australian
breastfeeding
association

Submission by the Australian Breastfeeding Association

The Australian Breastfeeding Association (ABA) (formerly the Nursing Mothers' Association of Australia) welcomes the opportunity to make this submission to the future direction for the health of our children. The health of Australia's children should be a priority for all governments. A significant body of research demonstrates that nutrition in infancy has a significant influence on health outcomes throughout life. Not breastfeeding or premature weaning from breastfeeding is known to be a significant indicator for poorer health outcomes later in life, including obesity.

Australia is currently burdened with the health costs associated with poor breastfeeding practices of the past. Investing in breastfeeding is an investment in the health of our children. The Association would like to see policy that addresses this issue through the promotion, protection and support of breastfeeding.

Since its' founding by six mothers in 1964, the Association has spread to all Australian states and territories to become one of the country's largest women's non-profit organisations and Australia's leading source of breastfeeding information and support. The Association aims to support and encourage women who desire to breastfeed their babies, and to raise community awareness of the importance of breastfeeding and human milk. Each year, we handle more than 260,000 counselling contacts, hold more than 90,000 community events, and our volunteers contribute more than $16.6 million in community support.

The Association is also a recognised authority on breastfeeding management and training. Our Lactation Resource Centre (LRC) provides a scientific basis for the Association's breastfeeding policies and provides training and education for health professionals, complementing the practical experience of breastfeeding mothers with one of the most comprehensive collections of breastfeeding information in the world.

Please do not hesitate to contact me if you would like further information about the Australian Breastfeeding Association or this submission.

Yours sincerely

Margaret Grove

Margaret Grove
National president
Australian Breastfeeding Association

Submission by the Australian Breastfeeding Association

Themes of submission:

1. Health Issues facing Australian Children and the Importance of Breastfeeding
2. Impact of Breastfeeding on the Health of Mothers
2. Breastfeeding Rates in Australia
3. Economic costs of premature weaning
4. Why are our breastfeeding practices poor?
5. Breastfeeding, Maternity Leave and Childcare

This submission will detail the importance of breastfeeding to health and the risks associated with premature weaning in relation to key health challenges faced by the Australian community. It will also address some other important considerations for health and wellbeing.

Executive summary

To improve children's health on a population basis it makes sense to work on the foundation of health. Good health for children begins with breastfeeding; poor health begins with premature weaning from breastfeeding.

Breastfeeding is important in preventative health behaviour with implications for infant and maternal health, national health costs and the environment. The public health benefits of breastfeeding are well documented and continue to accumulate. Artificial formula feeding substantially increases the risk of gastrointestinal illness, respiratory illness and infection, eczema, and necrotizing enterocolitis, with increasing scientific evidence of its links with chronic or serious illnesses or conditions such as childhood diabetes, urinary tract infection, certain types of cancers, diseases of the digestive system such as coeliac disease and Crohn's disease, liver disease and cot death. Breastfeeding is known to promote cognitive development and higher IQ, central nervous system development and visual acuity, and speech and jaw development. Breastfeeding also helps protect mothers against breast cancer and other cancers of the reproductive organs, and osteoporosis.[1]

Breastfeeding rates in Australia are well below levels recommended by health authorities. Very few Australian infants are exclusively breastfed to 6 months and one in two is already weaned by 6 months despite NHMRC recommendations for exclusive breastfeeding to 6 months and health targets for 80% of babies to be at least partly breastfeeding at that age. Poor infant feeding practices increase ill health of mothers and babies, and significantly raise community and family health costs.

Recommendations

The protection, promotion and support of breastfeeding are important public health needs. While most Australian mothers begin breastfeeding but they need support to continue. Breastfeeding is not a responsibility that lies just with mothers. Mothers need the support of their families, peers, communities, workplaces, health professionals and

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[1] See for example Gartner LM, Morton J, Lawrence RA, Naylor AJ, O'Hare D, Schanler RJ, Eidelman AI, American Academy of Pediatrics Section on Breastfeeding 2005, Breastfeeding and the use of human milk. *Pediatrics* 115(2): 496-506.

governments to continue breastfeeding. We propose a multi sector partnership approach, Governments and the community working together[2].

This Plan proposes actions in four strategic areas:

1. Establish policies, legislation and institutions protective and supportive of breastfeeding.

2. Develop a Breastfeeding Friendly Healthcare System – hospitals, health professionals, and pharmacies

3. Promote Breastfeeding Friendly Workplaces and Childcare Services

4. Strengthen Breastfeeding Friendly Families and Communities

We urge the current government, and indeed future governments, to consider including a strategy to protect, promote and support breastfeeding as part of its health policy because, as we will demonstrate the duration of breastfeeding and whether a child is prematurely weaned from breastfeeding impacts many health issues.

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[2] Australian Breastfeeding Association Leadership Plan August 2004

HEALTH ISSUES FACING AUSTRALIAN CHILDREN AND THE IMPORTANCE OF BREASTFEEDING

Foetal origins of disease are well established in the research literature. Early nutrition and care has a profound impact on the health and development of children. Human milk provides infants with nutrients that are essential for normal growth and with immune factors that support infants' ability to fight illness. Babies are born with an immature immune system, and are extremely vulnerable to infection. However, their breastmilk acts as an external immune support system. When babies are prematurely weaned their external immune support is removed from them and they are more likely to become ill and they have more difficulty in recovering from illness.

Low birth weight babies

An increasing number of babies are born in Australia with a low birth weight. Often these babies were born prematurely. These babies are particularly vulnerable and breastfeeding is particularly important to their health outcomes.

NEC is a common disease of the intestinal system seen almost exclusively in low birth weight babies. Between 5-10% of low birth weight babies develop NEC[3,4] resulting in a high risk of surgical complication and morbidity. It has been estimated that 20-35% of babies who develop NEC will die as a result of the infection[1-5]. **However, babies who are fed breastmilk are not equally vulnerable to NEC; babies who are fed breastmilk substitutes (infant formulae) are at 500-1000% increased risk of developing NEC and babies fed a mixture of breastmilk and breastmilk substitute are at a 200% increased risk of developing NEC[3].** It is thought that components of human milk assist in the maintenance of intestinal health in premature babies and prevent the development of NEC[6].

Premature babies fed breastmilk substitutes are also at greater risk of all infection related events including: late onset sepsis, urinary tract infection, diarrhoea and upper respiratory tract symptoms[7]. In very small babies any infection can be life threatening. Other conditions such as retinopathy of prematurity and chronic lung disease are more common in premature babies fed breastmilk substitutes[5]. Children who as premature infants did not receive breast milk display intellectual deficits of an average of 8 IQ points. Breastmilk is essential for normal brain development[8].

Mothers whose babies are born prematurely are in need of increased support for breastfeeding. Prematurity or having spent time in a special care nursery is a risk factor for not breastfeeding in Australia[9]. In addition, providing sufficient milk can be a challenge even for mothers who strongly wish to do so (especially when there are medical

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[3] Loh M, Osborn DA, Lui K (2001). Outcome of very premature infants with necrotising enterocolitis cared for in centres with or without on site surgical facilities. Archives of Disease in Childhood Foetal Neonatal edition 85: F114-F118.

[4] Landers S (2003). Maximising the benefits of human milk feeding for the preterm infant. Paediatric Annals 32: 298-306.

[5] Lucas A, Cole TJ (1990). Breastmilk and neonatal necrotising enterocolitis. The Lancet 336, 1519-1523.

[6] Caplan MS, Amer M, Jilling T (2002). The role of human milk in necrotizing enterocolitis. Advances in Experimental Medicine and Biology 503: 83-90.

[7] Schanler RJ, Lau C, Hurst NM, Smith EO (2005). Randomised trial of donor human milk versus preterm formula as substitutes for mothers' own milk in the feeding of extremely premature infants. Pediatrics 116: 400-405.

[8] Lucas A, Morley R, Cole TJ, Lister G, Leeson-Payne C (1992). Breast milk and subsequent intelligence quotient in children born preterm. Lancet 339: 261-264.

[9] Scott JA, Landers MCG, Hughes RM, Binns CW (2001). Factors associated with breastfeeding at discharge and duration of breastfeeding. Journal of Paediatric Child Health 37: 254-261

complications that led to the preterm birth such as pre-eclampsia)[10]. It is important that medical staff and managers prioritise assisting mothers to provide milk for their babies. Lactation support programs in NICUs have been successfully implemented and can result in breastfeeding success rates above those of the ambient population demonstrating that prematurity is not an inherent barrier to breastfeeding[11].

Human Milk Banks

In those circumstances where mothers are unable to provide milk, human milk banks can provide the most vulnerable babies with the nutritional support they need. Prof Peter Hartmann and Dr Karen Simmer in Perth have recently set up a Human Milk Bank at King Edward Memorial Hospital with the assistance of private funding. (Prof Hartmann's research group is also developing protocols for processing of human milk so that fortification of milk for premature babies can be provided without the risks associated with fortifiers based on animal milk.) Dr Howard Chilton is seeking to set up a bank in Sydney and midwife Maera Ryan is similarly raising funds to provide human milk to sick babies on the Queensland Gold Coast.

Human milk banks are a cost effective intervention because low birth weight babies who are not provided with breastmilk are not only less likely to survive but will require more interventions in hospital and have longer hospital stays[12]. However, governmental and departmental support is required to make human milk available to all babies who need it. Overseas experience indicates that the costs associated with banked donor milk are more than offset by the savings to the hospital system resulting from decreased costs due to illness when babies are provided with human milk[13].

Children born with a disability

Breastfeeding assists children to reach their full potential. In instances where a child's disability involves a cognitive impairment early nutrition can be particularly important because premature weaning causes a 3-8 point IQ deficit.[14] [15] [16] A deficit of this magnitude at the lower end of function increases the need for resources in special education at a population level and at, an individual level, may make the difference between living independently or being in need of intensive support. Lester et al[17] provides a detailed description of the additional health and educational costs flowing from the average 3 point IQ deficit caused by cocaine exposure in utero.

When a child is born with special needs of any kind the development of the mother-child relationship is impacted[18]. However, breastfeeding can assist in the development of the

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[10] Gorenendaal F, Sauer PJJ (1991). Breastmilk and necrotising enterocolitis. The Lancet 331: 435-436

[11] Spatz DL (2004). Ten steps for promoting and protecting breastfeeding for vulnerable infants. Journal of Perinatal and Neonatal Nursing 18: 385-396.

[12] Schanler RJ, Shulman RJ, Lau C (1999). Feeding strategies for premature infants: beneficial outcomes of feeding fortified human milk versus preterm formula. Pediatrics 103: 1150-1157.

[13] Arnold LD (2002). The Cost-effectiveness of Using Banked Donor Milk in the Neonatal Intensive Care Unit: Prevention of Necrotizing Enterocolitis. Journal of Human Lactation, 18(2); 172-177.

[14] Mortensen EL, Michaelsen KF; Sanders SA. Reinisch JM (2002). The Association Between Duration of Breastfeeding and Adult Intelligence. Obstetrical & Gynaecological Survey. 57(10): 659-661.

[15] Daniels MC, Adair LS (2005). Breast-feeding influences cognitive development in Filipino children. Journal of Nutrition 135: 2589-2595.

[16] Reynolds A (2001). Breastfeeding and brain development. Paediatric Clinics of North America 48: 159-171.

[17] Lester BM, La Gasse, Seifer R. (1998). Cocaine exposure and children: the meaning of subtle effects. Science 282.5389: 633.

[18] Blacher J, Meyers CE (1983). A review of attachment formation and disorder in handicapped children. American Journal of Mental Deficiency 87: 359-371.

mother-child relationship because hormonal and mechanical aspects of breastfeeding promote maternal responsiveness[19].

Mothers of babies born with a disability need additional support to breastfeed. Some disabilities prevent direct breastfeeding and mothers need additional support to express milk for their babies. Some disabilities may make children more vulnerable to the impact of premature weaning. For example, children born with a cleft palate have a eustachian tube dysfunction that makes them extremely vulnerable to otitis media (at a 300% greater risk)[20]. Children with cleft palates fed infant formula rather than breast milk are much more likely to suffer from otitis media and the shorter duration of breastfeeding the greater the incidence[18]. However, children with clefts are often difficult to feed, most cannot be breastfed directly, prior to cleft repair[18]. Some babies are unwilling to breastfeed after repair. Thus, babies with clefts often receive breast milk for a shorter length of time than non-cleft affected babies[18] despite their increased health needs due to their disability and surgical intervention. Cleft affected babies provide just one example of the impact infant feeding has on the health of children with disabilities and demonstrate the need for increased assistance to maintain breastfeeding for children with disabilities.

Sudden Infant Death Syndrome (SIDS)

While it is not possible to identify which babies are will fall victim to SIDS, this tragic event is not completely unpredictable. Rather, it is much more prevalent in socioeconomically deprived populations[21] [22] and these populations are those least likely to breastfeed their babies. Background epidemiological characteristics of SIDS victims and their families include low birth weight, short gestation, young maternal age, high parity, sole parent caregiver, parental smoking, parental alcohol consumption and bottle-feeding. **Every study looking at SIDS has found that babies that are not breastfed are on average twice more likely to die**[23] and even after statistical adjustment this relationship often remains[24] [25]. However, since not breastfeeding is also associated with socio-economic deprivation the impact of breastfeeding on SIDS sometimes disappears in statistical adjustment for socio-economic background.[21] [26]

Nevertheless, there are some reasons why babies not breastfed might be more vulnerable to SIDS. Children who are not breastfed sleep more deeply and may have higher arousal thresholds than breastfed infants, impairing their ability to respond to the life-threatening situation that results in SIDS.[27] Breastfeeding also provides protection against some

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[19] Gribble K (2006). Mental health, attachment and breastfeeding: implications for adopted children and their mothers. International Breastfeeding Journal 1:5.

[20] Aniansson G, Avensson H, Becker M, Ingvarsson L (2002). Otitis media and feeding with breast milk of children with a cleft palate. Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery 36: 9-15.

[21] Blair PS, Sidebotham P, Berry PJ, Evans M, Flemming PJ (2006). Major epidemiological changes in sudden infant death syndrome: a 20-year population-based study in the UK. Lancet 367 (9507): 314-319.

[22] Fleming PJ, Blair PS, Ward PM, Tripp J, Smith IJ (2003). Sudden infant death syndrome and social deprivation: assessing epidemiological factors after post-matching for deprivation. Paediatric and Perinatal Epidemiology 17: 272-280.

[23] McVea KL, Tuner PD, Peppler DK (2000). The role of breastfeeding in sudden infant death syndrome. Journal of Human Lactation 16: 13-20.

[24] Fredrickson DD, Sorenson JR, Biddle AK, Kotelchuck (1993). Relationship of sudden infant death syndrome to breast-feeding duration and intensity. American Journal of Diseases of Children 147: 460.

[25] Alm B, Wennergren G, Norvenius SG, Skaerven R, Lagercrantz H, Helweg-Larsen K, Irgens on behalf of the Nordic epidemiological sids study (2002). Breast feeding and the sudden infant death syndrome in Scandinavia, 1992–95. Archives of Disease in Childhood 86:400-402.

[26] Fleming PJ, Blair PS, Platt MW, Tripp J, Smith IJ, CESDI SUDI Research Group (2003). Sudden infant death syndrome and social deprivation: assessing epidemiological factors after post-matching for deprivation. Paediatric and Perinatal Epidemiology 17: 272-280.

[27] Horne RS, Parslow PM, Ferens D, Watts AM, Adamson TM (2004). Comparison of evoked arousability in breast and formula fed infants. Archives of Disease in Childhood 89: 22-25.

pathogens implicated in SIDS such as *S. aureusm* and *C. perfringens*.[28] Infants who die of SIDS are also more likely to have recently suffered from illnesses (the most common being respiratory infection)[29] to which non-breastfed babies are more vulnerable.

Asthma

Research has generally found that premature weaning from breastfeeding results in increased risk of development of asthma in children. A meta-analysis of well-designed studies from around the world found that children weaned before 3 months of age had a 25% increased risk of developing asthma as compared to children who were breastfed beyond 3 months. In a specifically Australian context, research has found that introduction of milks other than human milk before 4 months of age resulted in a 25% increased risk of asthma, an earlier diagnosis of asthma, a 31% increase in wheeze and earlier onset of wheeze[30]. Encouraging exclusivity of breastfeeding, avoidance of breastmilk substitutes and increasing total duration of breastfeeding should be an important part of any strategy aimed at decreasing asthma incidence.

The increased incidence of asthma in children who are not breastfed may be due to increased vulnerability in children not breastfed to respiratory infections and allergy. As will be discussed, children who are not breastfed are at an increased risk of suffering from multiple episodes of upper respiratory tract illness and this may make children more vulnerable to developing asthma. An Australian study found that lower respiratory illness with associated wheeze, in the first year of life, particularly where there are multiple episodes, increases the risk of asthma in children from between 300% (where no family history of allergy) and 800% (where a family history of allergy).[31] A dose dependent association between antibiotic exposure in infancy and the development of asthma has been identified[32] and children who are not breastfed have been found to spend twice as much time on antibiotics as children who are breastfed.[33] Children who are prematurely weaned from breastfeeding are also more likely to develop allergic symptoms and this is also associated with increased asthma risk.[29] There are other defence mechanisms against asthma associated with breastfeeding that are yet to be elucidated.[29]

The discussion paper notes that the ALP plans to liase with Professor Fiona Stanley on these issues. Professor Stanley is a co-author on some of the papers cited here in relation to early nutrition, asthma and allergies and is cognizant of the importance of breastfeeding in the health of children.

Allergy

Infants fed infant formula (cow's milk based or soy) have a higher incidence of allergy than babies who are breastfed.[34] [35] Eczema is a type of allergic manifestation that has

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[28] Gordon AE, Saadi AT, MacKenzie DA, Molony N, James VS, Weir DM, Busuttil A, Blackwell CC (1999). The protective effect of breast feeding in relation to sudden infant death syndrome (SIDS): III. Detection of IgA antibodies in human milk that bind to bacterial toxins implicated in SIDS. FEMS Immunology and Medical Microbiology 25: 175-182.

[29] Platt MW, Blair PS, Fleming PJ, Smith IJ, Cole TJ, Leach CEA, Berry PJ, Golding J, CESDI SUDI Research Group. A clinical comparison of SIDS and explained sudden infant deaths: how healthy and how normal? Archives of Disease in Childhood 82: 98-106.

[30] Oddy WH, Holt PG, Sly PD, Read AW, Landau LI, Stanley FJ, Kendall GE, Burton PR (1999). Association between breastfeeding and asthma in 6-year-old children: findings of a prospective birth cohort study. British Medical Journal 319: 815-819.

[31] Oddy WH, Klerk NH, Sly PD, Holt PG (2002). The effects of respiratory infections, atopy and breastfeeding on childhood asthma. European Respiratory Journal 19: 899-905.

[32] Marra F, Lynd L, Coombes M, Richardson K, Legal M, FitzGerald JM, Marra CA (2006). Does antibiotic exposure during infancy lead to development of Asthma? A systematic review and metaanalysis. Chest 129: 610-618.

[33] Flores MS, Fairchok MP (2004). The relationship of breastfeeding to antimicrobial exposure in the first year of life. Clinical Pediatrics 43: 631-636.

[34] Friedman NJ, Zeiger RS (2005). The role of breast-feeding in the development of allergies and asthma. Journal of Allergy and Clinical Immunology 115: 1238-1248.

been studied in relation to early nutrition. Kull et al [36] examined the development of eczema in children whose families had a history of allergy and those who did not. It was found that where there was no family history of eczema the risk of developing eczema was increased by 20% in children exclusively breastfed for less than 4 months and by 35% in children with a family history of eczema.[34] Children not exclusively breastfed for at least 4 months were also found to be 43% more likely to develop allergic rhinitis than children exclusively breastfed for 4 months or more.[37] Finally, children who were not exclusively breastfed for 4 months or more were 43% more to suffer from multiple allergic diseases.[35] Oddy et al[38] found that children who were not exclusively breastfed were 30% more likely to show a positive skin prick test to at least one common aeroallergen. Exclusive early breastfeeding (for around six months) is particularly important in preventing allergy. Australia's exclusive breastfeeding rates are very poor[39].

It is thought that children who are not breastfed are more likely to develop allergy because:

1) Breastfed children are less exposed to foreign dietary antigens
2) Human milk contains factors that promote gastrointestinal mucosa maturation thereby allowing early "closure" of macromolecular absorption
3) Children not breastfed have increased incidence of infection and breastmilk substitutes alter the gut microflora in such a way that can act as to act as a adjuvant for ingested food proteins, increasing the risk of sensitisation
4) Human milk has functional immunomodulatory and anti-inflammatory factors that reduce macromolecular intake. [40]

Thus, bottle-feeding provides regular exposure to many microbial products and foreign proteins that may cause sensitisation and other problems in infants, especially in those who are at high risk for development of allergic symptoms.[41] As mentioned in the discussion paper, babies can be exposed to antigens via their mother's milk however, the incidence of allergy as a result of this exposure is very low and it is possible that this low level exposure may induce tolerance rather than sensitisation.[42] Nevertheless, in cases where there is a strong family history of allergy it may be advisable for mothers to avoid consuming common dietary allergens.

It is not uncommon for babies to be exposed to cow's milk protein via infant formula in the first few days of life in hospital.[43] It is possible that this may initiate sensitisation to this protein in susceptible individuals so that subsequent exposures may then result in

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[35] Oddy WH, Peat JK (2003). Breastfeeding, asthma, and atopic disease: an epidemiological review of the literature. Journal of Human Lactation 19: 250-261.

[36] Kull I, Bohme M, Wahlgren C-F, Nordvall L, Pershagen G, Wickman M (2005). Breast-feeding reduces the risk for childhood eczema. Journal of Allergy and Clinical Immunology 116: 657-681

[37] Kull I, Wickman M, Lilja G, Nordvall SL, Pershagen G (2002). Breast feeding and allergic diseases in infants a prospective birth cohort study. Archives of Diseases in Childhood 87: 478-481.

[38] Oddy WH, Holt PG, Sly PD, Read AW, Landau LI, Stanley FJ, Kendall GE, Burton PR (1999). Association between breastfeeding and asthma in 6-year-old children: findings of a prospective birth cohort study. British Medical Journal 319: 815-819.

[39] Donath SM, Amir LH (2005). Breastfeeding and the introduction of solids in Australian infants: data from the 2001 National Health Survey 29: 171-175.

[40] Oddy (2004). A review of the effects of breastfeeding on respiratory infections, atopy, and childhood asthma. Journal of Asthma 41: 605-621.

[41] Peat JK, Li J (1999). Reversing the trend: reducing the prevalence of asthma. Journal of Allergy and Clinical Immunology 103: 1-10.

[42] Oddy (2004). A review of the effects of breastfeeding on respiratory infections, atopy, and childhood asthma. Journal of Asthma 41: 605-621.

[43] Host A (1994). Cow's milk protein allergy and intolerance in infancy. Some clinical, epidemiological and immunological aspects. Paediatric Allergy and Immunology 5 Suppl: 5-36.

allergic responses[40]. The use of banked human milk where a mother's own milk is unavailable would entirely remove this risk factor.

Type 1 Diabetes

There is some evidence that the likelihood of developing Type 1 diabetes may be related to early nutrition. It is thought that sensitisation and development of antibodies to a cow's milk protein may be the initial step in the aetiology of Type 1 diabetes.[44] A relationship between diarrhoeal disease due to rotavirus infection and Type 1 diabetes has also been identified[45] and as will be discussed, children who are not breastfed are more vulnerable to diarrhoeal illness. Thus, a meta analysis of high quality studies that looked at infant feeding and the development of Type 1 diabetes found that children exposed to cow's milk in the first 3 months of life or not breastfed for at least 3 months have a 63% increased risk of developing Type 1 diabetes. It appears that the relationship between infant feeding and development of Type 1 diabetes is strongest where children develop the condition young, thus, children not breastfed for at least 3 months have a 280% increased risk of developing Type 1 diabetes before the age of 4 years as compared to breastfed children.

It is worth noting that research in this area is conflicting (certainly some studies do not indicate that early nutrition has a role in the development of Type 1 diabetes) and it has been recognised for some time that a large-scale prospective study is required to elucidate the impact of early nutrition in this condition. Unfortunately since human milk is not a product that can be sold for profit this poses an obstacle to the consideration of the role of non-exclusive breastfeeding or premature weaning from breastfeeding in the development of a disease. There is currently an extremely large trial operating in 70 centres, including 3 in Australia, testing whether infant formula that does not contain cow's milk protein is less likely to result in children developing Type 1 diabetes than children fed a standard infant formula. The study design includes supporting women to breastfeed. However, women are provided with free infant formula, which, it has been argued is an inducement to wean. Indeed, results published so far indicate that a large proportion of women in the study breastfeed for a short time only.[46] Any study examining the impact of early diet on the development of Type 1 diabetes should include an exclusively breastmilk control as recommended by the WHO[47] but this study is funded at least partially by an infant formula manufacturer who was involved in developing the study design.[48] Currently, the environment is such that in Australia it is difficult to gain research funding for a projects that do not have potential for commercialisation. However, the situation with the TRIGR study highlights the need for government to be involved in funding research that is in the public good, regardless of commercial opportunities. The results from the TRIGR study are already promising that the "special" infant formula may have an impact and there is little doubt that pressure will be placed on the Australian government to subsidise the cost of this formula for the purposes of reducing the incidence of Type 1 diabetes. It is however, deplorable that the impact of exclusive breastfeeding on the development of Type 1 diabetes is not being considered because if effective this would be a far more cost effective intervention.

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[44] Villalpando and Hamosh 1998 Villalpando S, Hamosh M (1998). Early and late effects of breast-feeding: does breast-feeding really matter. Biology of the Neonate 74: 177-190.

[45] Couper JJ (2001). Environmental triggers of type 1 diabetes. Journal of Paediatrics and Child Health 37: 218-220.

[46] Akerblom HK, Virtanen SM, Ilonen J, Savilahti E, Vaarala O, Reunanen A, Teramo K, Hamalainen AM, Paronen J, Riikjarv MA, Ormisson A, Ludvigsson J, Dosch HM, Hakulinen T, Knip M; National TRIGR Study Groups. Diabetologia. 2005 May; 48(5): 829-37

[47] deOnis (2006). "Foreword." Acta Paediatrica 450: 5-6.

[48] http://trigr.epi.usf.edu/about.html

It is worth noting that women who suffer from diabetes themselves may have a delay in lacto genesis 2 post-birth[49], which often necessitates supplementing their babies with other milks. Given the suspected link between early nutrition and Type 1 diabetes, and the possibility of a genetic susceptibility it would be advisable that these babies be provided with donor human milk from a milk bank until their mothers' milk is sufficient.

The primary cause of Type 2 diabetes is obesity and the involvement of infant feeding in the development of obesity will be discussed later.

Childhood cancers

As put forward in Labour's discussion paper, the reasons why some children develop cancer are not well understood. Nevertheless a number of factors have been implicated in increasing the risk of development of cancers in childhood including early nutrition. Thus, research indicates that children who are not breastfed are at between a 75% to a 600% increased risk of developing any cancer.[50] [51] Research has found that artificial feeding increases the risk of developing Hodgkin's disease, non-Hodgkins lymphoma, acute lymphoblastic leukaemia and acute myeloblastic leukaemia.[49] [52] [53] However, there is a lot of variation in research results. Nonetheless, studies have generally found that breastfeeding duration is important. Cancer risk is greatest in babies not breastfed at all compared to those breastfed for the longest duration.[54] Childhood cancer has been associated with immunodeficiency and infection.[55] Since human milk is protective against infection and stimulates the early, normal development of the immune system this may explain why babies who are not breastfed are at greater risk of developing cancer.[56]

Obesity

Research has consistently found that children who are not breastfed are more likely to be overweight in childhood and adolescence. The relationship appears to be dose dependent. A recent meta-analysis of research found that children breastfed for less than 1 month have a 32% increased risk of being overweight as compared to children breastfed for 4-6 months and have a 47% increased risk of being overweight as compared to children breastfed for more than 9 months.[57]

There are several possible reasons for this relationship. Firstly, babies who are breastfed are able to regulate their own intake (self regulate) based on internal satiety cues[58] and

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[49] Reader D, Franz MJ (2004). Lactation, diabetes, and nutrition recommendations. Current Diabetes Reports 4: 370-376.

[50] Davis MK (1998). Review of the evidence for an association between infant feeding and childhood cancer. International Journal of Cancer Supplement 11: 29-33.

[51] Smulevich VB, Solionova LG, Belyakova SV (1999). Parental occupation and other factors and cancer risk in children: I Study methodology and non-occupational factors. International Journal of Cancer 83: 712-717.

[52] Kwan ML, Buffler PA, Abrams B, Kiley VA. 2004. Breastfeeding and the risk of childhood leukemia: a meta-analysis. Public Health Rep 119:521-535.

[53] Shu XO, Linet MS, Steinbuch M, Wen WQ, Buckley JD, Neglia JP, Potter JD, Reaman GH, Robison LL (2004). Breast-feeding and risk of acute Leukemia. Journal of the National Cancer Institute 91: 1765-1772.

[54] Davis MK (2001). The evidence for breastfeeding: breastfeeding and chronic disease in childhood and adolescence. Pediatrics Clinics in North America 48.

[55] Davis MK (2001). The evidence for breastfeeding: breastfeeding and chronic disease in childhood and adolescence. Pediatrics Clinics in North America 48.

[56] Davis MK (1998). Review of the evidence for an association between infant feeding and childhood cancer. International Journal of Cancer Supplement 11: 29-33.

[57] Harder T, Bergmann R, Kallischnigg G, Plagemann A (2005). Duration of breastfeeding and risk of overweight: a meta-analysis. American Journal of Epidemiology 162: 397-403.

[58] Dewey K.G (2003). Is breastfeeding protective against child obesity? Journal of Human Lactation 19: 9-18.

maternal milk production is driven by infant demand.[59] Overfeeding is therefore unlikely in exclusively breastfed babies, if not impossible. In contrast, babies that are bottle-fed may be encouraged to finish bottles so as not to waste milk or to meet parental expectations of consumption. It has been speculated that this may impede the later ability to self regulate energy intake.[56] In addition, mothers who continue to breastfeed their child for 12 months or more are less controlling of their toddler's eating habits and, perhaps as a result of this, their children eat a greater variety of foods and are leaner[60].

There may also be physiological differences between breastfed and non-breastfed infants that leads to a greater likelihood of overweight in those not breastfed. It is known that bottle fed babies consume more milk and gain weight more rapidly than breastfed babies.[61] Over feeding in infancy may result in increase in the number and fact content of adipocytes (cells that store fat)[62] potentially making such children more vulnerable to obesity.

There may be differences in insulin metabolism in formula fed infants that contribute to increased risk of overweight.[56] Levels of, and body's response, to the appetite regulatory hormone leptin may also be affected by early nutrition increasing the risk of overweight in non-breastfed individuals.[63]

It may also be that familial factors may modify the relationship between infant feeding and obesity so that "unhealthy" families may be less likely to breastfeed.[64] Nonetheless, when studies have adjusted for factors associated with infant feeding choice the relationship between formula feeding and overweight is still apparent.[65] While the impact of infant feeding on obesity is relatively small compared to other factors such as parental overweight, dietary practices and physical activity, infant feeding is still a significant factor and worthy of consideration in obesity prevention programs.

Smoking

Labour's health policy addresses the use of drugs by children and adolescents. However, children born to smoking parents (mothers particularly) should also be considered. Women who smoke are less likely to initiate breastfeeding and tend to breastfeed for a shorter duration than non-smokers.[66] This may be at least partially because educational materials about breastfeeding often undermine women's confidence in their breastmilk such that they feel that if their diet is not perfect, if they smoke or drink even a little, they feel that infant formula would be a better choice for their babies. However, while it is true that nicotine moves easily into breastmilk (one of only a small group of drugs to do so) the milk of a smoking mother nevertheless provides nutrition that is far superior to infant formula.[67] [68] Indeed, it may be more important for the children of smokers to

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[59] Dewey KG, Lonnerdal B (1986). Infant self-regulation of breast milk intake. Acta Paediatrica Scandinivica 75: 893-898.

[60] Fisher JO, Birch LL, Smiciklas-Wright H, Picciano MF (2000), Breastfeeding through the first year protects maternal control in feeding and subsequent toddler energy intakes. Journal of the American Dietetic Association 100: 641-646.

[61] Dewey KG (1998). Growth characteristics of breast-fed as compared to formula-fed infants. Biology of the Neonate 74: 94-105.

[62] McGill HC, Mott GE, Lewis DS, McMahan CA, Jackson EM (1996). Early determinants of adult metabolic regulation: effects of infant nutrition on adult lipid and lipoprotein metabolism. Nutrition Review 54: S31-S40.

[63] Locke R (2002). Preventing obesity: the breast milk-leptin connection. Acta Paediatrica 91: 891-896.

[64] Burke V, Beilin LJ, Simmer K, Oddy WH, Blake KV, Doherty D, Kendall GE, Newnham JP, Landau LI, Stanley FJ (2005). Breastfeeding and overweight: longitudinal analysis in an Australian birth cohort. Journal of Pediatrics 147: 56-61.

[65] Dewey KG (2003). Is breastfeeding protective against child obesity? Journal of Human Lactation 19: 9-18.

[66] Amir LH, Donath SM (2003). Does maternal smoking have a negative psychological effect on breastfeeding? The epidemiological evidence. Breastfeeding Review 11: 19-29.

[67] Dahlström A, Ebersjö B, Lundell C.Nicotine exposure in breastfed infants. Acta Paediatr. 2004; 93(6): 810-816.

breastfeed because breastfeeding may mitigate the increased vulnerability of their children to illnesses caused by exposure to cigarette smoke.[69] Smoking mothers need additional support to breastfeed their children if they cannot give up smoking.

Oral and Dental Health

Breastfeeding is important for the normal development of the oral cavity. In infants the palate is soft and malleable. Breasts are also soft and malleable and during breastfeeding the breast applies an even and dispersed pressure to the palate via the normal peristaltic movement of the tongue as it massages rather than sucks milks out of the breast.[70] This results in individuals who breastfed were more likely to have a healthy, broad palate, without malocclusions or improper alignment of teeth.[71]

In contrast, bottle teats are hard and a piston-like suckling with negative pressure is used to obtain milk from a bottle. The relatively strong and concentrated pressure associated with bottle-feeding can deform the infant's palate leading to a greater risk for poor alignment of the teeth and malocclusions.[72] Dummy and finger sucking are associated with restricted breastfeeding and with premature weaning from breastfeeding.[73] They are also associated with malocclusions such as crossbite, reduced arch width, open bite and tongue thrust.[74] In addition, when the palate is narrowed and heightened by bottle-feeding it may infringe on the upper airway.[72] It has been found that a high and narrow palate is a good predictor of snoring and obstructive sleep apnoea, both of which contribute to significant health problems in adulthood.[75]

Research has found that babies fed formula reconstituted using tap water containing fluoride may consume amounts of fluoride far in excess of the recommended intake of fluoride.[76] [77] These excessive levels of fluoride may cause dental fluorosis in the permanent teeth of children.[74] Antibiotic use in the first 6 months of life (more common in babies who have been weaned from breastfeeding) can also cause enamel defects in the permanent teeth of children.[78]

Preventable accidents, injury and child abuse

Epidemiological research in the US has looked at the impact of infant feeding on post-neonatal mortality. It has been identified that babies who are never breastfed are 27%

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[68] Myr R (2004). Promoting, protecting, and supporting breastfeeding in a community with a high rate of tobacco use. Journal of Human Lactation 20: 415-416

[69] Nafstad P, Jaakkola JJ, Hagan JA, Botten G, Kongerud J (1996). Breast feeding, maternal smoking and lower respiratory tract infections. European Respiratory Journal 9: 2623-2629.

[70] Palmer B (1998). The influence of breastfeeding on the development of the oral cavity: a commentary. Journal of Human Lactation 1493-98.

[71] Larsson EF, Dahlin KG (1985). The prevalence and the aetiology of the initial dummy- and finger-sucking habit. American Journal of Orthodontics 87: 432-435.

[72] Labbok MH, Hendershot G (1987). Does breast-feeding protect against malocclusion? An analysis of the 1981 Child Health Supplement to the National Health Interview Survey. American Journal of Preventative Medicine 3: 227-232.

[73] Larsson EF, Dahlin KG (1985). The prevalence and the aetiology of the initial dummy- and finger-sucking habit. American Journal of Orthodontics 87: 432-435.

[74] Palmer B (1998). The influence of breastfeeding on the development of the oral cavity: a commentary. Journal of Human Lactation 1493-98.

[75] Kushida CA, Efron B, Guilleminault C (1997). A predictive morphometric model for the obstructive sleep apnoea syndrome. Annals of Internal Medicine 127: 581-587.

[76] Anderson WA, Pratt I, Ryan MR, Flynn A (2004). A probabilistic estimation of fluoride intake by infants up to the age of 4 months from infant formula reconstituted with tap water in the fluoridated regions of Ireland. Caries Research 38: 421-429.

[77] NHMRC (1999). Review of Water Fluoridation and Fluoride Intake from Discretionary Fluoride Supplements. NHMRC, Melbourne.

[78] Hong L, Levy SM, Warren JJ, Dawson DV, Bergus GR, Wefel JS, James S (2005). Association of amoxicillin use during early childhood with developmental tooth enamel defects. Archives of Paediatric and Adolescent Medicine 159: 943-948.

more likely to die in their first year than babies who are ever breastfed.[79] Some of the reasons for the increased death rate in never breastfed infants are related to increased rates of illnesses in non-breastfed babies. However, an examination of cause of death found that babies who had never been breastfed were at 69% increased risk of death from accidents.[77] The relationship between not breastfeeding and increased mortality from accidents has been found before[80] and may be related to the absence of physiological and physical factors associated with breastfeeding that help prevent accidents. Breastfeeding women are physiologically different from women who are not breastfeeding and hormones that are released in response to breastfeeding act on the central nervous system of mothers to promote maternal behaviour[81 82 83] and reduce their response to physical and emotional stress.[84] This enables breastfeeding women to be more responsive to their babies and to want to be closer to them.[85 86 87] Thus, breastfeeding encourages maternal care giving and closer maternal-child proximity and this may directly decrease the risk of accident through increased adult supervision[88] and increased maternal-child attachment.[89]

Because of the potential for breastfeeding to promote maternal-child attachment[90] there is also the potential for breastfeeding to reduce child abuse amongst vulnerable populations such as where children are born prematurely[91 92] or where there is a history of intergenerational relational trauma.[88]

It is worth noting that there is a dose dependent relationship between post neonatal death and breastfeeding and babies who were never breastfed are at a 61% increased risk of death as compared to babies who were breastfed for 3 months.[86] Since research has only examined whether death due to accident is affected by infant feeding it is not possible to sate with certainty whether non-fatal accidents are also more likely in babies who are not breastfed, however, it seems reasonable to surmise that this would be the case.

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[79] Chen A, Rogan WJ (2004). Breastfeeding and the risk of post neonatal death in the United States. Pediatrics 113: e435-e439.

[80] Carpenter RG, Gardner A, McWeeny PM, Emery JL (1977). Multistage scoring system for identifying infants at risk of unexpected death. Archives of Diseases in Childhood 52: 606–661

[81] Bartels A, Zeki S (2004). The neural correlates of maternal and romantic love. Neuroimage 21:1155-1166.

[82] Mann PE, Felicio LF, Bridges RS (1995). Investigation into the role of cholecystokinin (CCK) in the induction and maintenance of maternal behaviour in rats. Hormones and Behaviour 29:392-406.

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[84] Groer MW, Davis MW, Hemphill J (2002). Postpartum stress: current concepts and the possible protective role of breastfeeding. Journal of Obstetrics, Gynaecology and Neonatal Nursing 31:411-417.

[85] Newton N, Peeler D, Rawlins C (1968). Effect of lactation on maternal behaviour in mice with comparative data on humans. Journal of Reproductive Medicine 1:257-262.

[86] Widstrom AM, Wahlberg W, Matthiesen AS (1990). Short-term effects of early suckling and touch of the nipple on maternal behaviour. Early Human Development 21:153-163

[87] Feldman R, Weller A, Leckman JF, Kuint J, Eidelman AI (1999). The nature of the mother's tie to her infant: maternal bonding under conditions or proximity, separation, and potential loss. Journal of Child Psychology and Psychiatry 40:929-939.

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[89] Anisfeld E, Casper V, Nozyce M, Cunningham N (1990). Does infant carrying promote attachment? An experimental study of the effects of increased physical contact on the development of attachment. Child Development 61:1617-1627.

[90] Gribble K (2006) Mental health, attachment and breastfeeding: implications for adopted children and their mothers. International Breastfeeding Journal 1:5.

[91] Macey TJ, Harmon RJ, Easterbrooks MA (1987). Impact of premature birth on the development of the infant in the family. Journal of Consulting and Clinical Psychology 55: 846-852.

[92] Field T (1987). Interaction and attachment in normal and atypical infants. Journal of Consulting and Clinical Psychology 55: 853-859.

The link between breastfeeding, premature weaning and later mental health is one that has received little attention from scientist (although there has been a small amount of work in this area[93]) and more research is needed in this area.

Indigenous health

Breastfeeding may be more important to the health of indigenous children because of the overall poorer health of aboriginal children. As stated by James Grant the former Director of UNICEF *"Breastfeeding is a natural "safety net" against the worst effects of poverty. If the child survives the first month of life (the most dangerous period of childhood) then for the next four months or so, exclusive breastfeeding goes a long way toward cancelling out the health difference between being born into poverty and being born into affluence.... It is almost as if breastfeeding takes the infant out of poverty for those first few months in order to give the child a fairer start in life and compensate for the injustice of the world into which it was born."* Traditionally aboriginal people breastfed their children for several years and in remote areas of Australia this continues.[94] However, in urban and non-remote rural areas of Australia breastfeeding rates amongst aboriginal mothers are as poor as those of non-indigenous mothers.[95 96] However, that aboriginal mothers breastfeed for as long or longer than mothers in the general population and that there is a strong cultural history of long-term breastfeeding provides a positive basis from which to build health promotion programs in aboriginal communities.

Gastroenteritis

Gastroenteritis is common disease in young children. In 1993-1996 there were approximately 20 000 hospital admissions in children under 5 years in Australia.[97] Rotavirus infection is thought to account for half of all hospital admissions for severe diarrhoea and in Australia the cost of hospitalisation for each case is estimated at $1700 per episode per child and cost of care in the community is estimated at $440 per child.[98] Children who are not breastfed have been found to be 3 times more likely to contract rotavirus infection[99] and children who are not breastfed will also be sicker than breastfed children who contract rotavirus.[97 100] One study found that babies who were not breastfed had an 800% increased risk of being sick enough with rotavirus to require a doctor's visit.[101] Other research has found that babies who are not breastfed have a 200-500% risk of developing gastroenteritis caused by non-viral pathogens.[102] Breastfeeding provides protection against infections such as gastroenteritis because human milk

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[93] Sorensen HJ, Mortensen EL, Reinisch JM, Mednick SA (2005). Breastfeeding and risk of schizophrenia 112: 26-29.

[94] Zubrick SR, Lawrence DM, Silburn SR, Blair EM, Milroy H, Wilkes T, Eades S, D'Antoine H, Read A, Ishiguchi & Doyle S (2005). The Western Australian Aboriginal Child Health Survey: The Health of Aboriginal Children and Young People. Curtin University of Technology, Perth.

[95] Zubrick SR, Lawrence DM, Silburn SR, Blair EM, Milroy H, Wilkes T, Eades S, D'Antoine H, Read A, Ishiguchi & Doyle S (2005). The Western Australian Aboriginal Child Health Survey: The Health of Aboriginal Children and Young People. Curtin University of Technology, Perth.

[96] Holmes W, Thorpe L, Phillips J (1997). Influences on infant-feeding beliefs and practices in an urban aboriginal community. Australian and New Zealand Journal of Public Health 21: 504-510.

[97] Carlin JB, Chondros P, Masendycz P, Bugg H, Bishop RF, Barnes GL (1998). Rotavirus infection and rates of hospitalisation for acute gastroenteritis in young children in Australia. Medical Journal of Australia, 1993-1996. Medical Journal of Australia 169: 252-256.

[98] Elliot EJ, Dalby-Payne JR (2004). Acute infectious diarrhoea and dehydration in children. Medical Journal of Australia 181: 565-570.

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[100] Duffy LC, Byers TE, Riepenhoff-Talty M, La Scolea LJ, Zielezny M, Ogra PL (1986). The effects of infant feeding on rotavirus-induced gastroenteritis: a prospective study. American Journal of Public Health 76: 259-263.

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[102] Golding J, Emmett PM, Rogers IS (1997). Does breastfeeding protect against non-gastric infections? Early Human Development 49: S105-S120.

contains several specific and non-specific anti-infective factors and because it may prevent the mucosal attachment of potential pathogens.[103] Currently, the government is being lobbied by manufacturers of a rotavirus vaccine to add their vaccine to the immunisation schedule at great cost to the government. However, serious illness due to rotavirus is largely preventable by breastfeeding. Since breastfeeding is also protective against many other illnesses it makes economic sense to place resources into breastfeeding promotion to reduce the need for expensive medical intervention.

Respiratory infections

Early feeding affects the incidence and severity of respiratory illness. Australian research has identified that in the first year of life babies not exclusively breastfed for 2 months or at least partially breastfed for 6 months are 1.4 times more likely to have 4 or more hospital or doctors visits because of upper respiratory tract infections.[104] Babies not exclusively breastfed for 6 months are 2 times more likely to have two or more hospital or doctors visits and 2.6 times more likely to be hospitalised for wheezing lower respiratory illness (bronchiolitis or asthma).[102] Cessation of breastfeeding before 12 months is associated with a 60% increased risk of 2 or more hospital visits for wheezing lower respiratory illness.[102]

Breastfeeding is protective against respiratory illness because breastmilk contains antibodies that neutralise some pathogens associated with respiratory infection.[105]

Otitis media

Research has consistently found that babies who are not breastfed are at increased risk of suffering from otitis media, otherwise known as middle ear infection.[106] Children not breastfed have between 60 and 100% increased risk of developing otitis media[107 108 109] and at about double the risk of suffering from recurrent otitis media.[107 110] The shorter the duration of breastfeeding, the greater the likelihood of otitis media.[111] Recurrent otitis media particularly problematic because of the impact that it can have on hearing. Recurrent otitis media is associated with mild, fluctuating hearing loss.[112] Since the first few years of life are critical for language development recurrent otitis media in infancy and toddlerhood can negatively affect children's language acquisition. Research has found that up to 70% of children with a history of recurrent otitis media exhibit a language delay[113] resulting in an increased need for speech therapy services. Hearing loss

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[103] Hanson LA, Hofvander Y, Lindquist B, Zetterstrom R (1985). Breast-feeding as a protection against gastroenteritis and other infections. Acta Paediatrica Scandinavica 74: 641-642.

[104] Oddy WH, Sly PD, de Klerk NH, Landau LI, Kendall GE, Holt PG, Stanley FJ (2003). Breast feeding and respiratory morbidity in infancy" a birth cohort study. Archives of Diseases in Childhood 88: 224-228.

[105] Downham MA, Scott R, Sims DG, Webb JKG (1976). Breast-feeding protects against respiratory syncytial virus infections. British Medical Journal 2: 274-276.

[106] Golding J, Emmett PM, Rogers IS (1997). Gastroenteritis, diarrhoea and breastfeeding. Early Human Development 49: S83-103.

[107] Duffy LC, Faden H, Wasielewski R, Wolf J, Krystofik D (1997). Exclusive breastfeeding protects against bacterial colonization and day care exposure to otitis media. Pediatrics 100: e7.

[108] Duncan B, Ey J, Holberg CJ, Wright AL, Martinez FD, Taussig LM (1993). Exclusive breast-feeding for at least 4 months protects against otitis media. Pediatrics 91: 867-872.

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[110] Fosarelli PD, Deangelis C, Winkelstein J, Mellits ED (1985). Infectious illnesses in the first two years of life. Paediatric Infectious Diseases 4: 153-159.

[111] Alho OP, Koivu M, Sorri M (1990). Risk factors for recurrent acute otitis media and respiratory infection in infancy. International Journal of Paediatric Otorhinolaryngology 19: 151-161.

[112] Schlieper A, Kisilevsky H, Mattingly S, Yorke L (1985). Mild conductive hearing loss and language development: a one year follow-up study. Journal of Developmental and Behavioural Pediatrics 6: 65-68.

[113] Friel-Patti S, Finitzo-Hieber T, Conti G, Brown KC (1982). Language delay in infants associated with middle ear disease and mild, fluctuating hearing impairment. Paediatric Infectious Disease 1: 104-109.

and language delay early in life have a flow on effect on academic learning in the early years of school. Children with a history of recurrent otitis media are also at an increased risk of having difficulties with learning to read in middle childhood[114] necessitating an increase in the need for remedial education programs. This is another example of the impact of early nutrition on later heath and wellbeing.

Breastfeeding may provide protection against otitis media because babies are often held in a more upright position when breastfed, or because of anti-infective and anti-inflammatory agents present in breastmilk.[115]

Urinary tract infection

Babies who are not breastfed are 5 times more likely to suffer from urinary tract infection in infancy than children who are breastfed.[116] They are also more likely to suffer from urinary tract infections up until at least 6 years of age. It is thought that breastfeeding is protective because the urine of breastfed infants contains substances that inhibit the adhesion of pathogens such as *E. coli* to uroepithelial cells and also because breastfed infants may have more stable and less pathogenic intestinal flora.[117]

Other conditions

Some research has found an increased risk of developing ulcerative colitis, Crohn's disease and coeliac disease in individuals who were formula fed as infants.[118]

Long term impacts of breastfeeding

The impact of breastfeeding continues beyond weaning. Children weaned earlier continue, for 2 or more years after weaning, to suffer more ill health than children who were breastfed for longer.[119] This finding supports the idea that breastfeeding supports the normal development of the immune system and conversely that premature weaning from breastfeeding retards the development of the immune system.

It has been found that children who were not breastfed are more likely to require antibiotic treatment at 18 and 30 months at least 3 times in the preceding 6 months as compared to babies' breastfed (not exclusively) for at least 4 months[117]. Antibiotic medication is commonly used to treat respiratory illness and otitis media. The duration of exclusive breastfeeding is significant in determining the likelihood of a child developing these conditions. One recent study found that children who were fully breastfed (meaning breastfed without supplementation with other milks) for 4 to <6 months were 4 times more likely to suffer from pneumonia and 2 times more likely to suffer from recurrent otitis media up until the age of 2 years than those breastfed for 6 months or more.[120]

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[114] Golz A, Netzer A, Westerman ST, Gilbert DA, Joachims HZ, Goldenberg D (2005). Reading performance in children with otitis media. Otolaryngology: Head and Neck Surgery 132: 495-499.

[115] Duncan B, Ey J, Holberg CJ, Wright AL, Martinez FD, Taussig LM (1993). Exclusive breast-feeding for at least 4 months protects against otitis media. Pediatrics 91: 867-872.

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IMPACT OF BREASTFEEDING ON THE HEALTH OF MOTHERS

Breastfeeding also has an impact on the health of mothers and has been found to reduce the incidence of hip fracture, breast cancer, rheumatoid arthritis, ovarian cancer and diabetes.

Hip fracture

Hip fractures are common in elderly women and have a high mortality and morbidity. However, women who breastfeed their children have a reduced risk of hip fracture. The reduction of risk is dependant on duration of breastfeeding. One study of Australian women who had breastfed each of their children for 9 months or more reduced their risk of hip fracture by 72% as compared to women who had not breastfed their children.[121] There is evidence that the risk of hip fracture continues to decrease with breastfeeding beyond 9 months per child.[122]

Breast Cancer

Breast cancer is the most common type of cancer and cause of cancer death in women in Australia. Breastfeeding reduces the risk of a woman developing breast cancer in a very strong dose dependent relationship. It has been estimated that each 12 months of breastfeeding reduces the risk of breast cancer development by 4.3%[123] and that the impact of breastfeeding on breast cancer reduction increases with long-term breastfeeding such that women who breastfeed each of their children for 2 years or more up to halve their risk of developing breast cancer.[124] A recent meta-analysis concluded *"the lack of or short lifetime duration of breastfeeding typical of women in developed countries makes a major contribution to the high incidence of breast cancer in these countries"* (Collaborative Group on Hormonal Factors in Breast Cancer, 2002). It is thought that breastfeeding may reduce the risk of breast cancer because it reduces the exposure to the cyclic hormones of reproductive life, it induces physical changes in the breast that associated with breastfeeding may be protective, breastfeeding reduces concentration of toxic organochlorins in the breast and because breastfeeding may activate factors that suppress the growth of breast cancer cells.[122]

Rheumatoid arthritis

Hormonal factors are involved in the development of rheumatoid arthritis and since breastfeeding can impact the hormonal milieu of women in the long term[125] it is not surprising that lactation history can affect the likelihood of women developing rheumatoid arthritis. A very large prospective study found that women who had a lifetime breastfeeding duration of 12 months had a 20% decreased risk of developing the condition and women who had a lifetime breastfeeding duration of 2 years or more had a

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121 Cumming RG, Klineberg RJ (1993). Breastfeeding and other reproductive factors and the risk of hip fractures in elderly women. International Journal of Epidemiology 22: 684-691.

122 Huo D, Lauderdale DS, Liming L (2003). Influence of reproductive factors on hip fracture risk in Chinese women. Osteoporosis International 14: 694-700.

123 Collaborative Group on Hormonal Factors in Breast Cancer (2002). 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. The Lancet 360: 187-195.

124 Zheng T, Duan L, Liu Y, Zhang B, Wang Y, Chen Y, Zhang Y, Owens PH (2000). Lactation reduces breast cancer risk in Shandong Province, China. American Journal of Epidemiology 152: 1129-1135.

125 Lankarani-Fard A, Kritz-Silverstein, Barrett-Connor E, Goodman-Gruen D (2001). Cumulative duration of breast-feeding influences cortisol levels in post-menopausal women. Journal of Women's Health and Gender-Based Medicine 10: 681-687.

50% decreased (i.e halved) risk of developing rheumatoid arthritis as compared to women who had breastfed for 3 months or less.[126]

Ovarian Cancer

Breastfeeding also impacts the likelihood of women developing ovarian cancer. Research has found that breastfeeding for 2-7 months results in an average 20% reduction in incidence of ovarian cancer (studies have found up to a 50% reduction with the relationship being dose dependent).[127]

Diabetes

A recent study found that each year of breastfeeding reduces the risk of developing Type 2 diabetes by 15% in young and middle aged women even when BMI and other risk factors are controlled for.[128] It is thought that this may be because breastfeeding improves the stability of glucose levels in women.[126]

BREASTFEEDING RATES IN AUSTRALIA

The Australian National Health and Medical Research Council's (NHMRC) Dietary Guidelines for Infant Feeding reflect the World Health Organisation (WHO) recommendation that infants be exclusively breastfed for the first six months of life[129], with ongoing breastfeeding until two years and beyond with appropriate complementary foods. Despite this policy support, Australia has a poor record when it comes to exclusive breastfeeding and breastfeeding duration.

The NHMRC has set breastfeeding targets for Australia. It recommends a 90% initiation rate and 80% of infants breastfed for at least six months of age.[130] Breastfeeding initiation rates in Australia are very close to the NHMRC goal. 87% of women initiate breastfeeding.[131] This suggests that the overwhelming majority of women want to breastfeed their babies. However, less than half of babies continue to be breastfed at 6 months of age, 23% are breastfed at a year and only 1% of children breastfed at 2 years of age.[129]

Figures from the latest National Health Survey (NHS) in 2001[129], showed that exclusive and sustained breastfeeding rates remain very low, with fewer than one in three **of all** babies aged less than six months being exclusively breastfed. In particular, there has been little if any improvement in the number of mothers and babies breastfeeding exclusively for the minimum recommended six months. That is, **less than half of Australian babies reach the normal standard for human nutrition.**

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[126] Karlson EW, Mandl LA, Hankinson SE, Grodstein F (2004). Do breast-feeding and other reproductive factors influence future risk of rheumatoid arthritis? Arthritis and Rheumatism 50: 3458-3467.

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[131] Australian Bureau of Statistics (2003). *Breastfeeding in Australia, Electronic Delivery.* Retrieved online from http://www.abs.gov.au/Ausstats/abs@.nsf/0/8E65D6253E10F802CA256DA40003A07C?Open#Links

ECONOMIC COSTS OF PREMATURE WEANING

The cost attributed to the hospitalisation of prematurely weaned babies alone is around $60-120 million annually in Australia for just five common childhood illnesses.[132] Conversely, any decline in breastfeeding from current levels has substantial and adverse cost implications for the public health system.

Premature weaning from breastfeeding results in an unnecessary disease burden on our health care system. There is a limited amount of research that had quantified this burden. One study (US) looked at just three illnesses (lower respiratory tract illness, middle ear infection and gastrointestinal illness) and found that for every 1000 babies never breastfed as compared to 1000 babies exclusively breastfed for 3 months there were 2033 extra visits to the doctor, 212 extra days of hospitalisation and 609 extra prescriptions in the first year of life.[133] It is therefore not surprising that increasing breastfeeding rates has been shown to decrease the frequency of illness at a community level.[134]

Breastfeeding is something that belongs to women. There is no commercial interest in fostering increased breastfeeding rates. Therefore breastfeeding has been largely ignored in terms of its economic contributions and is not currently included in the national product statistics whilst formula and its products are. Breastfeeding currently has a negative impact on the economy. *If more mothers breastfeed, the national accounts measure this as a fall in national food output and GDP, because more breastfeeding lowers commercial infant food sales and reduces spending on health care.*'[135]. By including breastmilk production and consumption in the national food output and GDP there are substantial economic gains from a resource that costs so little to produce and the follow-on effects of good health which reduces public expenditure on health. It had been earlier suggested that if the WHO targets for breastfeeding were achieved in Australia the economic value of breastfeeding would increase by $3.4 billion per annum[136]

A farmer can currently milk a cow and feed that to his baby and be included in the gross domestic product and food statistics. So while a farmer can claim exemption for the GST for expenses related to milking machinery, a mother with a baby who has a cleft palette and needs to use a breast pump cannot! This inconsistency does not value the contribution made by women and breastmilk.

WHY ARE OUR BREASTFEEDING PRACTICES SO POOR?

Low breastfeeding continuation and exclusivity rates are of public health importance. The normalisation of bottle-feeding results in a lack of confidence in mothers in their ability to breastfeed.

Most health care professionals gain the majority of their knowledge about breastfeeding from their own infant feeding experiences. Experience of successfully breastfeeding their

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[136] Oshuang A, Botten G (1994) Human milk on food supply statistics. Food Policy 19(5): 479-482.

own children for a physiologically normal length of time greatly increases the ability of health care providers to assist their patients with breastfeeding. However, where they do not successfully breastfeed this negatively impacts their ability to support their patients in breastfeeding. Unfortunately, health care professionals breastfeeding duration rates reflect those of the surrounding population[137]and unfortunately many women are pressured to prematurely wean by health care professionals. In addition, while doctors usually receive only one or two hours of breastfeeding education during their training they are repeatedly provided with education about infant feeding from the manufacturers of baby foods and breast milk substitutes (formula).

Marketing of infant formula to health care professionals and women undermines their confidence in breastfeeding.[138]

Research overseas has found that doctors' beliefs and practices surrounding breastfeeding mirror the ambient beliefs and practices in the society in which they operate.[139] Infant formula manufacturers are somewhat restricted in their ability to market directly to parents however, they have no restriction on marketing to health care professionals. They actively do so by sponsoring conferences, wooing with freebies and providing advertising that is targeted to health care professionals as parents rather than as medical professionals. Sponsorship: A recent child health conference held in NSW had no breastfeeding content but 5 infant formula or bottle manufacturers that were invited to sponsor the conference. They gave out misleading information about infant feeding to the health care professionals who attended this conference. This conference had NSW Health as a major sponsor! While health care professionals can be educated about breastfeeding and bottle-feeding by those with commercial interests in encouraging premature weaning from breastfeeding we have a problem. Similarities can also be draw with the marketing of cigarettes. It would not be appropriate to invite cigarette manufacturers to sponsor a respiratory conference!

Many health care professionals are completely unaware that the health and developmental impact of breastfeeding continues for years of breastfeeding rather than months or weeks.

Generally there is community support for positive parental health behaviours. So parents are commended for having a hat on their baby or child, or taking their child to sport but breastfeeding women often experience pressure to wean from family, friends and even health care providers (research has found that the attitudes of health care professionals re breastfeeding reflects the social norm). Hence there is a very real need for a public health campaign promoting the importance of breastfeeding.

Women who have successfully breastfed their children for physiologically normal durations have usually had to withstand often very significant pressure from family, friends and health care providers to wean. This is despite the fact that they are doing something good for their children and themselves.[140]

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137 Arthur, C.R., Saenz, R.B., & Replogle, W.H. (2003). Personal breast-feeding behaviours of female physicians in Mississippi. Southern Medical Journal., 96(2), 130-135.

138 Smith JP (2006). Selling sickness to mothers and babies: historical perspectives in infant food advertising and breastfeeding practices in Australia. Inaugural Conference on Disease Mongering. Newcastle, Australia. 11th-13th April 2006.

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BREASTFEEDING, MATERNITY LEAVE AND CHILD CARE

We currently have a vigorous debate about childcare. However, it has been identified that in order to provide the sort of care that babies need the cost is so high that providing paid maternity leave is comparable in cost. *"The Swedish case is very revealing - there was high-quality infant care available to all and heavily subsidised. It was widely used in the 70s and 80s, but in the early 90s, parental leave was increased and now there is remarkably little use of childcare under 18 months. Parents voted with their feet."*[141] Babies need the responsive care of a small number of adults. Where paid maternity leave is provided, the need for childcare for children under 2 years is almost non-existent. Paid maternity leave allows women choice in the early months of their child's life and makes it easier for women to continue breastfeeding. In Norway with 12 months paid leave, breastfeeding rates are 92% exclusively breastfeed for 3 months and still 40% are still breastfeeding 12 – 15 months.[142]

Children in daycare are more vulnerable to infection[143] and therefore it is very important for working mothers to be supported in continuing to breastfeed/provide breastmilk for their babies.
In addition, the increased illness in non-breastfed babies result in decreased productivity and increased absenteeism amongst parents in the paid workforce. Thus, a large employer in the US who instigated a lactation program that supports employees continuing to breastfeed once they have returned to work found that over a one year period 93% of bottle fed babies of employees were sick enough to require a doctors visit compared with 50% of breastfed babies.[144] Since bottle fed babies were not only sicker but also sicker for longer the parents of bottle bed babies had an absenteeism rate that was 7 times higher than parents of breastfed babies.[134] In addition, some research has found that women who are supported in breastfeeding their babies by their employers are more likely to return to work after their baby is born.[145]

CONCLUSION

We are sure that you can see that there are compelling reasons for including a breastfeeding component in Labour's health strategy. Breastfeeding belongs to women, it is not something that makes anyone any money and therefore is not seen as a valuable resource in terms of competing in international markets with large corporations that manufacture infant formula. These companies have the resources to spend large amounts on research and in marketing their product because there is profit involved. It is clear that the health consequences associated with premature weaning from breastfeeding are manifold and serious. Breastfeeding is an investment in the future health of our children

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141 Manne, A (2005). Motherhood: How should we care for our children? Allen & Unwin

142 Gevoed, G 1999 Borstvoeing in Noorwegen. 2000; No.1:: 3 extracted from the WHO Global Data Bank on Breastfeeding and Complementary Feeding: www.who.int/research/

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144 Geisel J (1994). Lactation program yields multiple benefits. Business Insurance 28: 12.

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