Feeding Guidelines for Infants and Young Toddlers: A Responsive Parenting Approach

March 7, 2017
Expert Panel Leadership

Panel Conveners:

Mary Story, PhD, RD
Director, Healthy Eating Research
Professor, Community & Family Medicine
Duke University

Megan Lott, MPH, RDN
Senior Associate of Policy and Research,
Healthy Eating Research
Duke University

Panel Chairs:

Rafael Perez-Escamilla, PhD, MS
Professor of Epidemiology and Public Health
Yale University

Sofia Segura-Perez, MS, RD (Panel Co-Chair)
Associate Unit Director, Community Nutrition Unit,
Hispanic Health Council

HER Panel Support:

Emily Welker, MPH, RD
Laura Klein, MPH
Lauren Dawson
Vivien Needham
Tracy Fox, MPH, RD (Consultant)

Robert Wood Johnson Foundation:

Claire Gibbons, PhD, MPH (Program Officer)
Jamie Bussel, MPH
Tina Kauh, PhD, MS
Expert Panel Members

Stephanie Anzman-Frasca, PhD
University at Buffalo

Shari Barkin, MD, MSHS
Vanderbilt University School of Medicine

Leann Birch, PhD, MA
University of Georgia

Katrina Holt, MPH, MS, RD, FAND
Georgetown University

Jennifer Orlet Fisher, PhD, MA
Temple University

Rachel K. Johnson, PhD, MPH, RD
University of Vermont

Martha Ann Keels, DDS, PhD
Duke University & UNC School of Dentistry

Angela Odoms-Young, PhD
University of Illinois at Chicago

Ian M. Paul, MD, MSc
Penn State College of Medicine

Lorrene Ritchie, PhD, RD
University of California

Anna Maria Siega-Riz, PhD
University of Virginia

Madeleine Sigman-Grant, PhD, RD
University of Nevada-Reno

Elsie M. Taveras, MD, MPH
Massachusetts General Hospital for Children

Shannon Whaley, PhD
Public Health Foundation Enterprises WIC Program
Panel Members With Us Today

Rafael Perez-Escamilla, PhD, MS (Panel Chair)
Yale School of Public Health

Sofia Segura-Perez, MS, RD (Panel Co-Chair)
Hispanic Health Council

Shannon Whaley, PhD
Public Health Foundation

Madeleine Sigman-Grant, PhD, RD
University of Nevada-Reno

Ian M. Paul, MD, MSc
Penn State College of Medicine
Why These Guidelines?

• Early life feeding behaviors play a central role in establishing food preferences

• Prevalence of unhealthy eating patterns and weight outcomes among U.S. infants and toddlers

• Previous comprehensive guidelines are dated
Dietary Patterns are Set Very Early in Life

Breastfeeding Disparities & Low Exclusive Breastfeeding Rates

Figure 4. Breastfeeding outcomes across U.S. ethnic/racial groups for children born in 2013

% Breastfed

<table>
<thead>
<tr>
<th></th>
<th>Hispanic</th>
<th>White</th>
<th>Black</th>
<th>Asian</th>
<th>Hawaiian/Pacific Islander</th>
<th>American Indian/Alaska Native</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever Breastfed</td>
<td>83</td>
<td>84.3</td>
<td>66.3</td>
<td>83.8</td>
<td>75</td>
<td>68.3</td>
</tr>
<tr>
<td>Breastfed at 6 months</td>
<td>45.6</td>
<td>57.9</td>
<td>39.1</td>
<td>64.4</td>
<td>50.2</td>
<td>41.3</td>
</tr>
<tr>
<td>Exclusive breastfeeding through 3 months</td>
<td>40.4</td>
<td>51.6</td>
<td>28.9</td>
<td>41.6</td>
<td>36.3</td>
<td>33.1</td>
</tr>
</tbody>
</table>

Note: Data from Centers for Disease Control and Prevention (CDC) National Immunization Survey (NIS).
Excessive Weight Among 0-2 Year Olds & Associations with Sex, Race/Ethnicity

Figure 3. High weight-for-recumbent length among U.S. infants and toddlers, birth to two years of age

% High Weight-for-Length**

<table>
<thead>
<tr>
<th>Group</th>
<th>% High Weight-for-Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>7.1</td>
</tr>
<tr>
<td>Girls</td>
<td>11</td>
</tr>
<tr>
<td>Boys</td>
<td>3.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>8.8</td>
</tr>
<tr>
<td>White</td>
<td>5.5</td>
</tr>
<tr>
<td>Black</td>
<td>7.3</td>
</tr>
<tr>
<td>Asian</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Note: Data from the 2011-2012 National Health and Nutrition Examination Survey (NHANES). Adapted from Ogden et al. (2014). **

** High Weight-for-Length defined as Weight-for-Length ≥ 97.7th percentile of WHO 2006 growth charts.
Obesity Prevention Needs to Start Even Before the Offspring is Conceived

Figure 1. Maternal-child life-course obesity framework

Key Guidelines’ Audience

- **Parents and caregivers**
- **Health professionals**
  - Nurses, OBGYNs, Pediatricians, etc…
- **Food assistance programs**
  - Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
- **Early care and education centers**
Guidelines Development Process

1. Review of key studies on topics identified as crucial, including how children learn to eat

2. Review of responsive feeding randomized control trials

3. Review of infant and toddler feeding guidelines from diverse countries including the U.S.

4. Interviews with experts in the field, including academic researchers and maternal-child health program delivery/evaluation professionals

5. Development of messages on what and how to feed infants and toddlers following an expert panel consensus process methodology
Guidelines Content & Approach

**Age Groups**
- 0 to ~6 months
- ~6 to 12 months
- 12 to 24 months

**Approach**
- Responsive parenting
  - Responsive feeding

**Themes**
- Breastfeeding, infant formula, cow’s milk
- Complementary feeding (solids)
- Beverages
- Transition to family meals
- Soothing & sleep
- Play/physical activity
- Screen time
- Food allergies
- Food safety
What is Responsive Parenting?

**Responsive Parenting** is a parenting style that is meant to foster the development of *self-regulation* and promote cognitive, social, and emotional development.

**Self-regulation** includes overlapping constructs that can affect feeding behaviors, including:

- self-control
- will power
- effortful control
- delay of gratification
- emotional regulation
- executive function
- inhibitory control
Responsive Parenting Framework

Responsive Parenting Dimensions:
- Feeding
- Soothing
- Sleep
- Physical Activity/Screen Time

Outcomes for Infants and Children:
- Caloric Intake
- Infant and Toddler Diet
- Child’s Weight
- Caloric Expenditure

Note: Original figure developed by authors of this report.
What is Responsive Feeding

Responsive Feeding is a key dimension of responsive parenting involving reciprocity between the child and caregiver during the feeding process.

It is grounded upon the following three steps:

1) the child signals hunger and satiety through motor actions, facial expressions, or vocalizations;

2) the caregiver recognizes the cues and responds promptly in a manner that is emotionally supportive, contingent on the signal, and developmentally appropriate; and

3) the child experiences a predictable response to signals.
Responsive Feeding Framework

Figure 5. Key factors that influence the reciprocal relationships between parent feeding practices and infant feeding

Maternal/parent factors
- Parenting style
- Weight status concerns
- Food preferences

Physiological factors
- Innate taste preference
- Appetite
- Growth stage

Intrinsic infant factors
- Temperament
- Neonatal history
- Feeding history

Early parent feeding practices
- Food exposure (type, amount, timing)
- Response to infant feeding behavior

Infant feeding behavior food preferences
- Acceptance
- Regulation
- Intake

Eating habits
- Child
- Adults

Family characteristics

Demographic factors

Development stage
- Independence
- Control
- Neo-phobia
- Self-feeding

Note: Reproduced with permission from “The NOURISH randomised control trial: Positive feeding practices and food preferences in early childhood - a primary prevention program for childhood obesity,” by L.A. Daniels, A. Magarey, D. Battistutta et al., 2009, BMC Public Health. License at http://creativecommons.org/licenses/by/2.0.
The First 6 Months

Breastfeeding

• The AAP recommends that infants be breastfed exclusively from birth until about 6 months.
• Once complementary foods are introduced, it is recommended that breastfeeding continues until the child is at least 1 year old.

The AAP recommends that infants be introduced to complementary foods when they are developmentally ready, which usually happens between 4 and 6 months of age.

Source: AAP 2013
How to Tell When a Baby is Ready to be Introduced to Complementary Foods?

Key Developmental Milestones

- Sits without support and has good head and neck control
- Munches or chews and uses the tongue to move pureed foods to the back of the mouth for swallowing
- No longer has extrusion reflex
- Brings hands and toys to the mouth for exploration
- Indicates a desire for food (e.g., eagerness to participate in family mealtimes, trying to grab food to put in her/his mouth)
<table>
<thead>
<tr>
<th>Age</th>
<th>Hunger Signals</th>
<th>Satiety signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth through 5</td>
<td>• Wakes and tosses</td>
<td>• Seals lips together</td>
</tr>
<tr>
<td>months</td>
<td>• Sucks on fist</td>
<td>• Turns head away</td>
</tr>
<tr>
<td></td>
<td>• Cries or fusses</td>
<td>• Decreases or stops sucking when full</td>
</tr>
<tr>
<td></td>
<td>• Opens mouth while feeding to indicate wanting more</td>
<td>• Spits out the nipple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Turns head away</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• May be distracted or pays more attention to surroundings</td>
</tr>
<tr>
<td>4 through 6 months</td>
<td>• Cries or fusses</td>
<td>• Decreases rate of sucking or stops sucking when full</td>
</tr>
<tr>
<td></td>
<td>• Smiles, gazes at caregiver, or coos during feeding to indicate wanting more</td>
<td>• Spits out the nipple</td>
</tr>
<tr>
<td></td>
<td>• Moves head toward spoon or tries to swipe food towards mouth</td>
<td>• Turns head away</td>
</tr>
<tr>
<td>5 through 9 months</td>
<td>• Reaches for spoon or food</td>
<td>• May be distracted or pays more attention to surroundings</td>
</tr>
<tr>
<td></td>
<td>• Points to food</td>
<td></td>
</tr>
<tr>
<td>8 through 11</td>
<td>• Reaches for food</td>
<td>• Eating slows down</td>
</tr>
<tr>
<td>months</td>
<td>• Points to food</td>
<td>• Pushes food away</td>
</tr>
<tr>
<td></td>
<td>• Gets excited when food is presented</td>
<td></td>
</tr>
<tr>
<td>10 through 12</td>
<td>• Expresses desire for specific food with words or sounds</td>
<td>• Clenches mouth shut or pushes food away</td>
</tr>
<tr>
<td>months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>• Combines phrases with gestures such as “want that” and pointing</td>
<td>• Shakes head to say “no more”</td>
</tr>
<tr>
<td></td>
<td>• Can lead parent to refrigerator and point to a desired food or drink</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uses words like “all done” and “get down”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Plays with food or throws food when full</td>
</tr>
</tbody>
</table>
6 to 12 Months

- Breast milk or formula continues to be the most important source of nourishment
- Nutrient contribution from a variety of healthful complementary foods should increase with age
  - Offer a variety of vegetables and fruits and avoid foods of limited nutritional value.
  - Solid foods rich in iron and zinc are important for exclusively breastfed babies.
  - Gradually transition from pureed or mashed food to lumpy and soft finger food (6-8 months), to chopped food and hard finger food (8-12 months).
How Children Learn to Like Healthy Foods

• **Maternal diet during pregnancy and lactation**
  • Flavors passed through amniotic fluid and breast milk

• **Associative learning**

• **Observation of caregivers’ eating behaviors**

• **Repeated exposure**
  • May take as many as 20 tries for some veggies to be accepted
12 to 24 Months

- **Focus on increasing dietary diversity**
  - Variety of fruits and vegetables, lean proteins, and whole grain foods
- **Developmentally appropriate portion sizes**
- **Cow’s milk**
  - AAP recommends pasteurized whole milk with no added sugars
- **Foods to avoid or limit:** SSBs, fruit juice, added sugars, high sodium, trans fats
Responsive Parenting/Feeding Works!

Responsive Parenting/Feeding Randomized Controlled Trials

- SLIMTIME (Paul et al. 2011)
- INSIGHT (Savage et al. 2016, Paul et al. 2016)
- NOURISH (Daniels et al. 2012, 2015)
- Healthy Beginnings (Wen et al. 2012)
- Prevention of Overweight in Infancy (Fangupo et al. 2015)
Guidelines Implementation: Systems Changes Needed

Collective Impact Activities
- Common agenda
- Shared measurement
- Mutually reinforcing activities
- Continuous communication
- Backbone support

System-Level Impacts
- Better coordination of health messaging
- Improved organizational practices
- Improved systems
- Trained professionals
- Health promoting environments

Modifiable Conditions
- Maternal pre-pregnancy BMI
- Prenatal smoking
- Gestational weight gain
- Maternal–infant relationship
- Rapid infant weight-for-length gain
- Infant feeding
- Infant activity and sleep

Outcome
- Childhood obesity prevention

Note: Reproduced from “Interventions for childhood obesity in the first 1,000 days a systematic review,” by T.L. Blake-Lamb et al., 2016, Am J Prev Med, 50, p.786.
Next Steps

• **Sharing the guidelines with healthcare professionals, early care and education providers, parents and caregivers**

• **Two additional briefs forthcoming:**
  - ECE Professionals
  - WIC Providers
How to Access Report

The Full Report and Executive Summary are available on the Healthy Eating Research website

http://healthyeatingresearch.org

Sign up for content alerts: be the first to receive the forthcoming ECE and WIC briefs.