REVISTA CHILENA DE PEDIATRÍA
Sociedad Chilena de Pediatría
www.scielo.cl

Rev Chil Pediatr. 2017;88(1):15-21
DOI:

CLINICAL OVERVIEW

Benefits of breastfeeding and risks associated with not breastfeeding

Beneficios de la lactancia materna y riesgos de no amamantar

Paulina Brahm[a], Verónica Valdés[b]

[a]Department of Family Medicine, Pontificia Universidad Católica de Chile. Family Physician, Master in Public Health (International Heath)
[b]Pediatrician, Family Physician

Abstract

Breastfeeding is the nourishment designed by nature for newborns and infants; however, its prevalence is nowadays not optimal. The aim of this article is to review the current evidence of the benefits of breastfeeding for children and society and to elaborate the risks associated with replacing breast milk with baby formulas. Breastfeeding has been shown to be a protective factor for several infectious, atopic and cardiovascular diseases as well as for leukemia, necrotizing enterocolitis, celiac disease, and inflammatory bowel disease. It also has a positive impact on neurodevelopment, improving IQ, reducing the risk of attention deficit disorder, and generalized developmental and behavioral disorders. Lactation can decrease the risk of sudden infant deaths syndrome by 36% and prevent 13% of infant mortality worldwide. Breastfeeding result in direct saving on the use of infant formulas and bottles, as well as indirectly on associated health costs, premature deaths, and quality-adjusted life years, among others. In addition, breastfeeding is environmentally friendly; it does not leave an ecological footprint in its production and consumption. The use of baby formulas and bottles have inherent risks, because they increase the risk of oral diseases, such as mouth breathing, malocclusion, alteration of bite, and tooth decay. Finally, the intestinal microbiota, oxygenation, and thermoregulation of infants are negatively affected by their use.

Keywords – MeSH terms:
Breast Feeding;
Lactation;
Infant Formula;
Adverse Effects

Breastfeeding (BF) is inherent to mammals -humans among them- and in its absence none of those species would have survived[1]. However, as shown in Figure 1, during the last century BF has undergone marked changes[2]. Currently only 37% of infants under six months in low-and middle- income countries are exclusively breastfed, and this figure is even lower in high-income countries[1]. In Chile, according to data from the Department of Statistics and Health Information (DEIS), in 2005 the exclusive BF (EBF) rate at six months of life in the Public System was 46%, and in 2008 it reached 50%; however, the latest data for 2014 reports only 44.5%. By the year 2020, the goal is to reach 60% EBF at six months[3]. The objective of this article, therefore, is to review the updated evidence of the benefits of BF for the child and society, as well as to highlight the risks of using milk formulas to replace it.

Correspondence:
Paulina Brahm
paulinabrahm@gmail.com

Benefits of Breastfeeding for the Child

Infectious diseases

EBF, defined as feeding the infant only breastmilk (BM) without inclusion of solids or other liquids has been shown to decrease the risk of gastrointestinal in- fections[4]. Any volume of breastmilk is protective, associated with a 64% reduction in the incidence of non-specific gastrointestinal infections. There is also a residual protective effect for up to two months after discontinuation of lactation[5]. On the other hand, exclusively formula-fed infants have an 80% increase in the risk of diarrhea[6]. Infants fed BM during the first year of life have a 30% lower risk of rotavirus diarrhea[7], and BM has also been described as a protective factor against both symptomatic and asymptomatic Giardia infection[8]. The frequency of prolonged diarrhea is also lower in breastfed infants[9]. A systematic review (SR) assessing the risk of developing nonspecific gastrointestinal infections in children under one year from developed countries reported that those infants fed BM had a lower risk of developing these conditions[10].

There is an inverse correlation between BF and acute febrile illness during the first months of life[11]. Specifically in relation to newborns, it has been observed that the EBF or predominant BF is a protective factor against hospitalization for this cause[12].

In relation to respiratory infections, compared to children with EBF during the first six months of life, non-breastfed children have almost fifteen times more mortality from pneumonia. And among children between the ages of six and 23 months who were receiving complementary foods, those who were fed formula had twice the mortality from pneumonia as those who maintained BF for up to two years of life[13]. The risk of hospitalization for lower respiratory infection during the first year of life is decreased by 72% in children with EBF for at least 4 months. The severity of syncytial virus bronchiolitis is 74% lower in those children with EBF for at least 4 months compared to those who were partially breastfed or fed exclusively with formula[5]. Furthermore, children fed with any volume of breast milk have a 23% lower risk of developing acute otitis media; for those with EBF for at least three months, the risk is reduced by 50%, and if prolonged for up to six months, the risk is reduced by 63%[5]. These results are also valid for children living in developed countries[1,10].

Finally, a dose response has been observed between the type of feeding (EBF, mixed breastfeeding and exclusive formula) and the risk of infectious diseases such as diarrhea, acute febrile illness and respiratory infections during the first two years of life[6,11,13].

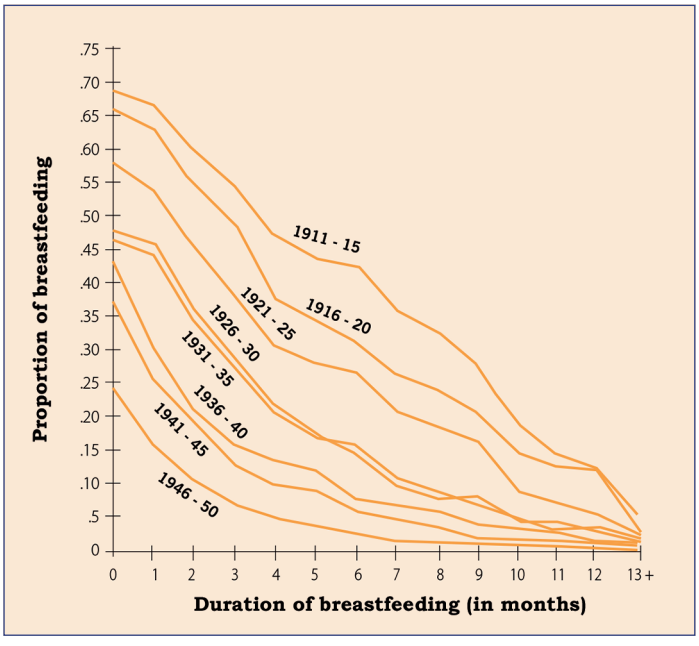

Figure 1. Length of BF during the last century (Taken from the Manual of Breastfeeding MINSAL 2010)[2].

Atopy, rhinitis, food allergies and asthma

Finnish infants breastfed for a shorter time showed a higher frequency of eczema, atopy, food allergy and respiratory allergy[14]. In those without a family history of atopy, the risk of asthma, atopic dermatitis and eczema is reduced by 27% when breastfed for at least three months[5], and the risk of atopic dermatitis is reduced by 42% in those children with a family history of atopy who are EBF for at least three months[10]. However other reviews have not found this correlation, so there is still no conclusive evidence[1]. EBF for at least four months protects against recurrent rhinitis[15].

Regarding food allergy, one review concludes that EBF for at least four months decreases the likelihood of allergy to cow's milk protein at 18 months, but does not have a relevant role in the protection of food allergy at one year of life[16].

An Australian cohort study evaluated the association between the duration of BF and the risk of asthma in children up to six years of age. It concluded that the introduction of dairy and non-dairy foods other than BM during the first four months of life increased the risk of asthma and wheezing by three or more times after the first year, wheezing during the previous year, and sleeping disorders due to wheezing[17]. In a study conducted in developed countries, it was observed that breastfeeding for at least three months reduced the risk of asthma by 27% in children without a family history of asthma. Those with a family history of asthma benefit even more, with the risk reduction of 40% in children younger than 10 years[10]. Another recent SR reported that in the general population breastfeeding

is a protective factor for asthma up to 2 years of age, but this effect decreases with time18. However other studies have been less conclusive about this[1,15].

Obesity, cardiovascular risk and diabetes

Although controversial, BF might play a protective role against obesity, hypertension, dyslipidemia and type 2 diabetes mellitus (DM) during adulthood[19]. Obesity rates are significantly lower in infants fed BM. There is a 15 to 30% risk reduction for obesity during adolescence and adulthood among those who were BF during childhood, compared to those not breastfed. The duration of lactation is inversely related to the risk of overweight; each extra month of BF is associated with a 4% decrease in risk[5]. Studies in different parts of the world have reported similar results[20-24]. In Chile, a case-control study concluded that EBF or predominant BF during the first six months of life is a protective factor against overweight and obesity during the preschool stage[25]. However, the interpretation of these data should be careful, since it is not clear if there are differences when the BM is given in bottle. This is of particular importance, since breastfed infants themselves regulate the ingested volume, and those infants who are fed using a bottle may have a lower ability to self-regulate their intake, which could affect adult weight gain[5].

With respect to hypertension, a prospective British study, which evaluated preterm infants and followed them through adolescence, found that those fed milk from a human milk bank had significantly lower mean and diastolic blood pressures than those fed formula for premature infants. No differences were found between the groups for systolic blood pressure (BP)[26]. The results of two SRs with moderate quality meta-analyses concluded that there is a reduction of less than 1.5 mm Hg in systolic BP and no more than 0.5 mm Hg of diastolic BP in adults who were breastfed in their infancy, compared to those fed formula[10].

With regard to dyslipidemia, there are studies that show no effect of BF[1]; however, a review of cohort and case-control studies found that there is a reduction in total and LDL cholesterol of 7 mg/dL and 7.7 mg/dL respectively, in adults who were breastfed as infants, compared with those who were not[10]. Regarding diabetes, a case-control study compared breastfed and non-breastfed infants at hospital discharge. Those not breastfed at discharge had a 33% higher risk of developing diabetes within the first 20 years of life[27]. Up to a 30% reduction in the incidence of type 1 DM in those with EBF for at least 3 months[5] has been reported, as well as a reduction of up to 40% in the incidence of type 2 DM, possibly in relation to the positive effect of long-term control of weight and self-control of food intake[1,5].

Leukemia

A recent SR that covered the literature of the last 50 years, concluded that BF for six months or more was associated with a 19% decrease in the risk of developing leukemia during childhood[28]. Another meta-analysis found similar results[10], and found that risk reduction is correlated with duration of BF, however the precise mechanism of protection is still unclear[5].

Necrotizing enterocolitis

In preterm infants, BM is associated with a 58% to 77% reduction in the risk of developing necrotizing enterocolitis (NEC). Every 10 infants who are exclusively breastfed prevents one case of NEC, and every eight prevent a case of NEC that requires surgery or results in death[5]. One study evaluated the impact of pasteurized donated breast milk in extreme preterm infants, where BM was insufficient or unavailable. It concluded that compared to those infants fed formula milk, those fed with human milk had a significantly lower risk of NEC and lower mortality from this disease[29]. Other papers have reported similar results[30,31].

Other pathologies

BF also has a protective role on celiac disease. There is a 52% reduction in the risk of development of celiac disease in infants with BF at the time of exposure to gluten. In addition there is an association between duration of BF and risk reduction when assessing the presence of celiac antibodies[5]. Furthermore, BF is associated with a 31% reduction in the risk of developing inflammatory bowel diseases during childhood[5].

Neurodevelopment

A cohort study evaluated 18-year-old adults using the Wechsler Adult Intelligence Scale (WAIS) and the Børge Priens Prøve (BPP); the results showed a dose-response relationship between duration of BF and all measurements of intelligence quotient (IQ). Those who were breastfed for less than one month had an IQ 6.6 points lower than those breastfed for 7 to 9 months on the WAIS scale and 2.1 points on the BPP[32]. Additionally, a meta- analysis of observational cohort and case-control studies conducted in several developed countries showed a significant difference of 3.16 points more in cognitive development in those breastfed as compared to those fed formula, and a greater benefit was also observed in those children breastfed longer[33]. In very low birth weight infants, the duration of BF correlated directly with verbal IQ score and performance on the Wechsler scale at 7-8 years, according to a cohort study[34].

In relation to the risk of developing attention deficit and autistic spectrum disorder a review found that BF for more than six months has a protective effect

Table 1. Percentage of decreased risk of developing pathologies, according to type of BF (Adapted from Pediatrics 2012)[5]

Pathology	Percentage decrease in risk	Type of Breastfeeding
Diarrhea	64	Any
Upper respiratory Infections	63	EBF > 6 months
Lower respiratory infections	72 77	EBF ≥ 4 months EBF ≥ 6 months
Bronchiolitis by respiratory syncytial virus	74	> 4 months
Acute otitis media	23 50	Any EBF ≥ 3 o 6 months
Recurrent acute otitis media	77	EBF ≥ 6 months
Atopic dermatitis	27 42	>3 months without family history >3 months with family history
Asthma	26 40	≥ 3 months, without family history of atopy ≥ 3 months, with family history of atopy
Obesity	24	Any
Obesity	30	> 3 months
DM, type 1	40	Any
DM, type 2	15-20	> 6 months
Leukemia	77	Exclusive breast milk during ICU hospitalization
Necrotizing enterocolitis	52	> 2 months, with exposure to gluten during BF
Celiac disease	31	Any

for both conditions[35]. In the same way, BF may play a role in reducing the risk of developing behavioral alterations[36].

Mortality

Finally, taking into account the 42 developing countries in which 90% of the world's infant mortality occurs, EBF for 6 months and weaning after a year of life is the most effective health intervention that exists. It has the potential to prevent more than one million infant deaths per year, which is equivalent to a 13% reduction in global infant mortality[5]. A Latin American ecological study comparing mortality rates during the first year of life found that approximately 14% of all infant mortality causes could have been prevented with EBF for at least the first 3 months of life and partial BF for the first year of life[37]. A review of three SRs found a correlation between early initiation of breastfeeding -within the first hour of life- and decreases in newborn mortality[38]. With respect to sudden infant death syndrome (SIDS), BF is associated with a 36% risk reduction, this being dose dependent. Moreover, it has been estimated that more than 900 children would be saved per year in the United States from SIDS if 90% of mothers exclusively breastfed their children during the first six months of life. This protective effect of breastfeeding on infant mortality is valid for both underdeveloped and developing countries, as well as those developed countries[1,10].

Benefits of Breastfeeding for the Society

A study that outlines the economic benefits of the BF for the United States shows that there are savings through decreasing state expenditure on milk formulas, a lower net cost of family food, and lower overall costs of health care. If 75% of neonates were BF were at the time of hospital discharge and 50% at 6 months postpartum, a savings of U.S. $ 3.6 billion could be achieved, using values from the year 1998. Moreover, these numbers are rather conservative since the costs associated with cognitive effects, various childhood diseases, and maternal or chronic illnesses are not included in the analysis; so the savings could be even higher[39].

Another US study that considers the impact of BF on mothers estimates that current BF rates in that country result in an annual excess of nearly 5,000 cases of breast cancer, more than 50,000 cases of hypertension, and nearly 14,000 cases of acute myocardial infarction, compared with a cohort of women who breastfed for at least one year. In addition, it concludes that suboptimal BF implies a total cost to society of $ 17.4 billion for premature deaths, $ 733.7 million for direct costs, and $ 126.1 million for indirect morbidity[40]. A statement

issued by the American Academy of Pediatrics based on a detailed cost analysis concluded that if 90% of American mothers exclusively breastfed their children at least 6 months, they would save US $ 13 billion each year. These savings do not include expenditures related to absenteeism at work by parents, or deaths in adults due to illnesses acquired in childhood such as asthma, type 1 DM, or obesity[5].

In an English economic impact assessment it was concluded that if all preterm infants born in 2013 had been fed BM, the health system would have saved an estimated £46.7 million (£30.1 million in the first year) and would have gained a total of 10,594 quality-adjusted life years (QALYs) in health improvements. In addition there would have been 238 fewer deaths from SIDS, resulting in a decrease of approximately £153.4 million in lifetime productivity[41].

Another assessment estimated the economic impact of increased intelligence by BF, assuming an increase of 4 IQ points if the group of children born in the year 2000 had been breastfed. The BF could mean up to U$900 billion in higher incomes, taking into account the potential earnings over the entire working life[42].

Finally, environmental sustainability is also affected by the use of milk formula bottles. BF is a "natural and renewable" food, environmentally friendly and safe, which is produced and delivered directly to the consumer without contamination, packaging or associated waste. The formulas on the other hand, leave a carbon footprint, require energy for their manufacture, material, packaging and transportation, and also need water, fuel and various detergents for daily preparation. Moreover, it is estimated that more than 4,000 liters of water are required for the production of one kilogram of milk powder formula[43].

Risks of Not Breastfeeding

Alteration of the oral cavity

It has been described that the use of a bottle interferes with the maturation of oral functions as the child grows. There would be an increased risk of atypical swallowing, mouth breathing, masticatory dysfunction, difficulties of phonoarticulation and an alteration of body posture, among others. In addition, there is an increase in the risk of mouth breathing, which leads to inadequate ventilation, increased respiratory infections, decreased hearing, altered thoracic and body posture development and altered maxillofacial development[44]. Also, a review concluded that BF was associated with 68% reduction in risk of developing malocclusion[1]. An Italian prospective cohort study further stated that breastfeeding would have a protective effect on the development of posterior crossbite in the temporal dentition[45]. Furthermore, the use of a bottle also increases the risk of cavities in children[44]. Thus, a SR with meta-analysis showed that breastfed children presented fewer cavities than those who used a bottle (OR: 0.43; 95% CI: 0.23-0.80)[46].

Alteration of intestinal microbiota

The microbiota plays a nutritional, metabolic, immunological, and protective role. It is established from childbirth, during breastfeeding and later by external factors. The type of feeding has therefore been shown to directly influence the composition of the intestinal microbiota. BF infants have a more stable and uniform microbial population compared to those fed formula (FF), and even small amounts of formula supplementation in breastfed infants change the normal microbiota to the pattern of infants fed only FF. This has future implications, since the microbiota acquired in early childhood are critical for determining immune response and tolerance, and alterations of the intestinal environment are responsible for inflammation of the mucosa, autoimmune pathology and allergic disorders in children and adults[47].

Alteration of oxygenation and thermoregulation

An Australian longitudinal prospective study evaluated oxygenation, heart rate, respiratory rate and body temperature patterns in breastfed and bottle fed preterm infants. These values were measured during 20 minutes of the feeding periods. Oxygen saturation and body temperature -even when breastfed children were outside the incubator- were significantly higher in breastfed infants. There were also two episodes of apnea and twenty episodes of oxygen desaturation to less than 90%, all of them during bottle feeding. The authors conclude that the breastfeeding process is physiologically more beneficial for feeding preterm infants[48]. Another American study aimed to evaluate the alteration of breathing patterns of term infants in relation to their feeding, comparing breastfed and bottle-fed infants. The results showed prolongation of expiration time, a reduction in respiratory rate, and a lower suction frequency in bottle-fed infants. In addition, bottle-fed infants experienced twice as many episodes of oxygen saturation to less than 90%, and some had episodes of bradycardia - a situation that did not occur in any of the breastfed infants[49].

In conclusion, BF has a positive impact on infant morbidity and mortality. Both mother's and donated breast milk can reduce the risk of various pathologies. Breastfeeding is environmentally friendly and also promotes an economic benefit derived not only flam direct savings by not consuming formula, but from a decrease in health expenses and an increase in years

and quality of life gained from breastfeeding. Finally, there are risks inherent in the use of formulas and bottles in replacement of BF, so it is important to encourage breastfeeding beginning in pregnancy, at childbirth and during puerperium in an empathetic, respectful and welcoming way as part of achieving whole health.

Ethical Responsibilities

Protection of people and animals: The authors state that no experiments have been performed on humans or animals for this research.

Confidentiality of data: The authors state that no patient data appears in this article.

Privacy rights and informed consent: The authors state that no patient data appears in this article.

Conflict of interests

The authors declare that they have no conflict of interest.

References

1. Victora, C.G., et al., Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. The Lancet, 2016. 387(10017): p. 475-490.
2. Ministerio de Salud, Manual de Lactancia Materna. 2010.
3. Ministerio de Salud. Subsecretaria de Salud Pública. División Políticas Públicas Saludables y Promoción. Depto. Nutrición y Alimentos, Vigilancia del Estado Nutricional de la Población Bajo Control y de la Lactancia Materna en el Sistema Público de Salud de Chile. 2014.
4. Kramer, M.S., et al., Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. JAMA, 2001. 285(4): p. 413-20.
5. Breastfeeding and the Use of Human Milk. PEDIATRICS, 2012 129(3): p. e827 -e84.
6. Scariati PD, Grummer-Strawn LM, and Fein SB. A, Longitudinal Analysis of Infant Morbidity and Extent of Breastfeeding in the United States. Pediatrics, 1997. 99(6).
7. Nacify AB, et al., Epidemiology of Rotavirus Diarrhea in Egyptian Children and Implications for Disease Control. Am J Epidemiol, 1999. 150(7): p. 770-777.
8. Morrow, A.L., et al., Protection against infection with Giardia lamblia by breast-feeding in a cohort of Mexican infants. J Pediatr, 1992. 121(3): p. 363-70.
9. Meremikwu, M.M., A.A. Asindi, and O.E. Antia-Obong, The influence of breast feeding on the occurrence of dysentery, persistent diarrhoea and malnutrition among Nigerian children with diarrhoea. West Afr J Med, 1997. 16(1): p. 20-3.
10. Ip, S., et al., Breastfeeding and maternal and infant health outcomes in developed countries. Evid Rep Technol Assess (Full Rep), 2007(153): p. 1-186.
11. Libraty, D.H., et al., Breastfeeding During Early Infancy is Associated with a Lower Incidence of Febrile Illnesses. Open Pediatr Med Journal, 2013. 7: p. 40-41.
12. Netzer-Tomkins, H., L. Rubin, and M. Ephros, Breastfeeding Is Associated with Decreased Hospitalization for Neonatal Fever. Breastfeeding Medicine, 2016. 11(5): p. 218-221.
13. Lamberti, L.M., et al., Breastfeeding for reducing the risk of pneumonia morbidity and mortality in children under two: a systematic literature review and meta-analysis. BMC Public Health, 2013. 13 Suppl 3: p. S18.
14. Saarinen, U.M. and M. Kajosaari, Breastfeeding as prophylaxis against atopic disease: prospective follow-up study until 17 years old. Lancet, 1995. 346(8982): p. 1065-9.
15. Bion, V., et al., Evaluating the efficacy of breastfeeding guidelines on long-term outcomes for allergic disease. Allergy, 2016. 71(5): p. 661-70.
16. Frank R. Greer, Scott H. Sicherer, and A.W. Burks, Effects of Early Nutritional Interventions on the Development of Atopic Disease in Infants and Children: The Role of Maternal Dietary Restriction, Breastfeeding, Timing of Introduction of Complementary Foods, and Hydrolyzed Formulas. Pediatrics, 2008. 121(1): p. 183-191.
17. Oddy, W.H., et al., Association between breast feeding and asthma in 6 year old children: findings of a prospective birth cohort study. BMJ, 1999. 319(7213): p. 815-9.
18. Dogaru, C.M., et al., Breastfeeding and childhood asthma: systematic review and meta-analysis. Am J Epidemiol, 2014. 179(10): p. 1153-67.
19. Kelishadi, R. and S. Farajian, The protective effects of breastfeeding on chronic non-communicable diseases in adulthood: A review of evidence.
20. Gillman, M.W., et al., Risk of overweight among adolescents who were breastfed as infants. JAMA, 2001. 285(19): p. 2461-7.
21. von Kries, R., et al., Breast feeding and obesity: cross sectional study. BMJ, 1999. 319(7203): p. 147-50.
22. Hediger, M.L., et al., Association between infant breastfeeding and overweight in young children. JAMA, 2001. 285(19): p. 2453-60.
23. Hess, C., A. Ofei, and A. Mincher, Breastfeeding and Childhood Obesity Among African Americans: A Systematic Review. MCN Am J Matern Child Nurs., 2015. 40(5): p. 313-9.
24. Aguilar Cordero, M.J., et al., Breastfeeding for the prevention of overweight and obesity in children and teenagers; systematic review. Nutr Hosp, 2014. 31(2): p. 606-20.
25. Jarpa, M.C., et al., Breastfeeding as a protective factor against overweight and obesity among pre-school children. Rev Chil Pediatr., 2015. 86(1): p. 32-7.
26. Singhal, A., T.J. Cole, and A. Lucas, Early nutrition in preterm infants and later blood pressure: two cohorts after randomised trials. Lancet, 2001. 357(9254): p. 413-9.
27. Jones, M.E., et al., Pre-natal and early life risk factors for childhood onset diabetes mellitus: a record linkage study. Int J Epidemiol, 1998. 27(3): p. 444-9.
28. Amitay, E.L. and L. Keinan-Boker, Breastfeeding and Childhood Leukemia Incidence: A Meta-analysis and Systematic Review. JAMA Pediatr, 2015. 169(6): p. e151025.
29. Sullivan, S., et al., An exclusively human milk-based diet is associated with a lower rate of necrotizing enterocolitis than a diet of human milk and bovine milk-based products. J Pediatr, 2010. 156(4): p. 562-7.
30. Herrmann, K. and K. Carroll, An exclusively human milk diet reduces

necrotizing enterocolitis. Breastfeed Med, 2014. 9(4): p. 184-90.
31. Meinzen-Derr, J., et al., Role of human milk in extremely low birth weight infants' risk of necrotizing enterocolitis or death. J Perinatol, 2009. 29(1): p. 57-62.
32. Mortensen, E.L., et al., The association between duration of breastfeeding and adult intelligence. JAMA, 2002. 287(18): p. 2365-71.
33. Anderson, J.W., B.M. Johnstone, and D.T. Remley, Breast-feeding and cognitive development: a meta-analysis. Am J Clin Nutr, 1999. 70(4): p. 525-35.
34. Horwood, L.J., B.A. Darlow, and N. Mogridge, Breast milk feeding and cognitive ability at 7-8 years. Arch Dis Child Fetal Neonatal Ed, 2001. 84(1): p. F23-7.
35. Bar, S., R. Milanaik, and A. Adesman, Long-term neurodevelopmental benefits of breastfeeding. Curr Opin Pediatr, .2016. 28(4): p. 559-66.
36. Rochat, T.J., et al., Exclusive Breastfeeding and Cognition, Executive Function, and Behavioural Disorders in Primary School-Aged Children in Rural South Africa: A Cohort Analysis. PLoS Med, 2016. 13(6): p. e1002044.
37. Betran, A.P., et al., Ecological study of effect of breast feeding on infant mortality in Latin America. BMJ, 2001. 323(7308): p. 303-6.
38. Edmond K, et al., Timing of initiation, patterns of breastfeeding, and infant survival: prospective analysis of pooled data from three randomised trials. Lancet Glob Health, 2016. 4(4): p. e266-75.
39. Weimer, J., The economic benefits of breastfeeding: A review and analysis. ERS Food Assistance and Nutrition Research Report No. 13. USDA Economic Research Service, Washington, D.C. . 2001.
40. Bartick, M.C., et al., Cost analysis of maternal disease associated with suboptimal breastfeeding. Obstet Gynecol, 2013. 122(1): p. 111-9.
41. Mahon, J., L. Claxton, and H. Wood, Modelling the cost-effectiveness of human milk and breastfeeding in preterm infants in the United Kingdom. Health Econ Rev, 2016. 6(1): p. 54.
42. Mcgregor and M. Barseghyan, Neurobiologically-Based Earning Benefits Of Being Breastfed: Longterm Economic Analysis JAMES 2016.
43. Rollins, N.C., et al., Why invest, and what it will take to improve breastfeeding practices? Lancet, 2016. 387(10017): p. 491-504.
44. Shellhorn, C. and V. Valdés, La leche humana, composicion, beneficios y comparación con la leche de vaca. Extraído y adaptado de Manual de Lactancia para Profesionales de la Salud. Comisión de Lactancia MINSAL, UNICEF., 1995. http://www.unicef.cl/lactancia/docs/mod01/Mod%20 1beneficios%20manual.pdf.
45. Viggiano, D., et al., Breast feeding, bottle feeding, and non-nutritive sucking; effects on occlusion in deciduous dentition. Arch Dis Child, 2004. 89(12): p. 1121-3.
46. Avila, W.M., et al., Breast and Bottle Feeding as Risk Factors for Dental Caries: A Systematic Review and Meta-Analysis. PLoS One, 2015. 10(11): p. e0142922.
47. Guaraldi, F. and G. Salvatori, Effect of Breast and Formula Feeding on Gut Microbiota Shaping in Newborns. Front Cell Infect Microbiol, 2012. 2(94).
48. Chen, C.-H., et al., The Effect of Breast- and Bottle-Feeding on Oxygen Saturation and Body Temperature in Preterm Infants. Journal of Human Lactation, 2000. 16(1): p. 21-27.
49. Mathew, O.P. and J. Bhatia, Sucking and breathing patterns during breast- and bottle-feeding in term neonates: Effects of nutrient delivery and composition. American Journal of Diseases of Children, 1989. 143(5): p. 588-592