

**(c) The potential short and long term impact on the health of Australians of increasing the rate of breastfeeding**



## Short Term:

### **Beneficial effects of breast milk in the neonatal intensive care unit on the developmental outcome of extremely low birth weight infants at 18 months of age.**

*Pediatrics*. 2006 Jul; 118(1): e115-23, Vohr, BR, Poindexter BB, Dusick AM, McKinley LT, Wright LL, Langer JC, Poole WK, (NICHD Neonatal Research Network - Department of Pediatrics, Brown Medical School, Providence, Rhode Island, USA)

#### **ABSTRACT**

**OBJECTIVE:** Beneficial effects of breast milk on cognitive skills and behaviour ratings have been demonstrated previously in term and very low birth weight infants. Extremely low birth weight infants are known to be at increased risk for developmental and behaviour morbidities. The benefits of breast milk that is ingested in the NICU by extremely low birth weight infants on development and behaviour have not been evaluated previously.

**CONCLUSIONS:** An increase of 5 points potentially would optimize outcomes and decrease costs by decreasing the number of very low birth weight children who require special education services. The societal implications of a 5-point potential difference (one third of an SD) in IQ are substantial. The potential long-term benefit of receiving breast milk in the NICU for extremely low birth weight infants may be to optimize cognitive potential and reduce the need for early intervention and special education services.

#### **EXTRACT FROM FULL-TEXT ARTICLE:**

There are several mechanisms by which breast milk ingestion by infants might contribute to more optimal cognitive/behavioural outcomes. It has been postulated that the act of feeding at the breast, as well as the interaction between mother and child, account for improved cognitive and behavioural outcome.

However, few ELBW infants in the NICU are feeding at the breast, and none are breastfeeding exclusively. Differences in parenting style and maternal intelligence, which were not a part of this study protocol, also have been proposed to be important. These factors are difficult to measure and cannot be ruled out. Our results, however, were adjusted for maternal education.

Another factor that was not evaluated is that there is greater bioavailability of protein in breast milk compared with formula.

The fourth proposed mechanism is the role of specific components of breast milk, including LC-PUFA (arachidonic acid and docosahexanoic acid), choline, glycoproteins, phospholipids, growth factors, and hormones, on cognitive function. These mechanisms may complement each other.

Our findings suggest that the effects of breast milk on the ELBW population are similar to that previously found in very low birth weight (VLBW) infants. The mean gestation of infants in our study was lower at 26.6 weeks. We speculate that the 12 to 14 weeks before term may be an important window of opportunity for this vulnerable population of infants.

Active brain development, neurogenesis, migration, and synaptogenesis occur during this time, and brain development may be particularly responsive to "maternal nutrition." Previous studies have shown beneficial effects of arachidonic acid and docosahexanoic acid in breast milk on neuro-development.

During the study period, preterm formulas with these nutrients were not available. Additional prospective studies need to be initiated to examine the relationships between breast milk ingestion and brain development before term and after discharge.

Strengths of the study include the large study population, the detailed nutritional intake data collected, and the finding of breast milk effects after controlling for known environmental and biological confounders. The 13.1-point difference in Bayley MDI scores (74.2–87.3) between the lowest and highest quintiles adjusted for environmental confounders at 18 months is remarkable and provides a measure of the gap between those with the highest and lowest amount of breast milk feeding.

The societal implications of a 5-point potential difference (one third of an SD) in IQ are substantial. Annually, 1.4% of infants in the United States are born VLBW. Reports indicate that 50% of VLBW children require remedial or special education services at school age. Hack reported a history of lower academic achievement in adult VLBW survivors for whom the IQ was 5 points lower than that in term control subjects.

Lucas et al reported that increased volume of breast milk was significantly associated with higher test scores in VLBW infants and that effects remained significant at 7.5 to 8 years of age.

Although critics of breast milk studies have suggested that higher family socio-economic status is the major contributor to higher developmental scores, both in our own cohort and in that of Lucas et al, breast milk effects remained significant after adjustment of measures of socio-economic status confounders.

A limitation of our study is that we did not assess maternal IQ. Long-term follow-up of ELBW infants is needed to determine whether these effects persist at school age. A weakness of this study is that we do not have data on use of breast milk after discharge, and we do not have specific information on the home environment.



## Duration of breastfeeding and developmental milestones during the latter half of infancy

*Acta Paediatrica* 88: 1327-1332, 1999, Vestergaard M, Obel C, Henriksen TB, Sorensen HT, Skajaa E, Ostergaard J.

Studies have suggested that breastfeeding may have a positive effect on long-term brain development. Researchers in Denmark studied 1,656 infants at the age of 8 months to determine whether breastfeeding affected mental development below the age of 1 year.

Three developmental milestones were measured: crawling, pincer grip, and polysyllable babbling. Duration of breastfeeding was classified according to the number of months of exclusive breastfeeding.

The results showed that 38.8% of the 7-month olds could babble in polysyllables. 93.7% of the mothers had exclusively breastfed their children for at least 1 month, with 65.7 % continuing until 4 months. The proportion of children who had mastered the milestones increased consistently with increased duration of exclusive breastfeeding.

For example, 73.4% of babies who were exclusively breastfed for 6 months or more were polysyllable babblers versus 48.5 % of babies who had been exclusively breastfed for only 1 month. There was little or no confounding from various factors like family social status, mother's education, gestational age or mother's employment.

**The authors believe that the causal relation between breastfeeding and brain development has major public health implications and should be explored further.**



## Long Term:

### **Faster growing babies are at greater risk of heart disease and stroke (14 May 2004)**

Dr Atul Singhal, Deputy Director of Nutrition at the *Institute of Child Health*, London, Professor Alan Lucas, *Medical Research Council* (MRC) and *Institute of Child Health* scientists say that:

Babies who grow fast are at greater risk of heart disease and stroke in later life. Because breast-fed babies grow less rapidly than those fed formula milk, the work strongly reinforces the message that breastfeeding is best.

The conclusions are drawn from the extensive studies carried out by the team over the last 20 years into high blood pressure, obesity, diabetes and now cholesterol. The researchers' full conclusions are laid out in a viewpoint article published today in **The Lancet**, along with their research paper on cholesterol and cardiovascular disease that completes the overall picture.

Prompted by evidence in animals, Dr Atul Singhal and Professor Alan Lucas, conducted unique randomised trials to determine the long-term health effects of early nutrition in humans.

They compared the health of adolescents who were fed as babies on breast milk with babies who were fed on formulas of varying nutritional value. The results showed that, irrespective of the baby's weight when it was born, the faster the growth, the greater the risk of heart disease and stroke in adult life.

They found that rapid growth early in life, promoted by nutrient enriched diets, programmed the babies' biology, making them prone to certain health conditions which increased their risk of heart disease and stroke in later life. These conditions include obesity, high blood pressure, high cholesterol and tendency to diabetes.

Because the size of the effect was so large, the scientists conclude that rapid growth early in life is one of the most important, but potentially controllable, influences on adult health.

Lead scientist, Professor Alan Lucas, Director of the MRC's Childhood Nutrition Research Centre, said:

**A number of recent theories about the importance of early life for later health have been based on observations. But randomised clinical trials are the best way to provide proof and determine the best health practices. Using the latter approach we assigned babies to different diets and then followed them into adult life. Such studies had not been done before and have taken us over 20 years. Now that the results have come through they have greatly changed our understanding of the importance of early nutrition and growth for long-term health. The evidence is very strong and supports a clear message. Slower growth as a baby reduces the risk of heart disease and stroke in adult life and the best way to achieve this is to breastfeed.**

A recent survey of 1000 women by the Department of Health found that although many of the benefits of breastfeeding are well known, the UK has one of the lowest breastfeeding rates in Europe. Almost one third (29 per cent) of women in England and Wales never try to breastfeed, compared to two per cent in Sweden. Younger mothers in particular are less likely to breastfeed. Over 40 per cent of mothers under 24 never try.

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### **Early nutrition and long-term cardiovascular health**

Source: International Society for Research in Human Milk and Lactation [www.isrhml.org.umu.se/](http://www.isrhml.org.umu.se/)

Singhal A. *Nutr Rev.* 2006 May; 64(5 Pt 2): S44-9; discussion S72-91 (Institute of Child Health, London)

Evidence that early nutrition can influence (program) later cardiovascular health was first obtained for the long-term effects of overfeeding in animals.

This concept is now supported in humans by evidence for a beneficial effect of breastfeeding on the major components of the metabolic syndrome (obesity, blood pressure, cholesterol metabolism, and insulin resistance) that affect cardiovascular risk. The size of this effect is large and relevant for public health.

The potential mechanisms involved include a benefit of slower weight gain in breast-fed compared with formula-fed babies.

