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Shaping the Dietary Guidelines for Infants and Young Children: Key Considerations

Program Agenda:

» **Expanding "Dietary Guidelines" to "Guidelines for Healthy Growth":**
A paradigm shift

Jose Saavedra, MD, VP, Medical and Scientific Affairs, Nestlé Nutrition, North America Associate Professor of Pediatrics, Gastroenterology, and Nutrition, Johns Hopkins University School of Medicine

» **Influence of Energy Density on Dietary Patterns of Young Children**

Kathleen Reidy, DrPH, RD, Head, Nutrition Science, Nestlé Infant Nutrition

» **Impact of Energy Density on the Diet Quality of Young Children:**
What Happens to the Nutrients?

Denise Deming, PhD, Principal Scientist, Nutrition Science, Nestlé Infant Nutrition

» **What Should Dietary Guidelines for Infants and Young Children Look Like?**

William H. Dietz, MD, PhD

Expanding "Dietary Guidelines" to "Guidelines for Healthy Growth":

A paradigm shift

Jose M. Saavedra, MD,
VP, Medical and Scientific Affairs, Nestlé Nutrition, North America &
Associate Professor of Pediatrics,
Johns Hopkins University School of Medicine

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When does "Childhood Obesity" Really Begin?

In the US: 15.2% infants are overweight by 9 mo of age, and 16.7 % are obese

Los Angeles Times

BOOSTER SHOTS: Oddities, musings and news for the health world

Childhood obesity can begin as early as 9 months of age, researchers find

December 31, 2010 | By Eryn Brown | Los Angeles Times

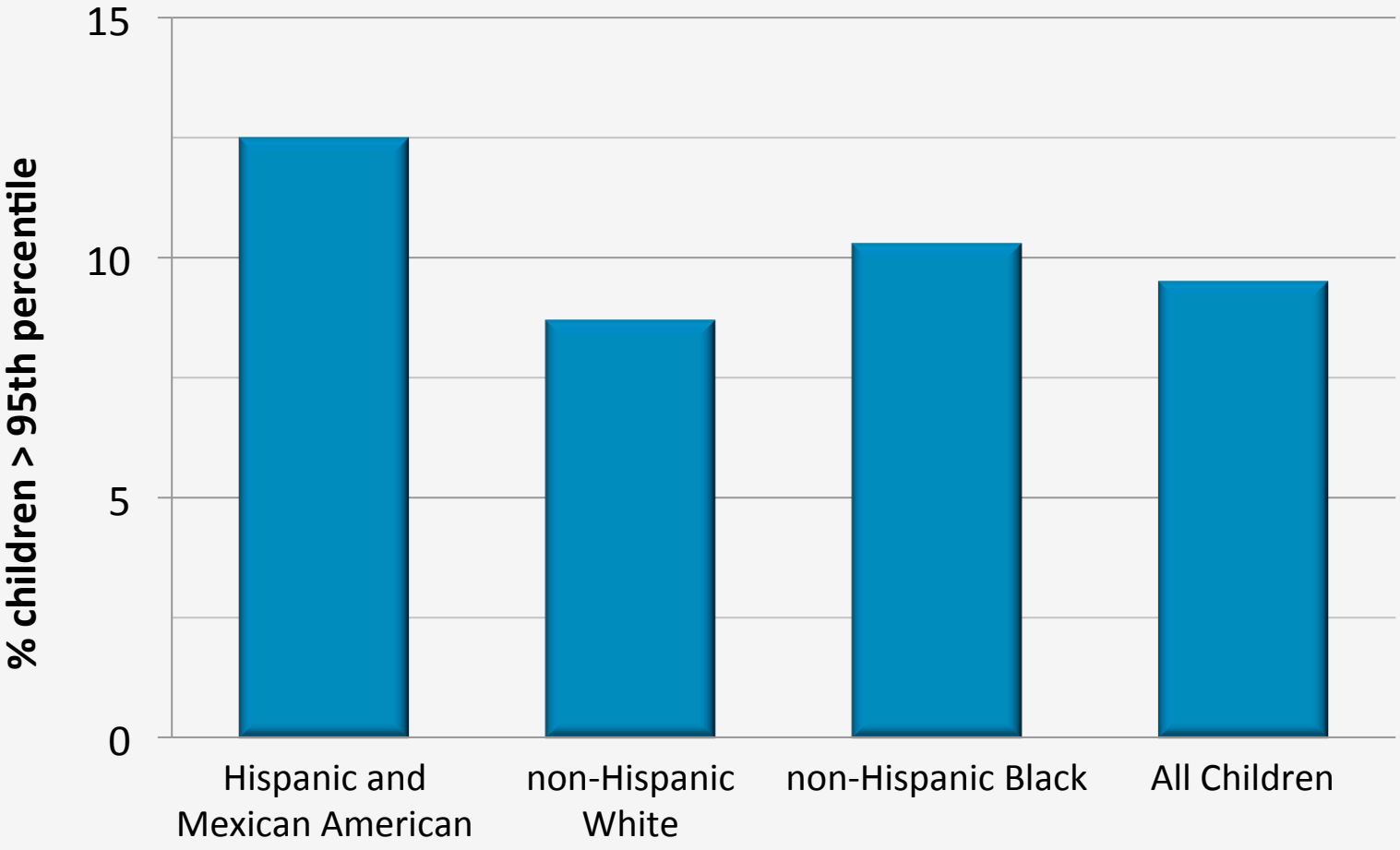
Everyone loves a roly-poly baby. Still, there is such a thing as an overweight infant, and obese babies -- even those as young as 9 months -- are predisposed to being obese later in life, researchers say in Friday's issue of the American Journal of Health Promotion.

Childhood obesity is a growing public health problem in the United States. It has been linked to psychological problems, asthma, cardiovascular troubles and a greater chance of developing diabetes.

Childhood obesity can start as early as 9 months... (Gregorio Borgia/Associated Press)

Recumbent Weight/Length > 95th Percentile Among US Children From Birth – 2 years of Age

National Health and Nutrition Examination Survey 2007-2008



Ogden CL, et al., JAMA 2010

Undesirable dietary practices associated with obesity are already present in infants

- **By two years of age**, the child has assumed the eating practices of the family.
  - Deming, DM., et al., The FASEB J. 2012; (abst).
  - Dwyer, JT., et al., J Am Diet Assoc, 2004.
- **By two years of age**, BMI is predictive of obesity in childhood and later life.
  - Moss, BJ and Yeaton, WH. Am J Health Promotion, 2012.
  - Harrington, JW., et al., Clinical Pediatrics, 2010.
  - Stettler, N., et al., Am J Clin Nutr, 2003.

Siega-Riz, AM., et al., J Am Diet Assoc, 2010.
Gubbels, JS., J Pediatr 2009.

Changing dialogue priorities
Childhood Obesity → Infant Obesity

THE JOURNAL OF PEDIATRICS • www.jpeds.com

ORIGINAL ARTICLES

Infant Obesity: Are We Ready to Make this Diagnosis?

David P. McCormick, MD, Kwabena Sarpong, MD, Lindsay Jordan, BS, Laura A. Ray, MPA, and Sunil Jain, MD

Objectives To assess the prevalence, risk factors, diagnosis and treatment of infant obesity (weight-for-length) in a pediatric practice.

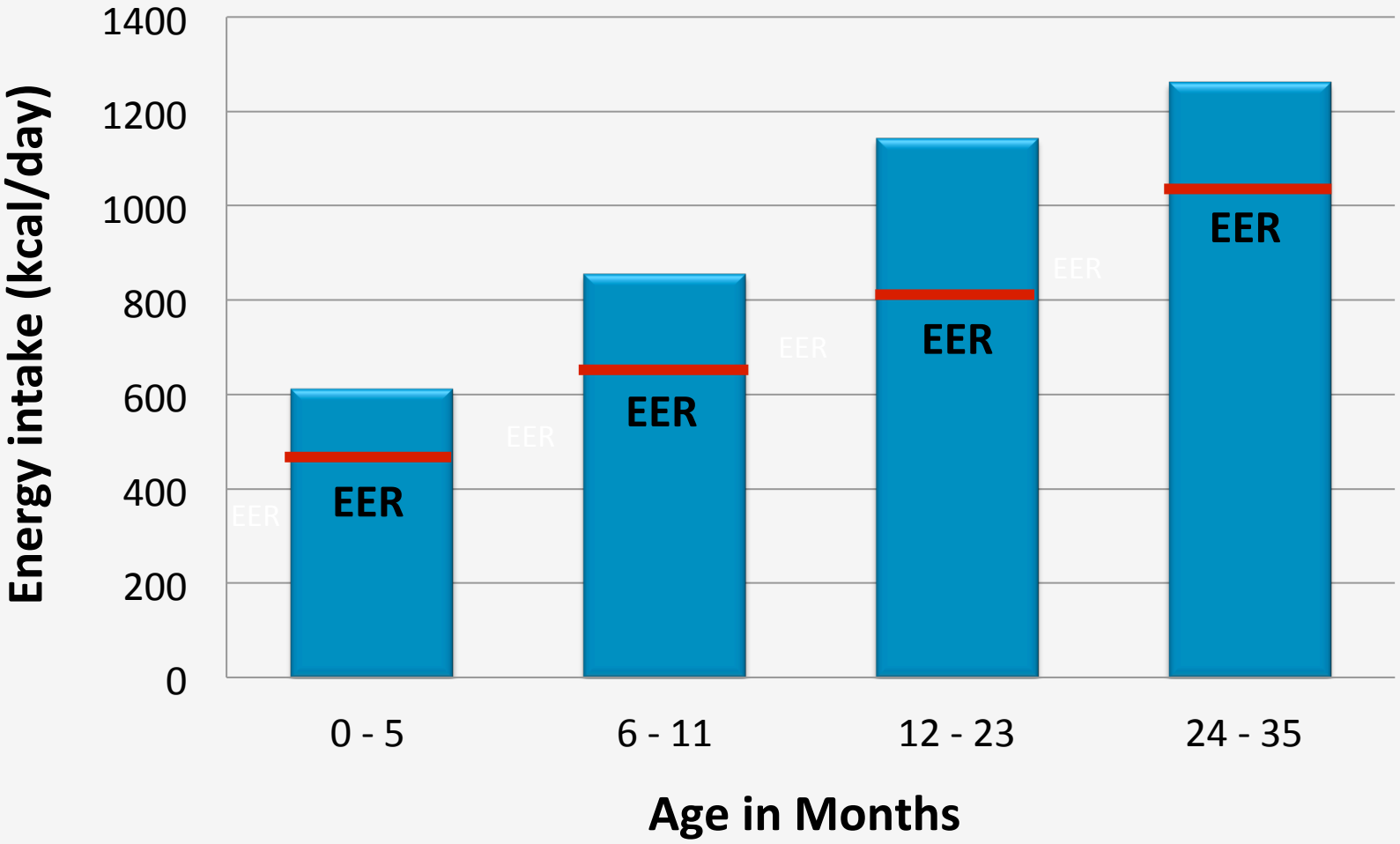
Study design This was a retrospective nested case-control design. The investigators reviewed and abstracted data from the records of the mothers (while pregnant) and their offspring.

Results The prevalence of infant obesity was 16%. Children who were obese at age 24 months were highly likely to have been obese at age 6 months (odds ratio = 13.3, 95% CI = 4.50-39.53). Mothers of obese infants gained more weight during pregnancy (+6.9 kg, $P < .05$) than mothers of healthy weight infants. Obese infants were more likely to have been large for gestational age (Odds ratio = 2.81, 95% CI = 1.27-6.22). However, only 14% and 23% of obese infants aged 6 and 24 months were diagnosed with obesity.

Conclusion Infant obesity was common in our practice. Infant obesity strongly predicted obesity at age 24 months. Risk factors included excessive intrapartum weight gain or being born large for gestational age. Clinicians diagnosed obesity in only a minority of children. Primary care providers need to diagnose obesity in infants and work to develop effective interventions. *(J Pediatr 2010;157:15-9)*.

http://weeksmd.com/?p=74

Average Energy (kcal/d) Intakes: FITS 2008 Compared to Estimate Energy Requirements



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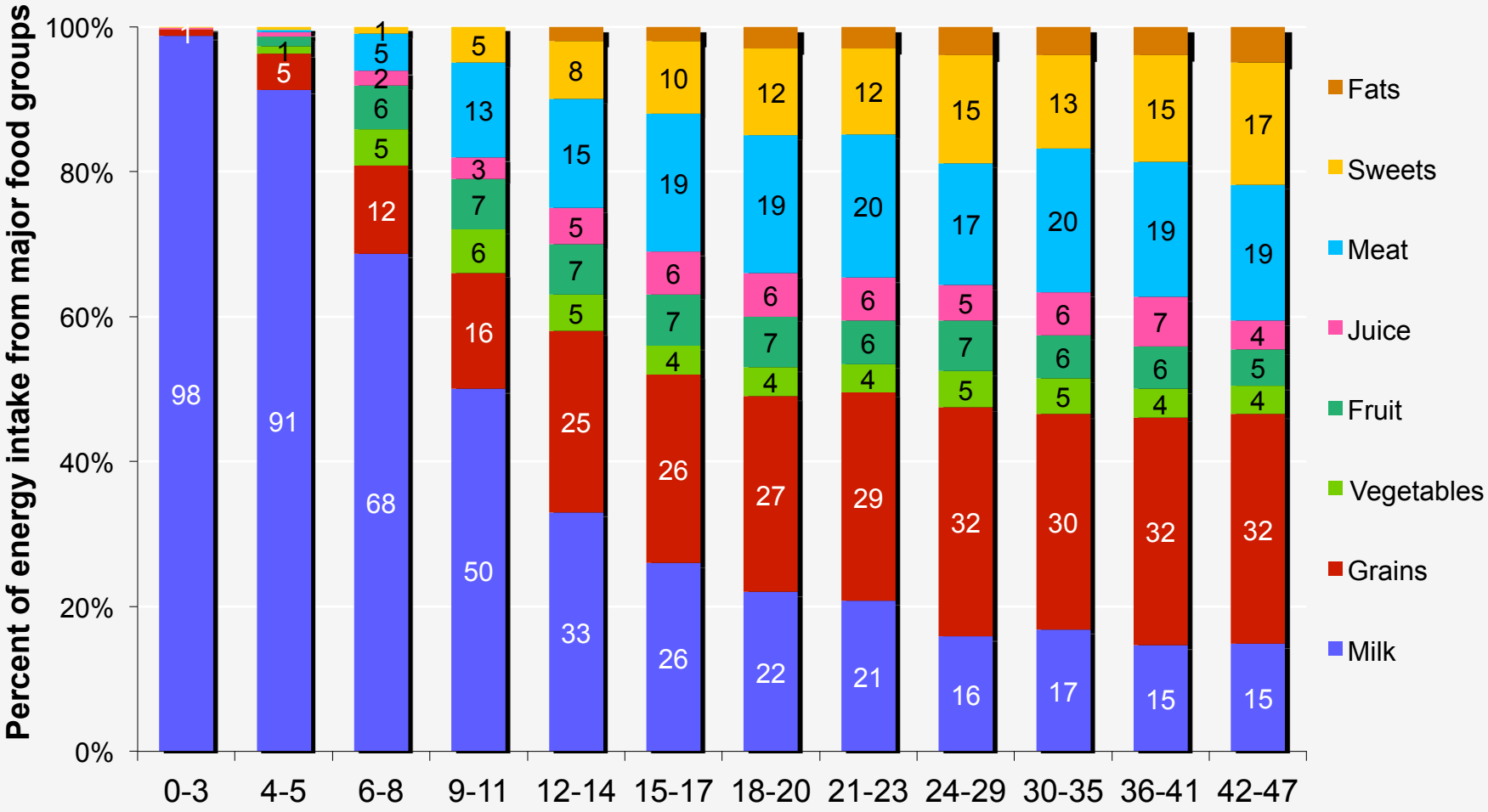
Changing dialogue priorities
Obesity Treatment → Obesity Prevention

After years of debate regarding infant focused interventions, the IOM, NIH, and the Department of Health and Human Services, now agree…

"What happens to a child during the first years of life is important to their current and future health and well-being… into adulthood. However, ***national efforts to prevent obesity have not paid enough attention to infants, toddlers, and preschool children.*** *The committee's report highlights the* ***urgent need for early prevention."***

Dietary food group patterns are set very early in life



Deming, DM. et al., The FASEB J. 2012; (abst).

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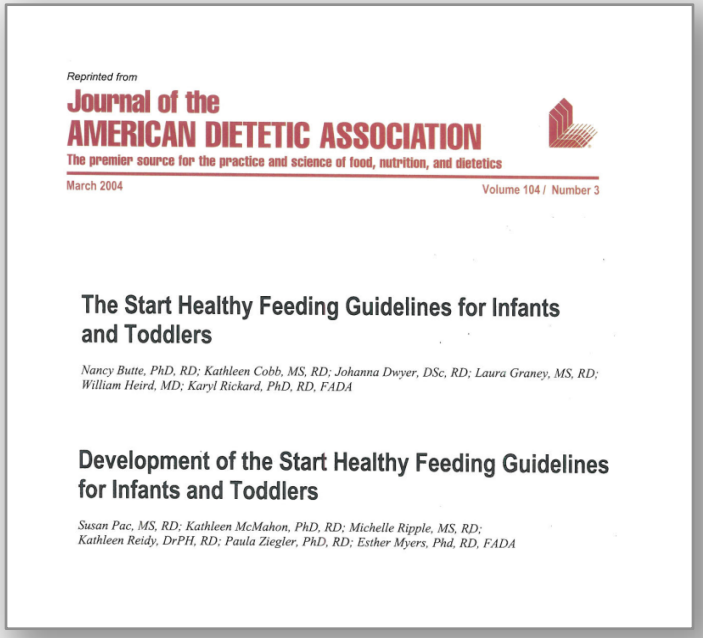
Changing dialogue priorities
Modifying Foods → Modifying the Diet

The Need for
"Dietary Guidelines"



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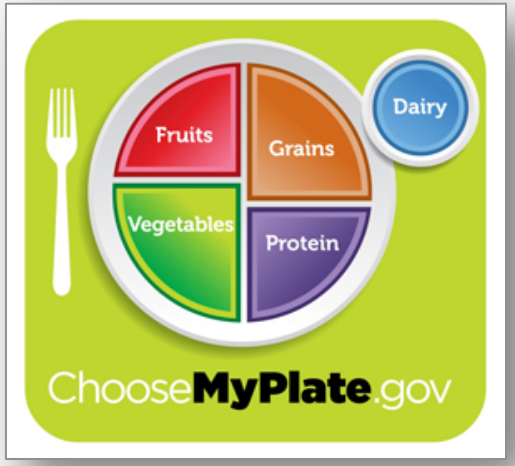
AMERICAN DIETETIC ASSOCIATION
The premier source for the practice and science of food, nutrition, and dietetics
March 2004 Volume 104 / Number 3

The Start Healthy Feeding Guidelines for Infants and Toddlers

Nancy Butte, PhD, RD; Kathleen Cobb, MS, RD; Johanna Dwyer, DSc, RD; Laura Graney, MS, RD; William Heird, MD; Karyl Rickard, PhD, RD, FADA

Development of the Start Healthy Feeding Guidelines for Infants and Toddlers

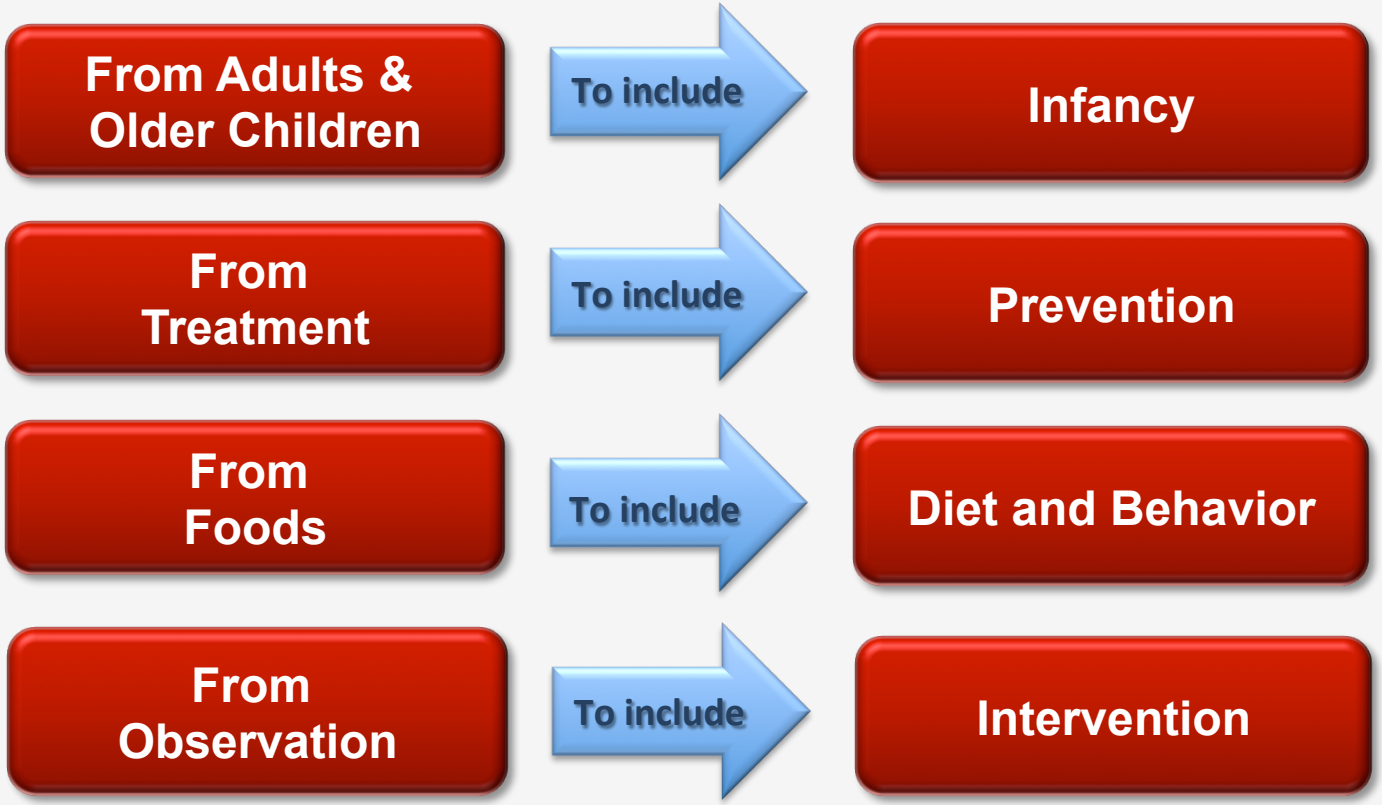
Susan Pac, MS, RD; Kathleen McMahon, PhD, RD; Michelle Ripple, MS, RD; Kathleen Reidy, DrPH, RD; Paula Ziegler, PhD, RD; Esther Myers, Phd, RD, FADA



- Nutritionally and developmentally appropriate guidelines are not existent for infants 0-2 years of age.

Addressing the Obesity Epidemic

The dialogue on a solution continues to move



Opportunity: To address obesity prevention starting in early life, with all stake holders, in a holistic way

Factors associated with overweight in Infants and Children

- Genetic and epigenetic
  - Including in-utero environment programing
  - Including taste predisposition (PROP), metabolic pre-determinants
- Parenting practices directly and indirectly associated to diet and activity
  - Including breastfeeding, infant feeding, sleep, activity, and child rearing
  - Defines and programs food preferences, future eating patterns and related behaviors
- Environmental
  - Social and economic dependent e.g.:
    - Food accessibility
    - Media
    - Work related (breastfeeding, maternity leave, daycare options)
  - Microbial environment (microbiota, antibiotics, mode of delivery)

How do we decide on which factors to build an effective intervention for obesity prevention starting in infancy?

A Systematic Review of Modifiable Factors Associated with Overweight and Obesity in the first Two years of Age

Objective: Comprehensively identify actionable, modifiable factors associated with overweight in the first two years of life.

Methods:

- Complete Database Review: MEDLINE, PubMed, Cochrane Central Register of Controlled Trials, and Web of Science through September 15, 2011
- Search Strategy: All studies indicating relationship between early weight gain, overweight, or obesity and genetic, biologic, dietary, environmental, and behavioral factors up to age 2 years. A *priori* exclusions: not published in the English, without test statistics or probability levels, with less than 10 subjects, or the primary study objective was not to specifically evaluate or describe factors associated with weight or adiposity status in full term "healthy" infants & toddlers.

Definitions:

Potentially **modifiable factors** associated with weight were defined as ***feeding and related dietary, environmental, or behavioral practices that could be potentially modified with interventions beginning at birth, in the first two years of life***

Dattilo A, Birch L, Lake A, Krebs N, Taveras E, Saavedra J J Obesity 2012

Primary search terms: Infant, toddler, overweight, obesity, prevention, weight, weight change, nutrition, diet, education, behavior change, and parenting. See Publication

A systematic Review of Modifiable Factors Associated with Overweight and Obesity in the first Two years of Age

Table 1: Modifiable feeding and related practices associated with overweight or obesity in infants through preschool age children.

Feeding and related practices	Direction of association to overweight or obesity in infants through preschool age children
Rate of weight gain during infancy	Rate of weight gain, increased weight for length, BMI, or measurements of adiposity during the first 2 years have been positively associated to BMI and/or adiposity during the preschool years [13, 14, 57, 58].
Breastfeeding	Breastfeeding duration and/or exclusivity has been inversely associated with rate of weight gain or weight measures during infancy, and with weight, adiposity or risk of overweight and obesity in toddler and preschool age children [59–74].
Introductory age to complementary foods	Early age of introduction to complementary foods (e.g., <4 months) has been positively associated with rate of weight gain during infancy, and increased weight, or measures of adiposity in infants, toddlers, and preschool age children [69, 75–81].
Diet quality and quantity:	
(i) Energy intake	Total energy intake has been positively associated with higher risk or prevalence of overweight in infant, toddler and preschool age children [81–85].
(ii) Intake of sweetened beverages	Intake of sugar sweetened beverages (excluding 100% juice) has been positively related to measures of adiposity or overweight in toddler and preschool age children [84, 86–94].
(iii) Fruit and vegetable consumption	Children with higher consumption of fruit and/or vegetables, or higher availability of such, consume less total energy and have been associated with a more desirable body composition or body weight during preschool years [95–99].
Parent feeding practices:	
(i) Attention to "hunger and satiety cues"	Parental inattention to a child's "hunger or satiety cues" has been positively associated with overfeeding or overweight in infants [100–103].
(ii) Use of "controlling", "rewarding" or "restrictive" feeding practices	Parental use of "controlling", "rewarding" or "restrictive" feeding practices has been associated with the child's food intake, weight gain during infancy, and overweight or obesity in preschool age children; depending on the parental feeding practice and child's age, the direction of the association has not been consistently reported [25, 104–113].
TV/Screen viewing time	Hours of TV or screen time viewing has been positively associated with overweight or obesity in toddler and preschool age children [5, 87, 91, 114–120].
Physical activity/active play time	Time spent during physical activity or active play has been inversely associated with measures of adiposity or risk of overweight among toddler and preschool age children [5, 78, 94, 117, 118, 121].
Sleep duration	Sleep duration has been inversely associated with overweight, obesity, or measures of adiposity in infants, toddlers, and preschool age children [116, 119, 122–127].
Shared family meals	Frequency of a child's participation in shared family meals per week has been inversely associated with overweight, obesity, or increased risk of overweight in preschool age children [116, 128].

Results:

- 6,255 citations generated.
- 143 publications meeting selection criteria of factors *significantly associated to early weight gain, overweight or obesity in children through 2 years of age.*

Due to the limited number of publications for some of the modifiable risk factor associations that surfaced, the search was subsequently extended to children with an average study age of ≤5 years.

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Results (1): Modifiable factors associated to childhood obesity up to 2 years of age.

- Lack of breast feeding
- Diet related
  - Early introduction (< 4-6 months) of complementary foods
  - High intake of sweetened beverages
  - Low intake of fruit and vegetables
  - Excessive protein intake
  - Lack of family meals

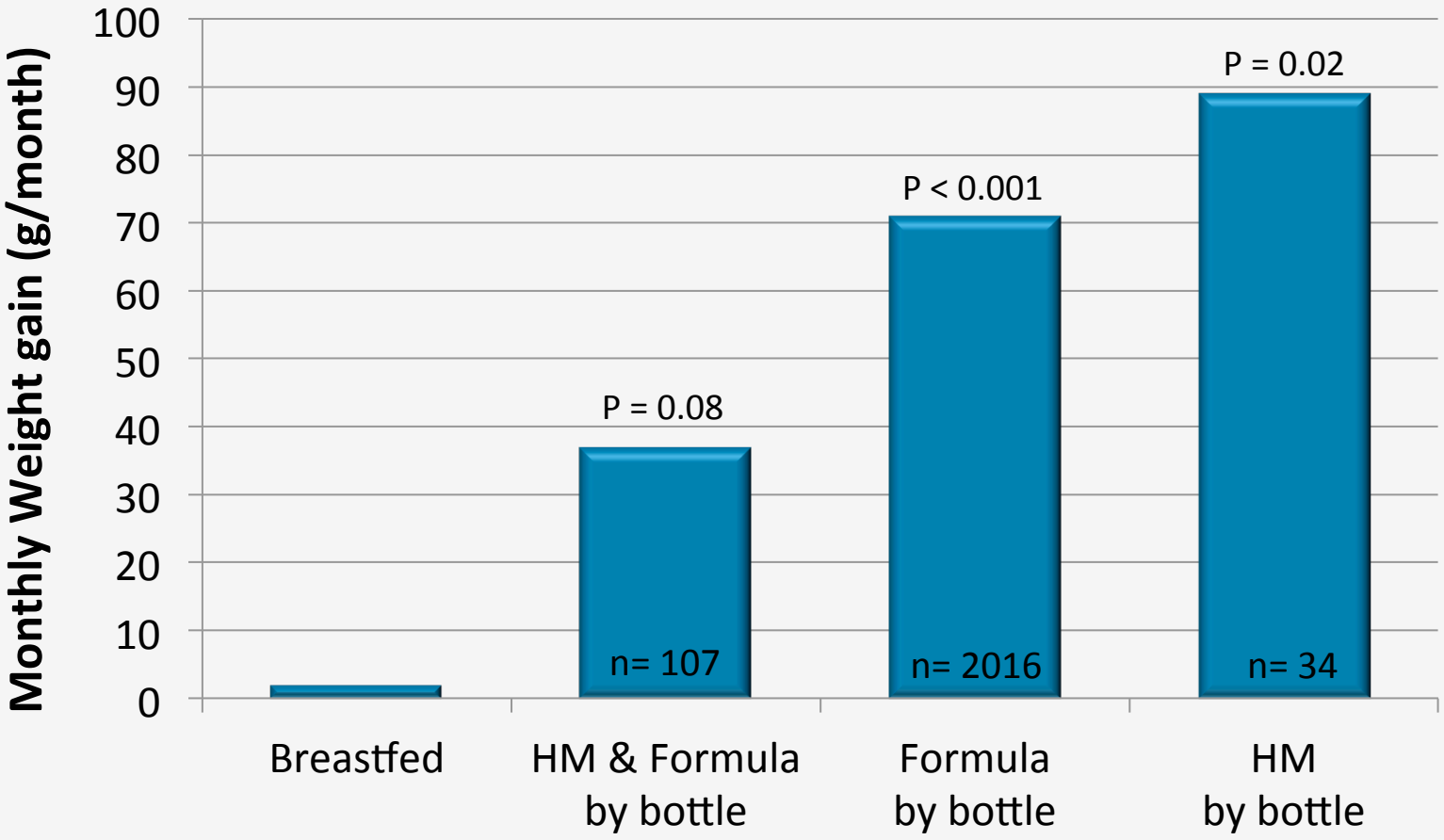
Dattilo et al J of Obesity 2012

Results (2): Modifiable factors associated to childhood obesity up to 2 years of age.

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

Dattilo et al J of Obesity 2012

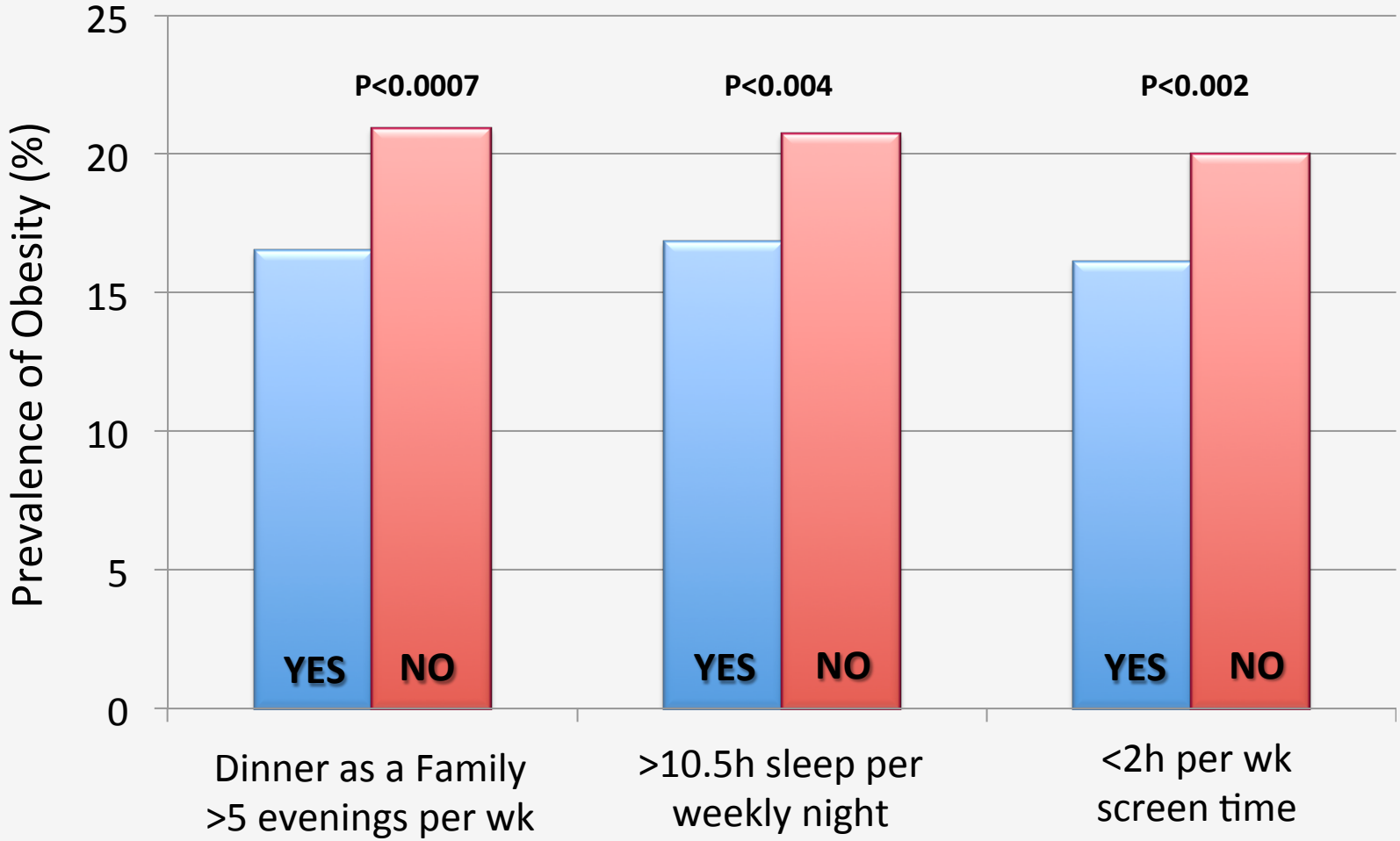
Bottle feeding of Formula or Breastmilk Results in Excess Weight Gain in the First 12 months



IFPS II

Adapted. Li R et al Arch Pediatr Adolesc Med 2012

Household Routines and Prevalence of Preschooler Obesity in 4 year old children



Early Childhood Longitudinal Study

Anderson SE, Whitaker RC Pediatrics2010

Published Trials with Interventions Addressing Modifiable Factors Associated with Overweight in Children 0-2 years

	Intervention	Methods/ Setting	Mother/ infant dyads	Results
Daniels, et al., 2012	▪Responsive feeding ▪Healthy eating ▪Intro to solids	Child health clinics	698	↓BMI-z at 14 months ↓ rapid weight gain
Kavanagh, et al, 2008	▪Satiety cues	WIC Clinic	61	No change in bottle feeding behavior
Paul, et al., 2011	▪Sleep, ▪ Intro to solid food	Home-nurse visits	110	↓wt for length at 1 yr ↑nocturnal sleep Delayed solids
Taveras, et al., 2010	▪Feeding ▪ Sleep ▪TV ▪Satiety cues	Pediatric Office; telephone calls; group sessions	84	Delayed intro to solids; ↑nocturnal sleep and less settling time to sleep
Wen, et al., 2012	▪Feeding ▪Activity, TV ▪Responsive feeding	8 home visit with community nurses	667	↓BMI at 24 months ↑vegetable intake ↓TV

Changing the paradigm focus on "Dietary Guidelines"

Adults

- Weight and health maintenance
- Food & diet recommendations
- Directed to individuals
- Eating behavior and behavior change
- Recommendations on activity and healthy behaviors

Infants and young children

- Healthy growth and development
- Developmentally appropriate foods & diet recommendations
- Directed to parents
- Feeding practices & behavior adoption
- Recommendations on child rearing, sleep & activity of child

Dietary Guidelines

Guidelines for Healthy Growth

Conclusions

- **Observation ➡ Intervention**

  Modifiable factors associated to obesity in infants and toddlers have been identified, and need to be studied holistically in prospective controlled interventions.

- **Food ➡ Diet & behavior**

  Non-dietary factors: Parent feeding and rearing practices are critical and major determinants of infant growth and should be included in these guidelines.

- **Childhood ➡ Infant** (and prenatal). We need to start early… very early

Obesity Prevention begins in the **First 1,000 days**

Guidelines for Healthy Growth

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