

# DRAFT - Nutrition for Healthy Term Infants: Recommendations from Birth to Six Months

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## A joint statement of Health Canada, Canadian Paediatric Society, Dietitians of Canada, and Breastfeeding Committee for Canada

This statement by the [Infant Feeding Joint Working Group](#) provides health professionals with evidence-informed principles and recommendations. Provinces, territories, and health organizations can use it as a basis for developing practical feeding guidelines for parents and caregivers in Canada.

This statement promotes the communication of accurate and consistent messages on infant nutrition in the first six months of life. Guidance on nutrition from six months to two years of age will be covered in a separate statement, available in 2013/14.

For information and ideas about how to answer the questions of parents and caregivers, see: [In Practice: Talking to families about infant nutrition](#).

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## Principles and recommendations for infant nutrition from birth to six months

Breastfeeding - exclusively from birth for ~~about~~ the first six months, and sustained for up to two years or longer, with appropriate complementary feeding starting at six months -- is important for the nutrition, immunologic protection, growth, and development of infants and toddlers.

[Breastfeeding is the normal and unequalled method of feeding infants.](#)

- Recommend exclusive breastfeeding for ~~about~~ the first six months of life with the introduction of complementary foods at six months being led by the infant's signs of readiness.

[Breastfeeding initiation and duration rates increase with active protection, support, and promotion.](#)

- Implement the policies and practices of the Baby-Friendly Initiative (BFI) for hospitals and community health services.

[Supplemental vitamin D is recommended for breastfed infants.](#)

- Recommend a daily vitamin D supplement of 10 µg (400 IU) to breastfed infants.

[First complementary foods should be iron-rich.](#)

- Recommend meat, and meat alternatives, ~~and iron-fortified cereal~~ as an infant's first complementary foods.

[Routine growth monitoring is important to assess infant health and nutrition.](#)

- Use the World Health Organization (WHO) Growth Charts for Canada for optimal monitoring of infant growth.

~~[Feeding changes are unnecessary for most common health conditions in infancy.](#)~~

~~[Continued breastfeeding is recommended for most health conditions in infancy.](#)~~

- Explain that feeding changes do little to manage infantile colic.

- Educate about the wide variation in normal bowel function, noting that true constipation is rare.
- Reassure that reflux or 'regurgitation' is common and rarely needs treatment.
- Manage mild to moderate dehydration from acute gastroenteritis with oral rehydration therapy and continued breastfeeding.

### Comment

**Should these conditions be mentioned here as they are not consequences of breastfeeding and thus should have no impact on the continuation of normal breastfeeding. What feeding changes can there be if an infant is breastfeeding? Change to formula? – this will exacerbate the above.**

~~Breastfeeding is rarely contraindicated.~~

Breastfeeding and special circumstances.

### Comment

**A section on the importance of breastfeeding in emergencies should be added – this should include poverty, lack of access to potable water, lack of dependable electricity sources...**

- Recommend an acceptable alternative to breastfeeding for mothers who are HIV-infected.
- Advise that most medications are compatible with breastfeeding. Take a case-by-case approach when a mother is using medications or drugs.

### Recommendations on the use of breastmilk substitutes

Some infants may not be exclusively breastfed for personal, medical, or social reasons. Their families need support to optimize the infant's nutritional well-being. The [International Code of Marketing of Breast-milk Substitutes \(WHO, 1981\)](#) advises health professionals to inform parents about the importance of breastfeeding, the personal, social, and economic costs of formula feeding, and the difficulty of reversing the decision not to breastfeed. Individually counsel those families who have made a fully informed choice not to breastfeed on the use of breastmilk substitutes.

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## Acknowledgements

The Infant Feeding Joint Working Group collaborated with Health Canada on this statement. Members of the working group came from the following organizations:

- Canadian Paediatric Society's Nutrition and Gastroenterology Committee (CPS)
- Dietitians of Canada (DC)
- Breastfeeding Committee for Canada (BCC)
- Public Health Agency of Canada (PHAC)
- Health Canada (HC)

The working group received guidance from the [Infant Feeding Expert Advisory Group](#) as well as broad stakeholder consultation.

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# Breastfeeding is the normal and unequalled method of feeding infants.

- **Recommend exclusive breastfeeding for about the first six months of life with the introduction of complementary foods at six months being led by the infant's signs of readiness.**

## Rationale

Exclusive breastfeeding from birth for ~~during~~ the first six months of life is accepted as the nutrition standard for infants, according to the Dietary Reference Intakes (IOM, 2006). With exclusive breastfeeding, an infant is fed only breastmilk. The infant is given no other food or liquid, not even water (WHO, 2008). Infants who are exclusively breastfed may still receive vitamin and mineral supplements or medicines, in the form of drops or syrups. They may be given oral rehydration solution, if needed (WHO 2008).

The mother-baby dyad needs special recognition and support. "Mothers and babies form an inseparable biological and social unit; the health and nutrition of one group cannot be divorced from the health and nutrition of the other." (WHO/UNICEF Global Strategy 2003).

Breastmilk supplies the correct quantity, quality, and absorption of nutrients (Butte, Lopez-Alarcon, & Garza, 2002). Infants digest it easily and efficiently (WHO, 2009). To support optimal growth, the balance of nutrients in breastmilk fluctuates changes during feedings and over time to meet the infant's unique growth and development requirements as the infant matures (Kent et al., 2006; Riordan & Wambach, 2010). Beyond nutrients, breastmilk's unique and complex composition includes bioactive factors, such as growth factors, anti-infective immunoglobulins and white blood cells (Riordan & Wambach, 2010). It also contains factors that aid in the digestion and the absorption of nutrients (Hamosh, 1996; Sheard, 1988).

The importance of breastfeeding is well recognized for infants' short and long-term health (Horta, Bahl, Martines, & Victoria, 2007; Ip et al., 2007; León-Cava, Lutter, Ross, & Martin, 2002). For example, breastfeeding is associated with enhanced cognitive development, and appears to protect against gastrointestinal infections, acute otitis media, respiratory tract infection, and sudden infant death syndrome (Kramer et al., 2008; Quigley et al., 2011; Ip et al., 2007; Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011). Observational research also points to the protective effect of breastfeeding against obesity later in life (Arenz, Ruckerl, Koletzko & von Kries, 2004, Ip et al., 2007).

Breastfed infants self-regulate intake volume compared to infants who are fed by bottle, formula, or expressed breast milk. These infants will have increased bottle emptying, poorer self-regulation, and excessive weight gain in late infancy (older than 6 months) compared with infants who only nurse from the breast. (Li R, Fein SB, Grummer-Strawn LM. Do infants fed from bottles lack self-regulation of milk intake compared with directly breastfed infants? Pediatrics. 2010; 125(6). Available at: [www.pediatrics.org/cgi/content/full/125/6/e1386](http://www.pediatrics.org/cgi/content/full/125/6/e1386))

Exclusive breastfeeding from birth to six months of age is associated with continued protection against gastrointestinal infections and illness (Kramer et al., 2003; Kramer & Kakuma, 2002) as well as from respiratory tract infections (Chantry, Howard, & Auinger, 2006). The breastfeeding mother also benefits from exclusively breastfeeding her infant to six months. Her return to pre-pregnancy weight weight loss is more rapid after birth and there may be a delayed return of menses (Kramer & Kakuma, 2002).

By about six months of age, infants are developmentally ready for other foods (Naylor & Morrow, 2001). The signs of physiological and developmental readiness include:

- Better head control
- Ability to sit up and lean forward
- Ability to let the caregiver know when they are full (i.e., turns head away)
- Showing an interest in food when others are eating (Grenier & Leduc, 2008)

At this stage, infants should be offered nutritious and safe complementary foods, along with continued breastfeeding (PAHO, 2003). The first foods introduced should be nutrient-rich family foods iron-rich.

## Comment

1. Adding the word "about" creates confusion in a population based policy statement.
2. The definition of exclusive breastfeeding should include the words – "from birth".
3. The addition of the word "about" does not concur with the decisions of the World Health Assembly and the recommendations made in the WHO Global Strategy for Infant and Young Child Feeding (2003).

The WHA Resolution 54.2 para 2(4) urges Member states to:

"4) to strengthen activities and develop new approaches to protect, promote and support exclusive breastfeeding for six months as a global public health recommendation, taking into account the findings of the WHO expert consultation on optimal duration of exclusive breastfeeding"

The government of Canada agreed with Resolution 54.2 at the 54th World Health Assembly, May 2001.

The conclusion of the Naylor & Morrow(2001) expert review on which the WHO recommendations are based in part state:

"The consensus opinion of the expert review group was that given the available information and the lack of evidence of significant harm to either normal mothers or normal infants, there is *no reason to conclude that exclusive breastfeeding should not continue to six months.*"

The current WHO Executive Board recommendations state: "Counselling and support for optimal breastfeeding (early initiation, *exclusive breastfeeding for the first six months* and continued breastfeeding up to two years of age or beyond)". (WHO. 130th Session of the Executive Board. Report by the Secretariat. Maternal, infant and young child nutrition: draft comprehensive implementation plan. EB130/10, December 2011.)

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

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## Breastfeeding initiation and duration rates increase with active protection, support, and promotion.

- **Implement the policies and practices of the Baby-Friendly Initiative (BFI) for hospitals and community health services.**

## Rationale

Breastfeeding initiation rates in Canada have increased considerably in recent decades, from less than 25% in 1965 (Millar & Maclean, 2005) to 87.5% in 2009 (Statistics Canada, 2010). Yet, of the mothers who initiate breastfeeding, some stop after less than one week, and more than 20% stop before their infant is one month old (Statistics Canada, 2010).

The percentage of Canadian mothers exclusively breastfeeding their infants to six months remains low, at 25% (Statistics Canada, 2010). That is why mothers require greater [support](#) to breastfeed exclusively for the first six months, and to continue breastfeeding for up to two years or longer.

The WHO/UNICEF Baby Friendly Hospital Initiative (BFHI) was created to improve breastfeeding outcomes for infants and their mothers (WHO/UNICEF, 2009). The BFHI practices have been shown to increase the duration and exclusivity of breastfeeding (Kramer et al., 2001, Merten,

Dratva, & Ackermann-Liebrich, 2005; DiGirolamo, Grummer-Strawn, & Fein, 2008; Declercq, Lobbok, Sakala, & O'Hara, 2009; Moore, Anderson, & Berman, 2009; Cattaneo & Buzzetti, 2001).

The BFHI is based on the evidence-informed policies and practices described in [Ten Steps to Successful Breastfeeding](#), the *Global Strategy for infant and Young Child Feeding* (WHO/UNICEF, 2003), the [International Code of Marketing of Breast-milk Substitutes](#), and subsequent World Health Assembly resolutions on nutrition for infants and young children.

## Comment

**One of the primary reasons why exclusive breastfeeding rates remain low is the lack of monitoring and enforcement of the provisions of the International Code and Subsequent WHA resolutions. The International Code is a fundamental tool to support mothers in their infant feeding decisions. Much more action is required to protect breastfeeding from commercial interference. This obligation should not be placed exclusively on BFHI implementation. Health Canada has a key leadership role and obligation to take action to ensure that the Code and Resolutions are given meaningful effect for all Canadian mothers and their children.**

## Include the following text:

**The Global Strategy for Infant and Young Child feeding (WHO/UNICEF, 2003) Article 44 states that:**

**"44. Manufacturers and distributors of industrially processed foods intended for infants and young children also have a constructive role to play in achieving the aim of this strategy. They should ensure that processed food products for infants and children, when sold, meet applicable Codex Alimentarius standards and the Codex Code of Hygienic Practice for Foods for Infants and Children. In addition, all manufacturers and distributors of products within the scope of the International Code of Marketing of Breast-milk Substitutes, including feeding bottles and teats, are responsible for monitoring their marketing practices according to the principles and aim of the Code. They should ensure that their conduct at every level conforms to the Code, subsequent relevant Health Assembly resolutions, and national measures that have been adopted to give effect to both."**

In Canada, the Baby-Friendly Initiative (BFI) has been adapted from the BFHI to reflect the continuum of care between hospital and community services. It is described in the [Integrated Ten Steps for Hospitals and Community Health Services](#). The 'Baby-Friendly' designation is given to a maternity hospital or a community health facility that puts the Ten Steps into practice and adheres to the Code. Implementation of the BFI is led by provincial and territorial governments in collaboration with the Breastfeeding Committee for Canada.

## WHO/UNICEF's Ten Steps to Successful Breastfeeding (global criteria)

(Reproduced from WHO/UNICEF, 2009)

### Step 1

Have a written policy on breastfeeding that is routinely communicated to all health care staff.

### Step 2

Train all health care staff in the skills necessary to implement the policy.

### Step 3

Inform all pregnant women about the benefits and management of breastfeeding.

### Step 4

Help mothers initiate breastfeeding within a half-hour of birth. Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed.

### Step 5

Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.

**Step 6**

Give newborn infants no food or drink other than breastmilk, unless medically indicated.

**Step 7**

Practice rooming-in -- allow mothers and infants to remain together -- 24 hours a day.

**Step 8**

Encourage breastfeeding on demand.

**Step 9**

Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

**Step 10**

Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

**Breastfeeding Committee for Canada's Integrated Ten Steps for Hospitals and Community Health Services (the interpretation for Canadian practice)**

(Reproduced from Breastfeeding Committee for Canada, 2011)

**Step 1**

Have a written breastfeeding policy that is routinely communicated to all health care providers and volunteers.

**Step 2**

Ensure all health care providers have the knowledge and skills necessary to implement the breastfeeding policy.

**Step 3**

Inform pregnant women and their families about the importance and process of breastfeeding.

**Step 4**

Place babies in uninterrupted skin-to-skin contact with their mothers immediately following birth for at least an hour or until completion of the first feeding or as long as the mother wishes: encourage mothers to recognize when their babies are ready to feed, offering help as needed.

**Step 5**

Assist mothers to breastfeed and maintain lactation should they face challenges including separation from their infants.

**Step 6**

Support mothers to exclusively breastfeed for the first 6 months, unless supplements are [medically indicated](#).

**Step 7**

Facilitate 24 hour rooming-in for all mother-infant dyads: mothers and infants remain together.

**Step 8**

Encourage baby-led or cue-based breastfeeding. Encourage sustained breastfeeding beyond six months with appropriate introduction of complementary foods.

**Step 9**

Support mothers to feed and care for their breastfeeding babies without the use of artificial teats or pacifiers (dummies or soothers).

**Step 10**

Provide a seamless transition between the services provided by the hospital, community health services, and peer-support programs. Apply principles of primary health care and population health to support the continuum of care. Implement strategies that affect the broad determinants that will improve breastfeeding outcomes.

**Summary of the International Code of Marketing of Breast-milk Substitutes and relevant World Health Assembly resolutions**

This Code seeks to protect and promote breastfeeding by ensuring the ethical marketing of

breastmilk substitutes by industry.

- No advertising of these products (i.e., formula, bottles, nipples, pacifiers) to the public.
- No free samples of these products to mothers
- No promotion of artificial feeding products in health care facilities, including the distribution of free or low-cost supplies
- No company representatives to advise mothers
- No gifts or personal samples to health workers
- No words or pictures idealizing artificial feeding, including pictures of infants on the labels of products
- Information to health workers should be scientific and factual.
- All information on artificial infant feeding, including the labels, should explain the benefits of breastfeeding, and the cost and hazards associated with artificial feeding.
- Unsuitable products, such as sweetened condensed milk, should not be promoted for babies.

**WHA Resolution 39.28 (1986)** - Any food or drink given before complementary feeding is nutritionally required may interfere with the duration or maintenance of breastfeeding and therefore should neither be promoted nor encouraged for use by infants during this period. The practice being introduced in some countries of providing infants with specially formulated milks (so-called follow-up milks) is not necessary.

**WHA Resolution 47.5 (1994)** - Member States are urged to "foster appropriate complementary feeding from the age of about six months."

**WHA Resolution 49.15 (1996)** - Member States are urged to "ensure that complementary foods are not marketed for or used in ways that undermine exclusive and sustained breastfeeding."

**WHA Resolution 54.2 (2001)** - Member States are urged to strengthen national mechanisms to ensure global compliance with the International Code of Marketing of Breast-milk Substitutes and subsequent relevant WHA resolutions regarding labelling and all forms of advertising and commercial promotion in all types of media, and to inform the general public on progress in implementing the Code and subsequent relevant WHA resolutions. Member states are urged to strengthen activities and develop new approaches to protect, promote, and support exclusive breastfeeding for six months.

**Add:**

**WHA Resolution 58.32 (2005) – Urges Member states:**

**"2 (4) to ensure that financial support and other incentives for programmes and health professionals working in infant and young child health do not create conflicts of interest;"**

**Source:** Breastfeeding Committee for Canada (in press)

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

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## Supplemental vitamin D is recommended for breastfed infants.

- **Recommend a daily vitamin D supplement of 10 µg (400 IU) to breastfed infants.**

## Rationale

Cases of vitamin D deficiency still occur in Canada among infants who do not receive

supplements (Ward, Gaboury, Ladhani, & Zlotkin, 2007). A daily vitamin D supplement of 10µg (400 IU) is recommended for exclusively and partially breastfed infants, from birth to one year of age. Without supplementation, an infant's vitamin D stores will be depleted (Butte 2002). This is particularly true if the mother's stores are low (Salle, Delvin, Lapillonne, Bishop, & Glorieux, 2000).

Low stores can lead to adverse effects such as vitamin D-deficiency rickets. Rickets is the inadequate mineralization and deformation of the bones. Evidence consistently links low serum 25OHD concentrations to confirmed cases of rickets in infants (Chung et al., 2009; IOM, 2011). Daily vitamin D supplements have been recommended for breastfed infants in Canada since 1967. They have been shown to be an effective preventative measure against rickets (Lerch & Meissner, 2007).

The level of adequate intake for vitamin D for infants is 10 µg (400 IU), based on intakes consistent with desirable serum 25OHD concentrations (IOM, 2011). For infants under six months of age, vitamin D intake should not exceed 25 µg (1000 IU) per day. This is the highest average daily intake level likely to pose no risk of adverse health effects (IOM, 2011). There are no known health benefits associated with intakes above 10 µg (400 IU) (IOM, 2011).

The evidence available at this time supports the adequacy of the 10 µg (400 IU) daily supplement for infants living in any part of Canada (IOM, 2011). Recommendations for vitamin D intake are set assuming only minimal sun exposure (IOM, 2011). Although, sunlight, which stimulates the formation of vitamin D in the skin, is the primary source of vitamin D for humans, current practice advises that infants under one year avoid direct sunlight due to the risk of skin cancer (Health Canada, 2006).

Canadian data suggests only two thirds of breastfed infants receive vitamin D supplements and the frequency and quantity of that supplementation is not known. Awareness should be increased, particularly among parents least likely to give vitamin D supplements. These include:

- younger mothers (15-24 years old)
- families with a lower household income
- mothers with a lower education level (Health Canada, 2010).

For information and ideas about how to talk to families about vitamin D supplements, see [In practice: Talking to families about infant nutrition](#).

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

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## **First complementary foods should be energy dense, nutrient rich family foods iron-rich.**

- **Recommend meat, and meat alternatives, ~~and iron-fortified cereal~~ as an infant's first complementary foods.**

## Rationale

Maintaining adequate energy and nutrient intake ~~iron~~ is essential to infant growth and cognitive, neurological, motor, and behavioural development. Iron is a critical nutrient in brain development. Deficiencies during infancy and childhood may have serious and irreversible effects (Lozoff & Georgieff, 2006; Beard, 2008).

Most healthy term infants are born with sufficient stores of iron to meet their iron needs until they are ~~about~~ six months old (IOM, 2001; Butte, Lopez-Alarcon, & Garza, 2002; Dewey & Chaparro, 2007). ~~At about six months of age, iron stores are depleted and breastmilk alone can no longer meet all of the infant's nutrient requirements~~ Exclusively breastfed infants have adequate iron stores for the first six months of age. After six months, to meet their increasing

growth and development requirements, additional energy dense and iron rich family foods are needed. (Butte et al. 2002; Meinzen-Derr et al., 2006, Dewey & Chapparo, 2007). At this stage, iron-rich family foods, such as meat, meat alternatives, ~~and iron-fortified infant cereals~~, are important to help meet the nutrient needs of the rapidly growing infant (~~ESPGHAN, 2008; (no mention of which foods to start)~~; Yang et al., 2009 (Among fully breastfed infants with a birth weight >2500 g, IDA is uncommon before 6 mo); Christofides, Schauer, & Zlotkin, 2005). This study notes that: "the consumption of cow/evaporated milk was found to be a significant independent risk factor associated with anemia, public health strategies should include promotion of breastfeeding, combined with iron-rich complementary foods." – therefore inappropriate reference used here?

It has been common practice in North America to introduce infant cereal, vegetables, and fruit as first complementary foods (Friel, Hanning, Isaak, Prowse, & Miller, 2010; Dee et al., 2008; Statistics Canada, 2004). However, the daily or frequent consumption of heme iron foods (meat, poultry, and fish) can contribute considerably to meeting infant iron requirements (PAHO, 2003; Krebs & Hambidge, 2007). Infants should be offered nutrient rich family iron-containing foods two or more times each day. They should be served meat, fish, poultry, or meat alternatives daily. The amount of food offered should be guided by the infant's hunger and satiety cues (PAHO, 2003). Breastfeeding continues to provide the main source of nutrition as other foods are introduced.

## Comment

**1. Infants require a full complement of nutrients for normal growth and development. Iron is an important nutrient, but so are all the others. Complementary feeding is a developmental process and a learning about foods process. The imprinting of food preferences are part of this developmental process. Iron fortified infant cereals are generally composed of a grain starch, 3 B vitamins and a form of iron and is a grey colour mush and requires spoon feeding (increased risk for obesity Townsend and Pitchford BMJ 2011). Hence, infant cereal is a nutritionally inferior carrier for iron that replaces breastmilk in the infant's diet. Additionally British researchers at Birmingham University have noted that babies weaned on "beige" coloured diets and processed foods are more likely to favour "beige" carbohydrates such as white bread, doughnuts, biscuits and potato chips later in life and that "children develop a visual prototype of their preferred foods early in life" (Avon Longitudinal Study of Parents and Children, UK).**

**Infant cereals should be perceived as a convenience food but not as a routine food in the infant's diet after six months. After six months an infant can transfer food to mouth by hand as is recommended for infant-led feeding. Important nutrients required for brain and neurological development such as essential long chain fatty acids are missing from fortified infant cereals.**

**2. Why not mention delayed cord clamping as an evidence based, simple and effective practice to prevent iron deficiency? (Hutton EK, Hassan ES, 2007). *Late vs early clamping of the umbilical cord in full-term neonates: systematic review and meta-analysis of controlled trails. (JAMA 297: 2141-52).***

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

## Routine growth monitoring is important for assessing infant health and nutrition.

- Use the World Health Organization (WHO) [Growth Charts for Canada](#) for optimal monitoring of infant growth.

## Rationale

In infancy, routine growth monitoring helps to identify nutrition or health problems in their early stages, when corrective action is most effective. Growth monitoring should be part of both 'well-baby' visits and 'unwell' visits.

The WHO Child Growth Standards are based on the growth of healthy breastfed infants, living in "conditions likely to favour the achievement of their full genetic potential" (WHO, 2006). The Growth Standards provide the normative growth model for how infants and young children grow regardless of their ethnic background and regardless of feeding method (Collaborative Statement, 2010).

The WHO standards have been promoted for use in Canada by the Dietitians of Canada, the Canadian Paediatric Society, the College of Family Physicians of Canada, and Community Health Nurses of Canada (Collaborative Statement, 2010). Growth charts, interpretation guides for health professionals, and parent information are available from the [Dietitians of Canada](#) and the [Canadian Paediatric Society](#).

Assessing infant growth requires several measurements, taken over time. Interpretation of the growth pattern should include clinical, developmental, and behavioural assessments as well as an assessment of feeding. Consider all of the following factors before suggesting a change to diet or invasive investigation:

- gestational age at birth (use of corrected age)
- growth trajectory (growth pattern)
- birth weight
- any problems with lactation
- any acute or chronic illness.

## References

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## **Continued breastfeeding is recommended. Feeding changes are unnecessary for most common health conditions in infancy.**

- **Explain that feeding changes do little to manage infantile colic.**
- **Educate about the wide variation in normal bowel function, noting that true constipation is rare.**
- **Reassure that reflux or regurgitation is common and rarely needs treatment.**
- **Manage mild to moderate dehydration from acute gastroenteritis with increased feeding at the breast before commencing with oral rehydration therapy and continued breastfeeding.**

## Rationale

During the first six months of life, infants may experience conditions such as colic, constipation, gastroesophageal reflux (regurgitation), and acute gastroenteritis. These may lead to unnecessary interventions that can compromise their nutrition. Unfortunately, many practices still used to manage these problems are not evidence-based and may be harmful. In managing these conditions, it is generally ~~not~~ beneficial to ~~maintain breastfeeding, alter feeding practices, interrupt breastfeeding~~ It is not necessary to supplement with formula as this may exacerbate these conditions, or restrict the diet of the breastfeeding mother.

Health professionals should be knowledgeable about the wide variations and the normal variants

in infant behaviours, such as crying time and frequency, consistency of bowel movements, and amount of regurgitation.

## **Infantile colic**

Infantile colic typically starts before three to four weeks of age and resolves by four months. Infants with colic have periods of irritability, fussiness, or crying that start and stop without obvious cause and with no evidence of failure to thrive. A commonly used definition of colic is that the episodes last three or more hours per day and occur at least three days per week for at least one week (Hyman, Milla, Benninga, Davidson, Fleisher, & Taminiau, 2006). Depending on the definition, the reported cumulative incidence varies between 5% and 19% (Lucassen et al., 2001).

The etiology of infantile colic is unknown. Current hypotheses suggest that it may have several independent causes. These include:

- immaturity of gut function
- altered visceral perception
- (rarely) cow milk allergy (Savino, 2007).

While infantile colic is a self-limiting condition, it is usually very stressful for caregivers. This often results in a variety of behavioural, nutritional, and pharmacological interventions. Unfortunately, few of these interventions have been subjected to appropriately designed trials.

Health professionals should first reassure caregivers that colic usually resolves by itself around four months. They should provide counselling and encouragement and check that caregivers have sufficient supports in place. Cuddling, rocking, stroking, and massaging are common ways to soothe an infant.

Although cow milk allergy appears to be infrequently associated with colic, some studies have demonstrated a reduction in symptoms in a small minority of infants when breastfeeding mothers consumed a hypoallergenic diet (Hill et al., 2005). However, many of these studies were unblinded, with small sample sizes and inadequate outcome measures (CPS, 2011). For breastfed infants with severe colic, a one- to two-week, cow milk-free maternal diet trial may help. This trial should be done with assistance from a registered dietitian, to ensure that all sources of cow milk protein are eliminated from the mother's diet and adequately substituted.

Others have proposed that abnormal gut microflora may lead to the development of colic through its effect on intestinal fatty acids (Savino, 2007). While there have been some studies using probiotics as a supplement for breastfed infants, there is currently insufficient evidence to recommend their use for colic (CPS, 2011).

## **Constipation**

Parents frequently express concern over their infants' bowel habits. The frequency of bowel movements varies widely during infancy. In the first one to two days of life, newborns pass meconium, which is a dark green, almost black bowel movement. After that, the stools become lighter. Infants fed breastmilk have, on average, 3 yellow, loose, and seedy bowel movements per day (Fontana et al., 1989). Some babies may have stooling with each feeding. Following the first four to six weeks of life, some healthy infants fed breastmilk may have bowel movements as infrequently as once every three to four days or even longer (Hyman et al., 2006).

While breastfed infants receiving adequate milk may experience infrequent stools, constipation is extremely rare. Normal bowel function occurs even when an infant appears to be in extreme discomfort, showing straining and reddening of the face. Unfortunately, this wide range of 'normal' in infant stooling frequency and consistency is often misinterpreted, leading to an erroneous diagnosis of constipation.

Reassure the caregiver that bowel function is within normal variants if the infant is growing normally and there are no signs of obstruction or enterocolitis (Baker et al., 2006). Home remedies such as prune juice, corn syrup or brown sugar water are not recommended for infants younger than six months.

## Reflux

Gastroesophageal reflux is the passage of gastric contents into the esophagus, with or without regurgitation. This normal physiologic process can occur several times a day in healthy infants. About half of healthy three- to four-month old infants regurgitate at least once daily (Nelson, Chen, Syniar, & Kaufer Christoffel, 1997; Martin et al., 2002; Vandenplas et al., 2009).

Gastroesophageal reflux disease (GERD) occurs only when gastric reflux leads to troublesome symptoms or complications. Most infants who regurgitate have no symptoms or complications and require no treatment, other than educating and reassuring the parents. Most importantly, breastfeeding should not be discontinued due to regurgitation. If there is concern that an infant is suffering from GERD, they should be referred to a physician experienced in its diagnosis and management.

## Acute gastroenteritis

Acute gastroenteritis is diarrhea, with or without fever or vomiting (Guarino et al., 2008). It is usually secondary to viral infections, with rotavirus being the most common cause of severe gastroenteritis. Breastfeeding reduces the risk of gastrointestinal infections in infants (Guarino et al., 2008; Bahl et al., 2002; Ribeiro et al., 1994).

Dehydration is the main clinical concern of acute gastroenteritis. It generally reflects disease severity. For minimal to moderate dehydration, the first recommendation should be to increase breastfeeding feeds; rehydration ~~should start as soon as possible~~ using oral rehydration therapy can be used if needed (CPS, 2006). Breastfeeding should continue during rehydration therapy, as it has been shown to reduce the severity and the duration of diarrhea from rotavirus (Guarino et al., 2008; Khin et al., 1985; Haffeejee, 1990).

Infants with severe dehydration must be managed in a hospital setting with intravenous rehydration.

## References

*[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]*

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## **Breastfeeding and special circumstances. Breastfeeding is rarely contraindicated.**

### **Add the following sections:**

- 1. A section on the importance of breastfeeding in emergencies – this should include poverty, lack of access to potable water, lack of dependable electricity sources...**
- 2. A section on the impact of birthing drugs on breastfeeding.**
- 3. A section on the importance of keeping the breastfeeding mother and infant together when mother is ill and needs hospitalization.**
- 4. A section on helping mothers maintain their milk supply when they are separated.**
- 5. A section on relactation if untimely cessation of breastfeeding has occurred.**
- 6. A section on induced lactation for adopted infants.**
- 7. A section on treatment and feeding healthy infants with cleft palate.**

- Recommend an acceptable alternative to breastfeeding for mothers who are HIV infected.**
- Advise that most medications are compatible with breastfeeding. Take a case-by-case approach when a mother is using medications or drugs.**

## Rationale

Galactosemia is one of only a few rare instances when an infant cannot tolerate breastmilk (WHO/UNICEF, 2009a).

There are also very few situations when a mother cannot, or should not, breastfeed. These include when the mother:

- is HIV-infected
- has herpes lesions on both breasts
- has untreated, infectious tuberculosis
- has a severe illness that prevents her from caring for her infant (WHO/UNICEF, 2009a).

A mother's use of certain drugs or treatments represents a situation when stopping or interrupting breastfeeding may be indicated. Mothers should be supported to [maintain lactation](#) during a temporary interruption.

## Maternal infections

HIV can be transmitted from an infected mother to her infant during breastfeeding (WHO, 2008). The risk of HIV transmission continues as long as the infant is breastfed (WHO, 2009). Current recommendations are that breastfeeding should be avoided, even if the HIV-positive mother is receiving antiretroviral therapy. This is consistent with the WHO's recommendation in countries where suitable breastmilk substitutes are available (WHO, 2009). Counselling about the risks of HIV transmission during pregnancy and lactation are an important part of early prenatal care. Mothers should be urged to access this care (Lawrence & Lawrence, 2001).

### Comment

**HIV positive mothers should be fully informed about safe options on how to feed their infants, including heat treatment of expressed milk. See: WHO (2010) Guidelines on HIV and Infant Feeding. Principles and recommendations for infant feeding in the context of HIV and a summary of evidence.**

Tuberculosis is rarely transmitted through breastmilk, but can be transmitted by exposure to sputum from an infected mother or other caretaker (Infectious Diseases and Immunization Committee, 2006). Herpes can be transmitted from lesions on the breast where they may come into contact with the infant's mouth (WHO/UNICEF, 2009). Hepatitis C is not transmitted through breastmilk, but it can be transmitted from cracked and bleeding nipples (CDC, 2009, Infectious Diseases and Immunization Committee, 2006). If a mother needs to [temporarily stop breastfeeding](#), she should be supported to maintain lactation.

With Hepatitis B, although the virus may be found in breastmilk, transmission through breastfeeding has never been reported. Breastfeeding can be safely recommended for these infants (Shi et al., 2011; CDC, 2009; Infectious Diseases and Immunization Committee, 2006).

## Medications and illicit drugs

Most common prescriptions are minimally excreted through breastmilk and are compatible with breastfeeding. This includes antibiotics, most medications for diabetes, and over-the-counter drugs such as acetaminophen (Briggs, Freeman, & Yaffe, 2011; Feig, Briggs, & Koren, 2007). They are pharmacokinetically benign to the infant (AAP Committee on Drugs, 2001).

When safer alternatives to medications or therapies such as antimetabolites, chemotherapeutic agents, and radioactive isotope therapies cannot be found, a mother may need to at least temporarily avoid breastfeeding (Briggs et al., 2011; AAP Committee on Drugs, 2001).

Natural health products (NHP) and herbal remedies may contain pharmacologically active substances. They should be used with caution by breastfeeding mothers. Refer to Health Canada's [NHP Monograph](#) for guidance on specific substances.

Women should be cautioned against using illicit drugs, and given support to abstain during pregnancy and breastfeeding. Illicit drugs can have harmful effects on breastfed infants and impair the mother's ability to care for her infant. If the mother is unable to stop, or chooses not to stop illicit drug use, she should be advised of the importance of breastfeeding and the risks the drug use poses, based on her circumstances.

[The Motherisk website](#) and the French language website for the [centre IMAGE](#) are other useful sources of information on the transfer of drugs and health products to breastmilk and their potential effects on milk supply or on infant health. Refer to Health Canada's [Drug Product Database](#) for detailed product monographs.

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

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## Recommendations on the use of breastmilk substitutes

### Add subsections:

#### **Requirements for the marketing and promotion of breastmilk substitutes and related products.**

The International Code of Marketing of Breastmilk Substitutes and subsequent World Health Assembly resolutions are designed to contribute to the safe and adequate nutrition for infants, by the protection and promotion of breastfeeding and by ensuring the proper use of breastmilk substitutes, when these are necessary on the basis of adequate information and through appropriate marketing and distribution.

Products that come under the scope of the International Code include breastmilk substitutes, including infant formulas, milk products foods and beverages when marketed or otherwise represented to be suitable for use as partial or total replacement of breastmilk; feeding bottles and teats.

Health care systems, governments and manufacturers and distributors of these products are responsibilities for ensuring that their practices and policies are in accordance with the aims, principles and provisions of the International Code and subsequent WHA resolutions.

#### **Health and developmental risks when infants are not breastfed.**

This section should include the following information to fully inform about the content and potential health hazards associated with the use of breastmilk substitutes:

- **Contaminants**
  - melamine
  - heavy metals
  - bisphenols
  - pathogenic microorganisms
- **Food additives**
  - thickeners
  - emulsifiers
  - acidity regulators
  - antioxidants
  - packing gases
  - colouring agents
- **Increased infectious diseases**
  - gastrointestinal
  - respiratory
  - otitis media
- **Increased risk of allergies and atopic disease**
- **Increased risk of non-communicable diseases/conditions**
  - diabetes

- obesity
- cancers
- **Reduced developmental outcomes**
  - reduced IQ
  - decreased school achievements

**Costs of using breastmilk substitutes.**

**The International Code requires that parents and care givers be informed about the "social and financial implications of the use of breastmilk substitutes. This information should include:**

- **costs to families and care givers**
- **costs to society**

If it is not possible for a mother to exclusively breastfeed an infant for the first six months, the parents or caregivers of the child should be supported to ensure the infant's nutritional well-being. They should be given appropriate information on breastmilk substitutes.

When feeding at the breast is not possible, the first choice is to feed expressed breastmilk from the infant's own mother. For situations when the infant is partially breastfed, it is important to support the mother to maintain or improve lactation.

For infants who cannot or [should not be fed their mother's breastmilk](#), pasteurised human milk from appropriately screened donors and commercial formula are suitable alternatives. These options depend on individual circumstances.

Breastmilk from appropriately screened donors must be properly collected, pasteurized, and stored. The only way to ensure this is to obtain the breastmilk from a milk bank that is operated under the Human Milk Bank Association of North America Guidelines. Access to pasteurised human milk from appropriately screened donors is currently limited in Canada. Hospitalised infants who will get the most benefit have highest priority for this milk (CPS, 2010). ~~Despite [Because of](#) the limited access to human milk banks, [this statement does not endorse the mothers are sharing their milk using community-based screening and home pasteurization methods or use of unprocessed and unscreened human milk](#) (Health Canada, 2010a).~~

Commercial formula ~~[can be used as replacement feeding](#) [may be the most feasible alternative](#)~~ if it is not possible for an infant to be exclusively fed their mother's breastmilk. The infant formula chosen must be appropriate for the infant, and prepared and stored safely to reduce the risk of illness from bacterial growth. ~~[Formula fed infants are immunocompromised and therefore in need of close medical monitoring.](#)~~

- **Recommend cow milk-based, commercial infant formula for an infant who is not exclusively fed breastmilk. Soy-based infant formula is indicated only for those infants who have galactosemia or who cannot consume dairy-based products for cultural or religious reasons.**
- **Recommend infant formulas for special medical purposes only when you detect or suspect that the formula-fed infant has the indicated condition.**
- **Discourage the use of home-made, evaporated milk formula. Cow milk, goat milk, soy beverage, rice beverage or any other beverages should not be given to young infants.**
- **Advise on proper preparation and storage to reduce the risk of bacteria-related illness.**
- **Warn of the risk of choking if infants are left alone while feeding. Explain the dangers of 'propping' a bottle.**

## Background

[The Food and Drug Regulations](#) set the nutritional composition and labelling of all infant formulas sold in Canada. Formulas are designed to meet the known nutritional requirements of the healthy term infant. The regulations also restrict the food additives that may be used. ~~[Food additives in infant formulas cannot be tested for safety for infants below the age of 12 weeks. Although Codex Member States note that there should be no additives in foods for infants below 12 weeks of age for practical reasons and "history of use" they are accepted \(28th Session Codex Committee on Nutrition and Foods for Special Dietary Uses Alinorm 07/30/26\). Canada](#)~~

does not have separate standards limiting food additives in infant formulas marketed for infants below the age of 12 weeks and those marketed for infants older than 12 weeks of age.

Infant formulas may contain a number of nutritive substances, such as nucleotides, that are not required under the Food and Drug Regulations. These substances are found in breastmilk, but evidence of their dietary essentiality is lacking. Claims about the health benefits of these substances must be substantiated by acceptable scientific evidence. Under the Food and Drugs Regulations Health claims are not permitted on foods for children under two years of age, including infant formulas.

## Comment

**Health Canada must do much more to monitor and enforce the Food and Drugs Regulations on labeling and claims made for “nutritive” additives to infant formulas.**

All new infant formulas, as well as products that undergo a change in formulation, processing, or packaging, are subject to a premarket notification. Health Canada requires the manufacturer to submit details of the formulation, ingredients, processing, packaging, and labelling for review. Manufacturers must also submit evidence that the formula is nutritionally adequate to support growth and development.

In this section:

- [Cow milk-based, commercial infant formulas](#)
  - [Soy-based formulas](#)
  - [Formulas for special medical purposes](#)
  - [Other milks](#)
  - [Safe preparation and storage](#)
  - [Supervision of a feeding infant](#)
- 

## Cow milk-based, commercial infant formulas

Cow milk protein-based commercial formulas are the standard product for healthy term infants who are not exclusively breastfed. The protein in these formulas may be whole milk protein, a combination of casein and whey proteins, or just one of these proteins. Some or all of the protein may be partially hydrolyzed (broken down to smaller peptides).

### Iron in formula

Currently, there are cow milk-based formulas on the market for term infants with lower iron levels, containing about 0.4 mg of iron per 100 mL. There are others with higher levels of about 1.2 mg per 100 mL. The lower iron formulas should provide sufficient iron for the healthy, term infant (ESPGHAN, 2005). The higher-iron formulas may need to be recommended for [infants at risk of iron deficiency](#).

### Lactose-free, cow milk protein-based formula

Glucose polymers, usually from corn-syrup solids, replace lactose in these formulas. For healthy-term infants, lactose-free formulas have no advantages compared to the usual cow milk formula. In developed countries, even in the case of acute gastroenteritis, enough lactose digestion and absorption are usually preserved to continue to use standard cow's milk-based formula (American Academy of Paediatrics, 2006).

Lactose-free, cow milk protein-based formulas contain small amounts of residual lactose (a disaccharide containing glucose and galactose). For this reason, they are contraindicated for infants with galactosemia. Nor are they recommended for infants with congenital lactase deficiency, a rare disorder that presents with intractable diarrhea when human milk or lactose-containing formulas are consumed. The only formula indicated for infants with galactosemia or congenital lactase deficiency is a soy-based formula which contains no lactose.

In addition, lactose-free, cow milk protein-based formulas are unsuitable for infants with

confirmed cow milk protein allergy and are ineffective in the dietary management of infant colic.

## **Formula based on partially hydrolyzed cow milk protein**

A number of infant formulas contain protein that has been partially hydrolyzed. The degree of hydrolysis varies from product to product. Some formulas contain a combination of partially hydrolyzed and intact proteins. Currently, there is little evidence to support any benefit of protein hydrolysates to the digestive system of infants compared to standard cow milk protein-based formulas. All infant formulas are "easy to digest" and "well tolerated" as evidenced by the results from growth and tolerance studies that are required for all marketed infant formulas.

The only potential [benefit effect](#) of formulas containing partially hydrolyzed protein as the sole source of protein may be a reduced risk of an allergic reaction to whole cow milk protein. However, parents should be advised that some formulas with partially hydrolyzed protein also contain whole (intact) cow milk protein. Advise parents to check this by reading the ingredients list on the label.

There is modest evidence that some formulas based on partially hydrolyzed protein, in comparison to formula with intact cow milk protein, may delay or prevent atopic dermatitis in early childhood. This evidence applies to some infants who are at high risk of developing atopic disease and who are exclusively fed formula (AAP, 2008). More research is needed to determine whether this [benefit](#) extends beyond early childhood.

## **Thickened infant formula**

Infant formulas are available which have been slightly thickened with rice starch. They may be labelled as suitable for [formula fed](#) infants who spit up frequently. However, spitting up is normal in infancy and only very rarely leads to health problems, such as failure to thrive. Further assessment is warranted if spitting-up persists or increases in severity.

These formulas are not suitable for infants with [severe reflux](#), such as gastro-oesophageal reflux disease (O'Connor, 2009).

## **Essential fatty acids in formulas**

The addition of the fatty acids DHA and ARA to infant formulas is not currently mandatory in Canada. However, they are permitted as an optional ingredient. Formulas with DHA and ARA have become widely available.

Infant formulas are required to contain adequate amounts of the essential fatty acids linoleic acid (omega-6) and alpha-linolenic acid (omega-3). These are the precursors of the long-chain, polyunsaturated fatty acids ARA (omega-6) and DHA (omega-3). The DHA and ARA added to infant formula are sourced from algal and fungal oils which have been [assessed for safety by Health Canada](#) (Health Canada, 2003).

Questions remain about an infant's ability to convert linoleic and alpha-linolenic acids to their long chain derivatives (Hoffman et al., 2000). However, evidence is inconclusive on the [benefit or harm](#) of including DHA and ARA in formula for healthy, term infants (Simmer, Patole, & Rao, 2008).

## **Nucleotides**

Some infant formulas on the market contain added nucleotides. The levels of nucleotides in formula are based on levels found in breastmilk. Human data is lacking on their benefits [or harm](#) to infant health (ESPGHAN, 2005).

## **Live microorganisms (probiotics)**

Probiotics have been defined as "live microorganisms which, when administered in adequate amounts, confer a health benefit to the host" (FAO/WHO, 2006). Live microorganisms may be added to infant formula if the microorganism has been assessed as safe for infant use. The addition of probiotics to infant formula is intended to mimic the effects of breastmilk on the infant's gastrointestinal system. However to date, the evidence for clinical benefits [or harm](#) from infant formulas supplemented with probiotic bacteria is equivocal (Lee & Seppo, 2009).

## **Palm olein**

The palm olein used as part of the fat component in most infant formulas provides palmitic acid but in a different format than that in breastmilk fat. There is some evidence that infants fed palm olein-free formula have slightly higher fat and calcium absorption. However, there is no data supporting any long-term benefits (Young et al., 2005).

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## Soy-based formulas

Cow milk-based commercial infant formula is recommended for an infant who is not exclusively fed breastmilk. Soy-based formula is indicated only for infants who have galactosemia or who cannot consume dairy-based products for cultural or religious reasons. The Canadian Paediatric Society recommends the use of an infant formula based on extensively hydrolyzed protein for the formula-fed infant with a cow milk protein allergy (CPS, 2009). When a diagnosis of non-IgE-mediated cow milk protein allergy can be ruled out, the use of soy-based formula may be considered (CPS, 2009).

The soy-based formulas currently available have been shown to support normal growth and nutritional status in the first year of life. No overt toxicities have been observed in healthy infants fed these formulas as their sole source of nutrition (Nutrition Committee, CPS, 2009; Badger et al., 2009). The American Academy of Pediatrics states that there is no conclusive evidence from studies with animals or humans that dietary soy isoflavones adversely affect human development, reproduction or endocrine function (AAP, 2008). The National Toxicology Program Board of Scientific Counsellors concluded that there is minimal concern regarding adverse developmental effects in humans due to the presence of estrogenic isoflavones (phytoestrogens) in soy infant formula, but found that there was insufficient information from studies in humans to reach a conclusion on potential adversity (National Toxicology Program, 2009).

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## Formulas for special medical purposes

Some infant formulas are intended for use only under medical supervision. They include formulas for the dietary management of conditions such as aminoacidurias and severe malabsorption syndromes. They also include formulas for preterm infants. These products are not generally available at the retail level. They are not for healthy term infants and are beyond the scope of this statement.

Formulas for preterm infants on discharge from hospital may be available at the retail level. Advise parents that they are not appropriate for healthy term infants.

### Infant formula with extensively hydrolyzed protein

Infant formulas based on extensively hydrolyzed protein are generally available at the retail level. They are intended for infants who have physician-confirmed food allergies or malabsorption syndromes and cannot tolerate formulas based on intact cow milk protein or soy protein. The protein in these formulas has been extensively broken down to the small peptide and amino acid level. Currently, the protein source is casein.

There is some evidence that formulas with extensively hydrolyzed protein, in comparison to formulas with intact cow milk protein, may delay or prevent atopic dermatitis in early childhood in infants who are at high risk of developing atopic disease. More research is needed to determine whether ~~the~~ there is harm or benefit of using a formula with hydrolyzed protein extends beyond early childhood (AAP, 2008).

Formulas based on extensively hydrolyzed protein have provoked allergic reactions in highly allergic infants. For these infants, an amino acid-based infant formula may be recommended (Hill, Cameron, Francis, Gonzalez-Andaza, & Hosking, 1995; Saylor & Bahna, 1991).

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## Other milks

Cow milk and other animal milks, including goat milk, are not appropriate alternatives to breastmilk for young infants (WHO, 2009). Cow and goat milks differ greatly from human breastmilk because they:

- are low in iron
- are low in essential fatty acids and other essential nutrients
- contain a less-digestible form of protein
- have a high renal solute load.

In infants under six months of age, the use of cow milk is associated with occult blood loss in stool, which can contribute to iron deficiency anaemia (WHO, 2009).

Unpasteurized cow or goat milk (raw milk) should never be offered due to the risk of food-borne illness from pathogens such as, *Salmonella*, *Escherichia coli*, *Campylobacter*, and *Listeria monocytogenes* (Health Canada, 2010b; Infectious Diseases and Immunization Committee, 2008).

Home-made formulas made from canned, evaporated, whole milk (cow or goat) are not recommended as a breastmilk substitute. They are nutritionally incomplete (Briend, 2006). These formulas should only be considered for emergency, short-term use. They must be prepared safely, following directions from [WHO's Guidelines for Use of Breast-milk Substitutes in Emergency Situations](#) (WHO, 2005).

Soy, rice or other plant-based beverages, even when they are fortified, are not appropriate as a breastmilk substitute because they are nutritionally incomplete for infants. Consumption of these beverages by young infants may result in failure to thrive (Tierney et al, 2010).

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## Safe preparation and storage

Young infants are vulnerable to food-borne illness. Proper preparation and storage of infant formula is very important to reduce the risk. Sterilization of all infant feeding equipment is recommended for the first four months, or as per the equipment manufacturer's instructions. Instruct parents and caregivers to:

- Thoroughly wash bottles, nipples, caps, tongs, measuring cups or other containers, and breast pump components.
- Sterilize the washed equipment by boiling in a pot of clean water for two minutes (Health Canada, 2010).
- Avoid [cross-contamination](#) from other foods prepared in the kitchen.

## Liquid formula

Liquid infant formula is heat-treated to be sterile. It is available in ready-to-feed formats or as a liquid concentrate. Ready-to-feed infant formula is the safest choice for higher-risk infants ~~who are when medically indicated need to be~~ formula fed, ~~since all formula fed infants are including low birth weight and~~ immuno-compromised infants. Although the liquid formula is sterile, parents and caregivers should follow the manufacturer's directions for preparation and avoid cross-contamination.

Opened cans of liquid formula should be covered and refrigerated immediately. They should be used within 48 hours, or according to manufacturer's directions.

Liquid concentrate infant formula must be prepared by adding water according to manufacturer's directions.

## Powdered formula

Powdered infant formula is not sterile. It has been linked to outbreaks of *Cronobacter sakazakii* and *Salmonella enterica* [infections resulting in meningitis, sepsis, necrotising enterocolitis and even death \(c. sakazakii\) and diarrheal disease \(s. enterica\)](#), mainly in high-risk infants (WHO, 2006). If liquid formula is not available, powdered infant formula can be used if it is properly prepared.

Advise parents and caregivers as follows:

- If the powdered formula will be fed immediately after preparation, it is safe to mix the powder with previously boiled water that has been cooled to room temperature (Health Canada, 2010c).
- If they are preparing more than one bottle in advance, advise them to follow the guidelines for [Preparation, Storage and Handling of Powdered Infant Formula](#) (Health Canada, 2010c). These guidelines recommend mixing the powdered formula with very hot water (boiled and cooled to no less than 70°C) to kill any harmful bacteria. Formula prepared in this manner can be stored in the refrigerator for up to 24 hours.

## Water

Municipal tap water and commercially bottled water (except carbonated or mineral waters) are suitable for preparing powdered or concentrated infant formulas. There is no indication for the use of distilled water.

Concentrated liquid or powdered infant formula can be reconstituted with fluoridated tap water. However, if the families are located in an area with naturally occurring high levels of fluoride (higher than the guideline of 1.5 mg/L), recommend they use a different source of drinking water with a lower [fluoride concentration](#).

Well water that is regularly tested and meets standards of safety for is also suitable. However, the nitrate concentration of well water should be monitored to ensure it is below 10 ppm, since methaemoglobinaemia is a risk for infants younger than six months.

Tap water, well water, and commercially bottled water are not sterile. Home water treatment equipment does not replace the need to sterilize water for infants. To ensure water for infants is safe and pathogen-free, advise parents and caregivers to:

- Use cold tap water. Hot tap water may contain more metal contaminants from the pipes, such as copper or lead.
  - Bring water to a rolling boil.
  - Continue to boil for 2 minutes.
  - Let cool.
- 

## Supervision of a feeding infant

Breastfeeding allows close, skin-to-skin contact and constant attention to infants during feeding. When an infant is not breastfed, skin to skin contact should still be encouraged while feeding.

Formula-fed infants, like breastfed infants, need to feed '[on-cue](#)', according to their appetite and satiety. Infants should not be encouraged to empty the bottle at a feeding (Institute of Medicine, 2011).

Feeding from a bottle or cup must always be supervised. Strongly discourage the use of a propped bottle to feed an unattended infant. There is a danger of choking or aspiration, because the flow of milk into the mouth may be too rapid. This practice also increases the risk of overfeeding, since the infant cannot stop the feeding (Institute of Medicine, 2011). Even older infants who are able to hold a bottle benefit from being held when feeding. In addition, the use of a bottle as a pacifier should be discouraged, particularly at bedtime. There is a risk of 'nursing bottle syndrome' and [early childhood tooth decay](#) (Health Canada 2009). Also, the risk of feeding difficulties increases with prolonged use of a bottle as a pacifier.

## References

[References removed for brevity. References can be viewed in Health Canada's [online draft statement](#).]

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## In practice: Talking to families about infant nutrition

- [Why is infant-led feeding \(also known as 'on-cue' feeding\) important?](#)
- [How can I reassure parents that an infant is nourished and growing well?](#)
- [If a mother needs to temporarily stop breastfeeding because of medical condition or treatment, how can she maintain her milk supply?](#)
- [What dietary advice can I offer to a breastfeeding mother?](#)
- [How can I use points of contact with expectant and new mothers to educate and support them to breastfeed?](#)
- [What supports are important for breastfeeding women and their families?](#)
- [What advice should I offer on the texture of first foods?](#)
- [Should parents be concerned about offering infants foods that are considered common allergens?](#)
- [Do infants under six months need iron supplements?](#)
- [What should parents look for when buying a vitamin D supplement?](#)
- [Can breastfeeding mothers take a vitamin D supplement instead of giving it to the infant?](#)
- [If infants are both breastfeeding and getting some formula, should they given a vitamin D supplement?](#)
- [Should an infant with jaundice continue to be breastfed?](#)
- [Are herbal teas suggested for infants?](#)
- [What advice should I give to a breastfeeding mother about alcohol or smoking?](#)
- [References](#)

### **Why is infant-led feeding (also known as 'on-cue' feeding) important?**

Breastfeeding is a system of demand and supply. To establish good breastmilk production and flow, infants need to feed 'on-cue'. Timed feedings, and restricting or delaying feedings, should be avoided (Kent et al., 2006). The goal in infant-led feeding is for the mother to recognize and respond to the infant's appetite, hunger, and fullness cues. Hunger cues include restlessness, rooting, or sucking on a hand.

Infants who are fed when they are hungry, and suckling effectively, will obtain what they need for satisfactory growth. Infant-led breastfeeding, as opposed to bottle-feeding, encourages self-regulation. It may protect against a tendency to over-feed in late infancy (Li, Fein, & Grummer-Strawn, 2010).

### **How can I reassure parents that an infant is nourished and growing well?**

Parents need reassurance and confidence that their infant is breastfeeding well and growing normally. Mothers give "not enough milk" as the most common reason for stopping breastfeeding (Health Canada, 2010). But in fact, insufficient breastmilk production is rare. In most cases the lack of milk is perceived rather than real (Gatti 2008; Lewallen et al., 2006; Thulier & Mercer, 2009).

In the first two weeks, newborns experience normal weight decline and recovery (Macdonald, Ross, Grant, & Young, 2003). During this initial period, a trained professional, such as a maternal-child or public health nurse, midwife, or certified lactation consultant, can observe breastfeeding technique and assess latch or other suspected problems.

After the first couple of weeks, when an infant has regained his or her birth weight, steady weight gain is a good indicator of the adequacy of the infant's intake. Infants are expected to gain weight at the rate of about 0.6 to 1.4 kg per month for the first three months (WHO, 2011). The rate is slower from three to six months: about 0.3 to 0.8 kg per month.

Some infants will gain more and some less. Proper [growth assessment](#) requires knowledge of the infant's growth pattern and their placement on the growth chart.

### **If a mother needs to temporarily stop breastfeeding because of medical condition or treatment, how can she maintain her milk supply?**

During a temporary interruption, mothers can express milk manually or with a breast pump, six to eight times per day. There should be no interval longer than four to six hours between pumpings. Expressing breastmilk prevents engorgement and maintains the mother's milk supply. Once the mother is ready to breastfeed, she can resume.

### **What dietary advice can I offer a breastfeeding mother?**

The quality of the [mother's diet](#) is important for her health and energy. Day to day diet quality, however, does not affect milk production and has little effect on milk composition for most nutrients. Milk composition relies primarily on the mother's nutrient stores (Riordan & Wambach, 2010). While breastfeeding her infant, a mother should consume more nutrients to conserve her stores, and enough fluids to satisfy her thirst. Most often, her nutritional needs can be met with a balanced diet following the advice for breast feeding women in [Eating Well with Canada's Food Guide](#).

Severe dieting for weight loss should be discouraged. Rapid weight loss can reduce the mother's milk supply (Riordan & Wambach, 2010).

Restricting common allergenic foods from a breastfeeding mother's diet has not been shown to prevent food allergies in infants at high risk for atopy and is not recommended for this purpose (AAP, 2008; ESPGHAN, 2008; SP-EAACI, 2008).

### **How can I use points of contact with expectant and new mothers to educate and support them to breastfeed?**

**With prospective parents**, explore their attitudes, values, and beliefs about breastfeeding. Your attitude toward this topic is also critical. Inconsistent, unfavourable - or even neutral -- attitudes towards breastfeeding on the part of health professionals are negatively associated with breastfeeding duration (Thulier & Mercer, 2009). Discuss concerns and correct misinformation to support fully informed decisions about infant feeding.

**At the first prenatal visit**, ask expectant mothers about their intention to breastfeed using open-ended questions such as "What do you know about breastfeeding?" Provide [written information](#) on the importance of breastfeeding to the mother and infant. For those who say they do not intend to breastfeed, explore their attitudes and beliefs towards breastfeeding and talk about the importance of breastfeeding even for a short period.

**At the time of birth**, ensure early skin to skin contact for at least one hour. Provide rooming-in and support infant-led, unrestricted, and exclusive breastfeeding, with no supplemental feedings unless [medically indicated](#).

**Before discharge**, ensure that parents understand how they will feed their infant and that they receive written information. [ [Ten Valuable Tips for Successful Breastfeeding](#) ] The information should explain the signs that their infant is feeding and growing well, as well as information on community breastfeeding resources. Advise mothers that feeding from bottles or using pacifiers may interfere with establishing breastfeeding. Help them to access resources in the community such as peer counsellors and certified lactation consultants.

**At the mother's first post-partum visit**, arrange for a skilled practitioner to observe the infant breastfeeding. Offer counselling about what to expect in terms of normal infant growth and increases in breastfeeding demand.

### **What supports are important for breastfeeding women and their families?**

**Skilled support from a combination of professionals and trained peers or laypeople** helps breastfeeding mothers and infants as they transition between the hospital and community services and beyond (Thulier & Mercer, 2009; Wijndaele, Lakshman, Landsbaugh, Ong, & Ogilvie, 2009; Britton, McCormick, Renfrew, Wade, & King, 2007).

**Peer support groups and community networks**, such as La Leche League Canada, give mothers and families the opportunity to share breastfeeding practices and experiences. Such

networks enhance their knowledge and confidence about breastfeeding (Morrow et al., 1999).

**Certified lactation consultants and public health nurses** provide ongoing support to breastfeeding mothers in the community with home visits, counselling, and resource referrals (Thurman & Allen, 2008).

**Community health programs**, such as those funded through the [Canada Prenatal Nutrition Program](#), provide breastfeeding education and support, and have also been shown to improve initiation and maintenance of breastfeeding among their participants (PHAC, 2009).

**The community at large** can further support breastfeeding as the normal way of feeding infants 'anytime and anywhere'. Community support helps to protect breastfeeding mothers and infants from discrimination and harassment. The right to breastfeed is protected under the Canada Charter of Rights and Freedoms, the provincial and territorial human rights codes, and the United Nations' Convention on the Rights of the Child, which Canada ratified in 1991.

### **What advice should I offer on the texture of first foods?**

At six months of age, infants can be offered foods with more of a semi-solid texture. The texture of the food should be gradually increased over the next few months. Meats such as beef, lamb, game, poultry, and [fish](#), as well as alternatives such as eggs, tofu, and legumes, can be easily and inexpensively prepared at home by cooking until tender and mashing with a fork or mincing finely with a knife or food grinder. Both meat and cereal were shown to have similar acceptability and tolerance when offered to infants as first complementary foods (Krebs et al., 2006).

### **Should parents be concerned about offering infants foods that are considered common allergens?**

Delaying the introduction of [priority food allergens](#) is not currently recommended as a way to prevent food allergies, including for infants at risk for atopy (AAP, 2008, ESPGHAN, 2008). Common food allergens that are iron rich, such as fish and eggs, can be introduced at about six months of age.

**Exception:** Health care providers should deal with cases where there is a family history of allergy on an individual basis.

**Note:** All nuts, as well as seeds, and fish with bones, are choking hazards and should not be fed to infants.

### **Do infants under six months need iron supplements?**

Current opinion suggests that iron supplements are not generally needed for breastfed infants during the first six months of life. However, there is concern that some healthy, full-term and exclusively breastfed infants are at an increased risk of iron deficiency (Baker, Greer & Committee on Nutrition, 2010).

Infants with lower iron stores are at higher risk of iron deficiency. These infants include those with a birth weight of less than 3000 grams, and those born to iron-deficient mothers, mothers with diabetes, or mothers who consumed excess alcohol during pregnancy (Berglund, Westrup, & Domellof, 2010; Georgieff et al., 1990; Carter, Jacobson, Molteno, & Jacobson, 2007; Yang et al., 2009). Infants who are not fed according to current recommendations are also at higher risk of iron deficiency, such as those fed homemade evaporated milk formula (Christofides, Schauer, & Zlotkin, 2005).

Since there is a potential for the development of iron deficiency in some healthy term infants born with lower iron stores, case-selecting infants for testing is a way to assess those who may benefit from supplementation with oral iron drops before six months of age. Further research is needed to more clearly delineate the prevalence of iron deficiency in infancy and determine the best strategies to manage this issue.

### **What should parents look for when buying a vitamin D supplement?**

A single vitamin D3 supplement (without other vitamins) in a liquid (drop) format is recommended for infants. Other vitamin D products such as vitamin D2 or a multivitamin (which contains vitamin D) are not suggested.

Vitamin D supplements are sold over-the-counter in pharmacies and some grocery stores. Some families may qualify for subsidized supplements. For example, First Nations or Inuit people may be eligible to receive vitamin supplements through the [Non-Insured Health Benefits Program](#).

### **Can breastfeeding mothers take a vitamin D supplement instead of giving it to the infant?**

Current guidelines advise women of childbearing age to take a [daily multivitamin](#), which provides between 5 and 20 µg (200 - 800 IU) of vitamin D. This level of supplementation is unlikely to sufficiently increase the concentration of vitamin D in a mother's breastmilk to meet the infant's needs (Wagner & Greer, 2008). A small number of studies have investigated the efficacy of supplementing breastfeeding mothers with high doses of vitamin D to prevent rickets in their infants (Wagner & Greer, 2008). However, more research is needed on this approach before making a change to practice recommendations.

### **If infants are both breastfeeding and getting some formula, should they be given a vitamin D supplement?**

Exclusively-formula fed infants do not require a vitamin D supplement because the formula contains vitamin D.

Infants who are not exclusively formula-fed should receive a vitamin D supplement of 10µg (400 IU). They should get this amount regardless of their average formula intake. Their total intake from supplement and formula is not likely to exceed the upper level of 25 µg (1000 IU) per day.

### **Should an infant with jaundice continue to be breastfed?**

Jaundice is a yellow colouration of the infant's sclera and skin caused by increased bilirubin levels in the body. It is common during the first few days of life. Some infants may develop jaundice if there is trouble with the initiation of breastfeeding or the supply of breastmilk is low. It is important that the mothers and infants receive support to ensure breastfeeding and lactation are well established, and are not compromised during this critical period.

Up to 15% of breastfed infants will display jaundice related to breastmilk in the second and third weeks of life. This can persist for several weeks (Winfield & MacFaul, 1978; Kelly & Stanton, 1995). Any infant with jaundice at 2 to 3 weeks of age should be promptly referred for evaluation by an experienced health professional to ensure there is no other cause for the persistent jaundice.

Very high levels of jaundice can lead to permanent neurological damage. However, interventions are very effective if instituted early. Causes of jaundice can include hemolysis, liver disease, metabolic problems, infections, and biliary atresia (Moyer et al., 2004). Do not assume that the jaundice will resolve itself until an evaluation has ruled out any potential causes that include life-threatening conditions. Breastfeeding should continue uninterrupted while the potential causes are investigated.

### **Are herbal teas suggested for infants?**

Some parents and caregivers use herbal teas to help with infant conditions such as colic (Zhang, Fein, & Fein, 2011). The use of these products is not without risk, as they may have pharmacologic actions. They frequently contain sugar and alcohol, and may interfere with breastfeeding. The composition of herbal teas varies considerably among products. At this time, there is insufficient evidence on efficacy and safety to warrant their use during infancy.

### **What advice should I give to a breastfeeding mother about alcohol or smoking?**

Advise mothers to limit their alcohol intake, particularly with newborns because of their rapidly developing central nervous system and underdeveloped ability to metabolize alcohol (Butt, Beirness, Cesa, Gliksman, Paradis, & Stockwell, 2011). Alcohol can alter the milk let-down reflex and decrease the amount of milk consumed by the infant (Giglia & Binns, 2006; Chien, Huang, Hsu, Chao, & Liu, 2009; Mennela, 2001a). With daily exposure, it may also affect the infant's short-term sleep patterns (Giglia & Binns, 2006, Mennela & Garcia-Gomez, 2001) and gross-motor development (Mennela, 2001b). Frequent or heavy drinking can impair the mother's judgment and functioning. Although there is no known "safe" amount of alcohol in breastmilk, occasional moderate alcohol intake is compatible with breastfeeding.

Advise a mother to stop or reduce smoking. Smoking can affect milk production (Fríguls et al., 2010) and may negatively impact infant growth (Little, Lambert, Worthington-Roberts, & Ervin, 1994; Boshuizen et al., 1998) and infant sleep patterns in the short-term (Mennela, Yourshaw, & Morgan, 2007).

If a mother continues to smoke, advise her that breastfeeding remains important for her infant's health and may mitigate some of the negative effects of smoking on the infant (Chatzimichael et al., 2007; Woodward, Douglas, Graham, & Miles, 1990). Advise also that exposure to tobacco smoke in the environment carries risks to the infant (Ladomenou, Kafatos, & Galanakis, 2009).

Smokers in the household should go outside to smoke, but always ensure the infant is supervised in their absence.