1. To take children off the trajectory toward overweight/unhealthy weight by instilling healthier dietary and physical activity habits.
  2. To test multiple obesity prevention strategies at both the childcare center and family level to determine efficacy and sustainability.

**FUNDING SOURCE:** LOCAL, The Children’s Trust
Pilot Phase Results that Led to HC2 Phase 1

- 32% were overweight/obese (compared to national estimates of 26%)
- 20% ate fruit 3-4 times a week (recommended daily- 0%)
- Teachers/Caregivers were poor health role models
- Childcare centers did not have nutrition and physical activity policies
Phase I (2010-2013): Healthy Caregivers, Healthy Children (HC2)

- 28 center RCT (12 Tx arm, 16 control arm)
- Child component- 48 lesson plans
- Teacher Component (8 monthly workshop)
- Parent Component (8 monthly workshops to compliment teacher lesson plans)
- USDA/FNP staff partnered
- UM staff delivered weekly TA
Phase II (2015-2018) - Healthy Caregivers-Healthy Children (HC2)

Reinforcing Phase 1 Strategies

- **Policies**
  - Screen Time
  - Snack
  - Beverage
  - Physical Activity

- **Child Curriculum**
  - 48 lesson plans
  - Age-appropriate lessons on nutrition and physical activity

- **Parent/Teacher Role Modeling**
  - 8 sessions
  - Project MOM and the Nutritional Gatekeeper

Design

- 26 center RCT (12 Tx, 14 control)
- QRIS schools only
- Train-the-Trainer- Quality Improvement Specialist (QIS) and Family Nutrition Program (FNP) delivered for sustainability
All Phases Incorporate *Caring for Our Children* Standards

- National Health and Safety Performance Standards
- Guidelines for Early Care and Education Programs
- A Joint Collaborative Project of the
  - American Academy of Pediatrics
  - American Public Health Association
  - National Resource Center for Health and Safety in Child Care and Early Education
Overview of Key Strategies

- Beverage Policy
- Snack Policy
- Physical Activity Policy
- Screen Time Policy
*Water readily available throughout the day – self serve hydration

*No sweetened beverages

*100% pasteurized juice limited to once per week

*Low fat (1%) or fat free cow’s milk
SNACK FOOD STANDARDS

- Fruits and vegetables
  - Fresh
  - Frozen-thawed
  - Low-sugar canned in natural juice or light syrup, drained
- AVOID high sugar, high fat foods
- Serve whole grain snacks
- Include children in food preparation when possible
Screen Time Standards

- TV / video / computer time: less than 30 minutes per week
- For educational or physical activity use only
- Promote physical activity as an alternative
PHYSICAL ACTIVITY STANDARDS

• Children will participate in at least 90 - 120 minutes of physical activity daily (according to age).

• Children should not be seated for more than fifteen minutes at a time, except during meals or naps.

• Teachers will provide indoor activities when it is not possible to go outside due to the weather.

• Staff will not withhold participation in physical activities as a punishment.
Data Collection

Primary Outcome Measures (pre-post school year over 3 school years):

1. **Child Level:** Anthropometric Measures (BMI)
2. **Teacher Level:** Role Modeling
3. **Parent Level:** Role Modeling, nutrition and physical activity patterns at home
4. **Center Level:** Environment and Policy Assessment and Observation (EPAO) and Health Environment Rating Scale (HERS)
Pilot Phase Key Findings

- 97% of children who started with a normal BMI, stayed normal
- 42% who started overweight down-percentiled to became normal
- 42% who started obese down percentiled to the overweight category
Pilot Phase Key Findings:
Mean Changes in Daily Consumption of Targeted Food Items Among Intervention/Control Centers

Intervention: More 1% Milk and Fruit, Less Juice, Cake, & Cookies

Mean Changes in Daily Consumption of Targeted Food Items Among Intervention Centers

Mean Changes in Daily Consumption of Targeted Food Items Among Control Centers

Messiah SE et al., Circulation 2008
Demographics of Participants

- 1,104 parents, 1,200 children and 175 teachers were enrolled in HC2 in 28 centers.
- 60% of children were Hispanic; 15% Haitian, 12% non-Hispanic Black, and 2% and non-Hispanic White.
- The majority of caregivers were born outside of the US (71%).

**One year Follow Up Change in Body Mass Index and Improvement in Quality of Nutrition Intake**

(1) intervention children had a greater reduction in BMI than controls (-4.0 +/- 3.2 % vs. 14.7 +/- 6.2%; p=0.02); and

(2) Mean change in nutritional factor score improved for the intervention group children versus the controls (-0.26 +/- 0.16 vs. 0.47 +/- 0.24; p=0.03).

A cost analysis showed that cost per child was $114 in year 1 and $29 in years 2 and 3. Average total cost per child over the duration of the intervention was $172.
Significant Increases in:
(1) the times they engaged in physical activity per day from 3.8 at baseline to 5.0 at 18-month post (p<0.001);
(2) the number of fresh fruit servings per day (1.2 to 1.5, p<0.001);
(3) the weekly servings of fish (0.3 to 0.9, p<0.001);
(4) times weekly they ate vegetables with their main meal (1.3 to 1.5, p<0.001);
(5) and significantly decreased the times per week they drank soda (0.9 to 0.7, p= 0.01) while children in the control group
significantly increased their weekly servings of high carbohydrate snacks (1.5 to 1.8, p<0.001).

Body Mass Index Changes
(1)50% of obese and 54% of overweight intervention-arm children
decreased their BMI %ile at the 2-year follow up
(2)control group showed > BMI %iles in the overweight group.
2 Year Key Outcomes of HC2 Phase I

Model Estimated PBMI Over Time by Treatment Group

- Model Estimated Means of BMI Percentile
- Time Point
- Treatment
- Control

P = 0.04

Model Estimated Fruit/Vegetable Consumption Over Time by Treatment Group and Obesity

- Model Estimated Means of Fruit/Vegetable Consumption Factor Score
- Time Point
- Obese - Treatment
- Obese - Control
- Not Obese - Treatment
- Not Obese - Control

P = 0.003
- 80% of QRIS childcare centers never serve sweet drinks
- 59% have water available to drink throughout the day
- 13% served fresh vegetables 1xday (20% never)
- 40% always serve whole grain snacks
- 94% go outside for physical activity ≥ 2x/day
- 38% spend at least 1.5 hours doing vigorous activity
- 60% spend < ½ hour/week on screen time
- Child BMI was significantly correlated with more daily vegetable servings (R=-.55, p=0.04)
HC2 Phase 2 Findings to Date

Center Level Analysis (EPAO Nutrition)

Control Centers

<table>
<thead>
<tr>
<th>EPAO Nutrition</th>
<th>Visit</th>
<th>N = 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>12.6</td>
<td>T2</td>
<td></td>
</tr>
</tbody>
</table>

Intervention Centers

<table>
<thead>
<tr>
<th>EPAO Nutrition</th>
<th>Visit</th>
<th>N = 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.4</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>13.5</td>
<td>T2</td>
<td></td>
</tr>
</tbody>
</table>

Note: Colored lines depict the trajectories of individual centers. The Bolded black line is the mean trajectory. Scale score range 0 - 20.
HC2 Phase 2 Findings to Date

Proportion Overweight and Obese by Visit and Center Type

Control Centers

Intervention Centers

Note: Colored lines depict the trajectories of individual centers. The Bolded black line is the overall trajectory. Overweight and obese is defined by a percentile > 85%.
HC2 Phase 2 Findings to Date

Change in BMI Z Versus Change in EPAO Nutrition and Physical Activity (T2 minus T1) by Center Type

- Control Center
- Intervention Center
Future Directions (HC2 Phase 3)

- Family Childcare Homes
- Children with disabilities
- Further cardiometabolic disease risk factor biomarkers (non-invasive)
Thank you to Our Community Partners