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# **THE OPTIMAL DURATION OF EXCLUSIVE BREASTFEEDING**

## **A SYSTEMATIC REVIEW**



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# **THE OPTIMAL DURATION OF EXCLUSIVE BREASTFEEDING A SYSTEMATIC REVIEW**

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# Abstract

**Background:** The longstanding debate over the optimal duration of exclusive breastfeeding has centered on the so-called “weanling’s dilemma” in developing countries: the choice between the known protective effect of exclusive breastfeeding against infectious morbidity and the (theoretical) insufficiency of breast milk alone to satisfy the infant’s energy and micronutrient requirements beyond 4 months of age. The debate over whether to recommend exclusive breastfeeding for 4–6 months vs “about 6 months” has recently become more intense.

**Objectives:** The primary objective of this review was to assess the effects on child health, growth, and development, and on maternal health, of exclusive breastfeeding for 6 months vs exclusive breastfeeding for 3–4 months with mixed breastfeeding (introduction of complementary liquid or solid foods with continued breastfeeding) thereafter through 6 months.

**Search strategy:** Two independent literature searches were carried out, together comprising the following databases: MEDLINE (as of 1966), Index Medicus (prior to 1966), CINAHL, HealthSTAR, BIOSIS, CAB Abstracts, EMBASE-Medicine, EMBASE-Psychology, Econlit, Index Medicus for the WHO Eastern Mediterranean Region, African Index Medicus, Lilacs (Latin American and Caribbean literature), EBM Reviews-Best Evidence, the Cochrane Database of Systematic Reviews, and the Cochrane Controlled Trials Register. No language restrictions were imposed. The two searches yielded a total of 2,668 unique citations. Contacts with experts in the field yielded additional published and unpublished studies.

**Selection criteria:** We selected all internally-controlled clinical trials and observational studies comparing child or maternal health outcomes with exclusive breastfeeding for 6 or more months vs exclusive breastfeeding for at least 3–4 months with continued mixed breastfeeding until at least 6 months. Studies were stratified according to study design (controlled trials vs observational studies), provenance (developing vs developed countries), and timing of compared feeding groups (3–7 months vs later).

**Data collection and analysis:** Two reviewers independently assessed study quality (using *a priori* assessment criteria) and extracted data.

**Main results:** Sixteen independent studies meeting the selection criteria were identified by the literature search: 7 from developing countries (2 of which were controlled trials in Honduras) and 9 from developed countries (all observational studies). The two trials did not receive high methodologic quality ratings but were nonetheless superior to any of the observational studies included in this review. The observational studies were of variable quality; in addition, their nonexperimental designs were not able to exclude potential sources of confounding and selection bias. Definitions of exclusive breastfeeding varied considerably across studies. Neither the trials nor the observational studies suggest that infants who continue to be exclusively breastfed for 6 months show deficits in weight or length gain, although larger sample sizes would be required to rule out small increases in the risk of undernutrition. The data are scarce with respect to iron status, but at least in developing country settings where newborn iron stores may be suboptimal, suggest that exclusive breastfeeding without iron supplementation through 6 months may compromise hematologic status. Based primarily on an observational analysis of a large randomized trial in Belarus, infants who continue exclusive breastfeeding for 6 months or more appear to have a significantly reduced risk of one or more episodes of gastrointestinal infection. No significant reduction in risk of atopic eczema, asthma, or other atopic outcomes has been demonstrated in studies from Finland, Australia, and Belarus. Data from the two Honduran trials suggest that exclusive breastfeeding through 6 months is associated with delayed resumption of menses and more rapid postpartum weight loss in the mother.

**Reviewers’ conclusions:** We found no objective evidence of a “weanling’s dilemma.” Infants who are exclusively breastfed for 6 months experience less morbidity from gastrointestinal infection than those who are mixed breastfed as of 3 or 4 months, and no deficits have been demonstrated in growth among infants from either developing or developed countries who are exclusively breastfed for 6 months. Moreover,

the mothers of such infants have more prolonged lactational amenorrhea. Although infants should still be managed individually so that insufficient growth or other adverse outcomes are not ignored and appropriate interventions are provided, the available evidence demonstrates no apparent risks in recommending, as

public health policy, exclusive breastfeeding for the first 6 months of life in both developing and developed country settings. Large randomized trials are recommended in both types of setting to rule out small adverse effects on growth and to confirm the reported health benefits of exclusive breastfeeding for 6 months.

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# Introduction

The debate over the optimal duration of exclusive breastfeeding has had a long history. Growth faltering is a commonly observed phenomenon in developing countries after about 3 months of age.<sup>1,2</sup> This growth faltering has traditionally been attributed to three factors: (1) the inadequacy of energy intake from breast milk alone after 3 or 4 months; (2) the poor nutritional quality (i.e., low energy and micronutrient content) of the complementary foods commonly introduced in many developing countries; and (3) the adverse effects of infection on energy intake and expenditure. The inadequacy of breast milk for energy requirements beyond 3 or 4 months was initially based on calculations made by the Food and Agricultural Organization (FAO) and World Health Organization (WHO) in 1973.<sup>3</sup> More careful studies since the 1980s<sup>4-7</sup> and a later FAO/WHO report,<sup>8</sup> however, have shown that the earlier FAO/WHO figures substantially overestimate true energy requirements in infancy.<sup>4-7</sup>

The belief that breast milk alone is nutritionally insufficient after 3 or 4 months, combined with the fact that complementary foods given in many developing countries are both nutritionally inadequate and contaminated, led to concern about the so-called “weanling’s dilemma.”<sup>9,10</sup> Breastfeeding is a life-and-death issue in developing countries. A recent meta-analysis<sup>11</sup> reported markedly reduced mortality (especially due to infectious disease) with breastfeeding even into the second year of life. A recent study from India reported an increased risk of postneonatal

The epidemiologic evidence is now overwhelming that, even in developed countries, breastfeeding protects against gastrointestinal and (to a lesser extent) respiratory infection, and that the protective effect is enhanced with greater duration and exclusivity of breastfeeding.<sup>13-17</sup> (“Greater duration and exclusivity” is used in a general sense here; the references cited do not pertain specifically to the subject of this review, i.e., the optimal duration of exclusive breastfeeding.) Prolonged and exclusive breastfeeding has also been associated with a reduced risk of the sudden infant death syndrome (SIDS)<sup>18</sup> and of atopic disease,<sup>19-21</sup> and some studies even suggest acceleration of neurocognitive development<sup>22-28</sup> and protection against long-term chronic conditions and diseases like obesity,<sup>29-31</sup> type I diabetes mellitus,<sup>32,33</sup> Crohn’s disease,<sup>34</sup> and lymphoma.<sup>35,36</sup> Maternal health benefits have also received considerable attention in developed countries, including possible protection against breast cancer among premenopausal women,<sup>37-39</sup> ovarian cancer,<sup>40</sup> and osteoporosis.<sup>41-43</sup>

Although growth faltering is uncommon in developed countries, a recent pooled analysis of U.S., Canadian, and European data sets undertaken by the WHO Working Group on Infant Growth showed that infants from developed countries who follow current WHO feeding recommendations (to exclusively breastfeed for 4 to 6 months of age and to continue breastfeeding with adequate complementary foods up to 2 years of age) show a deceleration in both weight and length gain

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