The scaling up of breastfeeding to a near universal level could prevent 823,000 annual deaths in children younger than 5 years and 20,000 annual deaths from breast cancer (Victora et al 2016:476).

This is the finding of the first part of The Lancet Series, which is a timely summary of the value of breastfeeding in reducing mortality and morbidity as well as addressing inequality globally (Victora et al 2016). In view of the economic and environmental costs of low breastfeeding rates and the ability of relatively low cost interventions to enable women to breastfeed for longer, it makes a convincing case for governments and civil society to improve investment in breastfeeding.

The first paper considers: health outcomes; potential lives saved; recent understanding of some of its effects on immunity and the microbiome; and estimates trends in breastfeeding rates globally. The second examines factors that influence breastfeeding rates and the effectiveness of promotion interventions (Rollins et al 2016). The changing understanding of breastfeeding in HIV transmission, marketing of breastmilk substitutes (BMS), and environmental and economic aspects are also summarised. This leads to the deduction that, as ‘potentially one of the top interventions for reducing under-5 mortality’, breastfeeding has a substantial contribution to make to future global development (Victora et al 2016:487).

Health outcomes
In updating health outcomes related to infant feeding, Victora et al (2016) considered 28 systematic reviews and meta-analyses, of which 22 were commissioned for this review.

Mortality
Meta-analysis of studies in low- and middle-income countries (LMICs) found a strongly protective effect on mortality, with exclusively breastfed infants under six months having only 12% of the risk of death compared with those who were not breastfed. Any breastfeeding was associated with a 50% reduction in deaths among children aged 6–23 months. In high-income countries (HICs), breastfeeding was associated with a 36% reduction in sudden infant deaths and, for premature babies, 58% lower risk of necrotising enterocolitis.

The Lives Saved Tool was used to calculate the mortality associated with not breastfeeding in 75 LMICs in 2015. If breastfeeding was increased to near universal levels, this was equivalent to 13.8% of the deaths of children under two years of age; an estimated 823,000 child deaths. Considering only breast cancer mortality, 22,216 mothers’ lives would be saved by increasing breastfeeding duration to 12 months per child in HICs and two years per child in LMICs every year.

Morbidty
Breastfeeding was associated with lower risks of infectious diseases, including gastroenteritis, respiratory infections and otitis media. Approximately half of diarrhoea episodes and a third of respiratory infections would be avoided by breastfeeding, with greater reductions in hospital admissions of 72% for diarrhoea and 57% for respiratory infections. Breastfeeding is also associated with a 19% lower risk of childhood leukaemia.

No clear evidence of protection against allergic disorders, including eczema or food allergies was detected, although there was some evidence of a reduction in allergic rhinitis in pre-school children. A statistically significant reduction in asthma of 9% was indicated with breastfeeding in analysis of 29 studies. However, this was not significant when analysis was limited to 16 studies with tighter control of confounding.

Oral health outcomes demonstrated a reduction of 68% in malocclusions with breastfeeding. In contrast, breastfeeding for longer than 12 months and nocturnal feeding were associated with 2–3 times more dental caries in deciduous teeth, which the authors note is possibly due to inadequate oral hygiene after feeds.

Most studies of links between breastfeeding and outcomes related to non-communicable diseases are from HICs. Longer periods of breastfeeding were associated with a 26% lower risk of overweight or obesity which was consistent across different income groups. Considering only large, high-quality studies reduced this to 13%. In line with this there was a 35% reduction in the incidence of type 2 diabetes, but high-quality studies indicated a potentially important, but not statistically significant, reduction of 24%. A review of six studies also found a possible
protective effect against type 1 diabetes. However, there was no evidence of protective effects of breastfeeding on systolic or diastolic blood pressure, and total cholesterol.

Breastfeeding was consistently associated with higher performance in intelligence tests in children and adolescents. Combined analysis of studies controlling for confounding factors, including maternal intelligence, found an increase of 2.6 IQ points, with a clear dose response effect.

The protection against mortality and morbidity from infectious diseases extends well into the second year of life, and breastfeeding prevents half of deaths caused by infections in children aged 6–23 months. For several outcomes, such as overweight and obesity in children, longer durations of breastfeeding are associated with lower risk.

**Mothers’ health outcomes**

Systematic reviews covered lactational amenorrhoea, breast and ovarian cancer, type 2 diabetes, postpartum weight change and osteoporosis. The majority of studies were carried out in HICs. Comparing longer versus shorter breastfeeding durations, incidence of breast cancer was reduced by 7% and ovarian cancer by 18%. Meta-analysis demonstrated an odds ratio of 0.68 for type 2 diabetes.

There was no evidence of an association between breastfeeding and bone mineral density. Although a review of 48 studies showed clear associations between breastfeeding and reduced maternal depression, the authors assume that it is more likely that depression affects breastfeeding than vice versa.

The well-recognised impact of exclusive or predominant breastfeeding on fertility was confirmed and it was estimated that in countries where continued breastfeeding is prevalent, 50% more births would be expected than if babies were not breastfed.

**Personalised medicine**

One aspect of the paper which is unusual is the discussion of mechanisms of breastmilk as a ‘personalised medicine’ for infants. This looks at the way breastmilk transmits elements of the mother’s microbiome and immune responses, while also providing specific prebiotics to support the growth of beneficial bacteria. Transport from the mother’s gut to the breast means that maternal bacteria, T-cells and plasma cells producing immunoglobulin A specific for the bacteria, are released into colostrum and breastmilk. Breastmilk cytokines also vary depending on the mother’s exposure to infections. This means there is coordinated support for each infant’s developing immune system, matched to the mother’s microbiome. Other specific components of breastmilk, including lactoferrin, stem cells, exosomes which may affect atopic sensitisation, and breastmilk fat globules containing micro-RNAs, can also affect infants’ epigenetic programming. Taken together these immune responses are likely to persist into adult life.

**Breastfeeding rates**

It is significant that breastfeeding rates were generally found to be better in LMICs. It was possible to account for 99% of children from LMICs compared to only 37 of 75 HICs. Most mothers in all country groups started breastfeeding; only France, Spain, and the USA had rates below 80% for initiation.

Exclusive breastfeeding rates were low in most countries, although exclusive breastfeeding rates increased globally from 24.9% in 1993 to 35.7% in 2013. The prevalence of breastfeeding at 12 months is highest in sub-Saharan Africa, south Asia, and parts of Latin America whereas in most HICs, prevalence is lower than 20%. The UK was singled out for mention of a very low rate of breastfeeding at 12 months (<1%) vs the USA (27%) and Norway (35%).

The authors note the strong inverse correlation between breastfeeding and log gross domestic product (GDP) per head; for each doubling in GDP, breastfeeding prevalence at 12 months decreased by ten percentage points. It is therefore one of the few positive health-related behaviours that is less frequently continued among richer people, both between and within countries. This raises the concern that more families will use BMS as incomes increase, particularly as rates of breastfeeding are decreasing in poorer populations.

One factor that is clear throughout is that it is not the responsibility of individual mothers, but a collective failure to act on the many factors which interfere with breastfeeding, not least the aggressive promotion of BMS and bottles (which undermines confidence across society, not only among women).

The second paper (Rollins et al 2016) argues that the multifactorial determinants of breastfeeding need supportive measures at many levels, from legal and policy directives to social attitudes and values, women’s work and employment conditions, and health care services to enable women to breastfeed. When relevant interventions are delivered adequately, breastfeeding practices are responsive and can improve rapidly.

**Effective action**

Interventions to increase breastfeeding were analysed in three settings: health systems and services, family and community, and workplace and employment, as well as combined interventions in more than one setting. Evidence on policies influencing an enabling environment for breastfeeding was also reviewed.

Health systems interventions which are part of the Baby Friendly Initiative (BFI), including: antenatal education, breastfeeding support at birth and lactation management, increased exclusive breastfeeding by 49% and any breastfeeding by 66%. Home- and family-
based interventions, including antenatal and postnatal support, peer or trained health professional counselling were effective at improving exclusive, continued, and any breastfeeding. Providing both antenatal and postnatal counselling was more effective than targeting one period only, whereas interventions targeting fathers gave mixed results. Community-based interventions, such as education groups or education and social mobilisation, were able to increase early breastfeeding initiation by 86% and exclusive breastfeeding by 20%. The one study evaluating the effect of mass or social media on breastfeeding suggested that it can have a major effect on early initiation of breastfeeding. This, and the effective use of social media in marketing BMS, indicate an urgent need for further research on this means of communication and influence.

Many countries have not met the International Labour Organization’s 14-week minimum standard for maternity leave. The limited evidence available indicates that maternity leave policies are effective in terms of increasing exclusive breastfeeding. Analysis of policies in 182 countries found that paid breastfeeding breaks were available in 130 countries (71%), unpaid breaks in seven countries (4%), and 45 countries (25%) had no policy. Paid breaks for at least six months were associated with an 8.9% increase in exclusive breastfeeding.

Considering enabling policies and practices, one study from 14 countries with low exclusive breastfeeding rates found a 1% increase per year in those that scored highly on implementation of the Global Strategy for Infant and Young Child Feeding (World Health Organization (WHO) 2003) as measured by the World Breastfeeding Trends Initiative (WBTi) (WBTi 2016). This comprises multiple levers including removing barriers, restricting promotion of BMS, and BFI accreditation. The increase was only 0.2% per year in countries with low scores. This indicates that societies need to protect women’s individual decisions; policies are both a means of empowering women to breastfeed and increasing the social value of breastfeeding.

Overall, the meta-analyses demonstrate that it is possible to significantly increase breastfeeding rates via interventions delivered in health systems, communities, and homes. Interventions are more effective when they are delivered in combination; in seven studies combined interventions almost doubled continued breastfeeding for 12–23 months.

The international Code and marketing of BMS

One focus of the second section of The Lancet Series is the poorly regulated marketing of BMS. The International Code of Marketing of Breast-milk Substitutes (WHO 1981) was adopted 35 years ago but has yet to have the impact envisaged as sales of formula milks have grown ever since. It requires national legislation, monitoring, and, above all, enforcement to be effective. There are still widespread violations of the Code across the world, although these vary according to political will and therefore implementation of national laws to curb inappropriate marketing practices are needed.

Case studies of policies and practices in Bangladesh, Nigeria, China, Brazil, USA and the UK show that breastfeeding can increase when countries implement and coordinate two or more actions. Strong civil society engagement and participation was a common element across the three countries with comparatively higher rates, whereas it was weak in the countries that had static or declining breastfeeding rates.

Market research for The Lancet Series established that global sales of formula milks amounted to about US $44.8 billion in 2014 and by 2019 this is projected to reach $70.6 billion. Advertising depicts formula milk as equivalent to, or better than, breast milk, or presents it as a lifestyle choice. Promotion of formula milk, including the distribution of free samples, increases bottle feeding rates. Studies find mothers’ recollection of formula advertisements is associated with shorter durations of breastfeeding. In HICs, sales of infant formula are static or decreasing but there are increasing sales of follow-on and toddler milks, which are often not covered under national legislation. There is widespread naivety about the power, not only of advertising but the more subtle promotion of BMS as the norm, with phrases such as ‘moving on from breastfeeding’ implying it is an inevitable progression.

The authors point out that ‘nearly all women are biologically capable of breastfeeding, bar very few with severely limiting medical disorders’ (p492). In practice, breastfeeding is affected by a wide range of historical, socioeconomic, cultural, and individual factors. This means that effective policies and programmes to improve breastfeeding practices will vary by country but are largely known.

Economic and environmental impact

Using a conservative approach, the estimated cost to the global economy is ~$302bn each year in lost cognitive development and thus economic potential. This is equivalent to 0.49% of world gross national income. Losses in LMICs account for $70.9 billion, with $231.4 billion in HICs. Models of the economic costs of not breastfeeding in terms of morbidity only covered four countries. Therefore the cost of effective protection and support of breastfeeding is small in relation to the current and escalating costs of not doing so.

Breastfeeding has little environmental impact in contrast to the resources used and pollution created by BMS. For example, it is estimated that more than 4000L of water are used to produce just 1 kg of BMS powder. In the USA, 550 million cans, 86,000 tons of metal, and 364,000 tons of paper are used annually.

In summary, The Lancet Series is a call to action. The scale of the problem, of BMS promotion, of half-hearted or poor support is detailed and effective programmes to address this are outlined. The series
as a whole argues that breastfeeding is a crucial contribution to the new Sustainable Development Goals (SDGs) and for people all over the world, whether rich or poor.

**Conclusion**

There have been significant and welcome reductions in infant mortality rates in many countries in recent years, but the potential of breastfeeding, possibly the most effective method of saving babies’ lives and improving outcomes, has not been realised. The latest *Lancet* series is not just a comprehensive summary of the global impact of low breastfeeding rates in health terms, it contends that improving support for breastfeeding relates to at least six of the SDGs (United Nations 2015) and needs much higher priority.

**Comment**

This is a highly significant and hopefully influential collation of the evidence around breastfeeding. It makes an incontrovertible case for governments, employers, civil society and donors to get behind breastfeeding in a way that has been demonstrated in only a few countries so far. The UK media missed this message entirely and re-ran stories about pressure to breastfeed, which is an important, but separate, issue and lets those with real responsibility off the hook.

It is notable that, in 40 of the 103 countries where data is collected, more than 90% of children are breastfed at six months and more than 99% in six countries. Perhaps this will give confidence to those who worry that breastfeeding often fails.

There is a wealth of detail included in the papers as well as multiple appendices. Although inevitably some of the meta-analyses cited were carried out several years ago, other aspects and calculations are new. Together they make a strong argument. The evidence from carefully controlled trials and the implementation of the *Global strategy* (WHO 2003) demonstrate that improving support for breastfeeding can enable more women to start and continue breastfeeding, as well as enhancing exclusivity. The case studies provide insight into reasons why breastfeeding rates are static or falling in some countries but high or increasing in others. An invited comment from academics and charities stresses that there is already clear evidence on what enables women to continue breastfeeding for longer, reduce deaths, realise gains in health and to stop much of the poorer development caused by low rates of breastfeeding (McFadden *et al* 2016). The frustrating and puzzling aspect is the lack of political will for concerted action to protect and support breastfeeding.

Perhaps it is related to the fact that most national and donor-level decision makers come from high-income groups. In general they can be predicted to have lower breastfeeding rates and/or poorer experiences. They are less likely to suffer the morbidity and excess cost associated with BMS use in lower-income groups. This, plus reluctance to confront manufacturers and perhaps hesitation to be seen to interfere with women’s ‘choice’ may help to explain the lack of effective action. It appears that they do not understand that many women are not able to make and fulfil their choices, due to commercial, social and employment pressures.

In common with the findings of The *Lancet Series on Midwifery* (*Renfrew et al* 2014), I believe that the low status of women and women’s unique roles also has a strong impact on the value of breastfeeding as an area on which to focus across the world. As McFadden *et al* (2016:415) argue, ‘Breastfeeding is too often siloed within the nutrition agenda rather than treated as a key public health approach that can help prevent communicable and non-communicable disease, reduce infant mortality, and lessen inequity’.

One area affected by repeated failure of government action in Europe is enforcement of the Code (WHO 1981). In the light of the failure of voluntary agreements, weak legislation, limited monitoring and policing, the evidence demands comprehensive legislation that is enacted. In the UK there has never been sufficient breastfeeding support and many services are now being cut (World Breastfeeding Trends Initiative 2016). Governments need to understand the messages of The *Lancet Series* and commission the range of services that have been proven to support women to establish and sustain breastfeeding.

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**References**


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