

# Scientific Rationale: Benefits of Breastfeeding. 2012

## Key messages:

- High coverage with optimal breastfeeding practices has potentially the single largest impact on child survival of all preventive interventions. The evidence on the many and remarkable benefits of breastfeeding is well known.
- The exclusive breastfeeding rate in developing countries is only 36% and an estimated 34 million infants are not exclusively breastfed. Significant progress is possible, as demonstrated by a number of countries, especially in Africa.
- Global declarations of commitment have been signed and strategies and tools to implement evidence-based programmes to improve breastfeeding practices have been developed.
- Today, one of the biggest threats to optimal infant feeding may be complacency. With competing priorities, disease-specific funding, and an interest in technologies, campaigns and products, the attention breastfeeding receives is very small given the magnitude of the problem and the potential impact.
- Interventions to improve infant and young child feeding need increased commitment and prioritization if sustainable achievements in child survival, growth and development are to be attained.

## 1. Physiological & scientific background

Breastmilk provides all of the nutrients, vitamins and minerals an infant needs for growth for the first six months, and no other liquids or food are needed. Breastmilk carries antibodies from the mother that help combat disease, which breastmilk substitutes cannot contain. In addition, breastmilk contains digestive enzymes which breastmilk substitutes do not contain, and therefore the infant easily digests and efficiently uses the breastmilk [1]. From the age of six months, breast milk is no longer sufficient by itself, but it continues to be an important source of energy, high quality nutrients and anti-infective factors beyond six months of age.

### Survival benefits:

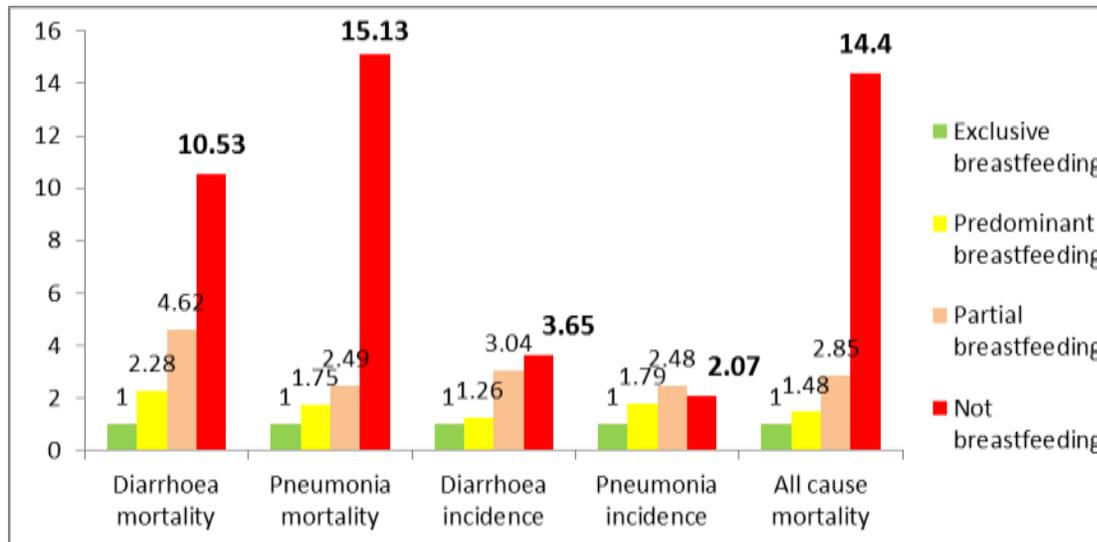
- Optimal breastfeeding practices in the first two years of life<sup>1</sup>, especially exclusive breastfeeding for the first six months of life, can have the **single largest impact on child survival** of all preventive interventions, with the potential to prevent 12-13% of all under-5 deaths in the developing world, or 1.4 million lives, according to the 2008 Lancet Nutrition Series [2]
- There is growing evidence of the significant impact of early initiation of breastfeeding (within first hour and first day after birth) on **reducing overall neonatal mortality**. A recent study from rural Ghana [3] shows that early initiation within the first hour could prevent 22% of neonatal deaths and initiation of breastfeeding within the first day could prevent 16% of neo-natal deaths. A study in Nepal [4] found that approximately 19.1% and 7.7% of all neo-natal deaths could be avoided with universal initiation of breastfeeding within the first hour and first day of life respectively.
- **Feeding of colostrum**, the breastmilk women produce in the first few days after birth, is very important for the infant, as it is rich in antibodies and white cells to protect against infection; it helps prevent jaundice, has growth factors which help the intestine to mature and is rich in Vitamin A. A study in India showed that neonatal and postneonatal deaths were around 5-6 times

<sup>1</sup> Optimal breastfeeding is exclusive breastfeeding for the first six months of life and continued breastfeeding up to 2 years or beyond, together with age-appropriate, nutritionally adequate and safe complementary foods or beyond.

lower in infants fed colostrum than among those not fed colostrum [5]. However, in many cultures colostrum is discarded due to traditional beliefs.

- **Breastfed children have at least 14 times greater chance of survival** in the early months than non-breastfed children [6]. In the first 6 months of life, non-breastfed infants were more than 14 times more likely than to die from all causes, 10 times more likely to die from diarrhoea and 15 times more likely to die from acute respiratory infection - two major child killers. During the first six months, the rates of infections are lower for exclusively breastfed than for partially breastfed infants [7]. Diarrhea incidence and mortality is especially elevated among non-breastfed infants in developing country situations with a high burden of disease and low access to clean water and sanitation [8]. The protective effect of breastfeeding against all infections was shown to be highest in poorly educated mothers. In addition, breastfed infants have a reduced incidence of serious infections affecting the whole body (sepsis) [9], ear infections [10] and other infections. Breastfed infants also have a reduced risk of Sudden Infant Death Syndrome [11]

**Relative risk of not breastfeeding for infections and mortality compared to exclusive breastfeeding from 0-5 months**



Source: Lancet 2008, Nutrition Series

- **Breastfeeding protects infants against diarrhea through two mechanisms:** 1) reduced risk of bacteria from contaminated formula, other liquids and complementary foods, and 2) the transfer of maternal antibodies through breastmilk [12].
- **Breastfeeding and HIV – the first 6 months:** In three large studies conducted in Africa, exclusive breastfeeding for up to six months was associated with a three to four fold decreased risk of transmission of HIV compared to mixed feeding<sup>2</sup> [13], [14], [15]. Weighed against the low but ongoing risk of transmission through breastmilk [16], breastfeeding substantially reduces the risk of infant mortality from other infectious diseases and malnutrition on average by 4–6 fold in the first six months and close to twofold in the second six months of life [17]. Since breastfeeding as commonly practiced carries a cumulative risk of transmission of around 1% for every additional month of breastfeeding, feeding the infant with breastmilk for a shorter period than usual reduces this risk. However, any benefits of shortening the exclusive breastfeeding period in terms of HIV transmission are unlikely to overcome the elevated risks of morbidity, mortality and malnutrition

<sup>2</sup> Mixed feeding is breastmilk given together with other milk, liquids or foods.

from early cessation before six months. Breastfeeding of HIV-infected infants beyond six months was associated with improved survival compared to stopping breastfeeding [18].

- **Non-breastfed children in industrialized countries** are also at greater risk of illness and death - a study of post-neonatal mortality in the United States found a 21% decreased risk of mortality among breastfed infants [19], as well as an increased risk of diarrhoea [20] and respiratory infections [21] in non-breastfed infants. A large volume on the evidence for the many benefits of breastfeeding in industrialized countries has been compiled [22]
- Benefits of **continued breastfeeding from 6-23 months** include a reduced risk of all-cause mortality and reduced diarrhea incidence [23].

**Benefits for nutritional status:** Breastfeeding helps prevent growth faltering and stunting, particularly as it reduces the risk of illnesses [24], [25], [26], [27]. Breastfeeding protects against weight loss due to diarrhea [28], and in some studies children exclusively breastfed were shown to be less likely to be stunted [29]. Due to its large impact on reduction of infectious diseases, breastfeeding plays a role in reduction of stunting, as infectious diseases are important determinants of stunting [30]. However, breastfed children will still become stunted if they do not receive an adequate quantity and quality of complementary foods from the age of six months onwards [31].

**Benefits in terms of reduced chronic conditions:** Reduction of chronic disease risk can be promoted as an additional potential benefit of breastfeeding. Breastfeeding lowers the risk of chronic conditions later in life compared to artificially-fed infants, including allergies, asthma, overweight and obesity [32], diabetes [33], heart disease [34] and cardiac risk factors such as hypertension [35] and high cholesterol levels [36], and cancers such as childhood leukaemia [37] and breast cancer later in life [38].

#### **Benefits for intellectual and motor development**

Many studies confirm that children who are breastfed do better on tests of cognitive [39] and motor [40] development, as well as academic outcomes [41] than children who are not breastfed. Infants fed breastmilk tend to have higher IQ scores [42]. The unique physical contact between mother and infant provided by breastfeeding also is thought to provide psychosocial stimulation and bonding that may have developmental benefits.

**Benefits for maternal health:** Initiation of breastfeeding immediately after delivery helps to contract the uterus, expel the placenta, and reduce bleeding. Breastfeeding may also lead to a more rapid return to pre-pregnancy weight. Exclusive breastfeeding may also delay the return of fertility, thus reducing exposure to the maternal health risks associated with short birth intervals [43]. Early cessation of breastfeeding or not breastfeeding was associated with an increased risk of maternal postpartum depression [44]. In the longer term, mothers who breastfeed tend to be at lower risk of premenopausal breast cancer [45] and ovarian cancer [46].

**Economic benefits:** Analyses of studies show clearly that apart from being the safest and healthiest infant feeding method, breastfeeding is also the least expensive [47]. For many poor households, the high cost of breastmilk substitutes, feeding and sterilizing equipment, fuel, represents a substantial drain on scarce household resources. Added to this are the cost of health care for the sick infant [48]. When infant illness requires mothers to miss work, employers and the economy are also affected [49]. Although the economic costs of not breastfeeding generally are considered to be greatest for poor households and poor countries, the evidence suggests that the impact in developed countries is also serious [50].

## Benefits of breastfeeding – an example from a training slide<sup>3</sup>

### Benefits of breastfeeding

**FOR THE BABY:**

- Improved growth and nutrition status
- Less likely to die
- Increased bonding
- Lower risk of chronic diseases (diabetes, heart disease, asthma, some cancers)
- Less diarrhoea and respiratory infections
- Lower risk of overweight/obesity
- Less ear infections, GI disorders, skin conditions and SIDS
- Improved cognitive and motor development



**FOR THE MOTHER:**

- Mother less likely to become pregnant in early months
- Faster maternal recovery and weight loss post partum
- Lower risk of maternal cancers (ovarian and breast cancer)
- Less post-partum depression

## Risks of artificial feeding – an example from a training slide

### Risks of artificial feeding

**FOR THE BABY:**

- Poorer growth and nutrition status
- More likely to die
- Increased risk of chronic diseases (diabetes, heart disease, asthma, some cancers)
- More diarrhoea and respiratory infections
- Overweight/obesity
- Increased ear infections, GI disorders, skin conditions and SIDS
- Lower scores on intelligence tests
- Interferes with bonding



**FOR THE MOTHER:**

- Mother may become pregnant sooner in early months
- More post-partum depression
- Increased risk of maternal cancers (ovarian and breast cancer)
- Slower maternal recovery and less weight loss post partum

## References

- <sup>1</sup> Lawrence R. Breastfeeding: A Guide for the Medical Profession. 1994
  - <sup>2</sup> Robert Black et al., Maternal and Child Undernutrition 1: global and regional exposures and health consequences. The Lancet 2008; 371(9608): 243-260
  - <sup>3</sup> Edmond, K et al. Delayed Breastfeeding Initiation Increases Risk of Neonatal Mortality. Pediatrics. 2006 Mar;117(3):e380-6.
  - <sup>4</sup> Breastfeeding Patterns, Time to Initiation and Mortality Risk Among Newborns in Southern Nepal. Mullany L etc al. The Journal of Nutrition 138: 599-603. 2008.
- <sup>3</sup> Adapted from: WHO/UNICEF Integrated IYCF counseling course, 2007.

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- <sup>5</sup> Singh K, Srivastava P. The effect of colostrum on infant mortality: Urban rural differentials. *Health and Population* 1992;15(3&4):94–100.
- <sup>6</sup> Black R. *et al.* Maternal and child undernutrition: global and regional exposures and health consequences. (Maternal and Child Undernutrition Series 1). *The Lancet* 2008.
- <sup>7</sup> Arifeen S, Black RE, Antelman G, Baqui A, Caulfield L, Becker S. Exclusive breastfeeding reduces acute respiratory infection and diarrhoea deaths among infants in Dhaka slums. *Pediatrics* 2001; 108: E67
- <sup>8</sup> Leon-Cava et al. Quantifying the benefits of breastfeeding: a summary of the evidence. PAHO. 2002
- <sup>9</sup> Furman L. et al. The effect of maternal milk on neonatal morbidity of very low-birth-weight infants. *Arch. Pediatr. Adolesc. Med.*, 2003; 157:66–71.
- <sup>10</sup> Duncan B, Ey J, Holberg CJ, Wright AL, Martinez F, Taussig LM. Exclusive breastfeeding for at least 4 months protects against otitis media. *Pediatrics* 1993; 91:867–72.
- <sup>11</sup> McVea, K.L., P. D. Turner and D.K. Pepler. The role of breastfeeding in sudden infant death syndrome. *J. Hum. Lact.*, Feb. 2000; 16(1): 13–20.
- <sup>12</sup> Long KZ, Wood JW, Gariby EV, Weiss KM, Mathewson JJ, de la Cabada FJ, et al. Proportional hazards analysis of diarrhea due to Enterotoxigenic *Escherichia coli* and breastfeeding in a cohort of urban Mexican children. *Am J Epidemiol* 1994;139:193– 205.
- <sup>13</sup> Coovadia HM et al. Mother-to-child transmission of HIV-1 infection during exclusive breastfeeding: the first six months of life. *Lancet*, 2007, 369:1107-1116.
- <sup>14</sup> Becquet R et al. Acceptability of exclusive breast-feeding with early cessation to prevent HIV transmission through breast milk, ANRS 1201/ 1202 Ditrane Plus, Abidjan Cote d'Ivoire. *Journal of Acquired Immune Deficiency Syndromes*, 2005, 1–9.
- <sup>15</sup> Iliff P et al. Early exclusive breastfeeding reduces the risk of postnatal HIV-1 transmission and increases HIV-free survival. *AIDS*, 2005; 19:699-708.
- <sup>16</sup> The BHITS Group. Late Postnatal Transmission of HIV-1 in breast-fed children: An individual patient data meta-analyses. *Journal of Infectious Diseases* 2004, 189:2154–2166.
- <sup>17</sup> WHO Collaborative Study Team on the role of breastfeeding on the prevention of infant mortality, effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analyses. *Lancet*, 2000, 355:451–455.
- <sup>18</sup> WHO: HIV and infant feeding : update based on the technical consultation held on behalf of the Inter-agency Team (IATT) on Prevention of HIV Infections in Pregnant Women, Mothers and their Infants, Geneva, 25-27 October 2006. 2007.
- <sup>19</sup> Chen A, Rogan WJ. Breastfeeding and the risk of postneonatal death in the United States. *Pediatrics*. 2004 May;113(5):e435-9
- <sup>20</sup> Scariati PD, Grummer-Strawn LM, Fein SB. A longitudinal analysis of infant morbidity an extent of breastfeeding in the United States. *Pediatrics* 1997;99:e5.
- <sup>21</sup> Cushing AH, Samet JM, Lambert WE, Skipper BJ, Hunt WC, Young SA, et al. Breastfeeding reduces the risk of respiratory illness in infants. *Am J Epidemiol* 1998;147:863–70.

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- <sup>22</sup> Ip S, Chung M, Raman G, et al. Breastfeeding and maternal and infant health outcomes in developed countries. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2007
- <sup>23</sup> Mølbaek K, Gottschau A, Aaby P, Hojlyng N, Ingholt L, de Silva APJ. Prolonged breast feeding, diarrhoeal disease, and survival of children in Guinea-Bissau. *Br Med J* 1994;308:1403–6.
- <sup>24</sup> Villalpando S, Lopez-Alarcon M. Growth Faltering is Prevented by Breastfeeding in Underprivileged Infants in Mexico City. *J Nutr.* Mar 1997; 127(3):436-43.
- <sup>25</sup> Froozani MD, Permezhadeh K, Motlagh AR, Golestan B. Effect of breastfeeding education on the feeding pattern and health of infants in their first 4 months in the Islamic Republic of Iran. *Bull World Health Organ.* 1999; 77(5):381-5.
- <sup>26</sup> Arifeen SE, Black RE, Caulfield LE, Antelman G, Baqui AH. Determinants of infant growth in the slums of Dhaka: size and maturity at birth, breastfeeding and morbidity. *Eur J Clin Nutr.* 2001 Mar; 55(3):167-78.
- <sup>27</sup> Kramer MS, Guo T, Platt RW, Shapiro S, Collet JP, Chalmers B, Hodnett E, Sevkovskaya Z, Dzikovich I, Vanilovich I; PROBIT Study Group. Breastfeeding and infant growth: biology or bias? *Pediatrics.* 2002 Aug; 110(2 Pt 1):343-7.
- <sup>28</sup> Bøhler E, Aalen O, Bergstrøm S, Halvorsen S. Breast feeding and seasonal determinants of child growth in weight in east Bhutan. *Acta Paediatr.* 1995 Sep;84(9):1029-34
- <sup>29</sup> Engebretsen IM, Tylleskär T, Wamani H, Karamagi C, Tumwine JK. Determinants of infant growth in Eastern Uganda: a community-based cross-sectional study. *BMC Public Health.* 2008 Dec 22;8:418
- <sup>30</sup> Scrimshaw NS, Taylor CE, Gordon JE. Interactions of nutrition and infection. Geneva: World Health Organization, 1968
- <sup>31</sup> Robert Black et al., Maternal and Child Undernutrition 1: global and regional exposures and health consequences. *The Lancet* 2008; 371(9608): 243-260
- <sup>32</sup> Grummer-Strawn, L., and Z. Mei. Does Breastfeeding Protect Against Pediatric Overweight?: Analysis of longitudinal data from the Centers for Disease Control and Prevention Pediatric Nutrition Surveillance System. *Pediatrics*, Feb. 2004; 113(2): e81–86.
- <sup>33</sup> Jones ME, Swerdlow AJ, Gill LE, et al. Pre-natal and early life risk factors for childhood onset diabetes mellitus: A record linkage study. *Int J Epidemiol* 1998;27:444– 9.
- <sup>34</sup> Rich-Edwards, J.W. et al. Breastfeeding during infancy and the risk of cardiovascular disease in adulthood. *Epidemiology*, 1 September 2004; 15(5): 550–556.
- <sup>35</sup> Martin, R. et al. Does breast-feeding in infancy lower blood pressure in childhood? *Circulation*, 2004; 109:1259–1266.
- <sup>36</sup> Singhal, A. et al., 'Breast milk-feeding and Lipoprotein Profile in Adolescents Born Preterm: Follow-up of a prospective randomised study', *The Lancet*, May 15 2004; 363 (9421): 1571–1578.
- <sup>37</sup> Shu XO, Linet MS, Steinbuch M, et al. Breast-feeding and risk of childhood acute leukemia. *J Natl Cancer Inst* 1999;91:1765–72.

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- <sup>38</sup> Freudenheim JL, Marshall JR, Graham S, Laughlin R, Vena JE, Bandera E, et al. Exposure to breastmilk in infancy and the risk of breast cancer. *Epidemiology* 1994;5:324–1.
- <sup>39</sup> Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: A meta-analysis. *Am J Clin Nutr* 1999;70:525–35.
- <sup>40</sup> Dewey KG, Cohen RJ, Brown KH, et al. Effects of exclusive breastfeeding for four versus six months on maternal nutritional status and infant motor development: Results of two randomized trials in Honduras. *J Nutr* 2001;131:262–7.
- <sup>41</sup> Horwood LJ, Fergusson DM. Breastfeeding and later cognitive and academic outcomes. *Pediatrics* 1998;101(1):e9.
- <sup>42</sup> Eidelman, A.I. and R. Feldma. Positive effect of human milk on neurobehavioral and cognitive development of premature infants. in L. Pickering et al. (eds.): *Protecting infants through human milk: Advancing the scientific evidence*. New York: Kluwer Academic/Plenum Publishers, 2004; 359–364.
- <sup>43</sup> Heinig, M., Dewey, K. Health effects of breastfeeding for mothers: a critical review. *Nutr Res Rev.* 1997;10:35-56.
- <sup>44</sup> Ip S, Chung M, Raman G, Chew P, Magula N, DeVine D, Trikalinos T, Lau J. Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries. Evidence Report/Technology Assessment No. 153. April 2007.
- <sup>45</sup> Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50,302 women with breast cancer and 96,973 women without the disease. *Lancet.* 2002;360:187-195.
- <sup>46</sup> Whittemore AS, Harris R, Itnyre J, Collaborative Ovarian Cancer Group. Characteristics relating to ovarian cancer risk: Collaborative analysis of 12 US case control studies. *Am J Epidemiol* 1992;136:1184–1203.
- <sup>47</sup> Leon-Cava et al. Quantifying the benefits of breastfeeding: a summary of the evidence. PAHO. 2002
- <sup>48</sup> Ross. J et al. Calculating the Effects of Malnutrition on Economic Productivity, Health and Survival in China. 2001.
- <sup>49</sup> Cohen R and Mrtek MD (1995). Comparison of Maternal Absenteeism and Illness Rates Among Breastfeeding and Formula Feeding Women in Two Corporations. *American Medical Journal of Health Promotion* 10(2):148.
- <sup>50</sup> 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.