Modifiable Protective & Risk Factors Associated with Overweight and Obesity Birth through age 5

Complimentary Feeding

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The First 1,000 Days
A unique window of opportunity

Conception to birth       1st year       2nd year

Early Programming

Metabolic - Immunologic - Sensory
Satiety - Behavioral - Developmental
Somatic growth & composition
Objective: Comprehensively identify actionable, modifiable factors associated with overweight in the first two years of life.

Definitions:
Potentially **modifiable factors** associated with weight defined as *feeding and related dietary, environmental, or behavioral practices that could be potentially modified by parents and caregivers with interventions beginning at birth, in the first two years of life*
Modifiable factors associated to childhood obesity in the first two years of age

- Lack of Breastfeeding
- Early introduction (< 4 months) of complementary foods
- High intake of sweetened beverages
- Low intake of fruit and vegetables

Food & Diet Related

- Lack of breast feeding
- Lack of responsive feeding practices by caregiver
  - Low attention to hunger and satiety cues
  - Use of overly restrictive, controlling, rewarding, or pressure feeding
- Low total and nocturnal sleep
- Lack of family meals
- TV / Screen viewing time
- Decreased active play

Feeding & Behavior Related

Adapted form Dattilo et al J of Obesity 2012
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Infant Feeding Practices Study - IFPS II

- 2005-2007
- Infant feeding and care practices in the first year of life.
- Longitudinal diet assessment
- 7 day FFQ questionnaires, by mail
- $N = 2,907$ at birth to $1,782$ at 12 mo of age.
- Response rates ranged from 63% to 87%
- Higher risk groups underrepresented
Nestlé Feeding Infants and Toddlers Study - FITS

- 2002 and 2008
- Nationally representative
- Cross-sectional household survey of parents and caregivers
- Birth to 4 years of age
- 24-hr dietary recall of foods, beverages, and supplements, by phone
- N= 3,273 infants 0-4 y of age
- 2nd recall on a random subsample

JADA Supplement, December, 2010
Infant Feeding and Feeding Transitions During the First Year of Life

21% of the mothers introduced solid foods before 4 months. IFPS Fein et al. 2008

By 4 months, 40% of the infants had consumed infant cereal. IFPS Grummer-Strawn 2008

Adapted from IFPS II,
Grummer-Strawn 2008

[Graph showing infant feeding transitions from breastfeeding to formula and mixed feeding over the first year of life.]

Percent

Age, mo

In hospital

1 2 3 4 5 6 7.5 9 10.5 12

Breastmilk

Formula

Mixed

3 food groups
2 food groups
1 food group
Some solids
Other liquids but no solids
Breast milk and formula only
Formula only
Breast milk only
Time of solid food Introduction in the US

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Time of solid food Introduction in the US

Fein 2008
Grummer-Srrawn 2008
Siega-Riz 2010

IFPS II
FITS 2008

Adapted
From IFPS II
Grummer-Srrawn 2008
Introduction of solid foods before 4 mo was associated with:

- Not initially breastfed infants
- Not breastfed until 6 months
- Less educated (non-College educated mothers),
- Single mothers
- Mothers <25 years old,
- Living outside western region of the country
- Participating in the WIC program

IFPS II
Clayton 2013
Fein 2008
Grummer-Strawn 2014
Prevalence and Reasons for Introducing Infants Early to Solid Foods: Variations by Milk Feeding Type

Top Six Most Commonly Cited Reasons for Early Introduction of Solid Food

• “My baby was old enough,” 88.9%
• “My baby seemed hungry,” 71.4%
• “My baby wanted the food I ate,” 66.8%
• “I wanted to feed my baby something in addition to breast milk or formula,” 64.8%
• “It would help my baby sleep longer at night.” 46.4%
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- “It would help my baby sleep longer at night.” 46.4%
- “A doctor or health care professional said my baby should begin eating solid food” 55.5%

IFPS 2013 Clayton et al Pediatrics 2013;131
FITS 2008
Solid food introduction

Figure 1. Percentage of children consuming any complementary foods by age groupings in the first year of life in the Feeding Infants and Toddlers Study 2008. Boxes in various shades represent the different food groups.

Siega Riz JADA 2010
Average Energy (kcal/d) Intakes: FITS 2008 Compared to Estimate Energy Requirements
Average Protein Intake (grams/d) : FITS 2008 Compared to Estimated Requirements

![Bar chart showing protein intake compared to Estimated Requirement (ER) across different age groups (6-11, 12-23, 24-35 months).]
Percent of Children Above Dietary Guidelines for Saturated Fat (% Total Energy)

Dietary Guidelines for Saturated fat < 10% total energy for ages > 2y

FITS 2008
Percent of Children Exceeding the UL for Sodium from Food

UL not determined for infants ages 0-11 months  AI: 1,000 mg  UL- 1,500mg
No Child Meets Current Recommendation for Fiber Intake

Mean Fiber Intake Among Toddlers and Preschoolers

<table>
<thead>
<tr>
<th>Age in Months</th>
<th>Fiber intake (grams/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 - 23</td>
<td>Mean: 8, 90th %ile: 10</td>
</tr>
<tr>
<td>24 - 35</td>
<td>Mean: 9, 90th %ile: 11</td>
</tr>
<tr>
<td>36 - 47</td>
<td>Mean: 10, 90th %ile: 12</td>
</tr>
</tbody>
</table>

AI 19 g

FITS 2008
Consumption on a given day
Sweets, Fruit, and Vegetable

<table>
<thead>
<tr>
<th>Age in Months</th>
<th>6-8.9</th>
<th>9-11.9</th>
<th>12-23.9</th>
<th>24-35.9</th>
<th>36-47.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Vegetable</td>
<td>60</td>
<td>70</td>
<td>75</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>Any Fruit *</td>
<td></td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>65</td>
</tr>
<tr>
<td>Any Type of Sweet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*excludes fruit juice
Sweets, Fruit, and Vegetable consumption on a given day

Percentage of Children Consuming

Any Vegetable  Any Fruit *  Any Type of Sweet

Age in Months

6-8.9  9-11.9  12-23.9  24-35.9  36-47.9
*excludes fruit juice
Sweets, Fruit, and Vegetable consumption on a given day

- Any Vegetable
- Any Fruit *
- Any Type of Sweet

*excludes fruit juice
More than a third of the calorie increase from 6 to 48 months is from sweets and sweetened beverages.

Table 172

Absolute Number of Calories

Age in Months

FITS 2008
By 4 years of age the majority of toddlers eat at a fast food restaurant 1-3 times a week.
Dietary food group patterns are set very early in life

Deming, DM. et al., The FASEB J. 2012; (abst).
Infant Feeding and Long-Term Outcomes: Results From the Year 6 Follow-Up of Children in the Infant Feeding Practices Study II

- Consumption of sugar-sweetened beverages in infancy doubles the odds of consuming them at age 6.

- Infrequent consumption of fruits and vegetables during infancy is associated with infrequent consumption of them at age 6.
The Public interest focus has also shifted from *children*.

*Fat for Life?*  
Six Million Kids Are Seriously Overweight. What Families Can Do.  
By Geoffrey Cowley & Sharon Begley

2000
The Public interest focus has also shifted from children to infants
Conclusions

• Lack of initiation or continuation of breastfeeding are associated to poor eating patterns

• Dietary patterns in the U.S. are poor
  – They start very early, and
  – They persist.

• Target messages for education to set adequate dietary patterns seem clear and modifiable: e.g.
  – Breastfeeding
  – Solids “not before 4 months of age”
  – Increased consumption of fruits and vegetables
  – Decreased consumption of sweets & sweetened beverages
What is needed

- **Education** to parents and caregivers
- to induce **behavior adoption**
- that addresses the **modifiable factors** associated with childhood obesity
- Including **diet and activity**

That are **accessible** and **scalable** → Digital
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Thank You