Main Points for Discussion

1. The First 1000 Days are critical times in which exposures to a complex array of factors can influence lifelong health and development;

2. Inequalities in child health & development begin in the first 1000 days and are exacerbated by poverty;
Main Points for Discussion

3. Achieving equity in early child health & development will require:
   - Alignment of individuals and organizations from multiple sectors;
   - Leveraging emerging science to drive approaches to systems change.
Main Points for Discussion

The First 1000 Days are critical times in which exposures to a complex array of factors can influence lifelong health and development.
Growing body of evidence shows that the first 1000 days are critical times in the developing fetus, infant, or young child that influence:

- Child development, effective learning, adaptive behaviors, lifelong health and well-being;
- Overweight, obesity, type II diabetes, and cardiovascular health.
Emerging Neuroscience in First 1000 Days

• Early experiences affect the development of brain architecture:
  – Strengthen: Responsive relationships & environments rich in serve and return experiences
  – Weakens: Toxic stress leading to lifelong problems in learning, behavior, physical & mental health
Mother

- Pre-pregnancy overweight/obesity

Fetus

- Altered fetal growth, microbiome & metabolism

Child

- Risk factors in infancy

Pregnancy

- Excess weight gain

Postpartum Period

- Excess weight retention

Later Life

- Obesity

- Later obesity and adverse cardiometabolic health

- Adult obesity and adverse cardiometabolic health
Selected Determinants of Childhood Obesity

- Gestational weight gain & GDM
- Maternal smoking during pregnancy
- Microbiome alterations
- Gene-environment interactions
- Rapid infant weight gain
- Breastfeeding
- Sleep duration and quality
- Television viewing & TV in bedrooms
- Responsiveness to infant hunger and satiety cues
- Parental feeding practices, eating in the absence of hunger
- Portion sizes
- Fast food intake
- Sugar-sweetened beverages
- Physical inactivity
- Socio-cultural, recreation, & transport environments
- Food & marketing environments
- Maternal smoking during pregnancy
- Microbiome alterations
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- Food & marketing environments
Inequalities in child health & development begin in the first 1000 days and are exacerbated by poverty.
Percentage of Children who are Poor or Low-Income, by Race and Hispanic Origin, 2015

Percent of Children Living in Poverty, by Age and Race, 2015

<table>
<thead>
<tr>
<th>Race</th>
<th>Under 5</th>
<th>Under 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, non-Hispanic</td>
<td>12.1</td>
<td>12.8</td>
</tr>
<tr>
<td>Black</td>
<td>37.4</td>
<td>32.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>30.2</td>
<td>28.9</td>
</tr>
<tr>
<td>Asian</td>
<td>11.9</td>
<td>12.3</td>
</tr>
</tbody>
</table>
Early Life Adversity Influences Health Throughout Life

- Early Death
- Social Problems: Opioid Use, Violence, Incarceration
- Chronic Diseases: Cancer, Heart Disease, Depression, Obesity
- Adoption of Risky Health Behaviors; Risk of School Failure
- Impaired Child Development
- Early Life Adversity

[Graph showing trends in obesity prevalence among adults and youth from 1999 to 2016.]
Weighted Prevalence of Obesity in US Children Aged 2 to 19 Years by Race Origin, 2015-2016

<table>
<thead>
<tr>
<th>Race Origin</th>
<th>Weighted Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL CHILDREN</td>
<td>18.5 %</td>
</tr>
<tr>
<td>NON-HISPANIC WHITE</td>
<td>14.1 %</td>
</tr>
<tr>
<td>NON-HISPANIC BLACK</td>
<td>22.0 %</td>
</tr>
<tr>
<td>NON-HISPANIC ASIAN</td>
<td>11.0 %</td>
</tr>
<tr>
<td>HISPANIC</td>
<td>25.8 %</td>
</tr>
</tbody>
</table>

Racial and ethnic disparities in obesity are already present by the age of two and persist into adulthood.
The majority of today’s children will have obesity at age 35

Predicted prevalence of obesity among 2-year-olds at future ages

Projections show that 59% of today’s 2-year-olds will have obesity when they are 35.
• Racial/ethnic differences exist in many early life risk factors for childhood obesity (Taveras, et al. Pediatrics; 2010)
“Racial and ethnic differences in obesity may be partly explained by differences in risk factors during the prenatal period and early life.”
Main Points for Discussion

Achieving equity in early child health & development will require:

- Alignment of individuals and organizations from multiple sectors;
- Leveraging emerging science to drive approaches to systems change.
Effectively enhance, leverage, and link early life systems
Reducing the Health Consequences of Early Life Adversity

Interrupt the Cycle in Early Childhood

- Coach & Support Caregivers of Young Children;
- Strengthen Community Capacity to Support Families Living in Poverty

Mitigate Effects of Adversity and Social Determinants through S.M.A.R.T. Programs

- High Risk Adolescents
- Opioid Use Disorder
- Intimate Partner Violence
- Cancer Screening & Care
- Obesity Prevention & Treatment
First 1,000 Days®

A program in partnership with:

The Boston Foundation
Mass General Hospital for Children
THE KRAFT CENTER for Community Health
The First 1000 Days Program Model

- Cross-sector partnership to prevent obesity and address disparities in early life;
- Collective impact approach engages multiple stakeholders invested in early life/ early childhood;
- Alignment of obesity prevention with promotion of healthy development.
1. System-wide changes to achieve improved outcomes do not occur as a result of good will alone.

2. Large scale problems such as obesity and health disparities require a highly structured, collaborative effort to achieve substantial “Collective Impact.”

3. Collective Impact has been loosely defined as “the commitment of a group of important actors from different sectors to a common agenda for solving a specific social problem.”
Systems-Level Approach to Early Childhood Health & Development

Collective Impact Activities
- Common Agenda
- Shared Measurement
- Mutually Reinforcing Activities
- Continuous Communication
- Backbone Support

System-Level Impacts
- Obstetrics/Gynecology
- Pediatric Primary Care
- Better coordination of health messaging
- Improved organizational practices
- WIC
- Fatherhood Programs
- Early Intervention
- Early Care & Education
- Family Childcare
- Worksites
- Trained professionals
- Health promoting environments
- Home Visiting Programs
- Community Centers

Modifiable Conditions
- Maternal prepregnancy BMI
- Maternal gestational weight gain
- Prenatal smoking
- Family social support
- Adverse childhood experiences
- Rapid infant weight-for-length gain
- Infant feeding; sugar-sweetened beverages
- Infant activity & sleep

Outcome
- Childhood Obesity Prevention
- Healthy Child Development (Social, Emotional, and Physical)
Program Overview

- Maternal-Family Health Promotion;
- Health & Social Determinants Screening, Referrals & Support;
- Health Coaching & Patient Navigation;
- Systems-Level Improvement
- Boston Basics
<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women Enrolled</td>
<td>855</td>
<td></td>
</tr>
<tr>
<td>Receiving Patient Coaching in OB</td>
<td>818</td>
<td>92%</td>
</tr>
<tr>
<td>Delivered</td>
<td>465</td>
<td>52%</td>
</tr>
<tr>
<td>1 month old</td>
<td>256</td>
<td>29%</td>
</tr>
<tr>
<td>Receiving Coaching in Pediatrics</td>
<td>199</td>
<td>22%</td>
</tr>
<tr>
<td>Fathers/Partners Enrolled</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Receiving Coaching</td>
<td>116</td>
<td>89%</td>
</tr>
</tbody>
</table>
### First 1,000 Days Baseline Demographics

**N = 855**

<table>
<thead>
<tr>
<th>Race and Ethnicity</th>
<th>MGH Chelsea n= 399</th>
<th>MGH Revere n= 364</th>
<th>DotHouse Health n= 92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>289 (76)</td>
<td>103 (30)</td>
<td>22 (26)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>26 (7)</td>
<td>29 (8)</td>
<td>24 (29)</td>
</tr>
<tr>
<td>White</td>
<td>52 (14)</td>
<td>164 (47)</td>
<td>9 (11)</td>
</tr>
<tr>
<td>Asian or Other</td>
<td>12 (3)</td>
<td>50 (14)</td>
<td>29 (35)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Income</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$10,000</td>
<td>73 (22)</td>
<td>31 (9)</td>
<td>18 (22)</td>
</tr>
<tr>
<td>$10,000- 20,000</td>
<td>77 (23)</td>
<td>74 (22)</td>
<td>23 (28)</td>
</tr>
<tr>
<td>$20,001-50,000</td>
<td>122 (36)</td>
<td>140 (42)</td>
<td>30 (37)</td>
</tr>
<tr>
<td>&gt;$50,000</td>
<td>66 (20)</td>
<td>86 (26)</td>
<td>10 (12)</td>
</tr>
<tr>
<td></td>
<td>MGH Chelsea n= 399</td>
<td>MGH Revere n= 364</td>
<td>DotHouse Health n= 92</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Maternal Age, mean (SD)</td>
<td>28.9 (6.5)</td>
<td>30.4 (5.7)</td>
<td>-</td>
</tr>
<tr>
<td>Gestational age at enrollment (wks), mean (SD)</td>
<td>10.6 (6.5)</td>
<td>11.3 (6.6)</td>
<td>9.5 (6.7)</td>
</tr>
<tr>
<td>Pre-gravid BMI, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt; 18.5</td>
<td>10 (3)</td>
<td>10 (3)</td>
<td>-</td>
</tr>
<tr>
<td>BMI 18.5- 24.9</td>
<td>122 (31)</td>
<td>128 (35)</td>
<td>-</td>
</tr>
<tr>
<td>BMI 25-29.9</td>
<td>130 (33)</td>
<td>129 (36)</td>
<td>-</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
<td>131 (33)</td>
<td>95 (26)</td>
<td>-</td>
</tr>
</tbody>
</table>
## Preliminary Baseline
### Social Determinants of Health

<table>
<thead>
<tr>
<th></th>
<th>Chelsea n= 399</th>
<th>Revere n= 364</th>
<th>DotHouse n= 92</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Insecurity</td>
<td>127 (34.4)</td>
<td>47 (13.3)</td>
<td>15 (18.1)</td>
</tr>
<tr>
<td>Food Insecurity</td>
<td>95 (24.7)</td>
<td>51 (14.2)</td>
<td>26 (30.2)</td>
</tr>
<tr>
<td>Enrolled in SNAP</td>
<td>87 (22.7)</td>
<td>54 (14.9)</td>
<td>18 (20.5)</td>
</tr>
<tr>
<td>Enrolled in WIC</td>
<td>119 (31.1)</td>
<td>111 (30.9)</td>
<td>24 (27.6)</td>
</tr>
</tbody>
</table>
Summary

1. Exposures in the First 1000 Days influence lifelong health and development;

2. Achieving equity in child health & development will require multi-sector partnership, leveraging emerging science, and systems change.

3. Preliminary results from the First 1000 Days program suggest improvements in behavioral risk factors and access to support services, reduced pregnancy anxiety, and no adverse effects on birth outcomes.
Acknowledgements

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• Mentors, trainees, and research staff in:
  – Department of Pediatrics, MGH
  – Department of Nutrition, Harvard Chan School of Public Health
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