Breastfeeding in the 21st century
epidemiology, mechanisms and lifelong effects

Anthony Costello
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Department of Maternal, Newborn, Child and Adolescent Health
We’re in trouble
OPTIMAL INFANT AND YOUNG CHILD (IYC) FEEDING PRACTICES

Adapted from F. Savage King and A. Burgess Nutrition for Developing Countries, 2nd ed., 1993 reprinted 1995, Oxford Medical Publications
BREASTFEEDING
It Rocks!
Breastfeeding in low, middle and high income countries in the 21st century?

Lancet Series

Breastfeeding 1

Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect

Cesare VG, Rijk Benth, Max S.J. Barse, Giovanny V.A. Franya, Susan Horton, Julia Krasvev, Simon Mudh, Marije Seer, Nigel C. Rollins, for the Lancet Breastfeeding Series Group

The importance of breastfeeding in low-income and middle-income countries is well recognised. It exists about its importance in high-income countries. In low-income and middle-income countries children younger than 6 months of age are exclusively breastfed. With few exceptions, breastfeed shorter in high-income countries than in those that are resource-poor. Our meta-analyses indicate that child infections and malnutrition, increases in intelligence, and probable reductions in overweight did not find associations with allergic disorders such as asthma or with blood pressure or cholesterol increase in tooth decay with longer periods of breastfeeding. For nursing women, breastfeeding against breast cancer and improved birth spacing, and it might also protect against ovarian cancer and diabetes. The scaling up of breastfeeding in a near universal level could prevent 82,000 annual deaths younger than 5 years and 20,000 annual deaths from breast cancer. Recent epidemiological and biological data from the past decade expand on the known benefits of breastfeeding for women and children are rich or poor.

Breastfeeding 2

Why invest, and what it will take to improve breastfeeding practices?

Nigel C Rollins, Nita Brandt, Namat Haque, Susan Horton, Chessa K. Lutter, Jose C. Martinez, Ellen G. Plowz, Linda M. Richter, Cesare VG, on behalf of The Lancet Breastfeeding Series Group

Despite its established benefits, breastfeeding is no longer a norm in many communities. 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. The best outcomes are achieved when interventions are implemented concurrently through several channels. The marketing of breast milk substitutes negatively affects breastfeeding: global sales in 2014 of $3.4 billion show the industry’s large, competitive claims on infant feeding. Not breastfeeding is associated with lower intelligence and economic losses of about $3.02 billion annually or 0.49% of world gross national income. Breastfeeding provides short-term and long-term health, economic and environmental advantages to children, women, and society. To realise these gains, political support and financial investment are needed to protect, promote, and support breastfeeding.
First global map of breastfeeding prevalence

Re-analysis of DHS and MICS surveys for 127 out of 139 LMICs

Systematic review of the literature on breastfeeding prevalence from high income countries: data on 37 out of 75 countries
Breastfeeding practices over time

For each doubling in national GDP per capita, breastfeeding prevalence at 12 months decreases by 10 percentage points.

Population-weighted averages from 217 surveys.
Improving breastfeeding would annually save about 820,000 children under 5 years of age.

87% infants are less than 6 months of age.

Reduce infection deaths (<3mo) by 88%.
Breastfeeding protects health and contributes to development

Breastfeeding protects against:
- Acute otitis media (<2 yrs)
- Malocclusion
- Type 2 diabetes
- Obesity

No evidence for effect on:
- Blood pressure
- Serum lipids
- Growth (wt or length)

Longer breastfeeding associated with higher performance on intelligence tests
- Average of 3 IQ points, controlling for maternal IQ
- Improved academic performance (some studies)
- Increased adult earnings

But not against:
- Asthma
- Eczema
- Food allergies

**NOTE:** Weights are from random effects analysis
Overall  (I-squared = 88.6%, p = 0.000)

<table>
<thead>
<tr>
<th>Author</th>
<th>ES (95% CI)</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Johnson (A)</td>
<td>5.00 (0.40, 9.60)</td>
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<td>Der (A)</td>
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<td>Gibson-Davis (A)</td>
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<td>Zhou (A)</td>
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<td>Wigg (A)</td>
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<tr>
<td>Morrow-Tlucak (A)</td>
<td>9.10 (1.88, 16.32)</td>
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<td>Quinn (M)</td>
<td>5.60 (4.10, 7.50)</td>
<td>7.28</td>
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<td>Quinn (F)</td>
<td>8.20 (6.50, 9.90)</td>
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<td>Whitehouse (A)</td>
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<td>Eickman (A)</td>
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<td>5.77</td>
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<tr>
<td>Clark (A)</td>
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<td>6.48</td>
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<tr>
<td>Evenhouse (A)</td>
<td>1.68 (-0.16, 3.52)</td>
<td>7.02</td>
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<tr>
<td>Jacobson (A)</td>
<td>4.00 (1.08, 6.92)</td>
<td>5.11</td>
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<tr>
<td>Bellfort, 2013 (A)</td>
<td>0.80 (0.39, 1.21)</td>
<td>8.17</td>
</tr>
<tr>
<td>Smith, 2012 (A)</td>
<td>0.97 (0.50, 1.44)</td>
<td>8.12</td>
</tr>
<tr>
<td>Overall (I-squared = 88.6%, p = 0.000)</td>
<td>2.86 (1.88, 3.84)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**NOTE:** Weights are from random effects analysis

- Unfavours
- Favours

-16.3  0  16.3
Economic case for investing in breastfeeding

Economic gains: US$302 billion/year (0.47% of global GNI) Due to increased productivity associated with higher intelligence

Estimated health benefits: reduced annual healthcare costs totalling nearly $400 million in the U.S., UK, Brazil and urban China

<table>
<thead>
<tr>
<th>Region</th>
<th>Estimated percentage loss in gross national income</th>
<th>Estimated loss in 2012 US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern and southern Africa</td>
<td>0.04%</td>
<td>$0.1 billion</td>
</tr>
<tr>
<td>West and central Africa</td>
<td>0.06%</td>
<td>$0.3 billion</td>
</tr>
<tr>
<td>Middle East and north Africa</td>
<td>0.97%</td>
<td>$11.8 billion</td>
</tr>
<tr>
<td>South Asia</td>
<td>0.05%</td>
<td>$1.0 billion</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>0.31%</td>
<td>$28.1 billion</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>0.39%</td>
<td>$12.1 billion</td>
</tr>
<tr>
<td>Eastern Europe and central Asia</td>
<td>0.75%</td>
<td>$17.6 billion</td>
</tr>
<tr>
<td>Subtotal (low-income and middle-income countries)</td>
<td>0.39%</td>
<td>$70.9 billion</td>
</tr>
<tr>
<td>High-income countries</td>
<td>0.53%</td>
<td>$231.4 billion</td>
</tr>
<tr>
<td>World</td>
<td>0.49%*</td>
<td>$302.0 billion (total estimated loss)</td>
</tr>
</tbody>
</table>

Estimates are based on data for 96 countries (of 197 countries in the UNICEF’s 2014 database)\textsuperscript{a}. For details about data and included countries, and country-level results, see appendix pp 116–16. *Global average, weighted by gross national income.

Table 2: Estimated economic losses from cognitive deficits associated with regional infant feeding practices compared with every infant breastfeeding until at least 6 months of age.
Breastfeeding benefits women's health

| Each year a mother breastfeeds decreases the risk of developing invasive breast cancer by 6% |
| Breastfeeding also reduces the risk of ovarian cancer |
| New impact modelling: |
| – Current rates of breastfeeding prevent almost 20,000 deaths from breast cancer per year |
| – Another 20,000 deaths could be prevented by improving breastfeeding practices further |
| New review confirms role of breastfeeding in birth spacing |
Are these effects biologically plausible?
Could an intervention as simple and so early, have such a profound impact on health throughout life?
Human milk oligosaccharides: Every baby needs a sugar mama

IMMUNITY

Lars Bode. Glycobiology vol. 22 no. 9 pp. 1147–1162, 2012

BRAIN DEVELOPMENT
Dynamics and Stabilization of the Human Gut Microbiome during the First Year of Life

Cell Host & Microbe 17, 690–703, May 13, 2015

Old Friends Hypothesis
Breastmilk Is a Novel Source of Stem Cells with Multilineage Differentiation Potential

STEM CELLS 2012;30:2164–2174

STEM CELL SUPPLY
Despite overwhelming evidence, women worldwide still do not have the support they need to breastfeed
The breast milk substitute (BMS) industry is large and growing

- In 2014, global sales of all baby milk formula were about US$ 44.8 billion
- By 2019, the market value is projected to reach US$ 70.6 billion.
Building an enabling environment to support breastfeeding: key actions

A package of actions, policies, and programs to support mothers at health facilities, home and work has the greatest impact

- Disseminate **accurate information** on the value of breastfeeding
- Foster **positive social attitudes** toward breastfeeding
- Demonstrate **political will** to support breastfeeding
- Regulate the **breastmilk substitute industry** by implementing, monitoring and enforcing the Code
- Scale up and monitor **breastfeeding interventions**
- Enact **policy interventions** to ensure that **maternity protection and workplace interventions** are implemented
Shared responsibility for creating a supportive environment for mothers to exercise their choice
GLOBAL FOCUS FOR ENSURING OPTIMAL INFANT AND YOUNG CHILD FEEDING

Promoted
Protected

Adequate
Available
Affordable
‘Buy only 1 can and you will get 2 free t-shirts, baby wipes and a 10% discount card.’

NO IFS, NO BUTS, NO MAYBES

“From tobacco, to sugar, to formula milk, the most vulnerable suffer when commercial interests collide with public health. Robust advertising regulation—covering all milk products for children up to 3 years, and banning social media promotion—is the next step to protect them.”
# The Quality Framework

<table>
<thead>
<tr>
<th>Leadership</th>
<th>Action</th>
<th>Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspiration</td>
<td>Evidence based standards</td>
<td>Data systems</td>
</tr>
<tr>
<td>Commitment</td>
<td>District focus</td>
<td>Learning platform</td>
</tr>
<tr>
<td>Engagement</td>
<td>Nine interventions</td>
<td>Capability strengthening</td>
</tr>
</tbody>
</table>

**Accountability for healthy mothers and newborns**
## Acknowledgements

### Authors
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