

## Conference Paper

# A Brief Economic Evaluation of Breastfeeding in Australia

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## Abstract

According to the Australian Bureau of Statistics (2013), in 2013 the percentage of exclusive breastfeeding for six months was less than one-fifth of the overall rate of breastfeeding initiation, which was related to socioeconomic status. This paper discusses the expenses related to breastfeeding and the reasons that the Australian Government should prolong the duration of the paid parental leave scheme to support exclusive breastfeeding. The literature for this systematic review was drawn from MEDLINE, Scopus, Google Scholar and various reports by agencies of the Australian Government. The inclusion criteria were based on the economic benefits of breastfeeding, the costs related to diseases caused by premature weaning and other financial factors. The selected previous studies were analysed to present a narrative review of the key themes. Sixteen studies and reports were selected from 144 sources. The findings of the review showed that in Australia, the total potential economic cost to individual income of the time spent on exclusive breastfeeding was approximately A\$611.49 million (A\$31,498.80 per mother per six months). However, in 2002, the short-term cost savings was A\$60 million. The total cost savings would be higher if other expenses in long-term premature weaning were calculated based on current value. Based on the findings of this literature review, the benefits of breastfeeding outweigh its costs. The findings suggest that the Australian Government should consider an additional financial incentive for breastfeeding mothers in order to reduce the gap between the proportion of exclusive breastfeeding mothers and better newborn health outcomes.

**Keywords:** breastfeeding, cost saving, Australia, parental leave, premature weaning

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## 1. INTRODUCTION

Australia has a poor breastfeeding culture [14]. Even though many Australians support breastfeeding and recognise it as the best food for infants [14], from 2011 to 2012, the proportion of infants exclusively breastfed for the first six months was only 17.6% of all children older than six months [3]. The percentage of infants exclusively breastfed during the first half year of life was less than one-fifth of the percentage of breastfeeding initiation (92.3%) from 2011 to 2012 [3]. The vast gap between the proportions of breastfeeding mothers also has been found in other developed countries, such as the US. The Organisation for Economic Co-operation and Development [5] reported 75% for breastfeeding initiation and 15% for exclusive breastfeeding in the first six months of life. Forster, McLachlan and Lumley (2006) identified that socioeconomic status was factor that could induce premature weaning. A study conducted by Forster et al. (2006) between 1999 and 2001 found that in Melbourne, women with low socioeconomic status were 2.08 times more likely not to breastfeed exclusively than those with high socioeconomic status were (95% confidence interval [95%CI]: 1.38 to 3.09). Although the Australian Government provides paid parental leave to support exclusive breastfeeding, the phenomenon of premature weaning still occurs. This paper will discuss the reasons that the government should prolong the duration of the paid parental leave scheme.

## 2. METHODS

The articles reviewed in this study were drawn from the academic databases MEDLINE, Web of Science, Scopus and Google Scholar from 1 January 1997 to 19 January 2017. The selected literature includes reports by the Australian Department of Human Services, the Australian Bureau of Statistics, The Parliament of the Commonwealth of Australia, and The Fair Work Ombudsman.

The search terms applied to various Boolean operators and medical subject headings are summarised as follows. The first author (ENN) applied the electronic search strategies under the direction of the secondary and tertiary authors, EMD and JFP, respectively. The following string of search terms was used to identify sources related to the economic benefits of breastfeeding: (Exclusive breastfeeding OR Premature weaning). The search term (Australia) was added to emphasis on breastfeeding in Australia. The following search terms were added (e.g., AND) for to conduct the search for sources

on economic value: (Cost). An iterative approach was used to refine the search strategies. The inclusion and exclusion criteria were applied systematically using Endnote X7 software (Thomas Reuters, New York, USA). Studies that did not refer to an economic value were excluded from the review.

## 2.1. Eligibility criteria and study selection

Articles were included only if they met the following criteria: (a) described the economic benefits of breastfeeding; (b) used and analyses the costs related to diseases caused by premature weaning and other financial factors. Ten of 138 studies and six reports by the Australian Department of Human Services, the Australian Bureau of Statistics, The Parliament of the Commonwealth of Australia and The Fair Work Ombudsman were selected and analysed in this literature review (Table 1).

TABLE 1: Study Selection.

Keywords	Google Scholar	Scopus	Medline
Exclusive breastfeeding OR Premature weaning	28,800	4,335	1,167,441
Australia	4,000,000	356,553	89,622
Cost	4,670,000	2,099,837	48,286
1 AND 2 AND 3	7,160	2	47
4 AND Limiting Year: 1999 to 2017	138	2	2

## 2.2. Data extraction

The data extraction was undertaken independently, in which the first author reviewed the full texts of the sources drawn from the databases using a piloted and revised spreadsheet. The second and third authors then reviewed all inclusions and inconsistencies, which were minimal and resolved in discussions held by the three researchers.

The following data were extracted: (a) economic benefits of breastfeeding; (b) costs related to diseases caused by premature weaning; (c) other financial factors that affected the decision to breastfeed exclusively for six months as identified by the study. Then ten studies and six reports were selected based on the inclusion criteria.

## 2.3. Summary measure

The official summary measure of the results is the value of money.

### 3. RESULTS AND DISCUSSION

#### 3.1. Cost of breastfeeding

In this study, the cost of breastfeeding refers to the economic cost of the time spent on exclusive breastfeeding [14]. The first calculated cost is the cost associated with the mothers' earning potential. Assuming that the average economic cost of the time spent on exclusive breastfeeding in Australia is around 17 hours per week [14], each breastfeeding mother would require approximately 408 hours per six months. Hence, the potential earnings lost through exclusive breastfeeding would be A\$7,221.6 per breastfeeding mother per six months if the breastfeeding women were assumed to be paid using the full amount of the national minimum wage in Australia (A\$17.70 per hour) [13].

Assuming that the breastfed mothers do not work during exclusive breastfeeding period and their potential weekly earnings are the same as those the full-time adult average weekly earnings in May 2016 in Australia (\$1,516) [2], the potential loss of earning potential would be A\$ 36,384 per breastfeeding mother per six months. If all exclusively breastfeeding mothers did not work, and they were eligible for the Australian Government's paid parental leave scheme (A\$ 672.6 per week for the first 18 weeks) [4], the potential parental leave pay received by each mother would be A\$12,106.80. In total, the potential loss of income would be A\$31,498.80 per mother per six months or A\$1,312.45 per week.

According to ABS (2013), the proportion of exclusive breastfeeding mothers varies based on the duration of the breastfeeding period. In 2011, 57.8% of babies in Australia aged less than two months had been exclusively breastfed for two months, 38.6% of children aged two to four months had received exclusive breastfeeding for four months, and 17.6% of infants up to six months had received exclusive breastfeeding for six months [3].

If the total number of births were the same as the number of births in Australia in 2014 (299,697 babies) [1], the number of babies in each category (0–2 months, 2–4 months, 4–6 months, 6–8 months, 8–10 months and 10–12 months) would be equal. If each baby were born from a different mother, 28,870 babies would have received exclusive breastfeeding for two months, 19,280 children would have received exclusive breastfeeding for four months and 8,791 infants would have received exclusive breastfeeding for up to six months. The total potential loss of income incurred during the six months of exclusive breastfeeding in Australia would be A\$611.49 million (A\$1,312.45

per week multiplied by the number of infants exclusively breastfed for two, four and six months).

If the total number of births were the same as the number of births in 2014 [1], and there was a 10% increase in the proportion of exclusive breastfeeding mothers over the percentage in 2011, the total potential loss of income incurred during the breastfeeding period (6 months) would increase by A\$160.94 million. This increase in the total potential loss of income could be underestimated or overestimated because of the potential diminishing returns.

Regarding the cost of breastfeeding to companies, they must provide the extra cost of A\$1,516 per breastfeeding mother per week or more than A\$172 million per six months if the breastfeeding mothers are previously full-time workers that have to be replaced by casual workers during the period of exclusive breastfeeding. This additional cost is incurred because the minimum wage per hour for a casual worker is 25% higher than the minimum wage for the full-time or part-time workers. This potential loss would be increased by A\$11,826 per mother per six months if the breastfeeding mothers were not eligible for the Australian Government's paid parental leave scheme.

### 3.2. Cost savings of breastfeeding

Breastfeeding has been shown to protect breastfeeding mothers and breastfed infants against numerous diseases, which then reduces the associated costs to the health care system [14]. In this study, the positive effects of breastfeeding are divided into short-term effects and long-term implications. Short-term effects are the effects of breastfeeding on children younger than five years, such as diarrhoea and respiratory infections (Horta & Victora, 2013b). The effects on children older than five years, such as type 2 diabetes, are referred to as long-term implications (Horta & Victora, 2013a).

### 3.3. Short-term impact

In 2002, a study conducted by Dr Smith (cited in [14]) in Canberra Hospital found that less than 10% of children in the Australian Capital Territory (ACT) were given exclusive breastfeeding up to six months. The low proportion of exclusive breastfeeding has caused an annual hospitalisation cost of A\$1 to A\$2 million because of the several diseases associated with premature weaning, such as gastrointestinal diseases, necrotising enterocolitis, and ear and respiratory infections [14]. In addition, exclusive

breastfeeding may save the Australian hospital system from A\$60 to A\$120 million, which are the costs currently incurred by these diseases [14].

A small increase in the number of exclusive breastfeeding mothers could promote further cost saving. Drane (1997) reported that cost saving in Australia could exceed A\$6 million if there were a 10% increase in exclusive breastfeeding (from 60% to 70%) for three months. The cost reduction improved significantly if the amount of maternal absenteeism was considered ([14], Drane 1997).

These findings are in line with various international studies, such as cohort studies conducted at a medical university hospital by Johnson et al. (2015) and Weimer (2001) in the US. Johnson et al. (2015) reported that the average total cost to a neonatal intensive care unit (NICU) for the hospitalisation of infants with NEC in 2012 was 1.3 times higher than the cost for infants without NEC (US\$180,163 for infants with NEC [95%CI: US\$79,339 to US\$280,987] and US\$134,494 for infants without NEC [95%CI: US\$61,980 to US\$207,098]). In addition, an extra 1 ml/kg body weight/day of human milk during the first two weeks of life decreased the average cost of NICU hospitalisation for infants without NEC by \$534 in 2012 ( $p < 0.001$ ) [9]. Weimer (2001) also found that the increase in the proportion of breastfeeding initiation of the mother in hospital from 64 to 70% and the growth of percentage of exclusive breastfeeding up to six months from 29 to 40% led to a cost saving of US\$1,981,300,696 in the US in 1997. The majority of the costs saved was associated with the prevention of the premature end of life (US\$1.78 billion of US\$1.98 billion).

### 3.4. Long-term implications

Smith and Harvey (2011) reported that in Australia, chronic diseases were associated with premature weaning. They found that people who were fed artificially during their first six months of life compared to those who had exclusive breastfeeding for six months had a higher risk of developing diabetes mellitus type 2 (Relative Risk [RR]: 1.64, 95% confidence interval (95%CI): 1.18-2.27), obesity (RR: 1.28, 95% CI: 1.19-1.39) and ulcerative colitis (RR: 1.30, 95%CI: 1.04 to 1.65). These findings were also in line with the results found by Tawia (2013), in which the percentages of chronic illnesses attributable to early weaning in 2005 was 20% for obesity, 37% for diabetes mellitus type 2 and 15% for cardiovascular diseases.

These chronic diseases have placed a huge burden on the Australian Government. For example, in the period from 2014 to 2015, obesity incurred an additional cost of A\$8,600 million [10]. In addition, prematurely weaned infants have a higher probability

of developing middle ear infections, which then lead to the ongoing cost of special education because of poor health conditions [14].

#### 4. CONCLUSION AND RECOMMENDATION

Exclusive breastfeeding has many benefits for both mothers and newborns. Moreover, exclusive breastfeeding has economic implications for families in Australia. Supporting exclusive breastfeeding would cause the mothers to lose substantial income. The findings of this review study showed that the potential loss of income incurred by the time spent in exclusive breastfeeding is A\$611.49 million per six months. An additional A\$160.94 million would be necessary for an increase of 10% in the proportion of breastfeeding mothers. Furthermore, from the company's perspective, the minimum cost of breastfeeding is approximate A\$172.65 million per six months. However, the benefits of breastfeeding outweigh its costs. In 2002, exclusive breastfeeding saved the Australian hospital system from A\$60 to A\$120 million incurred by three diseases alone (gastrointestinal diseases, necrotising enterocolitis, and ear and respiratory infections). Moreover, in 2002, an increase of 10% of the proportion of breastfeeding mothers provided an additional cost saving of A\$6 million. The amount of cost saving would increase if the costs of the long-term implications of premature weaning were fully calculated. The findings from this systematic literature review suggest that the Australian Government should consider providing an additional financial incentive for breastfeeding mothers to shorten the gap in the proportion of exclusive breastfeeding mothers and better newborn health outcomes.

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