

Opinion

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Infant Formula: Fast Food for Babies

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ABBREVIATIONS: WIC: Special Supplemental Nutrition Program for Women, Infants and Children; AAP: American Academy of Pediatrics.

Pediatric obesity is a declared epidemic with enormous consequences.^{1,2} There are many risk factors for being overweight, including frequent consumption of fast food. Fast food is cheap, calorie-dense, and easily accessible. Infant formulas closely resemble some of these characteristics and thus may contribute to expansion of pediatric obesity epidemic.

Infant formulas are designed to resemble growth and developmental parameters of breast fed babies. According to the statement by American Academy of Pediatrics (AAP), Work Group on Breastfeeding "The breast-fed infant is the reference or normative model against which all alternative feeding methods must be measured with regard to growth, health, development, and all other short- and long-term outcomes".³ In spite of their meticulous engineering over the last half century, human milk is far superior form of nutrition for most infants, as it serves a dual function of providing the optimal nutrition for growth and development, as well as disease protection.⁴ Furthermore, breast feeding provides numerous benefits to the infant, mother and the society in general. One of these benefits is being the only approved intervention during infancy to decrease the likelihood of developing obesity.⁵ It could be argued, however, since breast fed infant is the reference point, breast feeding does not protect against obesity, but rather that formula feeding increases the risk of being overweight. It is from this limited perspective that infant formulas may resemble some of the characteristics of fast food, such as being cheap, calorie-dense and easily accessible and contribute to the development of pediatric obesity.

Infant formulas are relatively cheap, especially when calculated on a per meal basis. An average six-month old that weighs 17 pounds and consumes 90 kcal/kg/day, requires approximately 34 ounces of mixed formula or about five ounces of formula powder per day. An average price for a thirteen ounce can of formula is fifteen dollars. Thus, the total daily formula expense comes to five dollars, or about 1.67 dollars per meal! Many impoverished families, unable to afford ongoing formula expenses, may qualify for state and federal programs, such as Special Supplemental Nutrition Program for Women, Infants and Children (WIC), which provides free formula. In fact, over half of all infant formulas sold in the United States are obtained through WIC.⁶ Furthermore, formula companies commonly give a significant amount of formula as free samples to new and expecting mothers, as their advertising campaign,^{7,8} thus further decreasing the cost of acquiring infant formula.

Although breast milk and standard infant formulas both contain 20 kilocalories per ounce, formula fed infants tend to consume more calories. Overfeeding is a common issue with bottle fed babies.⁹ This likely stems from a lack of self-regulation,¹⁰⁻¹² as the size of a bottle fed infant's meal is somewhat predetermined by caregivers. Breast fed infants, on the other hand, determine their own portion size, as well as maternal milk production by the intensity of their suckling.¹³ Breast feeding is also an active process requiring generation of negative intra-oral pressure, while bottle feeding is a relatively passive process. As a result, infants with craniofacial abnormalities who fail breast feeding may do well with bottle feeding.¹⁴ Health-

care providers have long recognized these feeding differences and thus common recommendation for breast fed neonate is to feed on demand, every 2-3 hours, while formula fed infants may feed every 3-4 hours. In addition to overfeeding, another reason for longer time interval between feeds is that formula is more difficult to digest leading to prolonged gastric emptying and thus producing longer satiety.¹⁵ The overfeeding effects of bottle fed infants have been quantified and in one study it resulted in six fold increased odds of obesity at 3 years of age, especially if solid food intake was initiated before 4 months of age.¹⁶

Infant formulas are easily accessible at all major stores. Moreover, a larger pool of care-providers other than the mother is available to offer feedings. This presents greater convenience and allows for feeding in places where breast feeding might not be socially acceptable. On the other hand, breast feeding initially is a more time consuming process and – like home cooking – in the beginning, it may take more time. However, with experience breast feeding mothers have stated that breast feeding becomes easier, more enjoyable and even restful.¹⁷

Some well recognized complications of pediatric obesity include a myriad of health problems such as insulin resistance, type 2 diabetes, non-alcoholic fatty liver disease, hyperlipidemia, sleep apnea, pseudotumor cerebri, orthopedic complications,¹⁸ as well as social rejection and scrutiny,^{19,20} diminished education potential,²¹ and a higher likelihood of living in poverty.²² The full extent of its negative implications is difficult to appreciate, as obesity impinges on every aspect of a child's life and its consequences are likely to extend far beyond childhood.²³ Some even fear that as a consequence of pediatric obesity this generation of American children might be the first in history to have shorter life expectancy than their parents.²⁴ Due to the magnitude of this effect, it might be argued that the formula industry will “catch up” and engineer a lower-calorie alternative. This is not likely to occur, however, since both breast milk and infant formulas already contain equivalent quantity of calories per ounce, the amount required for optimal brain development. Calorie reduction as a mode of obesity prevention is not a recommended intervention during infancy, so lower-calorie alternative is not a plausible solution.

Healthcare professionals need to continue encouraging exclusive breast feeding during the first six months and continued breastfeeding for up to two years of age.²⁰ One often overlooked reason for this recommendation is that it may help decrease the risk of developing obesity. It might be difficult to imagine that the choice others make for us early on might have such a profound effect, however, studies indicate that infancy may be a crucial time when predisposition to obesity develops.²⁵⁻²⁷ Pediatrician's voices must therefore be strong and clear to match the advertising campaigns by the formula industry. Pediatricians should advocate for breast feeding as zealously as they do for any other health-protecting and behaviour enhancing practice – for example vaccinations, safe car seats, a smoke-free

environment, and injury prevention – on behalf of society's largest vulnerable population group.

If we accept breast feeding as the norm against which every other foods for infants must be measured, then it should not be considered protective against obesity. Rather, other feeding methods must be recognized to increase the risk of being overweight, if their growth outcomes exceed those of breast fed infants. Health care providers should recognize this difference and provide anticipatory guidance indicating that infant formula feeding increases the risk of developing obesity and use it as a tool in an attempt to increase consumption of the most natural food source for infants, human milk.

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COMPETING INTERESTS

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REFERENCES

1. Ebbeling CB, Pawlak DB, Ludwig DS. Childhood obesity: public-health crisis, common sense cure. *Lancet*. 2002; 360: 473-482.
2. Lobstein T, Baur L, Uauy R. Obesity in children and young people: a crisis in public health. *Obes Rev*. 2004; 5(Suppl 1): 4-85. doi: [10.1111/j.1467-789X.2004.00133.x](https://doi.org/10.1111/j.1467-789X.2004.00133.x)
3. Gartner LM, Morton J, Lawrence RA, et al. Breastfeeding and the use of human milk. *Pediatrics*. 2005; 115: 496-506. doi: [10.1542/peds.2011-3552](https://doi.org/10.1542/peds.2011-3552)
4. Agostoni C, Braegger C, Decsi T, et al. Breast-feeding: A commentary by the ESPGHAN Committee on Nutrition. *J Pediatr Gastroenterol Nutr*. 2009; 49: 112-125.
5. Grummer-Strawn LM, Mei Z. Does breastfeeding protect against pediatric overweight? Analysis of longitudinal data from the Centers for Disease Control and Prevention Pediatric Nutrition Surveillance System. *Pediatrics*. 2004; 113: e81-e86.
6. Kent G. WIC's promotion of infant formula in the United States. *Int Breastfeed J*. 2006; 1: 8. [10.1186/1746-4358-1-8](https://doi.org/10.1186/1746-4358-1-8)
7. Frank DA, Wirtz SJ, Sorenson JR, Heeren T. Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. *Pediatrics*. 1987; 80: 845-854.

8. Bergevin Y, Dougherty C, Kramer MS. Do infant formula samples shorten the duration of breast-feeding? *Lancet*. 1983; 1: 1148-1151. doi: [10.1016/S0140-6736\(83\)92878-7](https://doi.org/10.1016/S0140-6736(83)92878-7)
9. Li R, Fein SB, Grummer-Strawn LM. Do infants fed from bottles lack self-regulation of milk intake compared with directly breastfed infants? *Pediatrics*. 2010; 125: e1386-e1393. doi: [10.1542/peds.2009-2549](https://doi.org/10.1542/peds.2009-2549)
10. Taveras EM, Rifas-Shiman SL, Scanlon KS, Grummer-Strawn LM, Sherry B, Gillman MW. To what extent is the protective effect of breastfeeding on future overweight explained by decreased maternal feeding restriction? *Pediatrics*. 2006; 118: 2341-2348.
11. Heinig MJ, Nommsen LA, Peerson JM, Lonnerdal B, Dewey KG. Energy and protein intakes of breast-fed and formula-fed infants during the first year of life and their association with growth velocity: the DARLING Study. *The American journal of clinical nutrition*. 1993; 58: 152-161.
12. de Bruin NC, Degenhart HJ, Gal S, Westerterp KR, Stijnen T, Visser HK. Energy utilization and growth in breast-fed and formula-fed infants measured prospectively during the first year of life. *The American journal of clinical nutrition*. 1998; 67: 885-896.
13. Lunn PG. Breast-feeding patterns, maternal milk output and lactational infecundity. *J Biosoc Sci*. 1992; 24: 317-324.
14. da Silva Dalben G, Costa B, Gomide MR, Teixeira das Neves LT. Breast-feeding and sugar intake in babies with cleft lip and palate. *The Cleft Palate-Craniofacial Journal*. 2003; 40: 84-87. doi: [10.1597/1545-1569\(2003\)040<0084:BFASII>2.0.CO;2](https://doi.org/10.1597/1545-1569(2003)040<0084:BFASII>2.0.CO;2)
15. Van Den Driessche M, Peeters K, Marien P, Ghoos Y, Devlieger H, Veereman-Wauters G. Gastric emptying in formula-fed and breast-fed infants measured with the ¹³C-octanoic acid breath test. *J Pediatr Gastroenterol Nutr*. 1999; 29: 46-51.
16. Huh SY, Rifas-Shiman SL, Taveras EM, Oken E, Gillman MW. Timing of solid food introduction and risk of obesity in preschool-aged children. *Pediatrics*. 2011; 127: e544-e551. doi: [10.1542/peds.2010-0740](https://doi.org/10.1542/peds.2010-0740)
17. Jones DA. Attitudes of breast-feeding mothers: a survey of 649 mothers. *Soc Sci Med*. 1986; 23: 1151-1156. doi: [10.1016/0277-9536\(86\)90333-3](https://doi.org/10.1016/0277-9536(86)90333-3)
18. Sokol RJ. The chronic disease of childhood obesity: the sleeping giant has awakened. *J Pediatr*. 2000; 136: 711-713. doi: [10.1067/mpd.2000.107787](https://doi.org/10.1067/mpd.2000.107787)
19. Cornette R. The emotional impact of obesity on children. *Worldviews Evid Based Nurs*. 2008; 5: 136-141. doi: [10.1111/j.1741-6787.2008.00127.x](https://doi.org/10.1111/j.1741-6787.2008.00127.x)
20. Zeller MH, Reiter-Purtill J, Ramey C. Negative peer perceptions of obese children in the classroom environment. *Obesity (Silver Spring)*. 2008; 16: 755-762. doi: [10.1038/oby.2008.4](https://doi.org/10.1038/oby.2008.4)
21. Fowler-Brown AG, Ngo LH, Phillips RS, Wee CC. Adolescent obesity and future college degree attainment. *Obesity (Silver Spring)*. 2010; 18: 1235-1241. doi: [10.1038/oby.2009.463](https://doi.org/10.1038/oby.2009.463)
22. Shrewsbury V, Wardle J. Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990-2005. *Obesity (Silver Spring)*. 2008; 16: 275-284. doi: [10.1038/oby.2007.35](https://doi.org/10.1038/oby.2007.35)
23. Dietz WH. Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*. 1998; 101: 518-525.
24. Olshansky SJ, Passaro DJ, Hershow RC, et al. A potential decline in life expectancy in the United States in the 21st century. *N Engl J Med*. 2005; 352: 1138-1145. doi: [10.1056/NEJMsr043743](https://doi.org/10.1056/NEJMsr043743)
25. Dennison BA, Edmunds LS, Stratton HH, Pruzek RM. Rapid infant weight gain predicts childhood overweight. *Obesity*. 2006; 14: 491-499.
26. Gillman MW. The first months of life: a critical period for development of obesity. *The American journal of clinical nutrition*. 2008; 87: 1587-1589.
27. Ekelund U, Ong KK, Linne Y, et al. Association of weight gain in infancy and early childhood with metabolic risk in young adults. *The Journal of clinical endocrinology and metabolism*. 2007; 92: 98-103. doi: [10.1210/jc.2006-1071](https://doi.org/10.1210/jc.2006-1071)