

# Benefits of Breastfeeding

Department of Health and Human Service Office on Women's Health

## ■ ABSTRACT

Infants who are breastfed experience fewer incidences of infectious and noninfectious diseases and less severe cases of diarrhea, respiratory infections, and ear infections. This article reviews the benefits to mother and child of breastfeeding and provides information for situations in which breastfeeding should not be implemented. *Nutr Clin Care*. 2003;6:125-131 ■

**KEY WORDS:** breastfeeding, infectious disease resistance, nutritional benefits

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## INTRODUCTION

Extensive research on the biology of human milk and on the health outcomes associated with breastfeeding has established that breastfeeding is more beneficial than formula feeding. Breastfed infants experience fewer cases of infectious and noninfectious diseases as well as less severe cases of diarrhea, respiratory infections, and ear infections<sup>1-15</sup>. Mothers who breastfeed experience less postpartum bleeding, earlier return to pre-pregnancy weight, and a reduced risk of ovarian cancer and pre-menopausal breast cancer<sup>16-26</sup>. Furthermore, breastfeeding is cost-beneficial to families<sup>9</sup>. Based on this evidence, the American Academy of Pediatrics has stated that "The breastfed 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"<sup>27</sup>. Thus, human milk is uniquely suited for human infants.

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## RESISTANCE TO INFECTIOUS DISEASES

Human milk contains an abundance of factors that are active against infection. Since the infant's immune system is not fully mature until about 2 years of age, the transfer of these factors from human milk provides a distinct advantage that infants fed formula do not experience. Specifically, human milk contains immunologic agents and other compounds, such as secretory antibodies, leukocytes, and carbohydrates that act against viruses, bacteria, and parasites<sup>28-29</sup>. Overall, research shows that breastfeeding may decrease the incidence of several acute bacterial and viral infections in infants (Table 1).

## ENHANCED IMMUNE SYSTEM

Breastfed infants, compared with formula-fed infants, produce enhanced immune responses to polio, tetanus, diphtheria, and *Haemophilus influenzae* immunizations, and to respiratory syncytial virus infection, a common infant respiratory infection<sup>28,30-31</sup>. Human milk contains anti-inflammatory factors and other factors that regulate the response of the immune system against infection<sup>28</sup>. There is also evidence that breastfeeding results in earlier development of the infant immune system<sup>32</sup>. Protection against infection is strongest during the first several months of life for infants who are breastfed exclusively<sup>2,4,12,33-36</sup>. Several studies suggest that the benefits continue even after breastfeeding ceases<sup>2,4,37</sup>, and a few studies have found that breastfeeding into the second 6 months of life protects against infection<sup>12-13,38</sup>. Longer durations of breastfeeding may provide an even stronger protective effect<sup>2,4,39,37,40</sup>. Finally, children who were breastfed exclusively have fewer illnesses than those who were never breastfed<sup>2,33,35</sup>.

**Table 1.** Infections That Are Lower in Incidence or Severity in Breastfed Infants Than in Formula-fed Infants

- Diarrhea<sup>18,21,29-30,46</sup>
- Respiratory tract infection<sup>18,21,46-49</sup>
- Otitis media<sup>19,29,50-51</sup>
- Pneumonia<sup>52-53</sup>
- Urinary infection<sup>54-55</sup>
- Necrotizing enterocolitis<sup>56-57</sup>
- Invasive bacterial infection<sup>44,59-61</sup>

## NUTRITIONAL AND GROWTH BENEFITS

Human milk contains a balance of nutrients that more closely matches human infant requirements for growth and development than does the milk of any other species<sup>41</sup>. For example, compared to cow's milk, human milk is low in total protein and low in casein, making it more readily digestible and less stressful on immature infant kidneys. The lipids and enzymes in human milk promote efficient digestion and utilization of nutrients<sup>41-42</sup>. Scientific evidence suggests that the normal pattern for breastfed infants is to gain less weight and to be leaner at 1 year of age than formula-fed infants, while maintaining normal activity level and development<sup>43</sup>. This early growth pattern may influence later growth patterns, resulting in less overweight and obesity among children who were breastfed<sup>43-51</sup>. Despite the finding that many African American infants are premature or small at birth, premature babies fare better when breastfed compared to premature babies who are fed formula<sup>44,52</sup>.

## REDUCED RISK FOR CHRONIC DISEASES

Many studies in infant feeding have found lower rates of several chronic childhood diseases among children who were breastfed. Recent findings suggest that breastfeeding may reduce the risk of type 1 and 2 diabetes<sup>53-56</sup>, celiac disease<sup>57-60</sup>, inflammatory bowel disease<sup>61-63</sup>, childhood cancer<sup>11,64-65</sup>, and allergic disease/asthma<sup>15,66-70</sup>. Mixed results from some studies suggest that further research is needed to establish some of these benefits<sup>71-74</sup>.

## DEVELOPMENTAL BENEFITS

Considerable interest has been raised about the potential effect of breastfeeding on cognitive development<sup>75-81</sup>. Long-chain polyunsaturated fatty acids, available in breast milk, are important for brain

growth and development<sup>77-81</sup>. Observations in some studies on neurological and cognitive outcomes in breastfed children have led to a hypothesis that the early visual acuity and cognitive function of these children is greater than in non-breastfed children<sup>75,78-79</sup>. However, this hypothesis has not been conclusively proven<sup>76,80</sup>.

## IMPROVED MATERNAL HEALTH

Breastfeeding has several positive hormonal, physical, and psychosocial effects on the mother. Breastfeeding increases levels of oxytocin, a hormone that stimulates uterine contractions, helping to expel the placenta, to minimize postpartum maternal blood loss, and to induce a more rapid uterine involution<sup>82-83</sup>. Breastfeeding, particularly exclusive breastfeeding, delays the resumption of normal ovarian cycles and the return of fertility in most women<sup>84</sup>. Mothers who breastfeed their infants may also experience psychological benefits, such as increased self-confidence and facilitated bonding with their infants<sup>85-87</sup>. Studies have shown that breastfeeding for longer time periods (up to 2 years) and among younger mothers (early 20s) may reduce the risk of premenopausal and possibly postmenopausal breast cancer<sup>18-23,88</sup>. In addition, the risk of ovarian cancer may be lower among women who have breastfed their children<sup>24-26</sup>.

## SOCIOECONOMIC BENEFITS

Breastfeeding provides economic and social benefits to the family, the health care system, the employer, and the nation<sup>89</sup>. Families can save several hundred dollars over the cost of feeding breast milk substitutes, even after accounting for the costs of breast pump equipment and additional food required by the nursing mother<sup>90</sup>. Breastfed infants typically require fewer sick care visits, prescriptions, and hospitalizations, especially if breastfed exclusively or almost exclusively<sup>9</sup>. Consequently, total medical care expenditures were about 20% lower for fully breastfed infants than for never-breastfed infants<sup>91</sup>. Because of the high occurrence of poverty among African Americans, these families would benefit substantially from breastfeeding their infants<sup>92</sup>. Employers also benefit when their employees breastfeed. Breastfed infants are sick less often; therefore, maternal absenteeism from work is significantly lower in companies with established

lactation programs<sup>93</sup>. In addition, employer medical costs are lower and employee productivity is higher.

## CAUTIONS ABOUT BREASTFEEDING

Human milk provides the most complete form of nutrition for infants, including premature and sick newborns, with rare exceptions<sup>27</sup>. When direct breastfeeding is not possible, expressed human milk, fortified when necessary for the premature infant, should be provided<sup>27</sup>. Professional health care advice against breastfeeding or recommendations about premature weaning should be based on a careful consideration of the general benefits of breastfeeding, the risks of not receiving human milk, and the most up-to-date information about the following situations.

Under certain conditions, women should not breastfeed:

- HIV-infected women in the United States should not breastfeed or provide their breast milk for the nutrition of their own or other infants because of the risk of HIV transmission to the child<sup>94-96</sup>. In countries with populations at increased risk for other infectious diseases and nutritional deficiencies resulting in infant death, the mortality risks associated with not breastfeeding may outweigh the possible risk of transmission of HIV infection<sup>27</sup>.
- Women with human T-cell leukemia virus type 1 (HTLV-1) should not breastfeed because of the risk of transmission to the child<sup>97</sup>.

Under certain conditions, a case-by-case assessment should be made of whether or not breastfeeding is advisable or should be temporarily suspended. A physician should evaluate cases involving:

- Environmental Exposures: During the last 30 years, environmental chemicals, such as polychlorinated biphenyls (PCBs), DDT, dioxin, methyl mercury, and lead have appeared in breast milk without occupational or even known exposure on the part of the woman<sup>98</sup>. Although most women have detectable levels of these agents, there are no established "normal" or "abnormal" values for clinical interpretation; therefore, breast milk is not routinely tested for these environmental pollutants. Thus far, effects on the nursing child have been seen primarily in poisonings where the mother herself was clinically ill<sup>99</sup>. Advisories are issued by the states, U.S. territories, Native American tribes, and the Environmen-

tal Protection Agency to inform residents of potential health risks from consuming contaminated non-commercially caught fish and wildlife. These advisories identify specific fish and wildlife species from specific water bodies<sup>100</sup>. These fish advisories should be followed.

- Hepatitis C: Transmission of hepatitis C through breast milk has not been established. The risk of infection among infants of infected mothers is the same whether breast or bottle fed. However, bleeding or cracked nipples on the breast of a woman positive for hepatitis C may put a breastfeeding infant at risk for transmission of hepatitis C<sup>101</sup>.
- Illicit Drugs: Amphetamines, cocaine, heroin, marijuana, and phencyclidine should not be ingested by the nursing mother. Not only are they hazardous to the nursing infant, but also they are detrimental to the physical and emotional health of the mother. This list is not complete; no drug of abuse should be ingested by nursing mothers even in the absence of adverse reports in the literature<sup>102-103</sup>.
- Implants and Breast Surgery: It is not known whether breastfeeding by women who have breast implants has an effect on the nursing infant<sup>104</sup>. Many women with implants lactate successfully. Women who have had reduction mammoplasty may not be able to lactate if the glandular tissue has been removed or the connection between it and the nipple is interrupted.
- Metabolic Disorders: An infant born with galactosemia cannot metabolize lactose, a sugar found in all mammalian milk. Such infants must be fed plant-derived formula<sup>105</sup>. Infants with phenylketonuria can be successfully breastfed, but doing so requires special clinical management<sup>106</sup>.
- Pharmaceutical Drugs: For most prescribed and over-the-counter medications taken by women, the risk to the nursing infant is unknown. A few medications make it necessary to discontinue breastfeeding. For example, cyclophosphamide, cyclosporin, doxorubicin, ergotamine, methotrexate, and radioactive isotopes are prohibited during lactation<sup>27,102</sup>. Pharmaceutical drugs that effect the central nervous system, such as anti-anxiety, anti-depressant, and anti-psychotic agents, are of special concern when taken by nursing mothers<sup>102</sup>. Some pharmaceutical agents such as bromocriptine and possibly estrogens in contraceptive doses make breastfeeding more difficult because they decrease breast milk production and consequently shorten breastfeeding

duration<sup>102</sup>. A woman taking any of those drugs should not breastfeed without first consulting her health care provider.

- Tobacco and Alcohol Consumption: Alcohol appears in breast milk<sup>107-108</sup>. For this reason, and for the general health of the mother, if alcohol is used, intake should be limited. The American Academy of Pediatrics Committee on Drugs lists alcohol as "usually compatible with breastfeeding"<sup>102</sup>. Nursing mothers should not smoke. Nicotine is present in the breast milk of smokers and may adversely affect milk volume<sup>109</sup>. However, for women who cannot or will not stop smoking, breastfeeding is still advisable, since the benefits of breast milk outweigh the risks from nicotine.

### Acknowledgment

This document presents the consensus of the members and reviewers on the HHS Subcommittee on Breastfeeding; it does not necessarily reflect the policy of the non-federal representative organizations.

In March 1998, the Environmental Health Policy Committee, which is chaired by the Surgeon General of the United States, requested that the HHS Office on Women's Health lead the Subcommittee on Breastfeeding in preparing the HHS Blueprint for Action on Breastfeeding. Federal representatives throughout the Department of Health and Human Services worked in partnership with the Department of Agriculture, the Environmental Protection Agency, and the U.S. Agency for International Development to develop this report. The Federal Liaison Members on the Subcommittee on Breastfeeding represent individuals with a broad range of expertise in breastfeeding: leaders of nonprofit breastfeeding organizations; representatives from major hospital, medical, and nursing organizations; private sector experts; and university-based researchers.

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