Historical Overview of Transitional Feeding Recommendations and Vegetable Feeding Practices for Infants and Young Children

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Although recommendations for introducing solid foods to infants and young children have changed significantly since the beginning of the 20th century, vegetable consumption recommendations have always been an important part of the child-feeding repertoire. In 1958, the first report of the American Academy of Pediatrics (AAP) Committee on Nutrition stated that developmental maturity of the gut and neuromuscular system, growth rate, and activity level were good indicators for determining when to introduce solid foods to infants than age. All 7 editions of the AAP *Pediatric Nutrition Handbook* use an evidence-based model for recommendations concerning the complementary feeding of infants and young children. The model includes developmental readiness principles, feeding practices, and age-appropriate nutrient requirements. Dietary patterns and nutrient consumption among infants and young children have been analyzed using data from the 2002 and 2008 Feeding Infants and Toddlers Study (FITS). The 2008 FITS also collected information concerning participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Since 1972, WIC has been a cost-effective means of improving the diets and health of infants and young children from low-income families. Data from the 2008 FITS showed that many young children did not consume recommended amounts of fiber or potassium, and vegetable and fruit intakes continued to be lower than recommended. Low vegetable consumption and limited variety were also seen among WIC participants and nonparticipants aged 6 months to 4 years prior to changes in the WIC food package. Increasing children's consumption of all vegetables should continue to be a focus going forward. Nutr Today. 2016;51(1):7–13

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Recommendations for the introduction of solid foods to infants and young children have evolved and changed significantly since the beginning of the 20th century, although not necessarily in a linear fashion. Prior to the founding of the American Academy of Pediatrics (AAP) in 1930, the idea that children had nutrient requirements that were distinct from those of adults was new. The AAP was created to further the field of pediatrics, advance the medical care and social needs of children, and improve the health and well-being of children through interventions that addressed their current and emerging health needs.[1]

As the evidence base for dietary recommendations evolved during the 20th century, periodic updates were made to the reference materials used by clinical practitioners and healthcare organizations to reflect this growth of information. Since their inception in 1980, the *Dietary Guidelines for Americans* have been the evidence-based foundation of federal government efforts to improve the overall health of Americans and prevent chronic diseases through a healthy diet. To date, the recommendations included in the dietary guidelines have been limited to Americans 2 years or older. Initiated by the US Department of Health and Human Services and the US Department of Agriculture, the Birth to 24 Months (B-24) Project was the first step in applying systematic reviews to the process of deciding whether the evidence was sufficient to include this age group in future

editions of the guidelines.[2] The project mandate was to identify key research questions and voids as the government moved forward in developing the *2020 Dietary Guidelines for Americans*. This edition of the guidelines will include recommendations for children aged 0 to 24 months for the first time to help ensure that the path to healthy eating starts as early in life as possible.

One of the critical research voids identified by the working group for 12 to 24 months in the B-24 Project was the lack of research for this developmental period. Much of the transitional feeding recommendations for this group were extrapolated from the science targeting infants from birth to 12 months and the preschooler.[3] Recognizing that the feeding practices of parents and primary caregivers during this transitional period can greatly influence the eating behaviors and food preferences of individuals throughout their lives, more researchers are examining the transition from breast milk or formula to solid foods.

Feeding recommendations for infants and young children must account for their immediate and long-term health and development. Vegetables provide many of the nutrients needed during early childhood to promote overall health and decrease the risk of developing chronic diseases. Hence, vegetable feeding recommendations are an essential component of the public health guidance concerning age-appropriate feeding recommendations communicated to parents and primary caregivers by health professionals with direction for government programs and the food industry. Because poor initial acceptance of vegetables during transitional feeding may discourage parents and primary caregivers from repeatedly offering them to the child, guidelines and strategies that promote healthy eating and vegetable feeding success are needed. This discussion will provide an overview of some of the critical research and events that have led to the current framework for recommendations and policy on the appropriate feeding of infants and young children with special consideration for vegetable feeding practices.

HISTORICAL OVERVIEW OF TRANSITIONAL FEEDING RECOMMENDATIONS

Pre-AAP Committee on Nutrition: 1900 to 1954

From 1900 to 1920, solid foods were seldom offered before 1 year of age because the belief at that time was that this practice would harm the child.[4] However, publications after 1920 began to recommend the introduction of meat and liver and additional solids during the first 2 weeks of life, followed by cereal.[5] By age 6 to 9 months, vegetables were to be offered to transition the older infant to a mixed diet by 1 year of age. During this period, Clara Davis[6] published her often cited experimental study on 3 weaning infants and concluded that when parents or primary caregivers provide developmentally appropriate, nutrient-dense foods, infants are able to self-select and consume adequate amounts to support healthy growth (Figure 1). In 1928, Gerber introduced the first widely available commercial baby foods in grocery stores, including strained fruits and vegetables.[7]

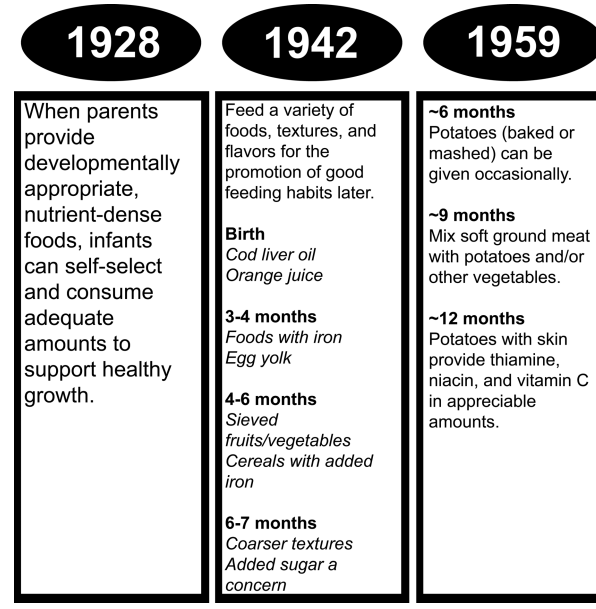

FIGURE 1. Feeding recommendations for children from birth to 12 months: 1928, 1942, and 1959.[6,9,10]

This was also the same period during which Philip Jeans and Genevieve Stearns in the Department of Pediatrics at the University of Iowa began a long series of studies on infant nutrition and metabolism.[8] Their research collaboration resulted in a series of publications that helped to establish age-appropriate nutrient requirements for children and provided guidance on the feeding of healthy infants and toddlers[9,10] (Figure 1). The influence of their work can be seen in the changes that occurred in the recommendations for the introduction of green vegetables and potatoes to the infant and toddler diet during 11 editions of *Holt's Diseases of Infancy and Childhood* published between 1897 and 1953[11] (Figure 2). In the 1897 edition, Holt advised introducing green vegetables and potatoes to the diet at age 36 months. By the 1953 edition, the textbook recommended that they be introduced at about 4 months of age.

AAP Committee on Nutrition Infant and Toddler Feeding Recommendations: 1954 to 1979

The AAP Committee on Nutrition (CON) was formed in 1954 and mainly included individuals from academic departments of pediatrics.[4] The CON also established liaisons with scientists and administrators from government agencies as well as with representatives from the infant food industry. In 1958, the CON issued its first report summarizing the science on the feeding of solid foods to healthy

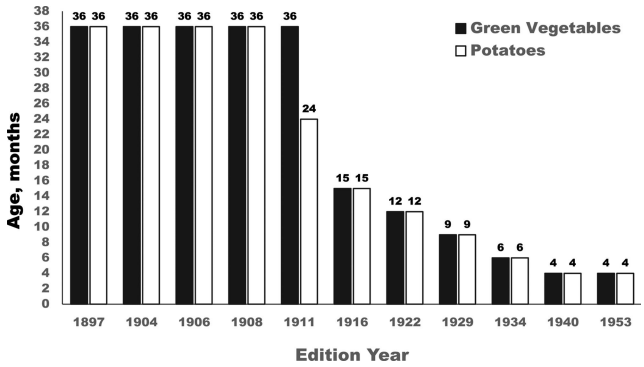

FIGURE 2. Changes in earliest age recommendations for introduction of green vegetables and potatoes to children from birth to 36 months in 11 editions of *Holt's Diseases of Infancy and Childhood*.[11]

infants, which stated that age should not be used as a rigid standard for the introduction of solid foods.[12] Developmental maturity of the gut and neuromuscular system, growth rate, and activity level were better indicators for determining when to introduce solid foods to infants. The age guidelines provided by the CON were to be used only as estimates, and no benefits were attributed to introducing solid foods before the first 3 or 4 months of life.

The 1958 CON report and its supporting research and survey data established the framework for developing subsequent infant feeding recommendations for future CON reports and the AAP *Pediatric Nutrition Handbook*. With the publication of *Infant Nutrition*, Dr Samuel Fomon, who served on and led the CON during this time, provided a synthesis of the science on the unique nutritional needs of infants.[13] His seminal research also demonstrated that formula-fed infants are able to efficiently self-regulate their dietary intake by age 6 weeks.[13–15] During the 1970s, Gerber scientists initiated infant nutrition surveys to determine the foods and nutrients consumed by infants and to document feeding practices during the first year of life.[16]

In response to the "Hunger in America" television documentary and other awareness campaigns in the 1960s, the need for food assistance among mothers, infants, and children from low-income families was brought to public attention in a very significant way. In 1972, the landmark legislation authorizing the establishment of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was passed by Congress.[17] In addition to providing nutritious foods, WIC provides healthcare and nutrition education to individuals who qualify for these benefits. The Special Supplemental Nutrition Program for Women, Infants, and Children has had a major positive influence on infant health, including a dramatic decrease in the prevalence of iron deficiency anemia during late infancy and early childhood from 7.8% in 1975 to 2.9% in 1985.[18] Although originally funded only as a pilot program in 1973 and 1974, WIC was serving more than 880 000 participants by 1977.[17]

AAP Committee on Nutrition Pediatric Nutrition Policy Statements and Handbooks: 1979 to 2014

The CON has closely followed an evidence-based model for its recommendations concerning the complementary feeding of infants and young children in all 7 editions of the *Pediatric Nutrition Handbook*. The model includes developmental readiness principles, feeding practices, and age-appropriate nutrient requirements (Figure 3). This discussion will focus on the first 2 components of the model.

Developmental Readiness Principles

Recognizing that developmental maturity (ie, neuromuscular readiness) was a key consideration for deciding when to begin introducing solid foods to infants, the first edition of the *Pediatric Nutrition Handbook* recommended an approximate age of 4 months.[19] In 1980, the CON issued a report defining the 3 overlapping periods of infant feeding and described the transitional period as the time when the nervous system, intestinal tract, and kidneys have reached the stage of sufficient maturation whereby the infant is ready to eat, digest, and absorb nonliquid/pureed foods.[20] The timing of the transitional period was related to oral-motor development and not to rigid age criteria. For healthy infants, approximate ages were cited to serve only as guidelines, including the ability to swallow by 4 to 5 months and the ability to convey satiety and hunger by 5 to 6 months. Until an infant can effectively convey satiety and hunger, a parent or primary caregiver could potentially override the infant's ability to self-regulate, which can lead to overfeeding. With the onset of the modified adult period, the physiological mechanisms have matured to near-adult proficiency, infants are beginning to learn to self-feed, and many table foods can be introduced with minimal alterations. The timing of the modified adult period was

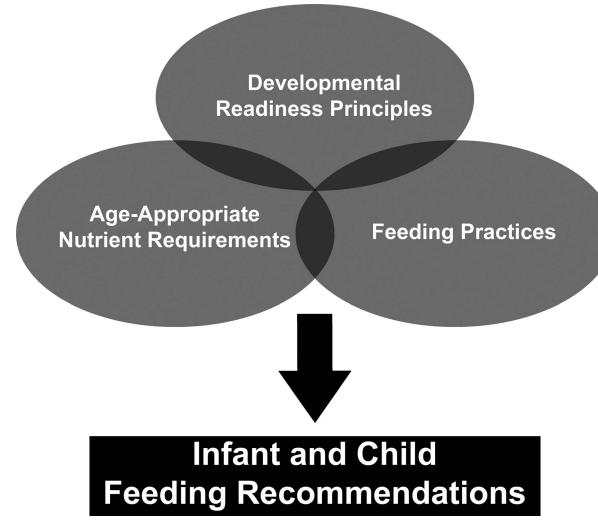

FIGURE 3. Evidence-based model of complementary feeding recommendations for infants and young children.[12,19–26]

considered a matter of individual preference, but often began around 1 year of age.

Although the 1980 CON report recognized that the evidence used to create the developmental readiness principles for solid food introduction was incomplete, these principles established the framework included in the 4 subsequent editions of the *Pediatric Nutrition Handbook*.[20–24] The developmental readiness principles have since been strengthened by ongoing research. In more recent editions, the CON notes that by the time solid foods are introduced, the gastrointestinal tract is able to absorb all essential nutrients.[25,26] In-depth guidance on how to encourage "responsive feeding" (ie, responding to hunger and satiety cues) was included in the 2014 edition. This guidance was validated using data from the 2002 Feeding Infants and Toddlers Study (FITS) that confirmed that infants and young toddlers can self-regulate energy intake.[27,28] Data from the 2002 FITS also supported the parent/primary caregiver-child division of responsibility model for feeding young children popularized by Satter.[29] The developmental readiness principles included in each edition of the *Pediatric Nutrition Handbook* are summarized in Table 1.

Feeding Practices

In 1979 and 1980, the CON developed recommendations to assist health professionals and policy makers in guiding the appropriate feeding of infants and young children through the second year of life.[19,20] These recommendations have remained relatively unchanged to the present day, except for the more recent recommendations to introduce iron- and zinc-rich foods—such as meats and fortified cereals—as "first foods."[26,30,31] At about 4 to 6 months, infants are physiologically ready for solid food introduction, and foods that provide key nutrients and meet energy needs should be chosen. Iron and zinc are nutrients of concern for exclusively breast-fed infants beyond 4 to 6 months of age. Therefore, iron-fortified cereals and meats are excellent first foods beginning around 4 to 6 months. New "single ingredient" foods should be introduced one at a time over a period of 3 to 5 days. At about 7 to 8 months, infants should be receiving complementary foods from all the food groups (cereals, meats, vegetables, and fruits) in addition to breast milk or formula. Unlike recommendations during much of the 20th century, the sequence of food introduction is not prescribed, but parents and primary caregivers are encouraged to offer each food multiple times (≥10 exposures) to promote acceptance and diet variety. Cow milk should be withheld until after the first birthday; low-fat cow milk is appropriate during the second year if growth and weight are appropriate. Juice consumption should be limited to no more than 4 to 6 oz/d (~118–177 mL/d) for children up to age 6 years, and adding sugar and salt to infant and toddler foods should be discouraged. The feeding practices included in each edition of the *Pediatric Nutrition Handbook* are summarized in Table 2. The CON recognizes that their feeding practice guidelines may not be applicable to *individual* infants. Deciding when to introduce solid foods strongly depends on an infant's growth rate, developmental stage, and activity level. Instead of providing parents and primary caregivers a daily or meal-specific calorie goal, the focus should be on diet quality and variety, feeding environment, and responsive feeding.

Vegetable Feeding Practices for Infants and Young Children

Many recent studies have examined dietary patterns and nutrient consumption among infants and young children using data from the cross-sectional 2002 and 2008 FITS.[27,32] The 2008 FITS included a nationally representative sample of 3273 US infants (0–23.9 months), toddlers (12–23.9 months), and preschoolers (24–47.9 months). The study included a

TABLE 1 Developmental Readiness Principles in *Pediatric Nutrition Handbook* by Edition Year[a]

	1979	1985	1993	1998	2004	2009	2014
Developmental maturity (not age)	X	X	X	X	X	X	X
Growth rate and physical activity			X	X	X	X	X
Satiety cues and feeding regulation		X	X	X		X	X
Solid foods at ~4–6 mo	X[b]	X	X	X	X	X	X
Multiple exposures						X	X
Diet quality (not calories)							X
Responsive feeding							X

[a]Adapted from the 1979, 1985, 1993, 1998, 2004, 2009, and 2014 editions of the *Pediatric Nutrition Handbook*.[19–26]

[b]The 1979 edition of the *Pediatric Nutrition Handbook* recommended beginning the introduction of solid foods when the infant weighed 6 to 7 kg and was at least 3 months old.

TABLE 2 Feeding Practices in *Pediatric Nutrition Handbook* by Edition Year[a]

	1979	1985	1993	1998	2004	2009	2014
Transitional period (~4–9 mo)							
Solid food introduction beginning with iron-fortified infant cereals	X[b]	X	X	X	X[c]	X[c]	X[c]
Single-ingredient vegetables, fruits, and meats	X	X[d]	X	X	X	X	X
Diet variety (no order)	X	X	X	X	X	X	X
Juice	X	X	X	X[e]	X[f]	X[f]	X[f]
No added salt or sugar	X	X	X	X	X	X	X
Modified adult period (~9–12 mo)							
Finely chopped food mixtures	X[g]	X[h]	X	X	X	X	X
Cow milk after 12 mo				X	X	X	X
No added salt or sugar	X	X	X	X	X	X	X

[a]Adapted from the 1979, 1985, 1993, 1998, 2004, 2009, and 2014 editions of the *Pediatric Nutrition Handbook*.[19–26]

[b]The 1979 edition of the *Pediatric Nutrition Handbook* recommended beginning the introduction of solid foods when the infant weighed 6 to 7 kg and was at least 3 months old. A common practice was to begin with rice cereal, which was a good source of iron if fortified.

[c]The 2004, 2009, and 2014 editions of the *Pediatric Nutrition Handbook* also recommended introducing single-ingredient pureed meats as ''first foods'' in addition to iron-fortified infant cereals.

[d]The 1985 edition of the *Pediatric Nutrition Handbook* also recommended egg yolk in addition to single-ingredient vegetables, fruits, and meats.

[e]The 1998 edition of the *Pediatric Nutrition Handbook* recommended the consumption of 100% juice and limiting it to no more than 8 to 10 oz/d (~237–296 mL/d).

[f]The 2004, 2009, and 2014 editions of the *Pediatric Nutrition Handbook* recommended the consumption of 100% juice and limiting it to no more than 4 to 6 oz/d (~118–177 mL/d) after the age of 6 months.

[g]The 1979 edition of the *Pediatric Nutrition Handbook* recommended introducing finely chopped food mixtures during the second 6 months of age (7th–12th months).

[h]The 1985 edition of the *Pediatric Nutrition Handbook* recommended introducing finely chopped food mixtures after 12 months of age.

multiple-pass 24-hour dietary recall administered to parents or primary caregivers and a questionnaire concerning family socioeconomic and demographic characteristics, knowledge and attitudes toward infant feeding, and child growth and development. The 2008 FITS also collected information concerning participation in WIC. Additional details about the study design, results, and limitations are described elsewhere.[32]

Except for a small proportion of infants at risk of inadequate intakes of iron and zinc, the 2008 FITS showed that nutrient intakes were adequate for the majority of US infants, toddlers, and preschoolers.[30] However, diet quality needs to be improved during the transition from infancy to early childhood. Many toddlers and preschoolers did not consume recommended amounts of fiber or potassium, and vegetable and fruit intakes continued to be lower than recommended.[30,31,33]

Among older infants (~9–11 months), sweet potatoes, broccoli, baby-food and table-food green beans, and mashed potatoes ranked among the top 5 vegetables consumed when expressed as the percentage of these infants consuming them at least once on the survey day.[31] Unlike in the 2002 FITS, French fries were not ranked among the top 5 vegetables consumed.[34] For children aged 2 to 3 years, the variety of their food choices decreased, and 30% did not eat any vegetables when expressed as a distinct food item on the survey day.[35] French fries and other fried potatoes ranked as the most popular vegetable consumed among children 12 months or older.[31,35] However, the percentage of children consuming foods from the various food groups, including vegetables, may be underestimated.[35] The percentages would most likely be higher if contributions from mixed dishes and other mixed food items were considered.

A recent study using data from the 2008 FITS provides additional details on vegetable feeding practices.[36] Vegetable consumption decreased from 84 g/d among infants aged 6 to 11 months to 64 g/d among children aged 2 to 3 years. Consumption of orange vegetables declined after the children reached 1 year of age, whereas potato consumption increased among those aged 2 to 3 years. However, energy from potato consumption was low among this age group. For preschoolers (24–47 months), total energy intake was approximately 1308 kcal/d, but potato consumption

contributed only 2.5% (32 kcal/d) of their total energy intake, which also included the 1.8% (23 kcal/d) of total energy provided by French fries.[30,36] The 2008 FITS data reinforce the low consumption of vegetables in general and the lack of vegetable variety among infants and young children.

Results With WIC Participants

Administered by the US Department of Agriculture Food and Nutrition Service, WIC has grown rapidly since its inception. As the third largest federal food and nutrition assistance program, WIC currently serves 8.3 million participants at an annual cost of $6.3 billion.[37] In 2012, infants and children aged 1 to 4 years accounted for approximately 23% and 53% of WIC participants, respectively.[38] Since the 2008 FITS included WIC participants, results from this study can be used to analyze the effects of the updated WIC food package on the feeding practices and nutrient intakes among this population.[39]

Using data from the 2008 FITS, a recent study compared the infant feeding practices and food consumption patterns of WIC participants (n = 794) to those of nonparticipants (n = 2477) among children aged 6 months to 4 years prior to changes in the WIC food package.[40] Low vegetable consumption and limited variety were seen for both groups. However, a higher percentage of WIC participants aged 6 to 12 months did not consume any vegetables on the day of the survey. The percentage of children consuming potatoes at least once a day was significantly higher for WIC participants aged 1 to 2 years and 2 to 4 years than for nonparticipants. The percentage of children consuming French fries did not differ between WIC participants and nonparticipants for any age category.

RESEARCH GAPS

The 2008 FITS highlights the research gaps concerning the role of vegetables within the overall diet of infants and young children. What are the factors driving the top vegetables consumed? What are the barriers to consuming a wider variety of vegetables among toddlers and preschoolers? In addition to providing the percentage of children consuming vegetables, data on the amounts of vegetables consumed as well as the amounts of vegetables consumed with or in other foods are needed for each of the specified age groups. Ongoing questions concerning the intake of potatoes among infants and young children must also be addressed. Are potatoes displacing other vegetables, or are potatoes a bridge to other vegetables or foods? Additional research is needed to determine potato and French fry intake levels and to ascertain which foods are consumed with the potatoes and French fries.

Further research is needed to determine the extent to which the updated WIC food package impacts vegetable feeding, diet quality, and nutrients of concern (eg, iron, zinc, potassium, and fiber). Data from the 2008 FITS and a recent longitudinal study suggest that consumption patterns among preschool and school-aged children are similar to the consumption patterns that were established in infancy.[41] More definitive research is required to determine if infant feeding patterns actually persist over time. These research gaps need to be addressed in order to develop actionable feeding guidance and policy.

CONCLUSIONS

From the beginning of the 20th century to the present, vegetable consumption recommendations have been an important part of the child-feeding repertoire. Since its inception in 1972, WIC has been a cost-effective means of improving the diets and health of infants and young children from low-income families. Vegetables, including potatoes, are an important source of potassium and fiber. However, low vegetable consumption and limited variety continue to be a concern among infants and children (~4–48 months) participating in WIC and among nonparticipants. Understanding current food consumption behaviors and implementing behavior change strategies that increase daily vegetable consumption should continue to be a focus going forward. The evidence-based model detailed in the *Pediatric Nutrition Handbook* (now titled *Pediatric Nutrition*) should continue to be used when developing future recommendations for the appropriate feeding of infants and young children, including the *2020 Dietary Guidelines for Americans*.

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REFERENCES

1. AAP facts. American Academy of Pediatrics Web site. https://www.aap.org/en-us/about-the-aap/aap-facts/Pages/AAP-Facts.aspx. Accessed September 30, 2015.
2. Raiten DJ, Raghavan R, Porter A, Obbagy JE, Spahn JM. Executive summary: evaluating the evidence base to support the inclusion of infants and children from birth to 24 mo of age in the Dietary Guidelines for Americans—"the B-24 Project." *Am J Clin Nutr*. 2014;99(3):663S–691S.
3. Birch LL, Doub AE. Learning to eat: birth to age 2 y. *Am J Clin Nutr*. 2014;99(3):723S–728S.
4. Fomon S. Infant feeding in the 20th century: formula and beikost. *J Nutr*. 2001;131(2):409S–420S.
5. Jundell I. On mixed diet during the first year of life. *Acta Paediatr*. 1924;1(2):240–255.
6. Davis CM. Self selection of diet by newly weaned infants: an experimental study. *Am J Dis Child*. 1928;36(4):651–679.
7. Gerber's history & heritage. Gerber® Start Healthy, Stay Healthy™ Web site. https://www.gerber.com/our-story/our-history-and-heritage. Accessed September 22, 2015.
8. Stead Family Department of Pediatrics: department history. University of Iowa Carver College of Medicine Web site. http://www.medicine.uiowa.edu/pediatrics/history/. Accessed September 22, 2015.

9. Jeans PC. The feeding of healthy infants and children. *JAMA*. 1942; 120(12):913–921.
10. Stearns G. Infants and toddlers. In: US Department of Agriculture, ed. *Food: The Yearbook of Agriculture 1959*. Washington, DC: Government Printing Office; 1959:283–295.
11. Adams SF. Use of vegetables in infant feeding through the ages. *J Am Diet Assoc*. 1959;35(7):692–703.
12. American Academy of Pediatrics Committee on Nutrition. On the feeding of solid foods to infants. *Pediatrics*. 1958;21(4):685–692.
13. Fomon SJ. *Infant Nutrition*. 2nd ed. Philadelphia, PA: WB Saunders Company; 1974.
14. Fomon SJ, Filer LJ Jr, Thomas LN, Rogers RR, Proksch AM. Relationship between formula concentration and rate of growth of normal infants. *J Nutr*. 1969;98(2):241–254.
15. Fomon SJ, Owen GM, Thomas LN. Milk or formula volume ingested by infants fed ad libitum. *Am J Dis Child*. 1964;108:601–604.
16. Purvis GA. What nutrients do our infants really get? *Nutr Today*. 1973;8:28–34.
17. Oliveira V, Racine E, Olmsted J, Ghelfi LM. The WIC program: background, trends, and issues. http://ageconsearch.umn.edu/bitstream/33847/1/fa020027.pdf. Food Assistance and Nutrition Research Report Number 27. Published September 2002. Accessed September 22, 2015.
18. Women, Infants, and Children (WIC): about WIC—how WIC helps. US Department of Agriculture Food and Nutrition Service Web site. http://www.fns.usda.gov/wic/about-wic-how-wic-helps. Accessed September 22, 2015.
19. American Academy of Pediatrics Committee on Nutrition. In: *Pediatric Nutrition Handbook*. 1st ed. Evanston, IL: American Academy of Pediatrics; 1979.
20. American Academy of Pediatrics Committee on Nutrition. On the feeding of supplemental foods to infants. *Pediatrics*. 1980;65(6): 1178–1181.
21. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 1985.
22. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 1993.
23. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 4th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1998.
24. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 5th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2004.
25. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 6th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009.
26. American Academy of Pediatrics Committee on Nutrition. *Pediatric Nutrition Handbook*. 7th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2014.
27. Devaney B, Kalb L, Briefel R, Zavitsky-Novak T, Clusen N, Ziegler P. Feeding Infants and Toddlers Study: overview of the study design. *J Am Diet Assoc*. 2004;104(1 suppl 1):S8–S13.
28. Fox MK, Devaney B, Reidy K, Razafindrakoto C, Ziegler P. Relationship between portion size and energy intake among infants and toddlers: evidence of self-regulation. *J Am Diet Assoc*. 2006; 106(1 suppl 1):S77–S83.
29. Satter E. Comments from a practitioner on Leann Birch's research. *J Am Diet Assoc*. 1987;87(9 suppl):S41–S43.
30. Butte NF, Fox MK, Briefel RR, et al. Nutrient intakes of US infants, toddlers, and preschoolers meet or exceed dietary reference intakes. *J Am Diet Assoc*. 2010;110(12 suppl):S27–S37.
31. Siega-Riz AM, Deming DM, Reidy KC, Fox MK, Condon E, Briefel RR. Food consumption patterns of infants and toddlers: where are we now? *J Am Diet Assoc*. 2010;110(12 suppl):S38–S51.
32. Briefel RR, Kalb LM, Condon E, et al. The Feeding Infants and Toddlers Study 2008: study design and methods. *J Am Diet Assoc*. 2010;110(12 suppl):S16–S26.
33. Dwyer JT, Butte NF, Deming DM, Siega-Riz AM, Reidy KC. Feeding Infants and Toddlers Study 2008: progress, continuing concerns, and implications. *J Am Diet Assoc*. 2010;110(12 suppl):S60–S67.
34. Fox MK, Pac S, Devaney B, Jankowski L. Feeding Infants and Toddlers Study: what foods are infants and toddlers eating? *J Am Diet Assoc*. 2004;104(1 suppl 1):S22–S30.
35. Fox MK, Condon E, Briefel RR, Reidy KC, Deming DM. Food consumption patterns of young preschoolers: are they starting off on the right path? *J Am Diet Assoc*. 2010;110(12 suppl):S52–S59.
36. Deming DM, Reidy KC, Briefel RR, Fox MK, Condon E. The Feeding Infants and Toddlers Study (FITS) 2008: dramatic changes in the amount and quality of vegetables in the diet occur after the first year of life. *FASEB J*. 2012;26:374.4.
37. National level annual summary: WIC program participation and costs. US Department of Agriculture Food and Nutrition Service Web site. http://www.fns.usda.gov/sites/default/files//pd/wisummary.pdf. Accessed September 22, 2015.
38. Charts: Special supplemental Nutrition Program for Women, Infants, and Children (WIC). US Department of Agriculture Economic Research Service Web site. http://www.ers.usda.gov/topics/food-nutrition-assistance/wic-program/charts.aspx#.VCh4NhbYG_I. Accessed September 22, 2015.
39. USDA finalizes changes to the WIC program, expanding access to healthy fruits and vegetables, whole grains, and low-fat dairy for women, infants, and children. US Department of Agriculture Food and Nutrition Service Web site. http://www.fns.usda.gov/pressrelease/2014/003114. Accessed September 22, 2015.
40. Deming DM, Briefel RR, Reidy KC. Infant feeding practices and food consumption patterns of children participating in WIC. *J Nutr Educ Behav*. 2014;46(3 suppl):S29–S37.
41. Grimm KA, Kim SA, Yaroch AL, Scanlon KS. Fruit and vegetable intake during infancy and early childhood. *Pediatrics*. 2014; 134(suppl 1):S63–S69.