Background

The Northern Health (NH) Infant-Toddler Nutrition Guidelines for Health Professionals is a long-standing resource that is updated regularly. This work is currently lead, on behalf of the Population Health Nutrition team, by Lise Luppens, MA, RD, Population Health Dietitian, and Regional Lead for Nutrition in the Early Years. For a summary of updates made in 2018 and 2019, please see the following pages.

To ensure access to the most recent version of these guidelines, we encourage NH staff to access the electronic link to these guidelines, either through the OurNH Population Health Nutrition page, or through Document Source directly (i.e. Job# 1946). It is also available to health professionals via the NH public website, on the Public Health Nutrition Guides webpage.

New! E-modules are available to support orientation to these guidelines: NHA – POP - Infant-Toddler Nutrition Guidelines for Health Professionals (course code # 20057). This course consists of a set of short modules: an introductory module, one module for each of the six chapters of these guidelines, and a final quiz.

These guidelines are intended to guide the practice of health professionals working with families of healthy infants and toddlers. It represents a compilation of public health nutrition recommendations, such as those from the federal statement Nutrition for Healthy Term Infants and the Provincial Health Services Authority’s Pediatric Nutrition Guidelines (Six Months to Six Years) for Health Professionals.

The unique nutritional needs of young children with diagnosed medical conditions are beyond the scope of this document. Also, given that this is a resource for health professionals, its format, content, and literacy level determine the inappropriateness of photocopying sections of this document for clients.

It is the position of Northern Health’s Population Health Nutrition program that breastfeeding is the normal and optimal method of infant feeding, and should be protected and supported. Discussion of alternatives to human milk in this document is not an endorsement of equivalency of commercial infant formula to human milk. Rather, it is an effort to support health care professionals to support families in doing the best for their infants, in the absence of exclusive breastfeeding.

For enquiries, comments, or suggestions, please contact the Population Health Nutrition team at: PopHthNutrition@northernhealth.ca
Acknowledgements

A variety of health professionals have reviewed and contributed to various revisions of these guidelines:

- In 2015 - Contributors/reviewers to support a major revision: Destyni Atchison, RD, Marianne Bloudoff, RD, Sarah Brown, RN(C), Beth Evans, RD, Laura Ewart, RN, Jeanne Hagreen, RN, IBCLC, Courtenay Hopson, RD, CNSC, Rebecca Larson, RD, Teresa MacDonald, RN, Brenda Matsen, RDH, Emilia Moulechкова, RD, Heather Paterson, RN, Kaethe Patterson, RD, Jane Ritchey, RN, PNC(C), Vanessa Salmons, RN, Darlene Schmid, MPH, RN, IBCLC, PNC(C), Loraina Stephen, M.Sc., RD, and Danelle Zwick, RN.
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- In 2019 - Additional contributors/reviewers: Kathryn Germuth, RN, Lindsay Willoner, RN(C)

In 2019, a number of NH staff also contributed to the development of new LearningHub modules to support orientation to these guidelines:

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# Updates in 2018 and 2019

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<th>Fall 2018</th>
<th>September 2019</th>
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<tr>
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<td>• Minor edits, additions, and clarifications; updated links</td>
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<td>Chapter 1: Breastfeeding and Human Milk</td>
<td>• Updated chapter title to include “human milk”</td>
<td>• Updated section: [Collection and Storage of Expressed Breast Milk (EBM)]</td>
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<td>• Updated section: “The Right to Breastfeed” (new resources)</td>
<td>including updated guidelines in [Storage of EBM]</td>
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<td>• New section on “Cannabis”</td>
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<td>• Reorganization of chapter</td>
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<td>Chapter 2: Human Milk Substitutes</td>
<td>New resources added:</td>
<td>• New practice points regarding informed decision making, and responsive, cue-based feeding.</td>
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<td>• [Informed Decision Making: Having Meaningful Conversations Regarding Infant Feeding]</td>
<td>• Addition of new resource: [Infant Formula: What You Need to Know]</td>
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<td>• [Infant Formula: What you Need to Know]</td>
<td>• Information on manganese in [Water Choices for Commercial Infant Formula Preparation]</td>
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<td>Chapter 3: Animal Milks and Other Beverages</td>
<td>• New resources regarding “Goat’s Milk” and “Plant-Based Beverages”</td>
<td>• Identification of [fruit juice] as a sugary drink</td>
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<td>• New points related to “Baby Led Weaning”</td>
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<td>Chapter 5: Issues of Concern</td>
<td>• Updates to food costing data in “Food Insecurity (Household)”</td>
<td>• Updated section: [Allergens] (common food allergens, eczema, timing of introduction of allergens, and [Allergy Check] resource)</td>
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<td>• Updated resources in “Allergens”, “Colic”, and “Dental Health”</td>
<td>• Updates to screening and supports in [Food Insecurity (Household)]</td>
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<td>Chapter 6: Nutrients of Concern</td>
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Executive Summary

Chapter 1: Breastfeeding and Human Milk

- Health professionals play an important role in protecting, promoting, and supporting breastfeeding.
- Human milk is the standard and optimal source of nutrition for infants, and breastfeeding is rarely contraindicated.
- If supplementation is medically indicated, or an informed decision has been made to supplement, expressed milk from the infant’s mother is the first choice. If that is not an option or is limited, pasteurized donor human milk from a regulated milk bank is the next best choice.
- Recommend exclusive breastfeeding for the first six months of life. Other than human milk, no other food or fluids should be offered unless medically indicated.
- Recommend introduction to nutrient-rich solid foods at about six months of age, with particular attention to iron, with continued breastfeeding for up to two years and beyond.
- Recommend that all infants and toddlers who receive any amount of human milk be given a liquid vitamin D supplement of 400 IU (10 mcg) daily.

Chapter 2: Human Milk Substitutes

- Support families to make fully informed decisions about infant feeding, which involve understanding the benefits and risks of various feeding options.
- For infants who are not exclusively receiving human milk, recommend a commercial infant formula that is cow’s milk-based.
- Other commercial infant formulas are only recommended in specific circumstances for infants who cannot take cow’s milk-based formulas due to confirmed medical conditions or for cultural or religious reasons.
- Other beverages are not nutritionally complete and are not appropriate as human milk substitutes.
- Support parents and guardians to ensure that they are safely preparing, storing, and transporting formula. Instruction should be provided, as needed, on an individual basis (i.e. not in a group setting).
- Regardless of feeding method, promote responsive, cue-based feeding.

Chapter 3: Animal Milks and Other Beverages

- Recommend waiting until about six months of age before offering water.
• Recommend delaying the introduction of pasteurized whole cow’s milk until nine to 12 months of age.

• Goat’s milk is not recommended in the case of cow’s milk protein allergy.

• Lower-fat milks and fortified soy beverages are not recommended before two years of age.

• Other plant-based beverages are not recommended as alternatives to milk.

• Fruit juice is not required and should be limited.

• Other sugary, artificially-sweetened, or caffeinated beverages should be avoided.

• Recommend that fluids introduced after six months be offered in an open cup.

Chapter 4: Feeding by Age

• Recommend offering solid foods starting at about six months of age.

• For first solid foods, recommend iron-rich choices such as well-cooked meat, poultry, fish, eggs, tofu, legumes, and iron-fortified cereals.

• Recommend that parents and guardians provide a variety of soft textures and finger foods starting at about six months of age.

• Recommend eating together as a family when possible.

• At every age, the child is responsible for deciding how much they want to eat or whether they want to eat at all.

• Breastfeeding and human milk continue to be important and are recommended to two years and beyond.

Chapter 5: Issues of Concern

Allergens

• Maternal dietary restrictions during pregnancy and lactation are not recommended for the prevention of food allergies in infants.

• Delaying the introduction of common food allergens is not recommended.

• For most infants, common food allergens can be introduced starting at about six months of age.

• For infants at high risk of food allergies, consider introducing common food allergens at about six months of age, but not before four months of age, based on signs of developmental readiness.

• Individualized care plans and an interdisciplinary team approach are indicated for children with suspected or confirmed food allergies.
Colic (High Crying Infants)

- It is generally not beneficial to alter feeding practices when an infant has colic (is a high crier).
- Support parents and guardians with information on normal periods of increased crying and coping strategies.

Constipation

- Support parents and guardians with information on the wide variation in normal stooling patterns.
- There are several types of constipation; management will vary depending on the type of constipation, mode of feeding, and the child's age.

Dental Health

- Dietary guidance and fluoride use can help to significantly reduce the risk of early childhood caries.

Diarrhea (Acute)

- Appropriate diagnosis of diarrhea and dehydration are important. Recommend seeking medical attention if a child is thought to be dehydrated.
- Infants with diarrhea, without dehydration, should continue to be fed an age-appropriate diet and should be offered increased fluids from their usual diet.
- Treatment for mild to moderate dehydration includes the use of oral rehydration solutions, fluid maintenance, and appropriate re-feeding.
- Severe dehydration requires intravenous rehydration in a clinical setting.
- When dehydration is corrected, early re-feeding with a normal diet is recommended.

Food Insecurity (Household)

- Household food insecurity is a significant public health issue in northern BC.
- Household food insecurity is based on a lack of sufficient income to purchase food. Screen clients, and link to financial and other supports, as needed.
- Families benefit from compassionate and non-judgmental support to reduce the risk of nutrient deficiencies and to optimize their children's diets.
- Although breastfeeding and the expression of breast milk have the potential to be food security strategies for infants, low income mothers may face greater barriers and are less likely to maintain breastfeeding and lactation. Provide mothers with additional and continued supports to meet their infant feeding goals.
- Support families who use commercial infant formula to choose a formula that is “acceptable, feasible, affordable, sustainable, and safe” in their circumstances.

**Growth**

- Routine growth monitoring is important for assessing the health and nutrition of young children.
- Use the WHO Growth Charts for Canada to monitor growth.

**Reflux**

- Reflux is common in infants and does not generally require treatment or changes in feeding.

**Vegetarian Diets**

- Well-planned vegetarian diets are compatible with lactation and can support normal growth and development.
- The more restrictive the diet, the greater the risk of nutrient deficiencies. Vitamin B12 is a nutrient of concern in vegan diets.
- Recommend support from a registered dietitian if there are concerns regarding dietary adequacy.

**Chapter 6: Nutrients of Concern**

**Calcium**

- Human milk is the optimal source of nourishment for infants and is the preferred sole nutritional source of calcium for infants during their first six months.
- Commercial infant formulas contain adequate calcium for infants from birth to 12 months of age.
- After 12 months of age, 2 cups (500 mL) of fluid cow’s milk daily will help meet the calcium requirements of toddlers who no longer receive human milk or commercial infant formula.

**Dietary Fats**

- Dietary fat restriction is not recommended under two years of age.
- Evidence is inconclusive on the benefits of adding DHA and ARA to commercial infant formulas for healthy term infants. However, there are potential benefits and no apparent risks.
- Recommend that pregnant and lactating women, older infants, and children regularly consume foods containing essential fatty acids, such as fatty fish.
Iron

- Recommend exclusive breastfeeding for the first six months of life, with continued breastfeeding for up to two years of age and beyond.

- For infants who are not exclusively receiving human milk, recommend a commercial infant formula. All commercial infant formulas contain iron, although fortification levels vary.

- Recommend offering iron-rich foods two or more times per day starting at about six months of age.

- Recommend delaying the introduction of animal milk until nine to 12 months and offering no more than 3 cups (750 mL) per day.

- Iron deficiency in infancy and childhood is a significant issue; the promotion of the preceding guidelines supports adequate intake of iron.

Vitamin D

- Recommend that infants and toddlers who receive any amount of human milk be given a daily liquid vitamin D supplement of 400 IU (10 mcg).

- Infants who receive only commercial infant formula, and who were born to mothers with adequate vitamin D status, do not generally require a vitamin D supplement.

- As a clinical decision, health professionals may recommend higher intakes of vitamin D to address suspected or known deficiency.

- A daily supplement of 400 IU (10 mcg) is unlikely to result in excessive vitamin D intake.
1. Breastfeeding and Human Milk

Practice Points

- Health professionals play an important role in protecting, promoting, and supporting breastfeeding.
- Human milk is the standard and optimal source of nutrition for infants, and breastfeeding is rarely contraindicated.
- If supplementation is medically indicated, or an informed decision has been made to supplement, expressed milk from the infant’s mother is the first choice. If that is not an option or is limited, pasteurized donor human milk from a regulated milk bank is the next best choice.
- Recommend exclusive breastfeeding for the first six months of life. Other than human milk, no other food or fluids should be offered unless medically indicated.
- Recommend introduction to nutrient-rich solid foods at about six months of age, with particular attention to iron, with continued breastfeeding for up to two years and beyond.
- Recommend that all infants and toddlers who receive any amount of human milk be given a liquid vitamin D supplement of 400 IU (10 mcg) daily.

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Breastfeeding Protection, Promotion, and Support

Health professionals have an important role to play in protecting, promoting, and supporting breastfeeding. Evidence-based policies and practices (i.e. Baby-Friendly Initiative) improve rates of breastfeeding initiation, duration, and exclusivity. (1) Health care providers have roles in “supporting [the normal process of infant feeding], removing barriers to success, and providing additional supports when challenges arise.” (1) Timely access to support is critical, especially when mothers face challenges.

Breastfeeding Recommendations

Exclusive breastfeeding is recommended for the first six months of life, with continued breastfeeding, along with appropriate complementary foods, for up to two years of age and beyond. This recommendation is supported by numerous organizations, including the World Health Organization, United Nations Children’s Fund, Health Canada, the Canadian Pediatric Society, Dietitians of Canada, and the Breastfeeding Committee for Canada. (2)

In Canada, a daily liquid vitamin D supplement of 400 IU is recommended for infants receiving human milk. (3) See “Vitamin D” in Chapter 6: Nutrients of Concern.

Resource for parents and guardians

- Vitamin D for Breastfed Infants and Toddlers in Northern BC (NH Document Source #10-421-6020)

Breastfeeding in British Columbia and Canada

In British Columbia (BC), between 2004/05 and 2012/13, 96% of newborns received some amount of human milk during their hospital stay after birth; 72.2% were exclusively breastfed during this time period. At six months, 41% were exclusively breastfed. (4) Nationally, only 19% of infants are breastfed beyond one year of age. (2) There is little information available regarding breastfeeding until two years of age and beyond, as per the recommendations above. (1)

Support is critical; common reasons mothers share for early breastfeeding cessation are: “not enough milk” (44%) and “difficulty with breastfeeding technique” (18%). (5)

Tools for Health Professionals

The OurNH Breastfeeding and Breast Milk page for Northern Health (NH) staff highlights a variety of resources, including staff education and training options, and other resources to support practice. Key resources include:

- Perinatal Service BC’s (PSBC) Health Promotion Guideline: Breastfeeding Healthy Term Infants has been adopted as an NH standard (see Clinical Practice Standard 1-1-3-070: Breastfeeding Healthy Term Infants). This comprehensive resource supports evidence-based lactation care. Contents include: (6)
Infant-Toddler Nutrition Guidelines for Health Professionals

- recommendations for prenatal, intra-partum, and post-partum care
- guidance to support teaching about early infant feeding cues, feeding frequency, and positioning
- management of breastfeeding challenges and weaning
- information on the Baby-Friendly Initiative and the International Code of Marketing of Breastmilk Substitutes

- **Breastfeeding Protocols for Health Care Providers** (Ontario) includes 21 evidence-informed protocols, from breastfeeding initiation, the management of breastfeeding concerns, expression and storage of breast milk, to weaning. Individual revised protocols are being released as they are completed.

- **NH Consensus Statement: Feeding Healthy Term Infants** (Document Source #10-030-6057)

- **NH Clinical Practice Standard 1-1-3-150: Baby-Friendly Initiative (BFI): Protect, Promote, and Support Breastfeeding** and related LearningHub module

- **The Baby-Friendly Initiative 10 Steps and WHO Code Outcome Indicators for Hospitals and Community Health Services** and related summary [poster](#) (Document Source #21074)

Resources and Supports for Parents, Families, and Community Partners

Where relevant, specific resources are highlighted in various sections throughout this chapter. NH's public [Breastfeeding and Breast Milk](#) webpage also provides a variety of resources for women, families, and community partners.

Women and families may be able to obtain professional support for breastfeeding from:

- NH nurses working in maternity and primary care settings
- NH Lactation Consultant, for specialized breastfeeding support:
  - in-person, telephone, and email support for clients throughout NH region
  - phone: 250-565-2327
- Midwives, physicians, nurse practitioners, and other local health professionals
- [HealthLink BC](#) (call 811 or 604-215-8110)

Community-based support may also be available from:

- [La Leche League Canada](#) for mother-to-mother peer support ([Find a group/leader](#))
- [Pregnancy Outreach Programs](#)
The Right to Breastfeed

The right to breastfeed is protected by the Canadian Charter of Rights and Freedoms, and BC’s Human Rights Code. As per BC’s Ministry of Justice: (7)

- it is illegal to discriminate against a woman because she may become pregnant, is pregnant, or has a baby
- nursing mothers have the right to breastfeed their children in a public area
- it is discriminatory to ask a mother to cover up or breastfeed somewhere else

PSBC has created a window decal, depicted below, for businesses and organizations to show their support for women’s right to breastfeed. Decals can be ordered via the NH Breastfeeding-Friendly Spaces webpage.

The following resources are also available:

- Tip sheet: Breastfeeding-Friendly Spaces Fact Sheet (Make Breastfeeding Your Business: Welcome Families to Breastfeed Any Time, Anywhere)
  (NH Document Source #10-030-6105)
- Poster: Breastfeeding-Friendly Spaces Poster (We Welcome You to Breastfeed Any Time, Anywhere)
  (NH Document Source #10-030-6106)

Resources for parents and guardians

- Human Rights in British Columbia: Sex Discrimination and Sexual Harassment (including pregnant and breastfeeding women)
- BC Human Rights Clinic: 1-888-685-6222
Human Milk and Health Outcomes

Human milk is the standard and optimal source of nutrition for infants. Human milk:

- supplies the correct quantity and quality of nutrients (3)
- is easily digested (3)
- composition evolves as the infant matures (3)
- includes numerous bioactive factors, including anti-infective immunoglobulins, white blood cells, and factors that stimulate the maturation of the small intestine and aid with digestion and absorption of nutrients (3)

The Importance of Breastfeeding and Human Milk

Breastfeeding is the biological norm and, compared to the use of human milk substitutes, is associated with numerous beneficial outcomes, outlined in the table on the next page.

In the context of supporting discussions about informed decision making about infant feeding, health professionals should not only provide information on the importance of breastfeeding, but should also provide information on the health consequences of not breastfeeding. See “Making Informed Decisions about Infant Feeding” in Chapter 2: Human Milk Substitutes.

Resource for parents and guardians

- 10 Great Reasons to Breastfeed (Government of Canada)
<table>
<thead>
<tr>
<th>Importance for infants</th>
<th>Importance for mothers</th>
<th>Other considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding is associated with a reduction in risk of:</td>
<td>Breastfeeding is associated with a reduction in risk of:</td>
<td>Breastfeeding has the potential to be a secure food system for young infants (13) (14)</td>
</tr>
<tr>
<td>• necrotizing enterocolitis (8)</td>
<td>• type 2 diabetes (8)</td>
<td>Breastfeeding supports bonding between mother and child, (2) which may help to promote secure emotional attachment</td>
</tr>
<tr>
<td>• gastrointestinal infections (3) (8) (9)</td>
<td>• breast cancer (2) (8) (9)</td>
<td>Feeding at the breast does not require cleaning, disinfection, preparation, or warming (6)</td>
</tr>
<tr>
<td>• acute otitis media (3) (8) (9) (10)</td>
<td>• ovarian cancer (2) (8) (9)</td>
<td>Breastfeeding has the potential to decrease:</td>
</tr>
<tr>
<td>• respiratory tract infections (3) (8) (9) (10)</td>
<td>• delayed menses, (3) which can influence child spacing</td>
<td>• costs to breastfeeding families (6)</td>
</tr>
<tr>
<td>• Sudden Infant Death Syndrome (SIDS) (3) (8) (9) (10)</td>
<td>• decreased iron losses (8)</td>
<td>• parental absenteeism from work (6)</td>
</tr>
<tr>
<td>• atopic dermatitis (8) (9)</td>
<td></td>
<td>• healthcare costs (6) (9)</td>
</tr>
<tr>
<td>• childhood leukemia (8) (9) (10)</td>
<td></td>
<td>• environmental impact (i.e. compared to the resources required to produce, package and transport commercial infant formula; and waste from cans and bottles) (6)</td>
</tr>
<tr>
<td>• type 2 diabetes (8) (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• high blood pressure (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• high blood cholesterol (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• overweight and obesity (2) (8) (9) (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding is associated with better:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• cognitive development and intelligence tests (3) (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• emotional security (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• jaw/tooth development (10) (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding and human milk are associated with a possible reduction in risk of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• asthma (8) (9) (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• food allergy (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• type 1 diabetes (9) (10)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Breastfeeding Older Infants, Toddlers, and Young Children

Health professionals can help to normalize, and promote the importance of, breastfeeding older infants, toddlers, and young children.

Many of the health outcomes associated with breastfeeding are considered to be dose-dependent. Outcomes associated with continued breastfeeding past six months of age include:

- continued provision of immune factors to the child (2)
- further reduction in child’s risk of:
  - gastrointestinal and respiratory infections (2)
  - childhood leukemia (9)
  - overweight and obesity (2) (9)
- further reduction in risk of maternal breast and ovarian cancers (2) (9)
- enhanced bonding between mother and child (2)

Women may face criticism and negative attitudes around breastfeeding older infants, toddlers, and young children, nursing during a subsequent pregnancy, and/or around nursing both a newborn and an older child (i.e. “tandem nursing”). As such, some may be reluctant to share that they continue to breastfeed, and they may choose to not breastfeed their children openly, which is referred to as "closet nursing." (1)

Women benefit from continued support to breastfeed their children beyond six months. (2) Health professionals can promote the importance of breastfeeding to two years and beyond, while supporting mothers regarding their decisions. (15) The provision of age-appropriate nutrient-dense complementary foods should also be supported (see Chapter 4: “Feeding by Age.”).

Continue to recommend a 400 IU liquid vitamin D supplement for as long as breastfeeding continues, or until the child is two years old and is consuming adequate vitamin D from their diet. (15) See “Vitamin D” in Chapter 6: Nutrients of Concern.

Resources for parents and guardians

- Breastfeeding Your Toddler (Toddler’s First Steps, Province of British Columbia)
- Breastfeeding Your Growing Child Through Ages and Stages (section on Northern Health public webpage: Breastfeeding and Breast Milk)
- Vitamin D for Breastfed Infants and Toddlers in Northern BC (NH Document Source #10-421-6020)
Collection and Storage of Expressed Breast Milk (EBM)

Detailed information on the expression, collection, and storing of human milk is found in the updated Breastfeeding Protocol: Expressing, Collecting, and Storing of Human Milk (2019).

Collection of EBM

The expression of breast milk is an important skill, for reasons such as relieving full breasts, increasing milk supply, maintaining lactation during periods when feeding at the breast is not possible, and collecting milk for feeding via alternative feeding methods (e.g. supplemental nursing system, syringe, cup, or bottle) or for human milk donation. It is important that all mothers learn how to hand express their milk. (16) (17) Milk can also be expressed with a hand pump or electric pump, and in combination with hand expression. (17)

Feeding at the breast is preferred, especially when skin-to-skin. Direct breastfeeding provides higher protection against infection. (17) It is recommended that breastfeeding be well established (i.e. after four to six weeks) before breast milk is expressed for feeding by cup or bottle. (18)

If a mother needs to express milk for reasons other than feeding by bottle, such as for feeding EBM through an alternative method; managing engorgement, over-supply, or forceful letdown; or as a strategy to increase supply, she may benefit from the support of a lactation consultant, or other knowledgeable health professional or support person.

Some families make an informed decision not to feed at the breast, but instead opt to express breast milk and provide this as a sole source of nutrition to their infants. This is often referred to as “exclusive pumping”. Some families also choose to alternate between feeding at the breast and feeding EBM by bottle.

In all cases, families benefit from support and information about milk expression, safe handling and storage of EBM, appropriate feeding techniques, and cleaning of equipment. (17)

Resources for parents and guardians

- NH’s Breastfeeding and Breast Milk webpage provides links to resources on the expression of breast milk in the “Baby Has Arrived: Getting Started” section.

Storage of EBM

Expressed breast milk (EBM) can be stored in clean glass or hard plastic containers, or in sturdy bags meant for EBM storage. (17) To minimize waste, advise storing EBM in small portions.
If not being used immediately, freshly expressed breast milk should be transferred to a refrigerator or freezer as soon as possible. Encourage clients to label containers with the date EBM was expressed to support using the oldest frozen milk first. (17)

EBM can be stored safely under specific conditions. Below are the recommendations outlined for home use. (17) (Recommendations for storage of EBM in acute care settings differ from those for home use. See NH CPS 1-1-3-090: Safe Handling, Storage, Administration, and Transport of Expressed Breast Milk.)

<table>
<thead>
<tr>
<th>Freshly expressed breast milk</th>
<th>Room temperature (20°C)</th>
<th>Refrigerator (0 to 4°C) (store in main compartment, not in door)</th>
<th>Freezer* (Separate door freezer on fridge) (-18°C) (store in back)</th>
<th>Deep freezer (-20°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshly expressed breast milk</td>
<td>Up to 6 hours</td>
<td>Up to 5 days</td>
<td>Up to 6 months</td>
<td>Up to 12 months</td>
</tr>
</tbody>
</table>

*In the case of a freezer compartment that is located inside a refrigerator (i.e. not with a separate exterior door), EBM can be stored for up to 1 month, if the compartment is cold enough to keep ice cream hard. (19)

Resources for parents and guardians

- Guidelines for Breast Milk Storage (fridge magnet) (NH Document Source # 10-421-6059)
- NH’s Breastfeeding and Breast Milk public webpage provides links to resources on the storage of breast milk in the “Baby Has Arrived: Getting Started” section

Thawing and Warming EBM

- EBM can be thawed by placing the container: in the refrigerator, in a bowl of warm water (less than 37°C), under warm running water, or with a waterless warmer (as per manufacturer instructions). (17)

- Thawed milk should be used within 24 hours. (17)

- EBM may be fed at body temperature, room temperature, or at refrigeration temperature, depending on the preference of the infant. (17)

- EBM should not be thawed or warmed in a microwave or on a stove top; this can result in uneven heating, high temperatures, and destruction of milk properties. (8) (17)

- EBM can be warmed over a period of 20 minutes by placing the container in a bowl of warm water or under warm running water. (17)
• Water used for thawing and warming EBM should not come into contact with the top of the container. (17)

• Unused warmed EBM, that infants have not started feeding, can be returned to the fridge for up to four hours, or kept at room temperature for up to one hour, and then should be discarded. (17)

Feeding Infants with EBM
For information on bottle feeding, see “Appropriate Bottle Feeding Techniques”, in Chapter 2: Human Milk Substitutes.

Cleaning Equipment
Support families with information on the cleaning of pump pieces, containers, and bottles.
Donor Human Milk

When the milk from an infant’s own mother is not available or is contraindicated (see “Contraindications to Breastfeeding”, later in this chapter), pasteurized donor human milk is the next best choice.

Pasteurized Donor Human Milk

BC’s only human milk bank is the BC Women’s Hospital Provincial Milk Bank in Vancouver. Donors are screened and milk is collected, pasteurized, and distributed. (20) Milk is prioritized for the most vulnerable infants, such as those in Neonatal Intensive Care Units (NICUs). (21)

Prospective donors are advised to begin storing milk, and to contact the milk bank in Vancouver directly regarding donation requirements and screening. (20)

NH has one donor human milk collection depot, located at the NICU at UHNBC in Prince George. (20) UHNBC NICU staff can assist with questions about the logistics of transporting milk to the depot (telephone: 250-565-2329).

Resource for parents and guardians

- Donating Milk (BC Women’s Hospital and Health Centre)

Informal (Peer-to-Peer) Milk Sharing (Unpasteurized Donor Human Milk)

As the availability of pasteurized donor human milk from the provincial milk bank is limited, some parents and guardians may be interested in providing their infant unpasteurized donor human milk (UDHM) obtained from family, friends, or other sources (e.g. online). This is referred to informal milk sharing, and may involve peer-to-peer sharing or the purchasing of UDHM between strangers. (21)

Health Canada, the Canadian Pediatric Society, and the Human Milk Banking Association of North America do not endorse the use of UDHM, as there are risks associated with its use. (21) Perinatal Services BC (PSBC) has created a practice resource for health professionals to support informed discussions and decision making processes with clients. See Informal (Peer-to-Peer) Milk Sharing: The Use of Unpasteurized Donor Human Milk: Practice Resource for Health Care Providers (PSBC).

Resource for parents and guardians

- Information for Families: Informal Milk Sharing Family Information Sheet (PSBC)
**Maternal Diet and Nutrition**

Diet quality is important for a lactating woman’s energy and health. However, her day-to-day diet has little effect on her milk production and the level of most nutrients in her breast milk. Milk production is generally controlled by infant demand, and nutrients in breast milk are drawn primarily from maternal nutrient stores. Rapid weight loss, however, can decrease milk supply. (3)

Many cultures promote specific foods for the purposes of enhancing milk supply. The use of such foods may help to give the mother confidence, and should be respected. (1)

For considerations related to household food insecurity, see “Food Insecurity (Household)” in Chapter 5: Issues of Concern.

Maternal caffeine intake may make an infant restless. (11) Limited studies have not identified any adverse effects of moderate caffeine consumption on behaviours of newborn infants. (22)

Recommendations:

- Reassure women that their day-to-day diet has little effect on their breast milk quality or supply. (22) Encourage women to breastfeed even if they do not always eat well.

- Food and nutrition guidelines for lactating women are similar to those for other women of childbearing age. For their own health and energy, encourage lactating women to:
  - follow a diet based on Canada’s food guide, (3) inclusive of relevant cultural and traditional foods,
  - consume at least 150 grams (5 ounces, or two small portions) per week of fatty fish that is low in mercury, (22) such as salmon, herring, and sardines (canned fish can be a nutritious and economical choice),
  - continue taking a daily multivitamin containing 400 micrograms (0.4 mg) of folic acid, such as a prenatal vitamin, (23)
  - follow their cues of appetite, hunger, and satiety to determine how much to eat. Compared to pre-pregnancy, they may need a small amount of additional food per day to meet the additional energy needs of lactation, (24) and
  - choose water to satisfy their thirst.

- Encourage women who eat a vegan diet to consume foods, beverages, fortified foods, and/or supplements that are reliable sources of vitamin B12, each day. (22) For more information, see Vegetarian Diets in Chapter 5: Issues of Concern.
• Dietary restrictions during lactation are not generally recommended to address common health conditions in infants. For more information, see Allergens, Colic (High Crying Infants), Constipation, and Reflux in Chapter 5: Issues of Concern.

• Sugar substitutes are approved for use during lactation. Advise that consumption should be moderate, and foods and beverages made with these sweeteners should not replace nutritious food or drinks. (25)

• Encourage pregnant and lactating women to limit their caffeine intake to 300 mg/day, which is the equivalent of about 2 cups (500 mL) of coffee per day, or 6 cups (1500 mL) of black or green tea. (22) (26)

• Energy drinks are not recommended for pregnant and lactating women. (27)

• The following herbs can be consumed in moderation (in the amount commonly found in food or in 2 - 3 cups (500 – 750 mL) per day of herbal tea): (22)
  ○ bitter orange/orange peel
  ○ echinacea
  ○ peppermint
  ○ red raspberry leaf
  ○ rose hip
  ○ rosemary

**Resources for parents and guardians**

• [Canada’s food guide](Government of Canada)
• [Nutrition While Breastfeeding](HealthLink BC)
• [Mercury in Fish](HealthLink BC)
• [Facts on Caffeine](Dietitians of Canada)
• [Folic Acid: Are you getting enough?](Public Health Agency of Canada)
Substance Use and Human Milk

The following chapter sections explore considerations related to human milk and the use of various substances: alcohol, cannabis, herbal products, medications (prescribed and over-the-counter) and illicit drugs, and tobacco.

NH CPS 1-16-1-030: Integrated Early Child Development and Family Services: Two Months to Six Years of Age includes guidance related to supporting families regarding substance use. Recommendations from this and other sources include the following:

- “Ask about cannabis, alcohol, and other substance use, including prescribed and over-the-counter medications.” (28) Use a supportive approach. As an example, see suggested language in the section on Tobacco, later in this chapter.

- “If substance use is disclosed, follow a harm reduction approach, and assess for dependence and patterns of use.” (28)
  - When engaging with clients who use substances, a trauma-informed lens and “person-first language” are recommended.
  - Harm reduction approaches to care are considered best practice. This includes safety planning around substance use and the use of human milk, such as that outlined in the section, “Medications (Prescription and Over-the-Counter) and Illicit Drugs”, later in this chapter.
  - A harm reduction approach involves using “non-judgmental approaches and strategies aimed at providing and enhancing the knowledge, skills, resources, and supports for individuals, their families, and communities to make informed decisions to be safer and healthier.” (28)

- “Refer to appropriate treatment options, as needed.” (28)

- “Recognize that there are cultural and ceremonial uses of tobacco and other medicinal plants, and the benefits of traditional uses can outweigh the potential harms.” (28)

Resources for Health Professionals include:

- Doorways to Conversations – Brief Intervention on Substance Use with Girls and Women (Centre of Excellence for Women’s Health)

- 50 Ideas for Dialogue, Skill Building, and Empowerment – Brief Intervention on Substance Use with Girls and Women (Centre of Excellence for Women’s Health)

- Respectful Language and Stigma Regarding People Who Use Substances (PHSA, BCCDC, and Toward the Heart)
Alcohol

Alcohol can:

- pass into human milk (8)
- reduce milk production due to altered milk let-down reflex (3)
- reduce the amount of milk consumed by the infant (3)
- affect the infant's short-term sleep patterns (3)
- impair the user's judgment and functioning (3)

For more information, see “Drinking Alcohol while Breastfeeding: Desk Reference for Health Care Providers” (Best Start)

Recommendations:

- Although there is no known "safe" amount of alcohol in human milk, occasional moderate alcohol intake is thought to be compatible with lactation (3) (except for when lactating women are pregnant).
- Advise mothers to limit their alcohol intake, particularly with newborns. (3)
- When alcohol is consumed occasionally, encourage lactating women to:
  - limit their consumption to one or two standard alcoholic drinks (13)
  - express milk in advance of drinking alcohol (8)
  - breastfeed their child just before drinking alcohol (11)
  - delay breastfeeding or expressing milk for a child’s consumption until alcohol is cleared from their breast milk – approximately two to three hours for each standard drink consumed (8)
- “Pumping and dumping” does not speed up the removal of alcohol from breast milk (but this practice may support the mother’s comfort and protect her milk supply). (11)
- When alcohol is consumed chronically and/or in large amounts, it is best not to breastfeed or express milk for child consumption. Some women may need support to manage their alcohol use. (11)

Resources for parents and guardians

- Mixing Alcohol and Breastfeeding (Best Start)
Cannabis

Maternal use of cannabis:

- results in transfer of tetrahydrocannabinol (THC) in breast milk, with concentrations up to eight times that of maternal plasma levels (29)
- results in storage of THC in adipose tissues for weeks to months (29)
- is linked to effects on infant sleep and motor development (30), and can have long-lasting cognitive and emotional effects in children (29)
- may impair the user’s judgment and functioning (29) (30)

Exposure of infants and children to second-hand cannabis smoke:

- is associated with an increased risk for SIDS (29) and may cause illness (30)
- can affect their alertness, understanding, and judgment (30)

There is no known safe amount of cannabis during lactation. It is considered safest not to use cannabis when breastfeeding and/or expressing milk for infant consumption. (31)

A 2015 review states, “although the data are not strong enough to recommend not breastfeeding with any [cannabis] use, we urge caution”. With moderate or chronic cannabis use, risks and benefits of breast milk need to be carefully considered (29).

A 2019 Best Start resource states, “Breastfeeding is still the healthiest choice for your baby. Until further information about the potential harms is available, it is recommended that women stop using cannabis while they are pregnant, or while breastfeeding.” (30)

Recommendations:

- Advise eliminating or reducing cannabis use, as much as possible. (29) Clients who use cannabis to help manage chronic pain or other conditions would benefit from the support of their primary care provider to explore safer alternatives.
- Advise parents and guardians regarding the possible long-term neurobehavioral effects of cannabis for exposed children. (29)
- Advise keeping cannabis products in child-resistant packaging, out of reach, as well as avoiding direct exposure of young children to cannabis smoke. (29) (30)

Resources for parents and guardians

- Risks of Cannabis on Fertility, Pregnancy, Breastfeeding and Parenting (Best Start)
- Women and Cannabis (BC Centre of Excellence for Women’s Health)

NH staff can access additional resources on the Cannabis OurNH page.
Herbal Products

Many herbs, herbal teas, and herbal products are not recommended during lactation due to documented adverse effects or due to insufficient evidence on safety during lactation.

For a list of herbal teas that can be consumed in moderation during lactation, see “Maternal Diet and Nutrition”, earlier in this chapter.

Other useful resources include:

- LactMed website or app (US National Institutes of Health, updated regularly)
- Government of Canada’ Natural and Non-Prescription Health Products website. Clients can check a product label for a NPN/DIN number, and look up information for the product.
- Health professionals such as lactation consultants, pharmacists, nurse practitioners, and physicians.

Recommendations:

- Where relevant, lactating women should speak with an informed health professional about the use of herbal products during lactation. (11)
Medications (Prescription and Over-the-Counter) and Illicit Drugs

Many prescription medications are compatible with lactation. (3) However, due to the varied range of prescription, over-the-counter, and illicit drugs, it is impossible to make a definitive global statement about the safety of their use during lactation. (13) Useful resources for health professionals about the transfer of drugs to human milk and their potential effects on milk supply or on infant health include:

- **LactMed** website or app (US National Institutes of Health, updated regularly)
- **Drug Product Database** (Government of Canada)
- Health professionals such as lactation consultants, pharmacists, and physicians.

Illicit drugs:

- are transferred through breast milk to children (22)
- can have adverse effects on the developing children (3) (22)
- can result in poor feeding behaviour (8)
- can impair the user’s mood, judgment, and ability to care for their child (3) (22)

Recommendations:

- Encourage women to inform their health care team of their lactating status so that informed decisions can be made about medications that, if possible, will preserve the breastfeeding relationship. (13)
- General guidelines suggest that illicit drug use is contraindicated during lactation. (22) Lactating women should be supported to abstain. (3) Harm minimization strategies may include delaying breastfeeding (and milk expression for infant feeding) for up to 24-48 hours after drug use (depending on the drug). (22) In these cases, support may be needed to maintain lactation until feeding can resume safely. See “**Contraindications to Breastfeeding**”, later in this chapter.
- Expert guidelines suggest that a prenatal care plan for drug-dependent women should be individualized according to maternal drug use and substance abuse treatment history; medical and psychiatric status, and medication needs; infant health status; and the adequacy of maternal family and community support systems. (8)

Resources for parents and guardians

- **Medicine Use While Breast-Feeding** (HealthLink BC)
**Tobacco**

Many women and their partners quit using tobacco during pregnancy, but relapse is common after the birth of their child. There is shame and guilt associated with tobacco use during and after pregnancy - it’s important to use a supportive approach. (32)

Despite the health concerns associated with tobacco use, exclusive breastfeeding is still recommended for mothers who smoke, as human milk may protect against some of the negative effects of smoking. (3)

Maternal tobacco use:

- is associated with decreased maternal intention to breastfeed, and decreased rates of breastfeeding initiation and duration (22)
- can affect milk production (3) and is associated with increased perceptions of low milk supply (however, studies have not consistently reported an effect of smoking during lactation on reduced milk production or infant weight gain) (22)
- results in transfer of nicotine and other harmful chemical through breast milk (22) (33), and lowers levels of fat and vitamins C and E in breast milk (22)
- is associated with an increased risk of asthma and SIDS, and may negatively impact child growth and, in the short term, sleep patterns (3)
- may result in exposure of children to second hand smoke, or third hand smoke remaining on skin and clothing (34)

**Recommendations:**

- Inquire about tobacco and vapour use, as per the NH Clinical Practice Standard 1-22-8-010: Addressing Tobacco Using the 3As Approach: Brief Intervention.
- **ASK:**
  - Ask about all tobacco use and dependence. If patients deny using tobacco, ask if they use e-cigarettes or vape.
  - Use a supportive approach. Instead of asking, “do you smoke?”, consider asking clients which of the five following statements best describes their situation: (35)
    - I have never used tobacco or have smoked <100 cigarettes in my lifetime.
    - I stopped using tobacco before I found out I was pregnant; I’m not using now.
    - I stopped using tobacco after I found out I was pregnant; I’m not using now.
    - I use tobacco now, but I’ve cut down since I found out I was pregnant.
    - I use tobacco regularly now - about the same amount as before I found out I was pregnant.
ADVISE:

- Advise parents and guardians to quit tobacco or vapour use to improve their own health and the health of others.

- Advise of the options available to support that change.

- If quitting is not possible, harm reduction strategies include:
  - breastfeeding (22) and the provision of human milk
  - breastfeeding and expressing milk for children before smoking or vaping (i.e. prolonging the time between the last cigarette smoked and breastfeeding/expression to minimize the exposure) (22)
  - limiting tobacco use as much as possible (3) (22)
  - switching to nicotine patches or other nicotine replacement therapies (NRT). (22) Only physicians and nurse practitioners can prescribe NRT for pregnant or lactating clients (36)
  - taking steps to reduce the family’s exposure to second and third-hand smoke

ACT:

- Provide information about services available to support tobacco cessation.

Resources for parents and guardians

- **QuitNow** offers free information, support, and counseling by trained professionals by phone, text, or email.

- **BC Smoking Cessation Program** covers the costs of nicotine replacement therapy products. Women who are pregnant or lactating are advised to consult with their doctor or pharmacist.

- **FNHA Benefits program** offers coverage for nicotine replacement therapy

- **Pregnets (Prevention of Gestational and Neonatal Exposure to Tobacco Smoke)** website offers information for women and health professionals.

NH staff can access additional resources on the [Tobacco Reduction OurNH](#) page.
Contraindications to Breastfeeding

- Breastfeeding is rarely contraindicated. (3)
- Most medications are compatible with lactation, (3) but a case-by-case approach is required with the use of medications or illicit drugs.

Contraindications to breastfeeding and the use of human milk include:

- galactosemia in the infant (3)
- certain maternal health concerns:
  - HIV infection – the virus can be transferred via human milk, even with antiretroviral therapy (3)
  - Human T-lymphotropic virus type 1 or 2 infection (6)
  - habitual high alcohol intake (more than about two drinks per day) (6) See “Alcohol”, earlier in this chapter.

Possible contraindications include:

- illicit drug use. (6) A case-by-case approach is required. See “Medications (Prescription and Over-the-Counter) and Illicit Drugs”, earlier in this chapter.

Temporary contraindications include:

- severe illness that prevents a mother from caring for her infant (3) (6)
- untreated, infectious tuberculosis (3) (6)
- herpes lesions on both breasts (3)
- hepatitis C infection, if mother has cracked and bleeding nipples (3) (37)
- use of certain medical drugs or treatments (3) (6)

In the case of temporary contraindications mothers should be supported to maintain lactation until they can safely breastfeed or provide their breast milk again. (3) (6) To maintain their milk supply and to prevent engorgement, support mothers to manually express or pump their milk as frequently as their children would normally feed. This may be six to eight times per day (no longer than four to six hours apart). (3)

When feeding at the breast or the use of milk from an infant's own mother is not possible or is contraindicated, the next best choice is pasteurized human donor milk (see “Donor Human Milk”, earlier in this chapter). (21) However, given the limited access to pasteurized human donor milk, in many cases a human milk substitute (i.e. commercial infant formula) may be the most feasible alternative. (3) See Chapter 2: “Human Milk Substitutes”.
2. Human Milk Substitutes

Practice Points

- Support families to make fully informed decisions about infant feeding, which involve understanding the benefits and risks of various feeding options.
- For infants who are not exclusively receiving human milk, recommend a commercial infant formula that is cow’s milk-based.
- Other commercial infant formulas are only recommended in specific circumstances for infants who cannot take cow’s milk-based formulas due to confirmed medical conditions or for cultural or religious reasons.
- Other beverages are not nutritionally complete and are not appropriate as human milk substitutes.
- Support parents and guardians to ensure that they are safely preparing, storing, and transporting formula. Instruction should be provided, as needed, on an individual basis (i.e. not in a group setting).
- Regardless of feeding method, promote responsive, cue-based feeding.

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Making Informed Decisions about Infant Feeding

- Families have the right to make a fully informed decision about infant feeding, which involves understanding the benefits and risks of various feeding options. (15) (16)

- To support informed decision making, health professionals can facilitate discussions that include: (15) (16)
  - the opportunity for a mother to discuss her concerns about infant feeding,
  - the importance of breastfeeding for the infant, mother, family, and community (see “Importance of Breastfeeding” in Chapter 1: Breastfeeding and Human Milk),
  - the health consequences of not breastfeeding for the infant and the mother (later in this chapter),
  - the risks and costs of human milk substitutes (later in this chapter), and
  - the difficulty of reversing the decision once breastfeeding is stopped (later in this chapter).

- Health professionals need to support women and families in their decisions and provide them with current and factual information, guidance, and education around their chosen infant feeding method. (15)
  - Families should not receive any marketing materials, free samples, coupons, or gift packages that include human milk substitutes and infant feeding paraphernalia. (16) Free samples are associated with shorter breastfeeding duration. (38)

- Whenever considering interrupting or stopping breastfeeding, the importance of breastfeeding should be weighed against the risks posed by the use of human milk substitutes and, where relevant, the need to intervene because of a presenting medical condition (see “Contraindications to Breastfeeding” in Chapter 1: Breastfeeding). (15) (16)

- For further information on supporting informed decision making, see the following resources:
  - Informed Decision Making: Having Meaningful Conversations Regarding Infant Feeding (Baby-Friendly Initiative Strategy Ontario and Best Start)
  - Tip Sheet – Infant Feeding Informed Decision Making (Baby-Friendly Initiative Strategy Ontario)
Potential Health Consequences of Not Breastfeeding

- Not breastfeeding results in loss of maternal protection against breast and ovarian cancers. (9) (10)

- While human milk substitutes can be a safe alternative, they do not provide the antibodies, enzymes, hormones, and stem cells found in human milk. (21)

- Compared to human milk, the use of human milk substitutes has been associated with an increased incidence of the following health outcomes for children: (21)
  - acute otitis media
  - asthma
  - atopic dermatitis
  - childhood leukemia
  - diabetes (type 1 and type 2)
  - gastroenteritis (non-specific)
  - obesity
  - necrotizing enterocolitis
  - severe lower respiratory tract infections
  - sudden infant death syndrome (SIDS)

Potential Risks and Costs of Human Milk Substitutes

- Powdered formula is not sterile, and may be contaminated with bacteria.* (3)

- Water for reconstitution of powdered or concentrated liquid formulas may present a hazard.* (21)

- Incorrect formula preparation, storage, transportation, and cleaning of equipment put infants at risk of foodborne illness.* (3)

- Improper reconstitution can result in over- or under-dilution of formula.* (13)

  *Proper preparation of formula is critical to managing these risks. See “Safely Preparing and Storing Commercial Infant Formula”, later in this chapter.

- Contaminated, out-dated, and recalled formulas may result in serious illnesses. (21)
• Homemade formulas and other beverages are likely nutritionally deficient, and are not appropriate as human milk substitutes. (3) (39) See “Evaporated Milk Formulas”, later in this chapter, and Chapter 3: “Animal Milks and Other Beverages”.

• There are significant financial costs related to human milk substitutes, for both families and societies. (21)

• The production, transport, and disposal of formula, containers, and related feeding products have a significant environmental impact. (21) (38)

• Feeding via propped bottle increases the risk of overfeeding, choking, aspiration, ear infections, and childhood caries. (3) See “Appropriate Bottle Feeding Techniques” later in this chapter.

Potential Benefits of Human Milks Substitutes

• Human milk substitutes provide an infant feeding option that: (21)
  ◦ is considered medically and culturally acceptable
  ◦ is readily available
  ◦ provides families with a choice

• It is an option in cases where:
  ◦ human milk is contraindicated* (i.e. for an infant diagnosed with galactosemia) (21)
  ◦ breastfeeding is contraindicated* (e.g. with maternal use of certain pharmaceuticals, such as chemotherapy drugs) (6) (21)
  ◦ human milk (mother’s own milk or pasteurized donor human milk) is not available, or is not available in adequate amounts, and human milk substitutes become a necessity (21)

*See “Contraindications to Breastfeeding” in Chapter 1: Breastfeeding and Human Milk

The Difficulty in Reversing the Decision Once Breastfeeding is Stopped

• It can be difficult to return to breastfeeding after formula feeding. This is especially true when milk supply has decreased, or was not well established. (40)

Support for Families Using Human Milk Substitutes

• Support families who are, or plan to be, using human milk substitutes, whether as a supplement to human milk or as a sole source of nutrition. (1)
• For those who are supplementing, steps should be taken to preserve and improve the breastfeeding relationship. (1) (3)
  o Resources for parents and guardians include: “Supplementing a Breastfed Baby” (page 4 of Infant Formula: What You Need to Know).
  o Consider a link to a lactation consultant, other health professional, or breastfeeding support person.

• Provide non-judgemental and supportive care. Consider that families may feel guilt or shame for supplementing with human milk substitutes and/or for not breastfeeding. In addition to requiring information and support regarding the use of commercial infant formula, these families may also benefit from emotional support. (1)

• Emphasize the importance for skin-to-skin contact for all infants. (1)

• Recommend appropriate commercial infant formulas; these formulas must be “acceptable, feasible, affordable, sustainable, and safe” for a family in their circumstances. (15) See “Selecting Commercial Infant Formula” on the next page.

• Provide information on the safe preparation, storage, and transportation of formula. See “Safely Preparing, Storing and Transporting Commercial Infant Formula” in this chapter. Information should:
  o be provided on an individual basis (i.e. not in a group setting) (3) (41)
  o be current, appropriate, and separate from breastfeeding information (16)
  o be free of promotional material (16)

• Promote responsive, cue-based feeding. (16) See “Feeding Infants with Commercial Infant Formula” in this chapter, as well as “Honour Hunger and Satiety Cues” in Chapter 4: Feeding by Age.

Resources for parents and guardians

• Infant Formula: What You Need to Know (Perinatal Services BC, and Document Source #21101)

  This comprehensive resource:
  o aligns with the Baby-Friendly Initiative
o addresses a wide range of topics related to formula use

o should be reviewed with, and provided to, individual families that have made an informed decision to use human milk substitutes

o is intended to be used in its entirety

As with other resources relating to human milk substitutes, this resource should:

o not be put on display (e.g. in waiting rooms)

o not be used in group settings

o not be added in standard prenatal or post-partum information packages
Selecting Commercial Infant Formula

- If an infant is not exclusively fed human milk, an appropriate commercial infant formula must be selected that is acceptable, feasible, affordable, sustainable, and safe for a family in their circumstances. (16)

- A commercial cow’s milk-based infant formula is the standard choice of human milk substitute. (3)

- All commercial infant formulas sold in Canada are fortified with iron, although fortification levels vary. (39)

- Formulas other than standard cow’s milk-based formulas (e.g. soy-based, lactose-free, or hydrolyzed formulas) are only recommended in specific circumstances, such as confirmed medical conditions, or cultural or religious reasons. (39) See the table on the next page on indications for use.

- Other beverages, such as cow’s milk, goat’s milk, soy beverages, and other plant-based beverages, are not nutritionally complete and are not recommended as human milk substitutes. (3) See Chapter 3: “Animal Milks and Other Beverages”.

- In rural and remote communities, formula choices may be limited. Health professionals can help to advocate for the availability of appropriate formulas for their clients.
## Types of Human Milk Substitutes: Indications for Use

<table>
<thead>
<tr>
<th>Formula type</th>
<th>Indications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cow’s milk-based formula</td>
<td>Standard choice for healthy term infants that are not exclusively receiving human milk (3)</td>
<td>Iron content ranges from 0.3 per 100 mL (3 mg/L) to 1.3 mg per 100 mL (13 mg/L). (3) (39)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infants at higher risk of iron deficiency may need a formula with iron levels at the higher end of this range. (3) (39) See “Iron” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td>Lactose-free cow’s milk-based formula</td>
<td>Limited (with healthy term infants) Temporary use may be justified with specific severe acute medical conditions (39)</td>
<td>These formulas are contraindicated with cow’s milk protein allergy. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These formulas are also contraindicated with galactosemia and congenital lactase deficiency due to residual lactose content. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These formulas are ineffective in management of colic. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These formulas offer no advantage over standard formula, even with acute gastroenteritis, due to the preservation of lactose digestion and absorption. (3)</td>
</tr>
<tr>
<td>Partially hydrolyzed cow’s milk-based formula</td>
<td>None</td>
<td>There is little evidence to support any benefit of these formulas in regards to the infant digestive system compared to standard formulas. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These formulas are contraindicated with cow’s milk protein allergy, as they would be expected to provoke an allergic reaction. (3) (42)</td>
</tr>
<tr>
<td>Extensively hydrolyzed casein formula</td>
<td>Physician-confirmed food allergies (3) Physician-confirmed malabsorption syndromes (3)</td>
<td>For infants who continue to experience allergic reactions even while on an extensively hydrolyzed formulas, an amino acid-based formula may be recommended (i.e. Neocate, Puramino). (3)</td>
</tr>
<tr>
<td>Formula type</td>
<td>Indications</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Soy-based formula</td>
<td>Galactosemia (3) (39)</td>
<td>These formulas are contraindicated for non-IgE mediated cow’s milk protein allergy due to high rates of coincident soy allergies. (39)</td>
</tr>
<tr>
<td></td>
<td>Congenital/primary lactase deficiency (39)</td>
<td>May be considered if diagnosis of non-IgE-mediated cow’s milk protein allergy can be ruled out. (39)</td>
</tr>
<tr>
<td></td>
<td>Cultural or religious reasons (i.e. vegan diet) (3) (39)</td>
<td>There is no conclusive evidence that soy isoflavones adversely affect development, but limited information is available. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infants who receive soy-based formula should continue receiving soy-based formula until two years of age. (15) See below.</td>
</tr>
<tr>
<td>Follow-up or second step</td>
<td>Not suitable for infants 0 – 6 months (43)</td>
<td>These formulas are higher in calcium than infant formulas, but do not offer nutritional or health advantages over other infant formulas for infants 6-12 months of age. (39)</td>
</tr>
<tr>
<td>formula</td>
<td>No indication for use for infants 6-12 months, but are an acceptable choice (44)</td>
<td>Follow-up formulas are not needed for most healthy children. Healthy children do not usually need formula after 12 months. (39)</td>
</tr>
<tr>
<td></td>
<td>May be a better option if families offer formula past 12 months (44)</td>
<td>Soy-based follow-up formula is recommended for children 12-24 months of age who have been consuming soy-based infant formula and/or who will not be consuming animal milk. (15)</td>
</tr>
<tr>
<td>Homemade milk “formula” (e.g.</td>
<td>Not recommended as human milk substitute</td>
<td>These formulas are nutritionally incomplete, (3) and have caused nutrient deficiencies in infants. (39)</td>
</tr>
<tr>
<td>evaporated whole milk formula)</td>
<td></td>
<td>They also have a high renal solute load, which can increase the risk of dehydration in young infants. (39)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>These may be considered for emergency, short-term use only. If used, follow appropriate recipes (i.e. from WHO). (3) See “Evaporated Milk Formulas”, on the next page.</td>
</tr>
</tbody>
</table>

*Formula type* indicates the type of formula. *Indications* list conditions for which the formula is recommended. *Comments* provide additional information about the formula's use and potential risks.
<table>
<thead>
<tr>
<th>Formula type</th>
<th>Indications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other milks and beverages</td>
<td>Not recommended as human milk substitutes</td>
<td>These beverages are not nutritionally complete and are inadequate as human milk substitutes. See Chapter 3: “Animal Milks and Other Beverages”.</td>
</tr>
</tbody>
</table>

For information on specific brands or types of formulas, consult product information on formula company websites or see the following resources from Alberta Health Services:

- [Compendium – Infant Formulas for Healthy Term Infants](#) (updated 2018)
- [Summary Sheet - Infant Formulas for Healthy Term Infants](#) (updated 2018)

**Evaporated Milk Formulas**

- Evaporated milk formulas should only be considered for emergency, short-term use and must be prepared with evaporated cow’s milk following specific directions to decrease some of the risks associated with their use. (3) See directions in the [Guidelines for Use of Breastmilk Substitutes in Emergency Situations](#) (World Health Organization). (45)

  - These formulas will still be lower than commercial infant formulas in specific fatty acids, vitamin A, Vitamin E, thiamine, folic acid, iron, and copper, and will be higher in recommended maximum levels of protein, vitamin C, calcium, phosphorus, sodium, and potassium. (39)

  - Iron supplements should be provided to infants using such formulas. (39)

  - Families should be supported to access appropriate commercial infant formulas, the composition of which is regulated by the Canadian Food and Drug Regulations.

**Resources for parents and guardians**

- [Safety of Homemade Infant Formulas in Canada](#) (Government of Canada)
Additions to Commercial Infant Formula

The Canadian Food and Drug Regulations regulate the composition and labelling of all commercial infant formulas sold in Canada. These regulations restrict what additives may be used, some of which are discussed in the table below. (3) Caution is advised regarding formula obtained from non-Canadian sources (e.g. online).

<table>
<thead>
<tr>
<th>Addition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>If an infant is not exclusively receiving human milk, a commercial infant formula is recommended. All commercially available infant formulas contain iron, although fortification levels vary from 0.3 or 0.4 mg per 100 mL (3 or 4 mg/L) to 1.3 mg per 100 mL (13 mg/L). (3) (39) There is no evidence to support the belief that iron-fortified formulas cause constipation in infants. (39) For more information, see “Iron” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td>Long Chain Fatty Acids</td>
<td>It is not currently mandatory in Canada for manufacturers to add long chain polyunsaturated fatty acids to formulas. Docosahexaenoic acid (DHA) and arachidonic acid (ARA) are permitted as optional ingredients, and formulas with these ingredients are common. Evidence is inconclusive on the benefits of adding DHA and ARA to formulas for healthy term infants, (3) but there are potential benefits and no apparent risks. (39) For more information, see “Dietary Fats” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td>Nucleotides</td>
<td>Some commercial formulas contain added nucleotides, based on the levels found in human milk. Evidence is lacking on their benefits to infants. (3)</td>
</tr>
<tr>
<td>Probiotics</td>
<td>Live microorganisms, specifically determined to be safe for infant use, may be added to commercial infant formulas. (3) This is intended to mimic human milk, as human milk is known to contain various bacterial strains. (46) More evidence is needed to support the use of such formulas. (3) Probiotics in powdered formulas may be inactivated when formula is reconstituted with hot water (&gt;70°C) (the temperature generally recommended for formula preparation). (39)</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Vitamin D is added to commercial infant formulas. Infants fed commercial infant formula only, and who were born to mothers with adequate vitamin D stores, do not generally require a vitamin D supplement. (3) (47) For more information, see “Vitamin D” in Chapter 6: Nutrients of Concern.</td>
</tr>
</tbody>
</table>
**Commercial Infant Formula Formats**

Commercial infant formula is available in three formats: ready-to-feed, concentrated liquid, and powdered formula. The table below highlights details related to considerations, preparation, and relative cost. For more information, see “Safely Preparing, Storing, and Transporting Commercial Infant Formula”, later in this chapter.

<table>
<thead>
<tr>
<th>Format</th>
<th>Considerations</th>
<th>Preparation and cost</th>
</tr>
</thead>
</table>
| Read-to-feed (liquid) | Sterile (3) (until opened)  
Safest formula choice for higher-risk infants* who receive formula (3) (i.e. least risk of contamination and no need for reconstitution)  
Recommended if no safe water source is available (48) | Does not require dilution (39)  
More costly than concentrated liquid and powdered formats (49)  
Often sold in cases (as opposed to individual cans), which may present a challenge for transportation and storage |
| Concentrated Liquid | Sterile (3) (until opened)  
Safer choice than powdered formula | Must be diluted properly to manage risk of over or under dilution  
Generally less costly than ready-to-feed format, but more costly than powdered format (49)  
Often sold in cases (as opposed to individual cans), which may present a challenge for transportation and storage |
| Powdered | Not sterile (3)  
Has been linked with rare, but very serious, infant illnesses. *Cronobacter Sakazakii* and *Salmonella enterica* are the main concerns, especially for higher-risk infants* (3) (49)  
Can be used if prepared properly (3) | Must be prepared properly to manage microbial risk, and risk of over or under dilution  
Generally less costly than ready-to-feed and concentrated liquid formats (49)  
Requires minimal storage space. (49) |

* Higher-risk infants include preterm, low birth-weight, and immunocompromised infants. (3) (48) (50)
BPA in Commercial Infant Formula Packaging and Plastic Baby Bottles

In 2009, Health Canada determined that Bisphenol A (BPA) was not detectable in canned powdered formula products available for sale in Canada. Additionally, since that time, manufacturers have phased out the use of BPA-containing packaging for liquid formulas. (51)

In Canada, it is illegal to manufacture, import, advertise, or sell polycarbonate baby bottles that contain BPA. BPA can be found in older types of polycarbonate baby bottles. (52) Caution should be exercised when purchasing baby bottles from non-Canadian sources (e.g. online) or when obtaining older bottles (e.g. used or second-hand).

Resources for parents and guardians

- Bisphenol A (BPA) (Government of Canada)
Safely Preparing, Storing, and Transporting Commercial Infant Formula

Proper preparation, storage, and transportation of formula is important to reduce the risk of food-borne illness. (3) Proper preparation is also required to prevent mixing errors.

- Over-dilution can result in irritability, poor weight gain, hyponatremia, or coma. (13)
- Under-dilution can result in vomiting, diarrhea, dehydration, or stress on the kidneys. (13)

Safe formula preparation practices are not always followed. (39) Parents and guardians should be provided with support to ensure that they are preparing, feeding, handling, and storing formula properly.

- Families who have made an informed choice not to breastfeed or to provide human milk should be individually supported. (2) (15)
- Group instruction on the preparation, storage, and feeding of formula is not recommended, and contradicts the WHO International Code of Marketing of Breast-Milk Substitutes. (15) (41)

Disinfection of Equipment

The cleaning and disinfection of all infant feeding equipment is recommended to help reduce the risk of foodborne illness.

Advise parents and guardians to wash their hands; clean and disinfect kitchen surfaces; wash and disinfect all feeding equipment; and avoid cross-contamination. (3) Equipment should not be washed with other dirty dishes. (39) Home dishwashers may not disinfect, even during the “sanitize” cycle. (39)

No research is available to determine an age at which it is safe to stop disinfecting equipment. (39) HealthLink BC’s resource Feeding Your Baby Formula: Before You Start includes the recommendation to disinfect bottles and tools used to make formula until infants are at least four months old. (48)

Resources for parents and guardians

- Relevant information on cleaning and disinfection is included in the comprehensive booklet, Infant Formula: What You Need to Know (Perinatal Services BC, and Document Source #21101)
- A one-page resource is also available: Formula Feeding: How to Clean and Disinfect (Healthy Families BC)
Water Choices for Commercial Infant Formula Preparation

The following tables describe suitable and unsuitable water sources for formula preparation. All safe water sources require disinfection. If safe water sources are not available, a ready-to-feed formula format should be considered (see “Commercial Infant Formula Formats”, earlier in this chapter). (39) (48)

<table>
<thead>
<tr>
<th>Suitable water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold tap water (3) (unless not advised as per local public water advisories)</td>
<td>Hot tap water may contain metal contaminants. (3) Tap water should be run until water becomes cold. (39) If charcoal or activated carbon filters are used, these should be changed regularly to prevent increased mineral/chemical build up and pathogen contamination. (39)</td>
</tr>
<tr>
<td>Commercially bottled water (3)</td>
<td>Water should not be carbonated or fortified with vitamins or minerals. (39)</td>
</tr>
<tr>
<td>Safe well water (3)</td>
<td>Well water should be tested regularly (at least twice per year) for mineral levels and contaminants. (39)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unsuitable water</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonated water (3)</td>
<td></td>
</tr>
<tr>
<td>Mineral water (3)</td>
<td>Mineral water has been implicated in infant electrolyte disturbances. (39)</td>
</tr>
<tr>
<td>High fluoride levels (3)</td>
<td>Fluoride levels must be below 1.5 mg/L. (3)</td>
</tr>
<tr>
<td>High manganese levels (53)</td>
<td>Manganese levels must be below 0.12 mg/L. (54) (55) (53) Avoid discoloured water until safety is confirmed. (53)</td>
</tr>
<tr>
<td>High nitrate levels (3)</td>
<td>Nitrate levels must be below 45 mg/L (or 10 mg/L of nitrate-nitrogen) (3) to reduce the risk of methemoglobinemia. (39)</td>
</tr>
<tr>
<td>High lead and copper levels (39)</td>
<td>High levels can occur when lead or copper leaches from water pipes, urns, kettles and cookware containing lead. (39)</td>
</tr>
<tr>
<td>Softened water (39)</td>
<td>Water that has gone through water softeners has sodium levels that are too high for infants. (39)</td>
</tr>
<tr>
<td>Over-boiled water (39)</td>
<td>Boiling water longer than the recommended two minutes can concentrate minerals in the water. (39)</td>
</tr>
</tbody>
</table>

There is no indication for the use of distilled water, (3) and no recommendations are available regarding distilled, deionized, demineralized, purified, or reverse osmosis water. (39)
Disinfection of Water
Tap water, well water, and bottled water are not sterile, and it is recommended that all water for formula preparation be disinfected by keeping it at a rolling boil for two minutes. Boiled water can be cooled and stored in a disinfected, tightly closed container for 48-72 hours in the refrigerator, or 24 hours at room temperature (i.e. primarily for use with concentrated liquid formula). (39)

There is no research supporting a specific infant age at which it is safe to stop boiling water for formula preparation. (39) While boiling water helps to minimize risks associated with formula preparation, in practice, it is recognized that this may not always be practical for parents and guardians. Based on expert opinion and common practice, HealthLink BC has previously recommended boiling water for formula preparation until infants are at least four months old. (56)

Preparation of Commercial Infant Formula
Ideally, formula is prepared and fed to infants immediately. Reconstituted formula is not sterile and all formula is an excellent medium for bacterial growth. The time between preparation and feeding should be minimized to decrease the risk of infant illness. (39)

The table below outlines considerations for the preparation of various types of formula.

<table>
<thead>
<tr>
<th>Formula format</th>
<th>Preparation considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ready-to-feed (liquid)</strong></td>
<td>No dilution is required. Follow manufacturer’s direction for preparation and storage.</td>
</tr>
<tr>
<td><strong>Concentrated Liquid</strong></td>
<td>Dilution is required, as per manufacturer’s directions. Disinfected water should be added first, then concentrated liquid, to help decrease the risk of over concentrating the formula. (39)</td>
</tr>
<tr>
<td><strong>Powdered Formula (PIF)</strong></td>
<td>Powdered infant formula (PIF) is not sterile. Outbreaks have been caused by the consumption of PIF contaminated with harmful bacteria, such as <em>Cronobacter Sakazakii</em> and <em>Salmonella enterica</em>. Special care is required in the handling of PIF to decrease the risk of infection. (3) Disinfected water should be added first, then the PIF powder (using the scoop provided with the specific product), to help decrease the risk of over concentrating the formula. (39) Differing recommendations are available regarding preparation of PIF for immediate use and for later use (i.e. advanced preparation). See next page.</td>
</tr>
</tbody>
</table>
### Preparation considerations

| Formula format                        | WHO recommends that PIF should be prepared with water that has been boiled and then cooled to no less than 70°C, to kill harmful bacteria that may be contaminating the PIF powder. (50) The formula should then be rapidly cooled to a safe feeding temperature. (39)  
|                                       | With healthy term infants, it is also considered safe to mix formula powder with previously boiled water that has been cooled to room temperature. (3) This should be consumed within two hours. (3)  
| Advanced preparation of PIF           | For advanced preparation of PIF, recommend mixing powder with very hot water (boiled and cooled to no less than 70°C) to kill harmful bacteria that may exist in the formula powder. (3)  
|                                       | Advise to cool prepared formula quickly and to store at refrigeration temperatures (0-4°C) for up to 24 hours. (3) Formula should not be frozen. (11) |

### Resources for parents and guardians

- Information on formula preparation is included in the booklet [Infant Formula: What You Need to Know](Perinatal Services BC, and Document Source #21101)
- The following one-page resources are also available:
  - [Formula Feeding: How to Prepare Ready-to-Feed Formula](Healthy Families BC; available as NH Document Source #10-421-6063*)
  - [Formula Feeding: How to Prepare Concentrated Liquid Formula](Healthy Families BC; available as NH Document Source #10-421-6046*)
  - [Formula Feeding: How to Prepare Powdered Formula](Healthy Families BC; available as NH Document Source #10-421-6031*)

* Document Source versions also include a second page on How to Clean and Disinfect related equipment.

### Automatic Infant Formula Preparation Machines

Automatic infant formula preparation machines measure, dispense, and mix powered infant formula with water. There are various concerns with the use of these machines and currently Dietitian Services at HealthLink BC generally discourages their use. (57)

Possible concerns include the following:

- Over- or under-dilution of formula (53)
Online customer reviews of one product indicate that over-dilution has been experienced by numerous users, although others have also reported under-dilution. (58)

- Inadequate water temperatures (53)
  - The water in these machines may be significantly lower than the 70°C recommended to kill bacteria that may be present in powdered infant formula. (57) This is especially a concern in the cases of advanced formula preparation, as formula is an excellent medium for microbial growth.

- Microbial growth, including mold and bacteria: (57)
  - Compartments and tubing must be cleaned thoroughly and regularly; one product manufacturer recommends cleaning certain components every day and/or after every four bottles made. (59) As a result, automatic infant formula preparation machines may be less convenient than they initially appear.

**Warming Refrigerated Commercial Infant Formula**

A limited amount of research suggests that it may be fine to feed cold formula, as long as it is accepted by the infant, but more research is warranted to explore the acceptability and effects of this practice, especially in younger infants. (39)

The following should be considered in order to warm formula safely.

- Refrigerated formula can be warmed to room temperature or to body temperature, depending on the preference of the infant. (39)

- A bottle of formula can be warmed under hot water, making sure that the water remains below the screw cap/lid to prevent contamination of the formula. (39) A bottle warmer may be also be used.

- Formula should not be warmed in the microwave, as it may result in uneven heating and possible scalding of the infant or the person handling the formula. (39)

- Warming should not take longer than 15 minutes, the formula should be fed immediately, and all leftovers should be discarded. Formula should not be warmed more than once. (39) Preparation of smaller volumes of formula may help to decrease the amount of formula discarded.

- Before feeding the infant, adults should check the temperature of prepared formula (i.e. with a clean thermometer or by shaking a few drops on the inside of their wrist). Formula can be cooled under cold or ice water, ensuring that water remains below the screw cap/lid to prevent contamination of the formula. (39)
Storage and Transportation of Prepared Commercial Infant Formula

The following table outlines considerations for the safe storage and transportation of formula.

<table>
<thead>
<tr>
<th>Location</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Store powdered formula and unopened containers of liquid formula in a cool, dry place. (39) Use formula before the expiration date, to help ensure that the formula maintains its “microbiological and physical stability and the nutrient content declared on the label.” (60) Discard if past the expiration date. (39) Do not donate expired formula. Prepared formula, when not stored at refrigerator temperatures, should be consumed within two hours or discarded. (39)</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>Formula should be stored in the main compartment of the refrigerator (i.e. not in the refrigerator door). (39) Opened ready-to-feed formula, and concentrated liquid formula which is not yet reconstituted, should be well covered or sealed and refrigerated immediately. This can be kept for 48 hours in the refrigerator (0-4°C). (39) Reconstituted powdered or concentrated liquid formula may be stored in the refrigerator for up to 24 hours. (3) (39)</td>
</tr>
<tr>
<td>Freezer</td>
<td>Formula should not be frozen, as it may become grainy and the fat may separate. (39)</td>
</tr>
<tr>
<td>Transportation</td>
<td>Prepared formula should be cooled to less than 5°C or removed from the refrigerator immediately before being transported, and should be transported in a cooler or bag with ice. (39)</td>
</tr>
</tbody>
</table>
Feeding Infants with Commercial Infant Formula

Appropriate Bottle Feeding Techniques

Appropriate feeding techniques can decrease some of the risks associated with bottle feeding. Support parents and guardians to:

- create a calm environment (13)
- hold the infant during feeding. Encourage skin-to-skin contact when feeding with a bottle; even older infants benefit from being held during feedings (3)
- maintain a semi-upright position with the infant’s head, back, and shoulders in a straight line (61)
- always supervising feedings (3)
- avoid propping of bottles due to dangers of:
  - choking or aspiration of contents into the lungs (3)
  - increased risk of childhood caries, from bottle contents pooling in the mouth if the infant falls asleep (13)
  - increased risk of ear infections, from bottle contents traveling from the back of the mouth up through the Eustachian tube into the middle ear (13)
  - overfeeding, since the infant cannot stop the feeding (3)
- avoid the use of the bottle as a pacifier (3)
- feed infants “on-cue,” responding to their early hunger and satiety cues. (2) (3) If showing signs of satiety (i.e. turning head away, falling asleep), stop feeding, even if the bottle has not been emptied. (3) For more information, see:
  - “Recommended Approaches to Feeding” in Chapter 4: Feeding by Age
  - Responsive Feeding Infosheet (Unicef UK – The Baby Friendly Initiative)
- let the infant eat at a pace that is comfortable for them (could be a little or a lot, fast or slow, steady or start-and-stop) (13)
- use bottle contents within two hours from the start of a feeding and discard leftovers, (3) as bacteria can be introduced into the bottle with sucking (39)
- take steps to reduce the risk of “nursing bottle syndrome” and early childhood tooth decay; (3) see “Dental Health” in Chapter 5: Issues of Concern
- avoid the addition of infant cereal or liquids other than EBM and formula to the bottle, due to choking risk and changes in caloric density (3)
Commercial Infant Formula Amounts to Prepare

Formula requirements vary depending on the infant’s size and metabolism. Formula intake is considered adequate if the infant is growing appropriately as measured by evidenced-based growth standards. (39) See “Growth” in Chapter 5: Issues of Concern.

The following table* outlines typical commercial infant formula amounts to prepare per day. The information is a guide - the actual amount consumed is determined by the infant’s appetite. (39) Some infants will need more and others less, (39) and there may be variations from day to day. Parents and guardians should be counselled to allow the infant's appetite to be the guide for the amount of formula to provide. (See “Recommended Approaches to Feeding” in Chapter 4: Feeding by Age.)

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight (kg)</th>
<th>Energy needs from formula (kcal)</th>
<th>Energy from complementary food (kcal)</th>
<th>Formula amount (ounces; based on 20kcal/oz.)</th>
<th>Formula amount (mL)</th>
<th>Feeds per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 weeks</td>
<td>2.7 – 5.0</td>
<td>315 - 520</td>
<td>n/a</td>
<td>16 - 26</td>
<td>473 - 769</td>
<td>6 – 10</td>
</tr>
<tr>
<td>1 month</td>
<td>3.0 – 5.7</td>
<td>342 – 582</td>
<td>n/a</td>
<td>17 – 29</td>
<td>503 - 856</td>
<td>6 - 8</td>
</tr>
<tr>
<td>2 months</td>
<td>4.0 – 7.0</td>
<td>431 – 698</td>
<td>n/a</td>
<td>22 – 35</td>
<td>651 - 1035</td>
<td>5 – 7</td>
</tr>
<tr>
<td>3 months</td>
<td>4.6 – 8.0</td>
<td>484 – 787</td>
<td>n/a</td>
<td>24 – 39</td>
<td>710 - 1153</td>
<td>5 – 7</td>
</tr>
<tr>
<td>4 months</td>
<td>5.0 – 8.8</td>
<td>401 – 739</td>
<td>n/a</td>
<td>20 – 37</td>
<td>591 - 1094</td>
<td>5 – 7</td>
</tr>
<tr>
<td>5 months</td>
<td>5.5 – 9.2</td>
<td>446 – 775</td>
<td>n/a</td>
<td>22 – 39</td>
<td>651 - 1153</td>
<td>5 – 7</td>
</tr>
<tr>
<td>6 months</td>
<td>5.8 – 9.9</td>
<td>342 – 707</td>
<td>130</td>
<td>17 – 35</td>
<td>503 - 1035</td>
<td>4 – 5</td>
</tr>
<tr>
<td>7 months</td>
<td>6.0 – 10.2</td>
<td>326 – 700</td>
<td>130</td>
<td>16 – 35</td>
<td>473 - 1035</td>
<td>4 – 5</td>
</tr>
<tr>
<td>8 months</td>
<td>6.2 – 10.7</td>
<td>344 – 744</td>
<td>130</td>
<td>17 – 37</td>
<td>503 - 1094</td>
<td>4 – 5</td>
</tr>
<tr>
<td>Age</td>
<td>Weight (kg)</td>
<td>Energy needs from formula (kcal)</td>
<td>Energy from complementary food (kcal)</td>
<td>Formula amount (ounces; based on 20kcal/oz.)</td>
<td>Formula amount (mL)</td>
<td>Feeds per day</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>---------------------------------</td>
<td>--------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>9 months</td>
<td>6.5 – 11.0</td>
<td>190 – 591</td>
<td>310</td>
<td>10 - 30</td>
<td>296 - 887</td>
<td>3 – 4</td>
</tr>
<tr>
<td>10 months</td>
<td>6.7 – 11.3</td>
<td>208 – 618</td>
<td>310</td>
<td>10 – 31</td>
<td>296 - 917</td>
<td>3 – 4</td>
</tr>
<tr>
<td>11 months</td>
<td>6.9 – 11.7</td>
<td>226 – 653</td>
<td>310</td>
<td>11 – 33</td>
<td>325 - 976</td>
<td>3 – 4</td>
</tr>
<tr>
<td>12 months</td>
<td>7.0 – 12.0</td>
<td>0 - 410</td>
<td>580</td>
<td>0 - 21</td>
<td>0 - 621</td>
<td>0 - 3</td>
</tr>
</tbody>
</table>

*Information obtained from Dietitians of Canada (39)*

**Duration of Formula Feeding**

- Infants fed with human milk substitutes should continue to receive commercial infant formula until they are nine to 12 months of age and are consuming a variety of solid foods, including iron-rich foods such as meat, fish, legumes, eggs, and iron-fortified cereal (see Chapter 4: Feeding by Age). (2)

- If an older infant, who is receiving commercial infant formula, is not regularly consuming a variety of solids, especially iron-rich solids, it may be prudent to wait until closer to 12 months to switch from formula to cow’s milk.

- Infants that have been fed soy-based formula for medical, cultural, or religious reasons should continue to receive soy-based formula until two years of age.
  - This recommendation also applies to older infants who are no longer receiving human milk and who will be not be introduced to animal milk (i.e. infants and toddlers in families with a vegan diet). (2)
  - In these circumstances, a “follow-up” or “second step” formula may be a better choice after 12 months, as these formulations are higher in calcium than infant formulas, which can help to meet changing nutritional requirements. (44)
  - For more information on soy “milks” and other vegetarian beverages, see Chapter 3: Animal Milks and Other Beverages.
Additional Resources for Parents and Guardians

- Please see previous chapter sections for client information specific to various infant formula topics.

- [Infant Formula: What You Need to Know](Perinatal Services BC, and Document Source #21101)

  This comprehensive resource:
  
  - aligns with the [Baby-Friendly Initiative](#)
  
  - addresses a wide range of topics related to formula use
  
  - should be reviewed with, and provided to, individual families that have made an informed decision to use human milk substitutes
  
  - is intended to be used in its entirety

  As with other resources relating to human milk substitutes, this resource should:
  
  - not be put on display (e.g. in waiting rooms)
  
  - not be used in group settings
  
  - not be added in standard prenatal or post-partum information packages

- Additional resources about human milk substitutes can be found on the “Making an Informed Decision about Feeding your Baby” section of the [Nutrition in the First Year](NH public webpage).

- Parents and guardians can connect with dietitians and nurses at [HealthLink BC](#), by calling 811 or 604-215-8110.
3. Animal Milks and Other Beverages

Practice Points

- Recommend waiting until about six months of age before offering water.
- Recommend delaying the introduction of pasteurized whole cow’s milk until nine to 12 months of age.
- Goat’s milk is not recommended in the case of cow’s milk protein allergy.
- Lower-fat milks and fortified soy beverages are not recommended before two years of age.
- Other plant-based beverages are not recommended as alternatives to milk.
- Fruit juice is not required and should be limited.
- Other sugary, artificially-sweetened, or caffeinated beverages should be avoided.
- Recommend that fluids introduced after six months be offered in an open cup.

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### Nutrition Composition of Human Milk, Animal Milks, and Plant-Based Beverages (per 250 mL/1 cup)

<table>
<thead>
<tr>
<th></th>
<th>Energy (kcal)</th>
<th>Fat (g)</th>
<th>Protein (g)</th>
<th>Carbohydrate (g)</th>
<th>Iron (mg)</th>
<th>Calcium (mg)</th>
<th>Folate (mcg DFE)</th>
<th>Vitamin A (mcg RE)</th>
<th>Vitamin D (IU)</th>
<th>Vitamin B12 (mcg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human milk, whole,</td>
<td>182</td>
<td>11.4</td>
<td>2.7</td>
<td>18</td>
<td>0.08†</td>
<td>83</td>
<td>13</td>
<td>159</td>
<td>10.4</td>
<td>0.13</td>
</tr>
<tr>
<td>mature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow’s milk 3.25% M.F.</td>
<td>157</td>
<td>8.4</td>
<td>8.1</td>
<td>12.4</td>
<td>0.08</td>
<td>291</td>
<td>13</td>
<td>119</td>
<td>103</td>
<td>1.16</td>
</tr>
<tr>
<td>(whole)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow’s milk 2% M.F.</td>
<td>129</td>
<td>5.1</td>
<td>8.5</td>
<td>12.4</td>
<td>0.05</td>
<td>309</td>
<td>13</td>
<td>163</td>
<td>103</td>
<td>1.37</td>
</tr>
<tr>
<td>Cow’s milk 1% M.F.</td>
<td>108</td>
<td>2.5</td>
<td>8.7</td>
<td>12.9</td>
<td>0.08</td>
<td>322</td>
<td>13</td>
<td>163</td>
<td>103</td>
<td>1.21</td>
</tr>
<tr>
<td>Cow’s milk 0% M.F.</td>
<td>88</td>
<td>0.2</td>
<td>8.7</td>
<td>12.8</td>
<td>0.08</td>
<td>316</td>
<td>13</td>
<td>163</td>
<td>103</td>
<td>1.29</td>
</tr>
<tr>
<td>(skim)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goat’s milk, whole</td>
<td>178</td>
<td>10.7</td>
<td>9.2</td>
<td>11.5</td>
<td>0.13</td>
<td>345</td>
<td>2 - 37*</td>
<td>147</td>
<td>10.3</td>
<td>100*</td>
</tr>
<tr>
<td>Soy beverages</td>
<td>72 - 150</td>
<td>0 - 4.5</td>
<td>6 - 8.5</td>
<td>1 - 20</td>
<td>0.84 - 1.66</td>
<td>65 - 330*</td>
<td>18 - 47</td>
<td>0 - 104*</td>
<td>0 - 100*</td>
<td>0 - 1.04*</td>
</tr>
<tr>
<td>Rice beverages</td>
<td>80 - 130</td>
<td>2.1 - 2.5</td>
<td>0.4 - 2</td>
<td>13 - 26.3</td>
<td>0 - 0.84*</td>
<td>0 - 330*</td>
<td>96</td>
<td>0 - 100*</td>
<td>0 - 90*</td>
<td>0 - 1.03*</td>
</tr>
<tr>
<td>Almond or cashew</td>
<td>25 - 60</td>
<td>2 - 4.5</td>
<td>0 - 1</td>
<td>1 - 22</td>
<td>0.28 - 0.56</td>
<td>22 - 330*</td>
<td>N/A</td>
<td>0 - 100*</td>
<td>0 - 90*</td>
<td>0 - 1*</td>
</tr>
<tr>
<td>beverages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coconut beverages</td>
<td>45 - 80</td>
<td>4.5 - 5</td>
<td>0.4 - 1</td>
<td>1 - 30</td>
<td>0.56*</td>
<td>0 - 330*</td>
<td>N/A</td>
<td>0 - 100*</td>
<td>0 - 90*</td>
<td>0 - 1*</td>
</tr>
<tr>
<td>Hemp or flax</td>
<td>30 - 130</td>
<td>2.5 - 5</td>
<td>2</td>
<td>1 - 18</td>
<td>0 - 0.84</td>
<td>275* - 330*</td>
<td>N/A</td>
<td>0 - 100*</td>
<td>0 - 80*</td>
<td>0 - 1*</td>
</tr>
<tr>
<td>beverages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† The iron content of human milk is low, but its bioavailability is high at 50-70%. (39)
*Fortified or enriched products only

Data for this table was obtained from the Canadian Nutrient Files (CNF) (62) (CNF #73, 113, 61, 63, 114, 72, 6353, 6720, 6332, 6330, 5241, and 4780), and from product labels in May 2015. As needed, data was converted from % Daily Value format to unit measures using the reference values for Daily Values available from the Canada Food Inspection Agency. (63)
Ingredients in Cow’s Milk and Plant-Based Beverages

The table below depicts ingredient lists of specific products within various beverage categories. Ingredient lists within a beverage category will vary, based on whether products are sweetened/flavoured, and manufacturers may change ingredients over time. This table highlights that plant-based beverages often have many ingredients, and that various nutrients present in these beverages are often added in to these beverages, as opposed to being naturally present.

<table>
<thead>
<tr>
<th>Beverage Type</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow’s milk 3.25% M.F.</td>
<td>Whole milk, vitamin A palmitate, vitamin D3.</td>
</tr>
<tr>
<td>Cow’s milk 1 or 2 % M.F.</td>
<td>Partly skimmed milk, vitamin A palmitate, vitamin D3.</td>
</tr>
<tr>
<td>Cow’s milk 0% M.F. (skim)</td>
<td>Skim milk, vitamin A palmitate, vitamin D3.</td>
</tr>
<tr>
<td>Soy beverage</td>
<td>Water, soybeans, sugar, tricalcium phosphate, salt, natural flavour, carrageenan, sodium bicarbonate, ascorbic acid, niacin, pantothenate, riboflavin, vitamin A palmitate, thiamine, vitamin B6, folacin, vitamin D2, vitamin B12, zinc gluconate. (So Nice Original soy beverage)</td>
</tr>
<tr>
<td>Rice beverage</td>
<td>Water, brown rice (partially milled), high oleic safflower oil, canola oil, sunflower oil, sea salt. (Rice Dream Classic Original)</td>
</tr>
<tr>
<td>Almond beverage</td>
<td>Almond milk (water, almonds), sugar, calcium carbonate, sea salt, potassium citrate, carrageenan, sunflower lecithin, vitamin A palmitate, vitamin D2, D-alpha-tocopherol. (Almond Breeze Original)</td>
</tr>
<tr>
<td>Coconut beverage</td>
<td>Water, coconut cream, calcium carbonate, natural flavour, carrageenan, yam flour, zinc gluconate, riboflavin, vitamin A palmitate, vitamin D2, vitamin B12 (Silk Coconut Unsweetened)</td>
</tr>
<tr>
<td>Hemp beverage</td>
<td>Hemp nut base (water, hemp seed), brown rice syrup, tricalcium phosphate, disodium phosphate, xanthan gum, vitamin A palmitate, vitamin D2, riboflavin, vitamin B12. (Pacific Hemp Original)</td>
</tr>
</tbody>
</table>

Data from this table was obtained from product labels in September 2015.
## Animal Milks

### Cow’s Milk

The following table outlines the recommendations for cow’s milk use at various ages.

<table>
<thead>
<tr>
<th>Age</th>
<th>Cow’s milk choice</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 9 months</td>
<td>None</td>
<td>• Support breastfeeding and provision of human milk. Infants who are not exclusively receiving human milk should receive formula until nine to 12 months.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cow’s milk is not an appropriate alternative to human milk for young infants. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cow’s milk is low in iron and has low iron availability. (3) In infants less than six months old, cow’s milk can cause gastrointestinal bleeding and increased occult blood loss in stool. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cow’s milk is low in essential fatty acids and other nutrients, contains proteins that are less digestible, and has a high renal solute load. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Homemade formulas from canned, evaporated milk are not recommended as human milk substitutes as they are nutritionally incomplete. (3) They should only be considered for short-term, emergency use and should be prepared as per WHO directions. (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See “Evaporated Milk Formulas” in Chapter 2: Human Milk Substitutes.</td>
</tr>
<tr>
<td>9 – 12 months</td>
<td>May introduce pasteurized, whole milk (3.25% milk fat (M.F.))</td>
<td>• Support continued breastfeeding and provision of human milk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Whole cow’s milk can be introduced when the healthy term infant is regularly eating a variety of solid foods each day, with a special emphasis on iron-rich foods, such as meat, eggs, plant-based protein foods, and iron-fortified cereals. (2)</td>
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<td></td>
<td></td>
<td>• If an older infant who is receiving commercial infant formula is not regularly consuming a variety of solid foods, especially iron-rich foods, it may be prudent to wait until closer to 12 months to switch from formula to cow’s milk.</td>
</tr>
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<td></td>
<td></td>
<td>• If introducing cow’s milk, recommend offering it in an open cup. (2) See “Use of Cups and Bottles” at the end of this chapter.</td>
</tr>
<tr>
<td>Age</td>
<td>Cow’s milk choice</td>
<td>Comments</td>
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<tr>
<td>12 – 24 months</td>
<td>May use pasteurized, whole milk (3.25% M.F.)</td>
<td>• Support continued breastfeeding and provision of human milk.</td>
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<tr>
<td></td>
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<td>• For children who are no longer receiving human milk, 2 cups (500 mL) of milk are recommended per day. Intake should not exceed 3 cups (750 mL) per day, to avoid displacing foods high in nutrients (i.e. iron or fibre). (2)</td>
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<td>• Recommend offering milk in an open cup. (2) See “Use of Cups and Bottles” at the end of this chapter.</td>
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<td>• If evaporated or powdered milks are used, they should be properly reconstituted. Recommend full-fat products. (2)</td>
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<td></td>
<td></td>
<td>• There is no convincing evidence to support an association between whole milk intake during complementary feeding and later obesity risk. (64)</td>
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<td>• Lower fat milks (2% or 1% M.F.) are generally not recommended before two years of age. (2) If they are used, the child should be growing well, eating a wide variety and adequate quantity of nutritious foods, and have other appropriate dietary fat sources. (2)</td>
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<td>• Skim milk (0% M.F.) is not an appropriate choice for children less than two years of age. (2)</td>
</tr>
<tr>
<td>2 years +</td>
<td>May use pasteurized whole (3.25% M.F.) or lower-fat milks (2%, 1% or 0% M.F.)</td>
<td>• Support continued breastfeeding and provision of human milk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For children who are no longer receiving human milk, 2 cups (500 mL) of milk are recommended per day. Intake should not exceed 3 cups (750 mL) per day, to avoid displacing foods high in nutrients (i.e. iron or fibre). (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• At two years, children can switch to the family’s choice of cow’s milk (i.e. whole, 2%, 1%, or skim). (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If evaporated or powdered milks are used, they should be properly reconstituted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recommend offering milk in an open cup. (2) See “Use of Cups and Bottles” at the end of this chapter.</td>
</tr>
</tbody>
</table>
Additional considerations regarding cow’s milk:

- Unpasteurized milk is not recommended due to risk of foodborne illness from various pathogenic bacteria. (2) The Government of Canada has additional information available about raw or unpasteurized milks. (2)

- The risks of unpasteurized dairy products outweigh perceived benefits. Pasteurization does not significantly affect the nutritional value of milk and only causes a slight decrease in the bactericidal enzymes present. (65)

- Cow’s milk obtained from non-commercial sources might not be fortified with vitamin D.

- Unsweetened cow’s milk is recommended over sweetened milk (i.e. chocolate or other flavoured milk). (2) Sweetened milks are considered “sugary drinks” as per Canada’s food guide, which should be limited. (66)

**Goat’s Milk**

- Goat’s milk is not recommended before nine to 12 months of age. (67)

- Like cow’s milk, goat’s milk is not an appropriate substitute for human milk for young infants. It is low in iron, essential fatty acids, folate, and other nutrients, contains a less-digestible form of protein, and has a high renal solute load. (3) It is also higher in electrolytes than human milk. (67)

- Older infants and young children with cow’s milk protein allergy are also likely to have an allergic reaction to goat’s milk (and sheep’s milk), due to the similarity in milk proteins. (2) (67)

- In Canada, it is not mandatory to fortify goat’s milk with vitamin D or other nutrients, although it can be fortified voluntarily, therefore nutrient levels vary from product to product. (62) (68) (69)

- When infants are nine to 12 months of age and are consuming a variety of iron-rich foods, pasteurized full-fat goat’s milk, with added folic acid and vitamin D, may be used as an alternative to cow’s milk. (2) (67)

- Goat’s milk poses the same risks for iron deficiency as cow’s milk when consumed in excessive amounts. (2) If offered to children, as with cow’s milk, recommend limiting intake of goat’s milk to less than 3 cups (750 mL) per day. (15)

- As with cow’s milk, if offered, recommend offering goat’s milk in an open cup. (2) See “Use of Cups and Bottles” at the end of this chapter.

**Resource for parents and guardians**

- Should I Give My Child Goat’s Milk? (Dietitians of Canada)
Plant-Based Beverages

- Plant-based beverages include those made from soy, rice, almond, cashew, coconut, hemp, flax, and potato. (70) (71)

- Plant-based beverages (other than commercial soy-based infant formula) are not recommended in the first two years of life as alternatives to human milk, commercial infant formula, and whole animal milk. (67) (70)

- The use of plant-based beverages in infants has been linked with kwashiorkor (severe protein-energy malnutrition), rickets, and death. (67) (70)

- Fortified soy beverage is the only plant-based beverage that is nutritious enough to be considered a “protein food”, as per Canada’s food guide. (72) (71) Fortified soy beverage (unsweetened) is an option for a main beverage after two years of age. See “Soy Beverages”, below.

- Other plant-based beverages are not nutritionally comparable to animal milk (see the “Nutrition Composition” table at the beginning of this chapter for more details). (2) (67) (71) See “Rice, Almond, Coconut and Other Plant-Based Beverages”, on the next page.

- Other concerns include higher than recommended manganese levels in plant-based beverages, and potentially high levels of arsenic in rice beverages. (67)

- For more information on nutrients of concern in vegetarian diets, see “Vegetarian Diets” in Chapter 5: Issues of Concern.

Resource for parents and guardians

- Dietitians, paediatricians advise parents to exercise caution with plant-based beverages (Canadian Pediatric Society & Dietitians of Canada, news release)

Soy Beverage

Under two years of age

- Soy beverage (i.e. soy “milk”) is not suitable as a main beverage for children under two years of age. (2)

- If an older infant or toddler is no longer receiving human milk and will not be introduced to animal milk (e.g. for cultural or religious reasons such as a vegan lifestyle), a soy-based commercial infant formula is recommended until two years of age. (2) A follow-up soy-based formula may be a better choice between 12-24 months of age, given its higher calcium content. (44)

- As an occasional complementary food (i.e. in addition to an infant’s usual milk source), a full-fat, fortified, unflavoured/unsweetened soy beverage may be offered. (2) (67)
- If a family is choosing to provide a soy beverage as a main “milk” source to their 12-24 month old child (despite these recommendations), supported them to:
  - choose a full-fat option (i.e. 4 to 5 g of fat per 1 cup), that is unsweetened/unflavoured, and that is fortified with calcium and vitamin D (2)
  - offer 2 - 3 cups (500 – 750 mL) per day, in an open cup (see “Use of Cups and Bottles” at the end of this chapter)
  - add extra fat sources to the diet (e.g. avocado, nut butters, fatty fish, cheese, fats, and oils)
  - seek support from a dietitian to ensure adequate intake of energy, total fat, essential fatty acids, and other nutrients

Over two years of age
- Canada’s food guide (for healthy Canadians two years and older) lists fortified soy beverages as a protein food. (71) Not all soy beverages are fortified.
- Unflavoured soy beverages are recommended over flavoured versions, such as vanilla or chocolate, which contain added sugar. (2)
- If soy beverage is offered as a main beverage/alternative to milk, recommend 2 cups (500 mL) per day, in an open cup (15)

Rice, Almond, Coconut, and Other Plant-Based Beverages
- Other plant-based beverages such as rice, almond, cashew, coconut, hemp, flax, potato, and other “milks” are not suitable as alternatives to milk, and are not appropriate choices for young children. (2) (70)
- Their nutrient composition is very different from animal milks. (2) See “Nutrition Composition” table at the beginning of this chapter.
  - They are low in protein, fat, and energy. (70)
  - Fortified versions may have vitamin D and calcium levels comparable to cow’s milk, but they are lacking in many other vitamins and minerals present in cow’s milk. Unfortified versions are also being sold. (72)
  - Sweetened versions are high in carbohydrate, and are considered to be “sugary drink” as per Canada’s food guide. (73) (72)
- If fortified plant-based beverages are offered to a young child (over two years of age), ensure that there is adequate intake of energy, protein, fat, and other nutrients from other dietary sources. (15) (70) Assessment and support from a dietitian is advised. (70)
Other Beverages

Water

- Exclusively breastfed infants do not require additional water, (67) even in hot or dry climates or conditions. (74)

- Infants should not be given water before six months of age as this may interfere with breastfeeding and the intake of human milk and commercial infant formula. Water should not interfere with the intake of human milk and human milk substitutes in the first year of life. (74)

- Sips of water may be introduced at about six months of age. It is recommended that this is offered in an open cup between feedings. (2)

- After 12 months, recommend offering water frequently to quench thirst. (2)

- Water must be clean and free from contaminants. Appropriate water sources include safe cold tap water and safe well water. Cold tap water is recommended because hot water from the tap can contain higher levels of lead or contaminants. Commercial bottled water (unflavoured and not carbonated) is also likely suitable. (67) (74)

- Mineral water, carbonated water, and flavoured water are not suitable for infants. No clear indications exist for the use of distilled water. (67)

- For information on choosing and disinfecting water for the preparation of infant formula, see “Safely Preparing, Storing, and Transporting Commercial Infant Formula” in Chapter 2: Human Milk Substitutes.

Fruit Juice

- Fruit juice is considered to be a “sugary drink” as per Canada’s food guide. (73)

- Fruit juice is not necessary for infants and children. There are various concerns related to the excessive intake of fruit juice, including:
  - displacement of human milk intake (2)
  - displacement of nutrient intake from solid food and whole milk (2)
  - dental decay (2)
  - gastrointestinal symptoms (e.g. diarrhea, flatulence) (2) (67)

- There are also concerns around the possibility that young children may develop a preference for sweet drinks and reject water. (13)

- 100% fruit juices contain 116 to 160 calories and 22 to 38 g (~5.5 to 9.5 tsp) of sugar per 1 cup (250 mL). (62)
“Baby juices” are marketed for use with infants. They have a similar nutrient profile as other juice, but may be more expensive. As with other juice, they are not required for infants and children. (13)

Recommendations (for children six months and older):

- Emphasize fruits and vegetables and offer them more often than juice. (67)
- Offer water frequently (after 12 months of age). (2)
- Offer juice infrequently, if at all. (2)
  - Limit offerings to once or twice per day. (2)
  - Limit intake to ½ cup (125 mL) per day. (2) (15)
- When offering juice:
  - choose 100% pure fruit or vegetable juice (2) (15)
  - choose pasteurized juice, as unpasteurized juice may be contaminated with pathogenic microbes which could lead to illness and death in vulnerable individuals. (67) The Government of Canada has additional information about unpasteurized juices and cider
  - offer it as part of a meal or snack (15) (67)
  - serve it in an open cup (i.e. as opposed to in a bottle or sippy cup) (15) (67)
  - avoid putting a child to bed with a bottle or sippy cup of juice (67)
- Although the dilution of juice is a common practice, there is no clear evidence to support this practice. (64)

Other Sugary Drinks

- Sugary drinks can include iced tea, fruit juice, soft drinks, sports drinks, energy drinks, fruit-flavoured drinks, sweetened plant-based beverages, flavoured waters, sweetened milk (e.g. chocolate milk), and others. (73)
- Not all “juices” are 100% real juice. There are various fruit beverages that contain juice, but in very small amounts. These have added sugar and potentially other ingredients. (13)
- Sugary drinks can contain 91-166 calories and 23-42 g (6-10.5 tsp) of sugar per 1 cup (250 mL). (62)
- Sugary drinks are not recommended for young children because of their high sugar content and potential lack of other nutrients. (2) As with fruit juice, the intake of these beverages may increase the risk of early childhood caries. (2)
Artificially Sweetened Beverages

- Artificially sweetened beverages include diet drinks, some fruit flavoured drinks, and some energy drinks.
- Beverages sweetened with artificial sweeteners are not recommended for young children. (2)
- These products may interfere with a young child’s intake of nutritious foods needed to support their growth and development. (2)

Caffeinated Beverages

- Caffeinated beverages include coffee, tea, iced coffee, iced tea, hot chocolate, energy drinks, and some pops and sports drinks. (2) (75)
- Caffeine is a stimulant drug, (2) associated with nervousness, irritability, headaches, and insomnia. (76)
- Beverages containing caffeine are not recommended for young children. (2)

Herbal Teas

- Due to their small size and rapid growth, infants are more vulnerable to the pharmacological effects of some of the flavouring and chemical substances occurring in herbal teas. (13)
- Herbals teas are not recommended for infants, as there is currently insufficient evidence of the safety of herbal teas in infancy. (3)
- Teas may also contain sugar and alcohol, and may interfere with breastfeeding. (3)

Follow-up or Second Step Formula

- For children who do not receive human milk, follow-up/second-step formulas are acceptable choices for children over six months of age, but may not be superior over regular infant formulas for infants six to 12 months of age. (2) (44)
- Healthy children do not usually need formula after 12 months. (39)
- Soy-based follow-up formula is recommended for children 12-24 months of age, who are not receiving human milk and who will not be consuming animal milk, such children in families who follow a vegan diet. (15) (44) See “Duration of Formula Feeding” in Chapter 2: Human Milk Substitutes.
Toddler Drinks and Toddler Milks

- After nine to 12 months, most infants who have been receiving commercial infant formula and who are regularly consuming a variety of iron-rich foods can transition directly to whole (3.25% M.F) cow’s milk. (2)

- Toddler drinks, toddler milks, toddler formulas, and growing-up milks are marketed as alternatives or complements to cow’s milk for children 12 months of age and older (e.g. 12 to 36 months). (2) Countries are working on developing standards for these products. (2)

- These beverages are generally not required for young children, (77) and are more costly than cow’s milk.

- There are concerns that the marketing of such commercial foods for young children may undermine progress in optimal feeding. (77) For example, providing such beverages to “picky eaters” may interfere with family meals, the division of responsibility in feeding, and a young child’s learning to (eventually) enjoy a range of family foods. (78)

- There are also concerns about the marketing practices of these products. Although they may not be explicitly promoted as human milk substitutes, they may resemble the branding, packaging, and labelling of commercial infant formula, which may result in confusion as to the purpose of the products. (77) (79) These products are not appropriate for infants. (79)

- If parents and guardians are using or are inquiring about these products, it may warrant an exploration of any concerns they might have regarding feeding or their child’s growth.
Use of Cups and Bottles

Bottles

- With infants who are fed by bottle, it is recommended that the transition from bottle feeding to an open cup should begin by about 12 months, and should be complete by 18 months. (2) (15)

Open cups

- As fluids are introduced after six months (i.e. other than human milk and commercial infant formula), they can be offered in an open cup. (2)
- Cup drinking has been shown to be a safe and easily learned skill in infancy. (2) Initially, infants will need an adult to help by holding the cup, and infants will use a sucking action to drink. (2)
- The use of open cups can help to: (2)
  - develop mature drinking skills
  - prevent prolonged bottle feeding
  - reduce risks associated with long term bottle feeding, including:
    - displacement of nutrient rich solid foods
    - risk of dental decay

Sippy cups

- Sippy cups with no-spill valves are not necessary, nor are they recommended.
- Infants need to suck to get liquids out of these cups and therefore these cups do not support the development of mature drinking skills. (2)

Resource for parents and guardians

- Hello Cup…Bye-Bye Bottle (NH Document Source #10-402-6027)
4. Feeding by Age

**Practice Points**
- Recommend offering solid foods starting at about six months of age.
- For first solid foods, recommend iron-rich choices such as well-cooked meat, poultry, fish, eggs, tofu, legumes, and iron-fortified cereals.
- Recommend that parents and guardians provide a variety of soft textures and finger foods starting at about six months of age.
- Recommend eating together as a family when possible.
- At every age, the child is responsible for deciding how much they want to eat or whether they want to eat at all.
- Breastfeeding and human milk continue to be important and are recommended to two years and beyond.

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Introducing Solid Foods

Delaying the Introduction of Solid Foods until about Six Months of Age

- Exclusive breastfeeding, and provision of human milk, is recommended to about six months. (2)

- It takes about six months for an infant’s digestive system to mature adequately to handle solid foods. (11)

- Introducing solid foods too early decreases the duration of exclusive breastfeeding.

- Early introduction of solid foods (including the addition of cereals or other foods to infant bottles) may increase the risk for:
  - under-nutrition (if solids displace intake of human milk and commercial infant formula, which are key sources of energy, fats, and various other nutrients) (13) (80)
  - over-nutrition (if the caloric density of bottles of expressed breast milk and commercial infant formula is increased with the addition of cereals or other foods) (80)
  - diarrheal diseases (due to exposure to pathogens present in food) (80)
  - methemoglobinemia (associated with the consumption of high nitrate vegetables before three months of age) (81)
  - development of feeding challenges in preschool-aged children (80)

- Most healthy term infants are born with adequate iron stores to meet their iron needs until they are about six months old. (2) For infants at higher risk of iron deficiency, see “Iron” in Chapter 6: Nutrients of Concern.

Introducing Solid Foods at about Six Months of Age

- Most infants are physiologically and developmentally ready for solid foods at about six months, and will show signs of readiness through the ability to:
  - maintain better head control (67)
  - sit up and lean forward (67)
  - demonstrate that they are full (e.g. turning head away) (67)
  - pick up food and try to put it in their mouth (67)
  - use vertical jaw movements (i.e. munching) (15)
At about six months, it is also normal for infants to: (15)

- have some tongue protrusion when beginning to eat solid foods – this will decrease with experience
- retain early gag reflex until around seven months
- not accept unfamiliar foods a number of times

From about six months, human milk alone can no longer meet all of an infant’s nutritional requirements. Complementary foods that are energy dense and nutrient-rich help meet changing nutrition requirements. (2)

Initially, infants may not consume a significant amount of solid food. (2) Human milk continues to be the main source of nutrition as complementary foods are introduced. (2)

Delaying the introduction of solids beyond six months increases the risk of:

- iron deficiency (2) and other micronutrient deficiencies (80)
- growth faltering (80)
- slower motor skills development (80)
- slower acceptance of new foods (80)

The introduction of common food allergens should not be delayed for the purposes of allergy prevention. These foods can be introduced at around six months, and should be introduced one-at-a-time. Other foods do not need to be introduced one-at-a-time. (15) For information about introducing common food allergens, see “Allergens” in Chapter 5: Issues of Concern.

Resource for parents and guardians

- Before You Feed Your Baby Solid Foods (NH Document Source #10-421-6060)
## Food Choices

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<th>Breastfeeding and Human Milk</th>
<th>6 to 12 Months</th>
<th>12 Months +</th>
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<tr>
<td>Recommend and normalize continued breastfeeding and provision of human milk, and vitamin D supplementation. (2) At any given feeding, it does not matter whether complementary foods are offered before or after breast feeds. (2) Parents and guardians can decide what works best for their child. For infants who do not receive human milk, recommend continued use of a commercial infant formula until they are nine to 12 months old and are consuming iron-rich foods daily. (2)</td>
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### Solid Foods

<table>
<thead>
<tr>
<th></th>
<th>6 to 12 Months</th>
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<tbody>
<tr>
<td>Recommend first solid foods that are iron-rich, (3) such as:</td>
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<tr>
<td>• well-cooked meat, poultry, fish, and shellfish (heme-iron sources*) (2)</td>
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<tr>
<td>• eggs, tofu, beans, lentils, nut butters, seeds (2)</td>
<td></td>
</tr>
<tr>
<td>• iron-fortified cereals (2)</td>
<td></td>
</tr>
<tr>
<td>*Heme-iron is better absorbed than non-heme iron. (2)</td>
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<tr>
<td>When iron-rich foods are regularly offered two or more times per day, other foods can be added to the diet, in no particular order: (2)</td>
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<tr>
<td>• full-fat cheese and yogurt</td>
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<td>• vegetables and fruit</td>
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<tr>
<td>• other grain products</td>
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<tr>
<td>By 12 months, young children can be offered a wide variety of family foods. (67)</td>
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<tr>
<td>Recommend offering a variety of foods from Canada’s food guide, including protein foods, grains, vegetables, and fruit. (2)</td>
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<tr>
<td>Nutritious, higher-fat foods are an important source of energy and essential fatty acids for young children. Dietary fat restriction is not recommended for children less than two years. (2) See “Dietary Fats” in Chapter 6: Nutrients of Concern.</td>
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<tr>
<td>Recommend offering small amounts of nutritious foods from family meals, modified to a texture and size appropriate for the child’s abilities. (2)</td>
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<tr>
<td>Foods should be energy and nutrient dense, with little or no added sugar or salt - this allows children to experience the natural flavours of foods. (2)</td>
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<tr>
<td>Commercial infant foods are not required and may be high in added sugars. (2) If used, the texture should be appropriate for the individual child. A child may be able to manage a more advanced texture than what is suggested on a product label.</td>
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### Beverages

See [Chapter 3: Animal Milks and Other Beverages](#).
## Infant-Toddler Nutrition Guidelines for Health Professionals

**6 to 12 Months** | **12 Months +**
---|---
**Delay these items** | To help prevent iron deficiency, recommend delaying the introduction of animal milks until nine to 12 months of age. (2)
To help prevent infant botulism, recommend delaying honey until 12 months. (2) See [infant botulism](https://government.gc.ca) (Government of Canada).
To reduce the risk of choking, recommend waiting until four years of age to offer higher risk foods. (2) See “Food Textures,” later in this chapter.
Delayed introduction of common food allergens is **not** recommended; these foods can be offered one-at-a-time starting at about six months. (2) (15) There is no need to introduce other new foods one-at-a-time. (15) See “Allergens” in Chapter 5: Issues of Concern.

**Food safety** | Food safety principles should be applied to the preparation and storage of foods for infants and young children. (2)
Recommend avoiding the following foods for young children due to a higher risk of foodborne illness:
- unpasteurized animal milks and milk products (15) (67)
- raw/undercooked fish and shellfish, including cold smoked fish (15) (67)
- raw/undercooked cooked eggs and products containing raw/undercooked eggs (15) (67)
- raw/undercooked meat, deli meat, and hotdogs (15)
- raw/lightly cooked sprouts (e.g. alfalfa sprouts, bean sprouts) (15) (67)
Exceptions to the above recommendation may include raw and/or frozen cultural foods prepared safely according to traditional practices. (2)
Homemade “baby food” can be safely stored in the fridge for one to two days, or in a freezer for use within three months. (82) Advise to avoid preparing large amounts of texturally modified foods, as infants can quickly advance to more challenging textures, and should be included family meals.

**High mercury fish** | Higher mercury fish include fresh or frozen tuna* (from countries other than Canada), shark, marlin, swordfish, escolar, and orange roughy. (83)
*Fresh, frozen, or canned albacore tuna from BC or Canada has no serving limits. On commercial product labels, look for “Product of Canada”. (83)
Limit: (83)
- higher mercury fish to 40 g (~¼ cup) per month
- canned albacore (white) tuna* to 40 g (~¼ cup) per week
Limit: (83)
- higher mercury fish to 75 grams (~½ cup) per month
- canned albacore (white) tuna* to 75 g (~½ cup) per week
Resources for parents and guardians

- [Feeding Babies Age 6 – 12 Months](#) (NH Document Source #10-421-6061)
- [Iron-Rich Foods for Baby](#) (includes sample meal plans) (NH Document Source #10-421-6023)
- Introducing Solid Foods ([Toddler’s First Steps](#), Province of BC)
- [Baby’s First Foods](#) (HealthLink BC)
- [Recipes for Your Baby: 6 - 9 Months Old](#) (HealthLink BC)
- [Recipes for Your Baby: 9 – 12 Months Old](#) (HealthLink BC)
- [Meal and Snack Ideas for Your 1 to 3 Year Old Child](#) (HealthLink BC)
- [Food Safety in Children Older than 1 Year - Preventing Foodborne Illness](#) (HealthLink BC)
- [Mercury in Fish](#) (HealthLink BC)
## Food Textures

<table>
<thead>
<tr>
<th>6 to 9 Months</th>
<th>9 to 12 Months</th>
<th>12 Months +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend advancing the textures of foods provided so that by 12 months children are offered a variety of modified foods from family meals. (15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advise parents and guardians that soft foods and finger foods can be offered regardless of whether or not teeth have appeared. (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>While convenient, commercial infant foods offer limited food textures. Pureed food in squeezable pouches, and “mesh feeders”, may not support the progression of eating skills or the inclusion of the child in family meals, and may present microbial food safety concerns. (78) (84)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommend providing a variety of soft textures and finger foods starting at about six months. (2)</td>
<td>Delaying the introduction of lumpy textures beyond nine months is associated with feeding difficulties in older children and a lower intake of nutritious foods, such as vegetables and fruit. (2)</td>
<td>By 12 months, recommend a variety of finger foods, and modified textures such as ground, mashed, or chopped foods, with a tender consistency. (2)</td>
</tr>
<tr>
<td>Textures for a six-month old can be lumpy, tender-cooked, and minced, pureed, mashed, or ground. (2)</td>
<td>Between eight and 12 months, older infants are able to move foods to the teeth with lateral movements of the tongue, enabling biting and chewing of chopped foods and a greater variety of finger foods. (2)</td>
<td>By 12 to 18 months, young children will acquire full chewing movements. (2)</td>
</tr>
<tr>
<td>Foods can be cooked until tender and/or mashed with a fork or minced with a knife. (3) No special equipment is required. Finger foods can include: (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• minced, ground, or mashed cooked meat, deboned fish, and poultry</td>
<td>• grated cheese</td>
<td></td>
</tr>
<tr>
<td>• pieces of soft or cooked vegetables and fruit</td>
<td>• bread crusts or toasts</td>
<td></td>
</tr>
</tbody>
</table>

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northern health
the northern way of caring
Choking Risk

Gagging is a reflex that helps prevent choking. (2) Anticipatory guidance distinguishing gagging from choking may help to decrease anxiety around feeding and can support parents and guardians to offer their infant progressively more challenging textures.

Recommend avoiding foods that are choking hazards for children under four years of age. (2) The table below lists foods that present a choking risk, as well as steps that can be taken to reduce risk.

<table>
<thead>
<tr>
<th>Foods at risk of causing choking include:</th>
<th>The risk of choking can be reduced by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• hard, small, and round solids (2)</td>
<td>• supervising children while they are eating (2)</td>
</tr>
<tr>
<td>• smooth and sticky solids (2)</td>
<td>• being aware of their chewing and swallowing abilities (2)</td>
</tr>
<tr>
<td>• certain protein foods:</td>
<td>• avoiding foods with the potential to cause choking (2)</td>
</tr>
<tr>
<td>o hot dogs/wieners and sausages (15)</td>
<td>• obtaining training in first aid to effectively respond to a choking incident (2)</td>
</tr>
<tr>
<td>o fish with bones (2)</td>
<td></td>
</tr>
<tr>
<td>o sunflower and pumpkin seeds (2)</td>
<td></td>
</tr>
<tr>
<td>o peanuts and nuts (2)</td>
<td></td>
</tr>
<tr>
<td>o nut or seed butter spread thickly</td>
<td></td>
</tr>
<tr>
<td>or served on a spoon (2) (15) (85)</td>
<td></td>
</tr>
<tr>
<td>• certain vegetables and fruit:</td>
<td></td>
</tr>
<tr>
<td>o raw vegetables (15)</td>
<td></td>
</tr>
<tr>
<td>o raisins and other dried fruit (15)</td>
<td></td>
</tr>
<tr>
<td>(85)</td>
<td></td>
</tr>
<tr>
<td>o grapes (15)</td>
<td></td>
</tr>
<tr>
<td>o olives with pits (15)</td>
<td></td>
</tr>
<tr>
<td>o whole small tomatoes (15)</td>
<td></td>
</tr>
<tr>
<td>• other: (2)</td>
<td></td>
</tr>
<tr>
<td>o hard candy and cough drops</td>
<td></td>
</tr>
<tr>
<td>o gum</td>
<td></td>
</tr>
<tr>
<td>o popcorn</td>
<td></td>
</tr>
<tr>
<td>o marshmallows</td>
<td></td>
</tr>
</tbody>
</table>

Foods can be modified to reduce risk: (85)

<table>
<thead>
<tr>
<th>Resources for parents and guardians</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prevent Choking in Babies and Young Children: For Child Care Providers (HealthLink BC)</td>
</tr>
<tr>
<td>• Reduce Choking Hazards (Toddler’s First Steps, Province of BC)</td>
</tr>
</tbody>
</table>
## Amounts and Frequency

<table>
<thead>
<tr>
<th>6 to 9 Months</th>
<th>9 to 12 Months</th>
<th>12 Months +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support parents and guardians to decide what foods to <em>offer</em> and to work towards a regular meal and snack schedule. (2)</td>
<td>At every age, the child is responsible for deciding how much to eat or whether to eat. (2)</td>
<td>Encourage parents and guardians to be responsive to their child’s hunger and satiety cues, and to avoid coercive or restrictive feeding practices, in order to support positive attitudes about eating. (2) (15)</td>
</tr>
<tr>
<td>From six to eight months, complementary foods typically contribute about one fifth of infants’ calories. (2)</td>
<td>From nine to 11 months, complementary foods typically contribute just under half of older infant’s calories. (2)</td>
<td>From 12 to 24 months, two thirds of young children’s calories typically come from complementary foods. (2)</td>
</tr>
<tr>
<td>Recommend <em>offering</em> iron-rich foods at least twice per day. (2)</td>
<td>Recommend <em>offering</em> iron-rich foods at least twice per day. (2)</td>
<td>Recommend <em>offering</em> iron-rich foods with each meal. (2)</td>
</tr>
<tr>
<td>Recommend working towards <em>offering</em> complementary foods three to five times per day. (2)</td>
<td>Recommend <em>offering</em> complementary foods four to five times per day. (2)</td>
<td>Support parents and guardians to maintain a routine of regular meals and snacks. Recommend <em>offering</em> three meals and two or three snacks per day, offered every two and half to three hours. (2)</td>
</tr>
</tbody>
</table>
| Recommend starting by *offering* small amounts of solids foods (i.e. perhaps just a teaspoon to start) and slowly increasing based on infants’ appetite. At first, infants may only eat a few spoonfuls per day. (2) | Recommend continuing to *offer* small amounts of food and to increase based on infants’ hunger and fullness cues. (2) | Amounts to *offer* could be about ¼ to ½ of the size of adult portions. Examples include:  
  - 2 to 3 Tbsps. meat or mashed beans, ½ egg  
  - ½ cup milk, 2 Tbsps. shredded cheese  
  - 2 to 3 Tbsps. cooked vegetables or soft fruit  
  - 2 to 3 Tbsps. cooked grains, ½ piece of toast or muffin, ¼ pita  
A child may eat less or more, depending on their appetite.
Recommended Approaches to Feeding

Recommend a Division of Responsibility in Feeding

NH’s Position on Healthy Eating supports the promotion of a division of responsibility in feeding (i.e. Ellyn Satter’s Division of Responsibility in Feeding). (86) This approach helps to prevent and address many common feeding challenges. (61) Adults support children to learn and grow with eating when they apply this approach, (87) described below.

<table>
<thead>
<tr>
<th>Age of child</th>
<th>Adults’ Roles with Feeding</th>
<th>Children’s Role with Eating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>Adults decide whether to breastfeed and/or offer human milk and/or an appropriate human milk substitute. (2)</td>
<td>Infants demonstrate through hunger and satiety cues when, where, how much, and whether they will feed. (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Suggestions for frequency of feedings and amounts to provide are guides only; support parents and guardians to respond to their infant’s feeding cues.</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>In addition to breast feeds, human milk, and/or commercial infant formula (or, after 9-12 months, whole cow’s milk), adults offer developmentally appropriate solid foods. (2) Adults work towards deciding when and where infants are fed, (87) by starting to establish a meal and snack pattern. (88)</td>
<td>Older infants continue to breastfeed on cue. (2) Children are always responsible for how much they will eat, and whether they will eat at a particular meal or snack. (2)</td>
</tr>
<tr>
<td>12 months+</td>
<td>Adults maintain a regular meal and snack pattern, choose food and beverages, and manage the meal time environment. (2)</td>
<td>Children are always responsible for how much they will eat, and whether they will eat at a particular meal or snack. (2)</td>
</tr>
</tbody>
</table>

Resources for parents and guardians

- **Helping Your 1 to 3 Year Old Child Eat Well** (HealthLink BC)
- **Raise a healthy child who is a joy to feed – Follow the division of responsibility in feeding** (Ellyn Satter Institute)
## Recommend Family Meals and Sit-Down Snacks

<table>
<thead>
<tr>
<th>The Importance of Family Meals</th>
<th>Tips for Family Meals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There are important social aspects to eating together. (2)</td>
<td>• Aim for regular meal and snack times. (15)</td>
</tr>
<tr>
<td>• Eating together supports learning about family and cultural food traditions. (89)</td>
<td>• Start with foods you already enjoy.</td>
</tr>
<tr>
<td>• Eating together at the table helps to ensure that older infants and young children are safe and supervised. (2)</td>
<td>• Gather the family (whoever is available at those times, even if it is just one adult and one child) to eat together. (90)</td>
</tr>
<tr>
<td>• Parents have the opportunity to model healthy eating habits and children can learn skills through imitation. (2)</td>
<td>• Establish an eating environment that is safe and comfortable (e.g. eating in a moving vehicle may be hazardous). (2)</td>
</tr>
<tr>
<td>• Infants and older children are exposed to the tastes, colours, and textures of family foods.</td>
<td>• Ensure children are sitting up (i.e. not lying down, walking, running, or distracted). (2)</td>
</tr>
<tr>
<td>• Young children are more likely to enjoy a variety of foods when they are offered the same foods as the rest of the family. (2)</td>
<td>• Minimize distractions (e.g. turn off the TV; remove games, toys, and other devices). (15)</td>
</tr>
</tbody>
</table>

### Resources for parents and guardians

- **Making Meals Matter Backgrounder** (Better Together BC)
- **Better Together BC**
- **Family Meals and Snacks** (Ellyn Satter Institute)
Honour Hunger and Satiety Cues

- Encourage parents and guardians to trust their child’s ability to decide how much to eat or whether to eat at a particular feeding, meal, or snack time. (2)

- Encourage parents and guardians be responsive to children’s innate abilities to self-regulate their energy intake; this helps to preserve these skills and helps to prevent over- or under-feeding. (15)

- Support parents and guardians in identifying and responding to early cues of hunger and satiety. (67) Hunger cues include: restlessness, irritability, rooting, and sucking on a hand, and satiety cues include the child turning their head away, closing their mouth, losing interest in food, playing, or falling asleep. (2)

- Encourage parents and guardians to offer small portions initially, and offer more based on the child’s cues. (2)

- Advise that children will compensate for eating less on some days, or at some feedings or meals, by eating more at other feedings or meals. (2)

- Pressuring infants and young children to eat using excessive verbal encouragement, praise, rewards, or other strategies may lead to negative attitudes about eating and poor eating habits. (2)

- Withholding food, restricting portions, or limiting energy-dense foods due to concerns over overeating or weight gain may adversely affect the child’s self-regulation and increase their intake of foods when they are available. (2)

Promote Self-Feeding

- Self-feeding is an important developmental and experimental process. (2)

- Encourage self-feeding starting at about six months of age, to take advantage of a critical period for oral and motor development, when older infants are ready to reach out for and “munch” on food. (2)

- Parents and guardians can support self-feeding by offering finger foods amongst the first complementary foods at about six months. (2)

- Advise parents and guardians that this approach may not result in much food consumption at first, and will be messy. (2)

- If parents and guardians express interest in a “Baby-Led Weaning” approach, which emphasizes self-feeding, advise prioritizing iron-rich foods and energy-dense foods, and taking steps to reduce choking risk. (91)

- In addition to providing their infants and toddlers with finger foods, advise parents and guardians that they can also offer foods via spoon. (92)
Common Concerns from Parents and Guardians

The following scenarios provide guidance to help support parents and guardians with common feeding concerns. Should a health professional have concerns that feeding practices are restrictive, coercive, or nutritionally inadequate, a more thorough assessment is warranted. In these situations, consider a connection with a local dietitian or with Dietitian Services at HealthLinkBC (dial 811 or 604-215-8110).

1) “Formula no longer seems to satisfy my four-month old baby for very long. Will my baby sleep longer if I add infant cereal to their bottle?”

The addition of cereal (or other solids) to a bottle is not recommended. (93) The addition of infant cereal to commercial infant formula has not been shown to influence sleep duration. (94) Furthermore, there are risks associated with the early introduction of solids (see “Delaying the Introduction of Solids Foods until about Six Months of Age”, earlier in this chapter).

Infant’s eating patterns are likely to change over time. Support parents and guardians to follow their infant’s feeding cues to determine how often and how much to feed their infant, which may involve feeding more often, or with a greater volume, than usual.

2) “My baby is six months old and I am concerned about him developing food allergies. His dad is allergic to eggs. Should I wait until a year or two to offer eggs?”

Infants with a first-degree relative with a history of food allergy are considered to be at increased risk of developing food allergy. (42) However, the introduction of common food allergens should not be delayed, as this may increase the risk of a food allergy developing. (15) (42) Current guidelines recommend that common food allergens can be offered at about six months, when infants show signs of readiness for solid foods. (2) (15) (42) These foods should be offered one-at-a-time to help clarify tolerance to individual foods. (2) (42) Other foods do not need to be introduced one-at-a-time. (15) Once a common food allergen has been introduced and is tolerated, it is beneficial to offer the food two or three times per week, as this appears to help maintain tolerance. (15) See “Allergens” in Chapter 5: Issues of Concern.

3) “My eight-month old baby refuses to eat anything. She only wants the breast.”

At this age, human milk will still be the main source of energy and nutrients for infants, but nutritional requirements also begin to change. (2)

Infants get interested in eating solid foods at different times. Parents and guardians can offer solid foods, but should not pressure their children to eat. (15)
An infant’s exposure to solid foods can be supported through the following approaches:

- Include her in family meal and snack times at the table. Eat with her. (15) See “Tips for Family Meals,” earlier in this chapter.

- Offer her the same foods the family is eating, modified to an appropriate size and texture. She is more likely to try food that she sees others enjoying. (85)

- Offer iron-rich foods at least twice daily (i.e. meat, poultry, fish, shellfish, eggs, beans, lentils, chickpeas, nut butters, seeds, iron-fortified cereal). The iron from meat, fish, and poultry (i.e. heme-iron) is better absorbed than iron from other sources. (2)

- Some infants prefer to feed themselves. It’s slow and messy, but valuable. Let her try to feed herself, as well as offering her foods by spoon. (2) (92)

- Give her lots of opportunity to get familiar with foods by letting her see, smell, touch, and taste them many times. It can take many exposures before children accept new foods. (15)

- Avoid pressure. Offer, but don’t force. (15) See the “Recommend a Division of Responsibility in Feeding,” earlier in this chapter.

If there is a concern about iron-deficiency, refer the family to their primary care provider to explore the possibility of an iron supplement. Iron supplements should be used under the direction of a physician. (95)

4) “I am hesitant to feed many foods to my older baby because I am afraid he will choke.”

Concerns about gagging or choking may cause parents and guardians to delay offering their child a variety of foods and textures, which is associated with feeding challenges in young children and decreased intakes of certain nutritious foods. (2)

Caregivers may need reassurance that gagging is a normal and healthy part of the process of learning to eat solid foods and more advanced textures. (85) Infants and toddlers have a sensitive gag reflex, which helps to prevent choking. (2) (85)

Encourage parents to stay calm and reassuring when gagging occurs, as to not startle their child or make them afraid of trying new foods. (85)

Gagging must be distinguished from choking, where a food or an object blocks the child’s airway and prevents them from breathing. (96) Children should be supervised during meals and snacks, and certain food shapes and textures should be avoided before four years of age. (2)

See “Food Textures,” earlier in this chapter.
5) “We all follow a low-fat diet in my family. Shouldn’t I give my baby a head start with some skim milk at 12 months?”

Dietary fat restrictions are not recommended for children younger than two years, as this may compromise their intake of energy and essential fatty acids. Adequate intake of dietary fat is required for proper growth and development, including brain development. See “Dietary Fats” in Chapter 6: Nutrients of Concern.

Skim milk is not recommended for children younger than two years. Skim milk is low in calories and provides no essential fatty acids. For children that are no longer receiving human milk, whole (3.25% M.F.) milk is recommended from nine to 12 months until at least two years of age, at which time they can be offered the family’s preferred choice of milk (i.e. whole, 2% M.F., 1% M.F., or skim milk). (2) See “Cow’s Milk” in Chapter 3: Animal Milks and Other Beverages.

6) “My 12-month-old doesn’t eat anything unless I force-feed him. How much should he be eating?”

Current guidelines for feeding young children do not prescribe specific quantities of food that should be consumed during a meal or day, reflecting that the amount that an individual child eats varies based on many factors. Parents and guardians may need reassurance that children will eat less on some days and will compensate by eating more on other days. (2) Growth monitoring can help to determine if the child is growing at an appropriate rate (see “Growth” in Chapter 5: Issues of Concern).

Tips for parents and guardians:

- Maintain a division of responsibility in feeding. See “Recommend a Division of Responsibility in Feeding,” earlier in this chapter. Pressure or restrictive feeding practices can interfere with his ability to respond to his hunger and fullness cues, and can affect his relationship with food. (15)

- At every age, he has the ability to determine how much to eat or whether he wants to eat at a particular meal or snack time. (2)

- Adults can take responsibility for deciding what foods to offer and can work towards a regular and age-appropriate meal and snack routine. (2)

- Aim for a regular routine of three meals and two or three planned, sit-down snacks per day. Food “handouts” or beverages (other than water) between times can make it harder for him to eat well at meals and snacks, and his progress in learning to enjoy a variety of family foods. (15)

- Serve the same foods to the whole family, modifying texture of his food if needed. Eat together. (2)
• Serve small portions to start and provide more if he shows interest. (2)

• Create a calm and pleasant eating environment. (90)

Resource for parents and guardians:

• The child who eats “too little” (Ellyn Satter Institute)

7) “My nine-month-old is very fat. I am concerned that she eats everything in sight. If I didn’t stop her she would eat everything. How can I control her?”

Restrained feeding does not reassure a child that they will get enough to eat, can increase their preoccupation with food, and can interfere with their ability to respond to their body’s hunger and fullness cues. It can also lead to feeding struggles. (97)

As per the division of responsibility in feeding, at every age, the child is responsible for deciding how much they want to eat, or whether they want to eat at all at a particular meal or snack time. (2) Encourage parents and guardians to apply the same feeding approaches as described in the scenario above (#6).

Resources for parents and guardians:

• The child who eats “too much” (Ellyn Satter Institute)


8) “My child doesn’t like vegetables.”

Children often need repeated neutral exposures to a food before they will accept it – this is normal. Some sources suggest it may take 10, 15, or 20 (or more) exposures before they learn to like a new food, but most parents and guardians “give up” after only offering it three times. (2) (98) With plenty of opportunities to learn, children will eventually learn to like a variety of family foods. Children will learn at their own pace. (99)

Tips for parents and guardians in helping their child to get comfortable with vegetables:

• Follow a division of responsibility in feeding. (2) See “Recommend a Division of Responsibility in Feeding,” earlier in this chapter.

• Continue offering vegetables, in different forms, as part of meals and snacks. (2) Do not limit the menu to foods kids will readily accept, as this will not help them learn to like new foods. (89)

• Adults are role models. Eat together and enjoy vegetables yourself. Kids are more likely to try foods that they see others enjoying. (85)
• Remove all forms of pressure. Pressure includes forcing, bribing, rewarding, or praising. Pressure can cause kids to eat less. (89)

• “Hiding” vegetables in foods (e.g. in sauces, purees, or juice) does not help kids learn to like those foods and may affect their trust. (100)

• Give kids lots of chances to learn - they need to see, smell, touch, taste, and experiment with food, at their own pace. Try growing vegetables, pointing them out in the store or market, or having kids “help” to prepare them. (85)

Resources for parents and guardians

• Picky Eater? Kids are “Eaters in Training” (NH Document Source #10-421-6038)

• Talking to Kids about Food (NH Document Source #10-421-6053)

• Coaching Kids to Become Good Eaters (NH Document Source #10-421-6048)

• The child who doesn’t eat fruits and vegetables (Ellyn Satter Institute)

9) “My toddler won’t drink milk.”

Children need time to learn to accept new foods. Strategies for helping a child learn to like milk are similar to those described above in the scenario about vegetables (#8).

In the interim, for the toddler who no longer receives human milk, it is important to consider sources of vitamin D, calcium, protein, and fat in the child’s diet:

• Plant-based beverages, such as soy, almond, hemp, or coconut “milks”, are not recommended before two years of age (see Chapter 3: Animal Milks and Other Beverages). (15)

• For children (over 9-12 months of age) who do not drink 2 cups of cow’s milk daily, a 400 IU vitamin D supplement is recommended. (2)

• Fat can be obtained from a variety of foods (e.g. avocado, nut butters, fatty fish, cheese, fats, and oils), as can calcium (e.g. cheese, yogurt) and protein.

• An assessment with a dietitian can help to ensure that the child’s diet contains an adequate amount of these nutrients of concern.

10) “My toddler doesn’t eat much food so I give her a toddler drink to make sure that she is getting her nutritional needs met.”

Toddler drinks and toddler milks are marketed as alternatives or complements to cow’s milk for children 12 months of age and older. (2) Generally, these beverages are not necessary for young children. (77)
There are concerns that the marketing of such commercial foods may undermine the progress in optimal feeding. (77) For example, providing such beverages to “picky eaters” may interfere with family meals, the division of responsibility in feeding, and a young child’s learning to (eventually) accept a range of family foods. (78)

If parents and guardians are using or are inquiring about these products, it may warrant an exploration of any concerns they might have regarding feeding or their child’s growth.


See also scenario #6, above, for guidance on supporting the parent or guardian of the child who appears to eat too little.
Additional Resources

Resources for Parents and Guardians
See previous chapter sections for client information specific to various aspects of infant and toddler feeding. Below are additional client resources.

- Nutrition in the First Year (NH webpage)
- Nutrition for Toddlers and Preschoolers (NH webpage)
- Healthy Eating - Infants and Children (HealthLink BC)
- Videos (1 minute each): “Raising our Healthy Kids” (Alberta Health Services):
  - Infant Nutrition
  - Preschool Nutrition
- Let’s talk! Meal-Time Conversation Cards for Toddlers and Preschoolers (Vancouver Island Health Authority) (NH Document Source #1926)
- Dietitian Services at HealthLink BC (NH Document Source #1997)

Resources to Support Practice:
- Pediatric Nutrition Guidelines (Six Months to Six Years) for Health Professionals (Provincial Health Services Authority)
  - Organized by age: six to nine months, nine to 12 months, 12-24 months, and two to six years
  - Summarizes guidelines for fluids and food, and lists nutrition risk indicators
- Display: Feeding Babies Age 6 – 12 Months (NH Document Source #10-421-6069)
  - Collection of posters for a tri-fold display board or bullet board display, ideal for waiting rooms or health fairs
  - Includes suggested display set-up information, key messages, and a list of recommended client handouts to accompany the display
5. Issues of Concern

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Allergens

Food allergy can be defined as “when the immune system mistakes a specific protein (an allergen) in a food as harmful.” (12)

Some food allergies are more common than others. The vast majority of food allergies are associated with the following foods, known as “common food allergens”: (12)

- Milk (and milk products)
- Egg
- Peanut
- Tree nuts (e.g. almonds, cashews, walnuts)
- Soy
- Seafood (fish, shellfish, and crustaceans)
- Wheat
- Sesame

When a person has a food allergy, they will have an allergic reaction each time they eat the food to which they are allergic. (12)

Symptoms of Food Allergy

- Symptoms of food allergy can range from mild to severe. (12)
- They can include hives, swelling, redness, rash, and/or stuffy or runny nose with itchy, watery eyes. Reactions often appear within minutes of exposure to food allergen. (12)
- Gastrointestinal symptoms can include vomiting and/or diarrhea, which can occur hours later. (12)

Practice Points

- Maternal dietary restrictions during pregnancy and lactation are not recommended for the prevention of food allergies in infants.
- Delaying the introduction of common food allergens is not recommended.
- For most infants, common food allergens can be introduced starting at about six months of age.
- For infants at high risk of food allergies, consider introducing common food allergens at about six months of age, but not before four months of age, based on signs of developmental readiness.
- Individualized care plans and an interdisciplinary team approach are indicated for children with suspected or confirmed food allergies.
• Severe symptoms require immediate medical attention, and include swelling of the mouth, tongue, or throat; hives that are spreading; difficulty breathing; difficulty swallowing; hoarse voice; pale or blue colour of the face or lips; and/or faintness, weakness, or loss of consciousness. (12)

**Risk of Food Allergy**

There is no international consensus on how to define infants who are at risk or at high risk for developing food allergy. A 2019 Canadian Pediatric Society practice point defines infants at high risk of developing food allergy as those who: (101)

• have a personal history of atopy, including eczema

• have a first-degree relative (i.e. parent or sibling) with atopy (e.g. eczema, food allergy, allergic rhinitis, or asthma)

Infants who have severe eczema or egg allergy (an estimated 1-2% of infants) are considered to be at higher risk than others for developing peanut allergy. (102) (103)

However, infants with mild to moderate eczema may also be at risk of developing food allergy. (101)

Food allergy does not cause eczema. Rather, having eczema increases the risk of developing a food allergy. (12)

Infants who develop food allergy tend to have broken skin (i.e. eczema). Research suggests that, when the first exposure to a food allergen happens via broken skin, the risk of food allergy development is increased. In contrast, initial exposure via the digestive tract appears to promote tolerance to a food. (104)

For these reasons, reducing risk of food allergy in infants and young children includes both good management of eczema and the timely introduction of food allergens. (12)

**Maternal Diet during Pregnancy**

• Dietary restrictions during pregnancy are not recommended for the prevention of allergic conditions among infants and carry the risk of maternal under-nutrition. (12) (42)

• There is currently insufficient evidence to support maternal supplementation of fish oil and/or DHA during pregnancy for the purposes of preventing food allergy in young children. (105) (106) (107) As for other adults, Health Canada recommends that pregnant women eat at least 150 grams (5 ounces, or two small portions) per week of fatty fish that is low in mercury (108).
Maternal Diet during Lactation

- Maternal dietary restrictions during lactation are not recommended for the prevention of allergic conditions in infants. (3) (12) (42)

- There is currently insufficient evidence to support maternal supplementation of fish oil and/or DHA during lactation for the purposes of preventing food allergy in young children. (105) As for other adults, Health Canada recommends that women of childbearing age eat at least 150 grams (5 ounces, or two small portions) per week of fatty fish that is low in mercury. (109)

- Allergens can pass from a mother’s diet into her breast milk, and some children may react to an allergen in breast milk. (42)
  - A mother may have to remove a confirmed allergen from her diet. (42) She should be encouraged to continue breastfeeding.
  - She should be offered support from a dietitian to ensure that the allergen is removed from her diet and, in order to support her health, to ensure that her diet remains nutritionally adequate and is not unnecessarily restricted. (42)

- Cow’s milk allergy is infrequently associated with “colic”. (3) For breastfed infants with severe colic, where the relatively rare concern of an allergy to cow’s milk is suspected, a short trial of a cow’s milk-free maternal diet may be considered. (3) (110)
  - This trial should be done with assistance from a dietitian, to ensure that all sources of cow’s milk protein are eliminated from the mother’s diet and are adequately substituted. (3)
  - This trial should be discontinued after two to four weeks if there is no observed benefit. (110) (111)
  - Care should be taken to ensure that breastfeeding is not prematurely discontinued. (110)

Breastfeeding and Human Milk

- Human milk may help to prevent allergies in infants, (12) but the evidence that breastfeeding is protective against allergy development is not strong. (42) (112)

- Breastfeeding, exclusively for the first six months, and to two years or beyond with appropriate complementary feeding, is recommended for nutrition, immunologic protection, growth, and development. (42)
Human Milk Substitutes (Commercial Infant Formulas)

- Soy-based formulas, compared to cow’s milk-based formulas, have not been demonstrated to have a protective effect on childhood allergy incidence, and are not recommended for preventing allergy. (113)

- A recent systematic review and meta-analysis does not support the use of hydrolyzed formula to prevent allergy in infants at risk of allergy. (114)

- Extensively hydrolyzed formula is intended for infants who have physician-confirmed food allergies. (3)

- There is no role for partially hydrolyzed formula in the management of suspected or confirmed cow’s milk allergy, as it would be expected to provoke an allergic reaction (in response to proteins that remain sufficiently intact to induce an immune response). (42)

Introduction of Complementary Foods – Timing

- Common food allergens are milk (and milk products), egg, peanut, tree nuts, soy, seafood (fish, shellfish, and crustaceans), wheat, and sesame. (15)

- For the majority of infants, common food allergens can be introduced starting at about six months. (2) (15) (101)

- For infants at high risk of developing food allergies, consideration can be given to introducing specific foods between four-to-six months of age. A recent Canadian Pediatric Society practice point states, “For high-risk infants, and based on developmental readiness, consider introducing common allergenic solids at around 6 months of age, but not before an infant is 4 months of age.” (101)
  
  - The evidence to support early introduction is strongest for egg and peanut. (15) (101)

- Delaying the introduction of common food allergens is not recommended as a way to prevent food allergies, including for infants at risk of allergies. (3) (15)
  
  - Unnecessary delays in the introduction of common food allergens:
    
    - may increase the risk of food allergies developing (15) (42) (102)
    
    - may interfere with the promotion of healthy eating behaviours (42)
    
    - may limit the range of iron-rich foods made available to infants, as many common food allergens are also sources of iron (e.g. fish, shellfish, peanut, tree nuts, whole egg, and fortified cereals containing wheat) (42)

- To reduce the risk of choking, recommend texturally modifying food to suit developmental stage. (42) See “Food Textures” in Chapter 4: Feeding by Age.
Introduction of Complementary Foods – Approaches

The recommendations below apply to infants at increased risk for allergy, but could also be applied by families if they are otherwise concerned about the risk of food allergy.

- Advise to introduce common food allergens one-at-a-time, to gauge reaction. Avoid unnecessary delays between each new food. (42) (101)

- Foods that are not common food allergens do not need to be introduced one-at-a-time. (15)

- If an infant tolerates a food, recommend that parents and guardians continue to offer it two to three times per week to maintain tolerance. (15) (101)

- If an allergic reaction to a food is suspected, advise parents and guardians to stop giving that food and to seek medical clarity (i.e. a diagnosis). Encourage the continued introduction of other new foods. (42)

There is little evidence available to support other recommendations around how to introduce common food allergens. (42)

- Although Health Canada recommends waiting two days in between offering each common food allergen, the optimal time to wait between common food allergens is unknown, and a variety of factors may influence family choices. (15) (42)
  - Consider that symptoms of an allergic reaction often appear within minutes of eating the food, although they can also appear hours later. (15)
  - It is advised to avoid unnecessary delays between each new food. (101)

- There is no evidence that the order in which foods are introduced affects the risk of developing allergy, including for infants at risk of allergies. (2)
  - However, research suggests that, for infants at high risk, early introduction of peanut and cooked egg are particularly effective for reducing the risk of developing an allergy to these foods.
  - Encourage families to start with the common food allergens that they eat often. (12)

- There is no “right” time of day to introduce common food allergens. Support families to make a plan that is convenient and comfortable for them. (42)

- It is not recommended to introduce a common food allergen on the skin or on the lips prior to offering the food for eating. Allergy Services at HealthLink BC does not recommend this approach. (42) The presence or absence of a reaction on the skin cannot be interpreted in relation to food allergy.
Exposure via the digestive tract is thought to support tolerance to a food, whereas exposure via skin, particularly broken skin (i.e. eczema), may increase risk of development of food allergy. (104)

Individualized Care Plans for Children with Suspected or Confirmed Allergies

- The preceding guidelines, regarding maternal diet and the introduction of solids to infants, apply to families with a family history of allergic conditions. (42)

- If an adverse reaction to a food is observed, advise parents to consult with their primary care provider promptly to determine next steps. (101) Encourage the continued introduction of other new foods. (42)

- Parents and caregivers may also be interested in using the Allergy Check app from BC Children’s Hospital to understand whether symptoms may be caused by a food allergy. This does not replace the advice of health professionals. (115)

- Individualized care plans are required for infants with suspected or confirmed allergic conditions. Optimal care is child-centered and facilitated through an interdisciplinary team approach. (42)

- Refer to doctor, paediatrician, or paediatric allergist to: (42)
  - confirm food allergy
  - assess need for an emergency treatment plan
  - follow child for evidence of remission of food allergy, so that food can be reintroduced in their diet when appropriate to do so

- Consider a connection with a local dietitian, or to Dietitian Services at HealthLink BC by calling 811 (or 604-215-8110). They can support parents to avoid confirmed allergens, while ensuring that the diet remains adequate, and promote confidence in feeding. (42)

- A goal is to not unnecessarily restrict the child’s diet, so that they can still eat a wide variety of foods and partake in family meals. (42)

Resources for parents and guardians

- Reducing Risk of Food Allergy in your Baby (HealthLink BC)
- Eczema and Food Allergy in Babies and Young Children (HealthLink BC)
- Allergy Check app (BC Children’s Hospital)
- Dietitian Services at HealthLink BC (including Allergy Nutrition Services)
Colic (High Crying Infants)

Practice Points

- It is generally not beneficial to alter feeding practices when an infant has colic (i.e. is a high crier).
- Support parents and guardians with information on normal periods of increased crying and coping strategies.

“Colic” is a term that is usually used to describe infants’ periods of irritability, fussiness, or crying, in the absence of other health concerns (e.g. failure to thrive). While the causes are unknown, colic usually resolves by itself around four months. (3)

There is concern that the use of the term “colic” suggests that there is something wrong with an infant, the parents or guardians, or the care that is being provided. The “Period of PURPLE Crying®” has been suggested to be a more useful phrase to describe the normal phase of increased crying in early infancy. “High crying” has been used to describe infants who cry five or more hours per day during their peak crying period, which is at the higher end of the spectrum of normal crying behaviour. (116) Because inconsolable crying is the most common trigger for shaking and physical abuse of infants, BC’s Prevent Shaken Baby Syndrome program aims to provide education to parents and guardians about normal infant crying and how to respond.

Despite the above, because related feeding research uses the term “colic,” this term will be used in this chapter section.

Infant crying is stressful for parents and guardians, and often results in a variety of interventions in an attempt to manage it. Many of these interventions are not evidence-based. It is generally not beneficial to alter feeding practices, interrupt breastfeeding, restrict the diet of the breastfeeding mother, or supplement with formula. (3)

Breastfeeding and Human Milk

- The experience of colic is similar in infants receiving human milk and those receiving commercial infant formula. Mothers who are breastfeeding and providing expressed breast milk should be supported to continue to do so. (117)

- Cow’s milk allergy is infrequently associated with colic. (3) For breastfed infants with severe colic, where the relatively rare concern of an allergy to cow’s milk is suspected, consider a short trial of a cow’s milk-free maternal diet. (3) (110)
  - This trial should be done with assistance from a dietitian, to ensure that all sources of cow’s milk protein are eliminated from the mother’s diet and are adequately substituted. (3)
This trial should be discontinue after two to four weeks if there is no observed benefit. (110) (111)

Care should be taken to ensure that breastfeeding is not prematurely discontinued. (110)

**Human Milk Substitutes (Commercial Infant Formulas)**

- In most cases, avoid nutritional interventions in formula-fed infants. (117)
- Lactose-free formulas are ineffective in the management of colic. (3)
- Soy-based formulas are not recommended for the treatment of colic. (110) (117)
- All commercial infant formulas are fortified with iron. Formulas with higher iron levels (i.e. 1.2 mg iron/100 mL) are well tolerated. (39)
- If there is a concern about the relatively rare possibility of a cow’s milk protein allergy, a two week trial of an extensively hydrolyzed formula can be considered. (110) (117) See “Types of Human Milk Substitutes: Indications for Use” in Chapter 2: Human Milk Substitutes.

**Other Interventions**

- **Gripe water** - the use of gripe water as a treatment for colic has not been formally evaluated. If parents or guardians choose to use gripe water, advise them that it should not contain alcohol or sugar. (117) Various brands of gripe water have recently been recalled due to microbial contamination. (118)
- **Herbal teas** - herbal teas are not recommended due to concerns of:
  - lack of standardization of strength and dosage
  - potential harmful side-effects
  - potential displacement of human milk and commercial infant formula intake
- **Lactase** - evidence does not support lactase use for management of colic. (110)
- **Probiotics** - there is currently insufficient evidence to recommend the use of probiotics in the management of colic. (3)

**Resources for parents and guardians**

- [The Period of Purple Crying](#)
- [Shaken Baby Syndrome](#) (HealthLink BC)
- [Crying, Age 3 and Younger](#) (HealthLink BC)
- [Colic](#) (HealthLink BC)
Constipation

Infrequent stools that are soft and easy to pass are not a sign of constipation. (120) Constipation that does not resolve quickly will likely require medical management in order to prevent or manage related problems (119).

Normal Bowel Patterns

Parents and guardians often express concern about the frequency of their child’s bowel movements. While infrequent stools alone do not define constipation, information on the wide variation in normal stooling patterns can be helpful. (3)

- Almost all infants will grunt and turn red when passing stool. (11)
- Infants who receive human milk may have a wide range of “normal” stool patterns.
  - Constipation in breastfed infants is extremely rare. (3) (11)
  - After the first four to six weeks, breastfed infants may stool daily or they may have bowel movements as infrequently as once every week or longer. (3) (11) (119)
  - Infants who receive human milk can have greater variability in stool frequency than infants receiving commercial infant formula. (119) This wide range of normal infant stooling frequency is often misinterpreted. (3)
- After the first few weeks, infants who receive commercial infant formula may have a bowel movement every one to two days. (121)
- Stool frequency decreases with age, as the gut matures and better conserves water. (122)
  - For infants six to 12 months old, mean stools per week have been reported as five to 28 per week.
  - For toddlers one to three years old, mean stools per week was found to be four to 21 per week.
Types of Constipation

Acute constipation:
- Defined as a short-term (less than two weeks) condition that is self-limited, it can usually be successfully treated with adequate fluid intake and, for older infants and children, a diet containing adequate fibre. (123)
- Acute constipation may occur with dietary changes (e.g. starting solids, weaning from human milk), changes in routine (e.g. starting daycare), or during or after illness with fever and vomiting. (124)

Chronic constipation - organic:
- In rare circumstances, constipation is caused by an underlying medical condition, with anatomic, endocrine, metabolic, or neurogenic causes, such as hypothyroidism, Hirschsprung disease, or anorectal malformations. (123)
- Onset of symptoms in infants less than one month old raises suspicion of the presence of an organic condition. (125)

Chronic constipation - functional:
- This constipation is of longer duration (one or two months), with no underlying medical/organic cause. (123) (125)
- Untreated constipation can lead to abdominal pain, appetite suppression, fecal incontinence, lowered self-esteem, social isolation, and family disruption. (119)
- Voluntary stool retention by the child, for fear of painful bowel movements, can result in stools that are even more painful to pass, resulting in further stool retention. (123)
- Chronic constipation usually requires several months of treatment and cooperation between parents and guardians, caregivers, the child, and the primary care provider. (120)
- Treatment goals include soft, painless stools, and the prevention of reaccumulation of feces, and may involve a combination of education, behavioural modification, medication, and dietary modification. (119)
Dietary Interventions

- Attention to diet can help prevent and treat acute constipation, and may help prevent the development of chronic functional constipation. (123)

- With chronic functional constipation, dietary interventions alone are not recommended as the first-line treatment. Alongside medical and behavioural therapy, dietary interventions (e.g. increased fibre intake) can be encouraged following disimpaction. (126)

- Adequate fluid intake is recommended in all cases. (126)

- If a cow’s milk allergy is suspected in a child experiencing constipation, support the family to seek a diagnosis, and consider a four-week trial of a diet free from cow’s milk protein. (126) See “Allergens”, earlier in this chapter.

Dietary Interventions for Infants Receiving Human Milk, 0-6 Months

- Provide support to correct any problems with breastfeeding. (126)

- As always, recommend offering the breast, and human milk, in a manner that is responsive to infants’ feeding cues. (124) See “Honour Hunger and Satiety Cues”, in Chapter 4: Feeding by Age.

- Prune juice, corn syrup, brown sugar water, or other home remedies are not recommended for young infants. (3)

Dietary Interventions for Infants Receiving Human Milk Substitutes (Commercial Infant Formula), 0 to 6 Months

- Care should be taken to ensure that formula is prepared properly (i.e. that powdered and concentrated formulas are adequately reconstituted as per manufacturer’s directions). (124)

- As always, recommend offering human milk substitutes in a manner that is responsive to infants’ feeding cues. See “Honour Hunger and Satiety Cues”, in Chapter 4: Feeding by Age.

- Iron-fortified formulas do not cause constipation in infants. (127) All commercially available formulas contain iron. (3)

- There is not enough evidence to recommend switching from a standard infant formula to formulas with different characteristics (e.g. with prebiotics). (126)

- Prune juice, corn syrup, brown sugar water, or other home remedies are not recommended for young infants. (3)
Dietary Interventions for Older Infants and Young Children (6 Months and Older)

- Recommend continued breastfeeding and provision of human milk. For formula-fed infants, recommend transitioning from infant formula to cow’s milk when infants are nine to 12 months old and are consuming iron-rich foods daily. (15) See “Cow’s Milk” in Chapter 3: Animal Milks and Other Beverages.

- Other beverages:
  - Small amounts of water can be offered in an open cup to infants 6-12 months of age. (15) After 12 months, recommend offering water frequently, (2) such as by making water available with and between meals and snacks.
  - Excessive milk intake can displace intake of dietary fibre. (2) Recommend limiting cow’s milk intake to 3 cups (750 mL) per day (for children 9-12 months and older). (2) (15)
  - If parents and guardians wish to offer juice, such as unsweetened apple, pear, or prune juice, advise them to limit this to ½ cup (125 mL) per day. (15) For detailed recommendations regarding the use of juice, see “Fruit Juice” in Chapter 3: Animal Milks and Other Beverages.

- Solid foods:
  - Recommend an age-appropriate, balanced diet with sufficient fibre. (2) (119) (126) Foods sources of fibre include: soft beans, peas, and lentils; whole grain breads, crackers, and cereals; and soft vegetables and fruit.
  - If parents and guardians wish to offer additional fibre-rich foods, advise that this should occur only after disimpaction has occurred (if needed). Advise increasing fibre gradually. Sufficient fluids are also required. Monitor gastrointestinal side-effects and growth. (126)
  - Fibre supplements are not generally recommended for infants and toddlers. (124) (128) Bran is not recommended for children less than two years of age. (126) Recommend providing adequate fibre through foods.
  - There is a lack of evidence to inform guidelines regarding the use of prunes for the treatment of constipation in children. (126) If prunes are offered, advise starting with a small amount (i.e. 1 Tbsp or 15 mL) and increasing slowly. (124)

Resources for parents and guardians

- Constipation, Age 11 and Younger (HealthLink BC)
- Healthy Bowel Habits for Children (Canadian Pediatric Society)
Dental Health

Early childhood caries (ECC) is a common, but preventable, disease in children that can lead to serious infections, eating difficulties, and other dental and social problems. (2)

Dental Health

Dietary risk factors for ECC include:

- prolonged and frequent exposure to sugar through:
  - continuous sipping of fluids (other than water) (2)
  - high and frequent sugar intake from sugary foods and beverages (129)
  - dipping pacifiers in honey or syrup (129)
  - sleeping with a bottle (129) (containing anything other than water)

- saliva sharing behaviours between adults and children, or between children, such as sharing spoons, cleaning soothers in mouths, (129) or pre-chewing food. There is a significant correlation between maternal salivary levels of \textit{S.mutans} bacteria and ECC in their children. (129)

Recommendations:

- Encourage good dental hygiene for parents and guardians to help prevent vertical transmission of cavity-causing bacteria to their children. (129)
  - Parental \textit{S.mutans} bacteria levels can be reduced through dietary modifications, reduced intake of sugars, dental care, use of fluoride, and use of chewing gum containing xylitol or sorbitol. (129)
  - Bacteria transmission is reduced by avoiding saliva-sharing behaviours. (129)

- Emphasize oral hygiene for all infants and children as part of daily care. (2)
  - Recommend cleaning infants’ gums with a clean, damp washcloth or soft baby toothbrush, even before teeth are visible. (129)
  - Advise that, between birth and three years of age, children should have their teeth and gums brushed by an adult. (129) When the first teeth appear, recommend using a rice-sized amount of fluoridated toothpaste. (85)
○ Between three years and seven to eight years, advise that children should be assisted to brush their teeth with a pea-sized amount of fluoridated toothpaste. (129) (130)

- If using bottles, recommend that parents and guardians:
  ○ hold infants during feeding – even older infants benefit from being held (3)
  ○ remove the bottle when the child is finished feeding
  ○ avoid putting children to bed with a bottle
  ○ avoid propping bottles (3)
  ○ avoid the use of a bottle as a pacifier (3)
  ○ avoid long-term use of bottles. Consider that:
    ▪ after six months, fluids other than expressed breast milk and commercial infant formula can be offered in an open cup (3)
    ▪ the transition from bottle feeding to an open cup can take place by about 12 months, and is ideally completed, for all fluids, by 18 months (3)


- Recommend limiting fruit juice; it is considered to be a “sugary drink” as per Canada’s food guide. (2) (73) If parents and guardians choose to offer fruit juice (after six months of age), recommend that they:
  ○ serve it in an open cup (i.e. not in a bottle or sippy cup) (2) (64)
  ○ offer it as part of a meal or snack (64)
  ○ limit offerings to once or twice per day (2)
  ○ limit intake to 125 mL (½ cup) per day (15)

See “Fruit Juice” in Chapter 3: Animal Milks and Other Beverages.

- Recommend limiting or avoiding sugary drinks, acidic beverages, and sticky foods. (2) (129) If such foods and beverages are offered, recommend limiting them to meal and snack times.

- Recommend working towards establishing a regular meal and snack pattern. By 12 months, this could be three meals and two or three snacks daily, with water in between times. (2) (15)
Resources for parents and guardians

• Hello Cup…Bye-Bye Bottle (NH Document Source #10-402-6027)
• Dental Care (Baby’s Best Chance, Province of BC)
• Looking After Your Toddler’s Teeth (Toddler’s First Steps, Province of BC)
• Dental Care for your Infant and Toddler (HealthLink BC)
• NH Dental Health Program
Diarrhea (Acute) and Dehydration

Practice Points

- Appropriate diagnosis of diarrhea and dehydration are important. Recommend seeking medical attention if a child is thought to be dehydrated.
- Infants with diarrhea, without dehydration, should continue to be fed an age-appropriate diet and should be offered increased fluids from their usual diet.
- Treatment for mild to moderate dehydration includes the use of oral rehydration solutions, fluid maintenance, and appropriate re-feeding.
- Severe dehydration requires intravenous rehydration in a clinical setting.
- When dehydration is corrected, early re-feeding with a normal diet is recommended.

Diarrhea is generally defined as a change in consistency of the stools to loose, liquid, or watery stools, and/or an increase in the frequency of stools. (3) (131) Acute diarrhea is often caused by an infection, such as rotavirus. (3)

The main clinical concern with acute diarrhea is the risk of dehydration, especially in infants and young children, as they can become dehydrated very quickly. (3) (132) Rehydration is the key treatment and should be started as soon as possible. Management will depend on the degree of dehydration. (131)

As soon as dehydration is corrected, early re-feeding with a normal diet is recommended. This helps repair the digestive tract, decreases nutrient losses, and hastens recovery. (13) (131)

Mild or Minimal Dehydration

- Symptoms include an increase in thirst and a slight decrease in urine output. (132)
- Diets should not be restricted; infants and young children should continue to be fed age-appropriate diets, without interruption. (131)
- Breastfed infants should be offered the breast more often than usual. (13) (132)
- Infants receiving expressed breast milk and/or commercial infant formula should be offered an increased number of feedings daily. (13) (132)
- Older infants and young children should be encouraged to drink often; (132) their regular fluids or oral rehydration solutions can be offered to replace fluid losses.
and cover maintenance needs. (131) Fluids high in sugars (e.g. fruit juices, ginger ale, and other soft drinks) should be avoided. (131)

**Moderate Dehydration**

- Symptoms may include dry mouth and eyes, significantly increased thirst, little urine output in last six to eight hours, and sunken fontanel. (132) Medical attention is recommended. (132)
- Rehydration should start as soon as possible with oral rehydration therapy. (3) (131)
- Oral rehydration solutions (ORS) are specially formulated solutions of water, carbohydrate, sodium, potassium, chloride, and a base precursor. (131) They are available in ready-to-serve format in pharmacies. ORS can be provided by dropper, syringe, spoon, or bottle. (131) (132)
- ORS should be given until diarrhea stops, to replace ongoing stool losses and prevent the reoccurrence of dehydration. (131)
- Homemade ORS are not recommended due to potential errors in formulation. (131)
- The following are *not* appropriate substitutes for ORS: water, tea, juice, soft drinks, sports drinks, broths, and homemade remedies. (131)

**Severe Dehydration**

- Symptoms may include very dry eyes and mouth, little to no urine output in last 12 hours, and a child that is weak, dizzy, very sleepy, and/or hard to wake up. (132)
- Intravenous rehydration in a clinical setting is recommended. (3) (131)

Additional considerations for the nutritional management of diarrhea and dehydration are included below.

**Infants Receiving Human Milk**

- Human milk reduces the risk of gastrointestinal infections in infants, and has been shown to reduce the severity of diarrhea from rotavirus. (3)
- Breastfed infants should continue to breastfeed and receive EBM during the management of acute diarrhea. (131) They should be offered a greater number of feeds than usual, (132) and should continue to feed on cue. (13)
Infants Receiving Human Milk Substitutes (Commercial Infant Formulas)

- Once rehydrated, infants should return to their usual formula feeds. Formula should be reconstituted as per manufacturers’ directions (i.e. it should not be over-diluted). (133)

- Adequate lactose digestion and absorption are preserved in acute gastroenteritis so that low lactose and lactose-free formulas have no clinical advantages over lactose-containing formulas. (131)

- Lactose-free or low lactose formulas are not indicated when: (131)
  - dehydration is not present, or has been treated
  - mild to moderate dehydration exists

- Lactose-free or low lactose formulas may be justified in the following cases: (131)
  - severe dehydration
  - severe enteropathy
  - severe malnutrition
  - when lactose-containing formula worsens the condition, such as with confirmed lactase deficiency

Older Infants and Young Children

- Once rehydrated, young children should be offered their usual diet. (131)

- Research continues to explore the best foods for re-feeding. Recommend offering a variety of age-appropriate, nutrient-dense foods from pre-illness diets. (131)

- The “BRAT diet” (bananas, rice, applesauce, tea/toast), clear fluids, other restrictive diets, or “gut rest” are not recommended and can result in severe malnutrition. (131)

- Foods and fluids high in sugar might worsen diarrhea. Advised avoiding juices, sports drinks, soft drinks, flavoured gelatins, and sugary desserts. (131)

Resources for parents and guardians

- Diarrhea, Age 11 and Younger (HealthLink BC)

- Dehydration and Diarrhea in Children: Prevention and Treatment (Canadian Pediatric Society)
Food Insecurity (Household)

Practice Points

- Household food insecurity is a significant public health issue in northern BC.
- Household food insecurity is based on a lack of sufficient income to purchase food. Screen clients, and link to financial and other supports, as needed.
- Families benefit from compassionate and non-judgmental support to reduce the risk of nutrient deficiencies and to optimize their children’s diets.
- Although breastfeeding and the expression of breast milk have the potential to be food security strategies for infants, low income mothers may face greater barriers and are less likely to maintain breastfeeding and lactation. Provide mothers with additional and continued supports to meet their infant feeding goals.
- Support families who use commercial infant formula to choose a formula that is “acceptable, feasible, affordable, sustainable, and safe” in their circumstances.

Household food insecurity is defined as “when a household worries about or lacks the financial means to buy healthy, safe, and personally acceptable food.” (134) This definition highlights that the root cause of household food insecurity is not a lack of food skills, budgeting skills, or nutrition knowledge, (135) nor is it the cost or availability of food. Rather, household food insecurity is based on the lack of sufficient income to purchase food. It is an income-based problem that requires income-based solutions.

Household Food Insecurity Rates

Based on 2011-12 BC data, household food insecurity rates were as follows:

- 17% of all northern BC households (compared to 12% of BC households) (134)
- 25% of northern BC households with children (compared to 15% of BC households with children) (134)
- 34% of BC households with female lone parents/guardians (134)
- 29% of BC Indigenous households off reserve, (134) 41% of households on reserve, and 45% of households on reserve with children (136)
- 79% of northern BC households who rely on social assistance as the main source of income (compared to 76% of BC households who rely on social assistance as the main source of income) (134)
While the above statistics emphasize that households who rely on social assistance are particularly vulnerable, it is also important to note that 65% of food insecure households in BC are working households, with income from salaries or wages. (134)

In addition to income, many Indigenous peoples face unique barriers to food security, including concerns regarding access to, and control over, land and foods that are culturally appropriate. (137)

The following infographic describes household food insecurity in the NH region: NH BC – Household Food Insecurity in 2011-2012 (BC Centre for Disease Control; NH Document Source #21069).

**Food Costs**

In addition to higher food insecurity rates in northern BC, food prices are also rising, which is particularly challenging for families on fixed and low incomes. In 2017, the average monthly cost for a basic nutritious diet, for a reference family of four in the Northern Health region, was $1038. (138) However, the true cost of eating in northern BC includes more than food prices, as there are other expenses associated with accessing food (e.g. travel to food stores).

**Experiences and Impacts of Household Food Insecurity**

Members of food insecure households worry about not having enough food, which may compromise the quality or quantity of food they consume. (14) (134) There may also be challenges with inadequate kitchen equipment (e.g. refrigeration, storage, cooking pots) and transportation to grocery stores, especially for rural and remote communities, where families often have to travel long distances to reach full-service grocery stores. (139)

Adults who are food insecure are at risk for distress, depression, and social isolation. (134) When parents or guardians have difficulty feeding their children well, they may also feel like failures as parents. (14) In food insecure households with children, mothers and other adults may go without food to prioritize feeding their children. (14) (136) (139)

Food insecurity can hinder growth and development in early life: (134)

- Food insecure children have poorer general health, academic outcomes, and social skills than their peers. They are also at risk for a variety of chronic illnesses.
- Iron deficiency anemia is a particular concern for young children who are food insecure.
Screening and Supporting Clients Who Experience Food Insecurity

All healthcare providers can play an important role in supporting clients who experience household food insecurity.

Recommendations:

- Screen for household food insecurity
  - Consider asking, “Within the past 12 months, did you and other household members worry that food would run out before you got money to buy more?”
  - Document in the patient record and revisit at subsequent visits.

- Provide compassionate, non-judgemental, and culturally safe care, acknowledging that food insecurity presents challenges for feeding family members and meeting health care needs.

- Assist clients in accessing support (e.g. financial, food, other):
  - Household food insecurity is an income-based issue that requires income-based solutions. As a first step, connect clients to financial supports.
  - Emergency food access may be required. Consider linkages to community programs that facilitate access to food and/or supplements, such as food banks, soup kitchens, Friendship Centres, and parenting programs.
  - Consider linkages with other health professionals and programs:
    - Liaise with allied health professionals to best support clients.
    - Consider linking Indigenous clients with their bands, communities, and/or friendship houses for supports.
    - The First Nations Health Authority benefits program provides coverage of specific products for eligible clients, including for a manual breast pump, maternal multivitamins, and vitamin D supplements. A prescription may be required.

Additional resources for health professionals:

- Poverty: A Clinical Tool for Primary Care Providers (BC) (Centre for Effective Practice)
- CLEAR toolkit: health professionals addressing social causes of poor health (McGill Department of Family Medicine)
Implications for Practice: Breastfeeding and Human Milk

Breastfeeding and the expression of breast milk can be viewed as food security strategies for infants; a mother’s milk is generally safe and is available regardless of income. However, in Canada, food insecure mothers face greater barriers to breastfeeding; research demonstrates that lower incomes and household food insecurity are associated with lower rates of breastfeeding initiation, exclusivity, and duration. (139) (140) (141) While many mothers worry about having “enough milk”, food insecure mothers may also worry about the quality of their breast milk. (14)

- Mothers can be reassured that their milk will be of excellent quality, even if they do not always eat well.
  - Day-to-day maternal diet quality has little or no effect on the milk production and the quantity of most nutrients in breast milk. (3) Some nutrient levels are affected by maternal diets, such as vitamin B12. (22) Continued use of a maternal multivitamin supplement is recommended for lactating women. (142)
  - Human milk also contains other important components not found in infant formula (e.g. antibodies, enzymes, hormones, and stem cells). (21)
  - Once breastfeeding is established, a modest maternal energy deficit (i.e. a deficit of 500 calories per day) does not adversely affect milk production or nutrient composition. (22) (143)
  - Rapid weight loss and/or protein-energy malnutrition can reduce milk production, (3) but does not significantly affect nutrient composition. (143)
  - A mother’s diet is important for her own health. (3) Link to a dietitian, if needed. See “Maternal Diet and Nutrition” in Chapter 1: Breastfeeding and Human Milk.

- Breastfeeding generally requires no special equipment.
- Hand expression of breast milk incurs no costs, and any clean container can be used to collect breast milk. (11) See “Collection and Storage of Expressed Breast Milk (EBM)” in Chapter 1: Breastfeeding and Human Milk.

- In some communities, breast pumps may be available for rent or for loan from health units/centres, pharmacies, or community programs. Eligible BC First Nations clients can obtain one manual breast pump through the First Nations Health Authority benefits program (a prescription is required).

- Starting in the prenatal period, low-income mothers may benefit from additional, ongoing connection with health professionals for lactation and emotional support. (14) (22) (139) For more information, see Chapter 1: “Breastfeeding and Human Milk”.
Implications for Practice: Human Milk Substitutes (Commercial Infant Formulas)

Access to commercial infant formula can be a significant problem for low-income families. (14) (139) Families may prioritize the purchasing of formula over other foods, which may compromise the diets of other household members. Other strategies to offset the costs of formula include diluting formula, and earlier than recommended introduction of water, juice, or cow’s milk. (14) Formula is not always accessible through food charity, and families may have to switch types of formula depending on what is available. (14) Parents and guardians who do have access to formula sometimes continue to provide this to their children beyond one year of age, as they view it to be a reliable source of nutrients. (14)

- Families who do not exclusively breastfeed and provide their young infants with human milk should be supported to choose a commercial infant formula that is “acceptable, feasible, affordable, sustainable, and safe” in their circumstances. (144) See “Selecting Commercial Infant Formula” in Chapter 2: Human Milk Substitutes.

- The composition of commercial infant formula is regulated in Canada by the Food and Drug Regulations. (3) Families can be assured that commercial infant formula will be nutritionally adequate for healthy, term infants, regardless of brand or price.

- Powdered formulas are less expensive than liquid alternatives, but present additional risks because they are not sterile; support families to ensure that they are preparing and handling all infant formula safely. (3) See “Safely Preparing and Storing Commercial Infant Formula” in Chapter 2: Human Milk Substitutes.

- Feeding changes are unnecessary for most common health conditions in infancy. (3) Families may benefit from support if they are considering trialling more expensive formulas. See “Allergens”, “Colic (High Crying Infants)”, or “Reflux”, earlier in this chapter.

- Formula-fed infants at higher risk of iron deficiency may need formulas with iron levels at the higher end of the fortification range. (3) See “Iron” in Chapter 6: Nutrients of Concern.

- Homemade formulas are not recommended. If families provide their infants with such formulas, steps need to be taken to reduce associated risks. (3) See “Evaporated Milk Formulas” in Chapter 2: Human Milk Substitutes.
Implications for Practice: Complementary Foods

To off-set the costs of commercial infant formula, families who feed their infants with formula sometimes choose to start solid foods and cow’s milk earlier than recommended. (139)

- Iron deficiency anemia is a concern for children living in food insecure households. (134) See “Iron” in Chapter 6: Nutrients of Concern.

- There is no need for special equipment or blenders to prepare texturally modified family foods for infants and toddlers. A fork is sufficient for mashing foods. (145) See “Food Textures” in Chapter 4: Feeding by Age.

- Commercial infant foods can be relatively costly and may not be texturally appropriate. However, these foods can be convenient, have a long shelf-life, and may be available to families through food assistance programs. (14) Iron-fortified cereals also provide a reliable source of iron.

- Eating together has benefits regardless of what foods are served. (146) See “Recommend Family Meals and Sit-Down Snacks” in Chapter 4: Feeding by Age.

- All families benefit from compassionate and non-judgmental support. In order to “meet clients where they are at”, respect the foods they are able to provide. Consider that the priority is to make sure these families have enough to eat. If dietary modifications are indicated, make suggestions for adding to the diet, as opposed to restricting or taking away. As needed, consider a referral to dietitian.
Growth

Practice Points

- Routine growth monitoring is important for assessing the health and nutrition of young children.

- Use the WHO Growth Charts for Canada to monitor growth.

Growth monitoring is an important part of health assessment for infants and young children. (3) A full review of the recommendations regarding growth monitoring is beyond the scope of this resource; however, a few key points to consider are included here.

- Assessing growth requires accurate serial measurements, taken over time at “well-baby/child” visits (and/or other visits, where possible). (3)

- Measurements should be plotted on a consistent growth chart appropriate for age and gender.

- Health professionals should use the WHO Growth Charts for Canada. (3)

  - These growth charts, and related health professional resources (including free online training modules), are available online from Dietitians of Canada.

  - Practitioners and/or organizations can choose between two versions of the WHO Growth Charts for Canada, which are based on the same data sets, but feature different percentiles:

    - “Set 1” uses the 3rd, 15th, 50th, 85th and 97th +/- 99th percentiles.

    - “Set 2” uses the 3rd, 10th, 25th, 50th, 75th, 90th and 97th +/- 99th percentiles.

- Interpretation of growth patterns requires assessment of clinical, developmental, behavioural, and feeding parameters prior to suggesting investigations or changes to the diet. (3) The direction of the serial measurements on the curve is more important than the actual percentile. (15)

- In the first few months of life, infants fed with commercial infant formula are often lighter than infants fed with human milk. After this time, they often become heavier. This pattern should be anticipated so that unnecessary investigations or counseling regarding formula use or food intake are avoided. (147)

Resource for parents and guardians

- Is my Child Growing Well? (Dietitians of Canada) (NH Document Source "WHO Q&A")
Reflux

Practice Points

- Reflux is common in infants and does not generally require treatment or changes in feeding.

Gastroesophageal reflux is common in healthy term infants. This normal physiologic process can occur several times a day in healthy infants. (3) Regurgitation (“spitting up”) occurs daily in:

- 50% of infants from birth to three months of age
- 67% of infants by four months of age
- 5% of infants by ten to 12 months of age

Most infants with reflux have no complications and require no treatment; they can be managed conservatively with parental education and reassurance regarding the natural course of reflux in infants. (3) (148)

Gastroesophageal Reflux Disease (GERD) is much less common, affecting only about one in 300 infants. (148) If there are concerns that an infant may be suffering from GERD, they should be referred to a physician experienced in its diagnosis and management. (3)

Breastfeeding and Human Milk

- Limited data suggests that breastfed infants do not differ in the frequency of reflux compared to infants receiving commercial infant formula. (149)
- Breastfed infants may have shorter duration of reflux episodes. (149)
- Symptoms of reflux in infants are rarely severe enough to warrant discontinuation of breastfeeding. (149) Breastfeeding and the provision of human milk should continue to be supported.
  - If an allergy to cow’s milk is suspected, a short trial of a cow’s milk-free maternal diet may be considered. Care should be taken to ensure that breastfeeding is not prematurely discontinued. (111)
    - This trial should be done with assistance from a dietitian, to ensure that all sources of cow’s milk protein are eliminated from the mother’s diet and are adequately substituted.
    - This trial should be discontinued after two to four weeks if there is no observed benefit.
Human Milk Substitutes (Commercial Infant Formulas)

- Evidence indicates that, for most infants, symptoms of reflux do not decrease when there is a change from one cow’s milk-based formula to another, or to a soy-based formula. (149)

- Thickened formulas:
  - result in a decrease in visible reflux, but do not decrease the frequency of reflux episodes (149)
  - are associated with side-effects, such as increased coughing and diarrhea (149)
  - may result in a significant increase in the energy density of the feeds when thickeners are added to formulas; this is not a concern with commercial anti-regurgitant formulas (150)
  - promote weight gain in infants with recurrent vomiting and poor weight gain (149)
  - require further research to assess possible nutritional risks of long-term use (149)

- In infants who present with vomiting, reflux may be associated with a cow’s milk protein allergy. In these cases, with infants who receive formula, a two to four week trial of an extensively hydrolyzed formula may be beneficial. (149)

- Decreasing the volume or frequency of feedings: (149)
  - is not generally recommended to treat reflux
  - could compromise an infant's energy intake
  - may be beneficial if an infant is overfed, or fed large volumes of formula at infrequent intervals

Resource for parents and guardians

- Spitting Up (HealthLink BC)
Vegetarian Diets

Practice Points

- Well-planned vegetarian diets are compatible with lactation and can support normal growth and development.
- The more restrictive the diet, the greater the risk of nutrient deficiencies. Vitamin B12 is a nutrient of concern in vegan diets.
- Recommend support from a registered dietitian if there are concerns regarding dietary adequacy.

Types of Vegetarian Diets

There are various types of vegetarian diets. In general, they include:

- lacto-ovo-pesco ("Pescatarian"): includes dairy products, eggs and fish; excludes meat and poultry. (151)
- lacto-ovo: includes dairy products and eggs; excludes meat, poultry, and fish. (151)
- lacto: includes dairy products; excludes meat, poultry, eggs, and fish. (151)
- ovo: includes eggs; excludes meat, poultry, fish, and dairy products.
- vegan: excludes all foods of animal origin, (151) including gelatin and honey.

Nutritional Adequacy of Vegetarian Diets

- Well-planned vegetarian diets can be nutritionally adequate, and have been shown to support normal growth and development of infants. With adequate diets, children fed vegan and vegetarian diets grow similarly to children fed more varied diets. (152)
- The nutrients of concern will vary by the type of vegetarian diet. The more restrictive the diet, the greater the nutrients of concern, which may include calcium, zinc, iron, vitamin D, and vitamin B12. (2) For example, inadequate vitamin B12 intake is a risk with vegan diets and can cause serious health consequences, especially for infants and young children. (24)
- Parents and guardians of children following a restrictive vegetarian diet or vegan diet may benefit from a consultation with a dietitian. (2)
Vegetarian Diets and Human Milk

- Breast milk of women following a vegetarian/vegan diet is similar in composition to that of women who consume varied diets and is nutritionally adequate. (13)

- All lactating women are advised to continue taking a multivitamin containing 0.4 mg of folic acid (e.g. a prenatal vitamin). (23)

- Maternal intake of vitamin B12 influences the secretion of this vitamin in human milk. (152)
  - Lactating women following a vegetarian/vegan diet are encouraged to consume foods, beverages, fortified foods, and/or supplements that are reliable sources of vitamin B12 each day to prevent vitamin B12 deficiency in their infants.
  - As an infant's intake of human milk decreases with the introduction of complementary foods, they will need to receive adequate vitamin B12 from foods, fortified foods and/or beverages, or supplements.

- Recommend a 400 IU liquid vitamin D supplement for all infants and toddlers who receive any amount of human milk, until they are two years old and are obtaining adequate vitamin D from their diets. (2) (3) See “Vitamin D” in Chapter 6: Nutrients of Concern.

Vegetarian Diets and Human Milk Substitutes (Commercial Infant Formulas)

- Infants who are not exclusively receiving human milk and whose diets allow dairy products should be offered a cow’s milk-based formula until they are nine to 12 months old. (2)

- Infants in families who follow a vegan diet, who are not exclusively receiving human milk, or who are younger than two years of age and are not receiving human milk, should receive a soy-based formula until two years of age. (2) (152)
  - This is the only appropriate human milk substitute for children in families with a vegan diet, even though the form of vitamin D that is added to commercial infant formula is usually of animal origin (i.e. sheep’s wool lanolin). (43) (153)
  - A recent systematic review supports the safety of soy-based commercial infant formulas. (154)

- Plant-based beverages (other than commercial soy-based formula), such as soy, almond, and rice beverages, are not recommended in the first two years of life as alternatives to human milk, commercial infant formula, and whole cow’s milk. (2) (67) See “Plant-Based Beverages” in Chapter 3: Animals Milks and Other Beverages.
**Nutrients of Concern for Vegetarian Diets**

The following table outlines possible nutrients of concern with vegetarian diets, and identifies some food sources of these nutrients. This is a guide only. A thorough assessment by a dietitian and tailored guidance may help to support nutritional adequacy.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Dietary sources</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (Calories)</td>
<td>Offer a variety of foods, and high fat foods such as:</td>
<td>Inadequate energy intake may be a concern if the diet contains too much fibre or includes beverages such as soy, rice, and other beverages, which are not appropriate substitutes to human milk, commercial formula, and cow’s milk. (3) (13)</td>
</tr>
<tr>
<td></td>
<td>Eggs, fish, shellfish</td>
<td></td>
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<tr>
<td></td>
<td>Yogurt, cheese</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whole (3.25% M.F.) cow’s milk (after nine to 12 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avocado</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nut and seed butters</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>Eggs, fish, shellfish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yogurt, cheese</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cow’s milk (after nine to 12 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fortified soy beverages (after two years)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beans, chickpeas, lentils, tofu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat analogues (“veggie meats”)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nut and seed butters (modified to address choking hazard for young children)</td>
<td></td>
</tr>
<tr>
<td>Omega-3 fatty acids</td>
<td>Omega-3 eggs, fatty fish</td>
<td>While some vegetarian diets may provide little EPA and DHA, more research is needed before recommendations can be made regarding supplements. (152)</td>
</tr>
<tr>
<td></td>
<td>Tofu, soybeans</td>
<td>See <a href="#">Omega-3 Fats</a> (Dietitians of Canada)</td>
</tr>
<tr>
<td></td>
<td>Canola, soybean, and flaxseed oils</td>
<td>See “<a href="#">Dietary Fats</a>” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td></td>
<td>Hempseed and flaxseed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Walnuts (modified to address choking hazard for young children)</td>
<td></td>
</tr>
<tr>
<td>Nutrient</td>
<td>Dietary sources</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Iron</td>
<td>Eggs, fish</td>
<td>Vitamin C rich foods eaten at the same time as iron-containing foods can increase iron absorption. Many fruits and vegetables are sources of vitamin C. (95) See <a href="https://www.healthlinkbc.ca">Iron in Foods</a> (HealthLink BC) See “Iron” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td></td>
<td>Iron-fortified cereals</td>
<td></td>
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<tr>
<td></td>
<td>Fortified soy beverages (after two years)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beans, chickpeas, lentils, tofu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blackstrap molasses</td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>Cheese, yogurt</td>
<td>Labels of fortified products should be checked for calcium content. (155) See <a href="https://www.healthlinkbc.ca">Food Sources of Calcium and Vitamin D</a> (HealthLink BC) See “Calcium” in Chapter 6: Nutrients of Concern.</td>
</tr>
<tr>
<td></td>
<td>Cow’s milk (after nine to 12 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tofu made with calcium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fortified soy beverages (after two years)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Almond and sesame butter (modified to address choking hazard for young children)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blackstrap molasses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oranges</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Eggs, oysters, crab, lobster</td>
<td>For more information, see <a href="https://www.nih.gov">Zinc</a> (National Institutes of Health). (156)</td>
</tr>
<tr>
<td></td>
<td>Milk, yogurt, cheese</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cow’s milk (after nine to 12 months)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beans, chickpeas, lentils</td>
<td></td>
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<tr>
<td></td>
<td>Tofu</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Whole grains, fortified cereals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nut and seed butters (modified to address choking hazard for young children)</td>
<td></td>
</tr>
<tr>
<td>Nutrient</td>
<td>Dietary sources</td>
<td>Comments</td>
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<td>----------</td>
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<td>----------</td>
</tr>
</tbody>
</table>
| Vitamin B12 | Eggs, fish, clams  
Yogurt, cheese  
Cow’s milk (after nine to 12 months)  
Fortified meat analogues (“veggie meats”)  
Fortified soy beverages (after two years)  
Fortified cereals  
Fortified nutritional yeast | This is a nutrient of concern for vegan diets. (152) The use of fortified food or beverages, or supplements, is likely required.  
Seaweeds and fermented plant foods are generally not good sources of vitamin B12. (155)  
For more information, see [Vitamin B12](#) (National Institutes of Health). (157) |
| Vitamin D | Eggs, fatty fish  
Margarine  
Cow’s milk (after nine to 12 months)  
Fortified soy beverages (after two years) | There are few foods that naturally contain vitamin D. Fortified foods or supplements may be required.  
See [Food Sources of Calcium and Vitamin D](#) (HealthLink BC)  
See “Vitamin D” in Chapter 6: Nutrients of Concern. |

**Resources for parents and guardians**

- [Dietitian Services](#) at HealthLink BC (NH Document Source #1997)
- Being a Vegetarian Toddler ([Toddler’s First Steps](#), Province of BC)
- [Healthy Eating Guidelines: For Your Vegetarian Toddler 1-3 years](#) (HealthLink BC)
- [Vegetarian Diets](#) (HealthLink BC)
6. Nutrients of Concern

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Calcium

Practice Points

- Human milk is the optimal source of nourishment for infants and is the preferred sole nutritional source of calcium for infants during their first six months.

- Commercial infant formulas contain adequate calcium for infants from birth to 12 months of age.

- After 12 months of age, 2 cups (500 mL) of fluid cow’s milk daily will help meet the calcium requirements of toddlers who no longer receive human milk or commercial infant formula.

Calcium

- Calcium is important for bone health and numerous metabolic functions. (158)

- Calcium is the most abundant mineral in the body, with over 99% of the body’s calcium stored in the bones and teeth, where it supports their structure. (159)

- Bone undergoes continuous remodeling, with constant resorption and deposition of calcium into new bone. In infants and children, bone formation exceeds resorption. (158)

Calcium Requirements

The following table outlines the recommended dietary allowances (RDA) or adequate intake (AI) levels* of calcium per day for various age groups. (159) The tolerable upper intake levels (UL) are also included.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Recommended Dietary Allowance (RDA) or Adequate Intake* (AI) per day</th>
<th>Tolerable Upper Intake Level (UL) per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0-6 months</td>
<td>200 mg*</td>
<td>1000 mg</td>
</tr>
<tr>
<td>Infants 7-12 months</td>
<td>260 mg*</td>
<td>1500 mg</td>
</tr>
<tr>
<td>Children 1-3 years</td>
<td>700 mg</td>
<td>2500 mg</td>
</tr>
</tbody>
</table>

There are no additional benefits to consuming calcium above the RDA, and intakes should stay below the UL to avoid possible adverse effects, such as kidney stones. (159)
### Meeting Calcium Requirements

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommendations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>Recommend exclusive breastfeeding, and provision of human milk, with vitamin D supplementation. (3)</td>
<td>Calcium levels in human milk, which are generally not influenced by maternal diet, meet the requirements of infants. (160)</td>
</tr>
<tr>
<td></td>
<td>If an infant is not exclusively receiving human milk, recommend a commercial infant formula until 9-12 months. (3)</td>
<td>Commercial infant formulas provide adequate calcium to 12 months. Specialized formulas, such as hydrolysate, lactose-free, and soy formulas, contain a higher calcium level to compensate for decreased calcium bioavailability. (13)</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>Recommend continued breastfeeding, and provision of human milk (and a liquid vitamin D supplement). Offer a variety of foods (may include yogurt, cheese). (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If using formula, recommend formula until 9-12 months. (2)</td>
<td>Commercial infant formulas provide adequate calcium to 12 months. (13)</td>
</tr>
<tr>
<td></td>
<td>Delay cow’s milk until infants are nine to 12 months and are consuming a variety of iron-rich foods. (2)</td>
<td></td>
</tr>
<tr>
<td>12 to 24 months</td>
<td>Recommend continued breastfeeding, and provision of human milk (and a liquid vitamin D supplement). For children no longer receiving human milk, recommend 2 cups (500 mL) (max 3 cups (750 mL)) of whole cow’s milk daily, along with a variety of family foods. (2)</td>
<td>Plant-based beverages are not recommended at this age. They may be fortified with calcium but may be deficient in energy and other nutrients. (67) See Chapter 3: Animal Milks and Other Beverages, and “Vegetarian Diets” in Chapter 5: Issues of Concern.</td>
</tr>
<tr>
<td></td>
<td>For children who continue to use commercial formula after 12 months, recommend a follow-up formula to help meet increased calcium needs. (44) Recommend 2 cups (500 mL) daily.</td>
<td>For most children, there is no indication for formula use past 12 months. An exception is children who have been using a commercial soy formula and who will not be drinking animal milk, who should receive soy follow-up formula to two years. (2)</td>
</tr>
</tbody>
</table>

**Resources for parents and guardians**

[Food Sources of Calcium and Vitamin D](HealthLink BC)
Dietary Fats

Practice Points

- Dietary fat restriction is not recommended under two years of age.
- Evidence is inconclusive on the benefits of adding DHA and ARA to commercial infant formulas for healthy term infants. However, there are potential benefits and no apparent risks.
- Recommend that pregnant and lactating women, older infants, and children regularly consume foods containing essential fatty acids, such as fatty fish.

Dietary Fat

- The first years of life are a time when energy needs are particularly high. Fat restriction may compromise intake of energy and essential fats, and can adversely affect growth and development, (2) including brain development.
- Between 12 months and 24 months, children who are no longer receiving human milk should be provided with whole (3.25% M.F.) cow’s milk. Lower fat milks are generally not recommended. Skim milk and plant-based beverages (e.g. soy “milk”) are not advised under two years of age. (2) (See Chapter 3: Animal Milks and Other Beverages.)

Essential Fatty Acids

- Essential fatty acids include the omega-6 fatty acid linoleic acid (LA) and the omega-3 fatty acid alpha-linolenic acid (ALA), which are precursors for the long chain polyunsaturated fatty acids arachidonic acid (ARA), docosahexaenoic acid (DHA), and eicosapentaenoic acid (EPA). (3)
- Essential fatty acids are important for normal growth and development, and have a role in the development of the nervous and visual systems. (11)
- Essential fatty acids cannot be made in the body; dietary sources are required.
- There are dietary reference intakes for LA and ALA, but optimal levels of EPA and DHA have not been established for infants and young children. (2) (161)

Essential Fatty Acids in Human Milk

- Human milk contains more than 100 fatty acids, as well as the lipases to convert the fatty acids to useable forms (which formulas lack). (13) Many essential fatty acids, including EPA and DHA, are found in varying levels in human milk. (3) (39) Breastfeeding (and provision of expressed breast milk) should be supported where possible.
• There is inconsistent evidence for a benefit of EPA and/or DHA supplementation during lactation on neurodevelopment, visual function or allergy prevention in children. (162) (105)

• As with other adults, sources of essential fatty acids are recommended in the diets of pregnant and lactating women. Recommend at least 150 grams (5 ounces) per week of, preferably fatty, fish (e.g. about two small portions) for all adults, including women of childbearing age. (109)

**Essential Fatty Acids in Commercial Infant Formula**

• Commercial infant formulas are required to contain both linoleic acid and alpha-linolenic acid. There are questions about infants’ ability to convert these precursors to ARA and DHA. (3)

• It is not currently mandatory in Canada for manufacturers to add ARA and DHA to formulas. (3) DHA and ARA are permitted as optional ingredients and formulas with these ingredients are commonly available. In these cases, the DHA and ARA are sourced from algal and fungal oils. (3)

• Evidence is inconclusive on the benefits of adding DHA and ARA to formulas for healthy term infants. (39) (163) Expert opinion acknowledges potential benefits on visual and neurodevelopmental outcomes, and the lack of adverse effects noted to date. (39) (163) Concerns may include potential increased costs and limited product availability. (163)

**Dietary Sources of Essential Fatty Acids**

• Essential fatty acids can be found in fish, walnuts, soybeans, tofu, ground flax seed, omega-3 enriched eggs, and canola, flaxseed, and soybean oil. (11)

• Sources of EPA and DHA include fatty fish such as anchovies, mackerel, herring, salmon, sardines, cod, halibut, tuna, and trout. (164)

• For pregnant and lactating women, as with other adults, recommend at least 150 grams (5 ounces) per week of, preferably fatty, fish (e.g. two small portions). (109)

• Recommend offering fatty fish when solids are introduced at about six months, and work towards offering two portions per week by 24 months of age. (2)

• Recommend limiting or avoiding fish high that is high in mercury. (2)

**Resources for parents and guardians**

• [Omega-3 Fats](Dietitians of Canada)

• [Mercury in Fish](HealthLink BC)
Iron

Practice Points

- Recommend exclusive breastfeeding for the first six months of life, with continued breastfeeding for up to two years of age and beyond.

- For infants who are not exclusively receiving human milk, recommend a commercial infant formula. All commercial infant formulas contain iron, although fortification levels vary.

- Recommend offering iron-rich foods two or more times per day starting at about six months of age.

- Recommend delaying the introduction of animal milk until nine to 12 months and offering no more than 3 cups (750 mL) per day.

- Iron deficiency in infancy and childhood is a significant issue; the promotion of the preceding guidelines supports adequate intake of iron.

Iron

- Iron is a mineral that is critical to growth and development, including brain development. (3) It is an essential element of hemoglobin and myoglobin, and is involved in normal cellular function, as well as hormone and connective tissue synthesis. (165)

- In the diet, iron exists in two forms: (95)
  - Heme iron is present in meat, fish, and poultry, and is well absorbed.
  - Non-heme iron is found in eggs and in plant foods, such as beans, chickpeas, lentils, tofu, nuts, and seeds, and is not as well absorbed as heme iron.

Iron Requirements

The following table outlines the recommended dietary allowances or adequate intake levels* of iron per day for various age groups. (161) The tolerable upper intake levels are also included.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Recommended Dietary Allowance (RDA) or Adequate Intake* (AI) per day</th>
<th>Tolerable Upper Intake Level (UL) per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>0.27 mg*</td>
<td>40 mg</td>
</tr>
<tr>
<td>7 to 12 months</td>
<td>11 mg</td>
<td>40 mg</td>
</tr>
<tr>
<td>1 to 3 years</td>
<td>7 mg</td>
<td>40 mg</td>
</tr>
</tbody>
</table>
Iron Deficiency

- Children between six months and two years of age are a high-risk group for iron-deficiency, (2) due to depletion of iron stores at about six months, increased growth, and high iron needs. (2) (166)

- Iron deficiencies in infancy and early childhood may have serious and irreversible effects, (3) such as motor and cognitive deficits. (166)

- Screening is advised for infants and children at risk of deficiency. (2) (3) (167)

- Iron-deficiency is more prevalent in high-risk groups, which include:
  - children from families with low socioeconomic status (167)
  - children from select ethnic backgrounds (e.g. Indigenous, Chinese, Latin American), and from recently immigrated families (167)
  - infants born to mothers with low hemoglobin, with poorly controlled diabetes, who consumed excess alcohol during pregnancy, or who experienced perinatal bleeding (3) (15) (167)
  - infants born pre-term, with low-birth weight, or with medical conditions (167)
  - infants fed non-iron-fortified formulas, such as homemade evaporated milk formulas (which are not advised) (3) (167)
  - infants exclusively breastfed past six months; or offered low-iron foods (167)
  - children introduced to animal milks earlier than recommended (i.e. before nine to 12 months of age) (2) (3) (167)
  - children who consume large amounts of milk (>750 mL per day) or juice, and who eat little iron-rich solid foods (2) (166) (167)
  - children who use bottles past 12-15 months (166)

- Some children may be asymptomatic. Symptoms of iron deficiency may not appear until a deficiency is severe and include:
  - poor feeding/appetite, pica/pacophagia (2) (166)
  - irritability, depression (2) (166)
  - tiredness/lethargy, inattention, restless legs (166)
  - failure to thrive; growth retardation (166)
  - attention-deficit/hyperactivity disorder (166)
  - iron-deficiency anemia (2)
  - cardiomegaly; tachypnea (166)
  - developmental delay; unexplained cognitive and intellectual impairment (166)

- Iron supplements should be used under the direction of a physician. (95)
## Meeting Iron Requirements

<table>
<thead>
<tr>
<th>Age</th>
<th>Recommendation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6 months</td>
<td>Recommend exclusive breastfeeding, and provision of human milk, until about six months of age. (3) (167)</td>
<td>Most healthy term infants have sufficient iron stores to meet their needs through the first six months. (3) The iron content of human milk is low, about 0.3 mg/L, but its bioavailability is high at 50 to 70% (compared to about 10% bioavailability in commercial infant formula). (39) Maternal iron deficiency has little effect on the iron content of human milk. (168)</td>
</tr>
<tr>
<td></td>
<td>For infants that are not exclusively consuming human milk, recommend a commercial infant formula. (3) (167)</td>
<td>Commercial infant formulas are fortified with iron, and range from 0.4 to 1.3 mg/100 mL (4 to 13 mg/L). (3) (39) Formula fed infants at risk of iron deficiency may need formulas with iron levels at the higher end of this range. (3) These formulas are well tolerated. (39)</td>
</tr>
<tr>
<td>6 months</td>
<td>Recommend introducing iron-rich solid foods at about six months to help meet iron requirements. (167) At this age, human milk will still be the main source of nutrition. (3)</td>
<td>At about six months of age, iron stores are depleted and, in addition to human milk, food sources of iron are required to meet increased needs. (3)</td>
</tr>
<tr>
<td>6 to 9 months</td>
<td>Recommend offering iron-rich foods two or more times per day. (2) Recommend continued breastfeeding, and provision of human milk. For formula fed infants, recommended continued infant formula used until 9 – 12 months. (2)</td>
<td>See <a href="#">Dietary Sources of Iron</a> for more information on iron-rich foods.</td>
</tr>
<tr>
<td>Age</td>
<td>Recommendation</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9 to 12 months</td>
<td>Recommend offering iron-rich foods two or more times per day. (2)</td>
<td>See <a href="#">Dietary Sources of Iron</a> for more information on iron-rich foods.</td>
</tr>
<tr>
<td></td>
<td>Recommend continued breastfeeding, and provision of human milk.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recommend delaying the introduction of cow’s milk until infants are nine to 12 months of age and are consuming a variety of iron-rich foods. (2) (167)</td>
<td>Cow’s milk is low in iron, can displace intake of human milk and iron-rich foods, and can inhibit iron absorption. Once the older infant is eating a variety of iron-rich foods, the introduction of cow’s milk is not associated with iron deficiency. (2)</td>
</tr>
<tr>
<td></td>
<td>If a formula-fed infant is not regularly consuming iron-rich foods, it may be prudent to continue infant formula use, and delay cow’s milk introduction, until closer to 12 months. (2)</td>
<td></td>
</tr>
<tr>
<td>12 months and older</td>
<td>Recommend offering iron-rich foods with each meal. (2)</td>
<td>See <a href="#">Dietary Sources of Iron</a> for more information on iron-rich foods.</td>
</tr>
<tr>
<td></td>
<td>Recommend continued breastfeeding, and provision of human milk.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For children that are no longer receiving human milk, recommend offering about 2 cups (500 mL) of whole cow’s milk daily. Intake should not exceed 3 cups (750 mL) per day. (2)</td>
<td>Cow’s milk intake can displace the intake of nutrients from other foods, and excessive cow’s milk intake is the most common risk factor for severe anemia in young children. (2)</td>
</tr>
<tr>
<td></td>
<td>Recommend the use of an open cup. (2)</td>
<td></td>
</tr>
</tbody>
</table>
### Dietary Sources of Iron

<table>
<thead>
<tr>
<th>Heme iron sources (Higher bioavailability)</th>
<th>Non-heme iron sources (Lower bioavailability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Meat, (3) such as beef, moose, deer, caribou, elk, pork, lamb, veal</td>
<td>• Iron-fortified grains (e.g. cereals) (2)</td>
</tr>
<tr>
<td>• Poultry, (3) such as chicken, turkey, wild birds</td>
<td>• Eggs (2)</td>
</tr>
<tr>
<td>• Fish*, such as tuna, herring, trout, mackerel, and salmon (169)</td>
<td>• Legumes (beans, lentils, chickpeas) (2)</td>
</tr>
<tr>
<td>• Shellfish, such as oysters, mussels, clams, shrimp (169)</td>
<td>• Tofu (2)</td>
</tr>
<tr>
<td>*Recommend limiting or avoiding fish high in mercury. (2)</td>
<td>• Peanut, tree nut, and seed butters (15)</td>
</tr>
</tbody>
</table>

The absorption of non-heme iron is enhanced when combined with sources of vitamin C (found in many fruits and vegetables) and/or with heme-iron sources. (170)

For more information on the introduction of solids, see [Chapter 4: Feeding by Age](#).

Health professionals can learn more about the diagnosis and management of iron deficiency by referring to the BC Guideline: [Iron Deficiency – Diagnosis and Management](#) (updated April 2019).

**Resources for parents and guardians**

- [Iron-Rich Foods for Baby](#) (includes sample meal plans) (NH Document Source #10-421-6023)
- [Iron and Your Health](#) (HealthLink BC)
- [Iron in Foods](#) (HealthLink BC)
- [Mercury in Fish](#) (HealthLink BC)
Vitamin D

**Practice Points**

- Recommend that infants and toddlers who receive any amount of human milk be given a daily liquid vitamin D supplement of 400 IU (10 mcg).

- Infants who receive only commercial infant formula, and who were born to mothers with adequate vitamin D status, do not generally require a vitamin D supplement.

- As a clinical decision, health professionals may recommend higher intakes of vitamin D to address suspected or known deficiency.

- A daily supplement of 400 IU (10 mcg) is unlikely to result in excessive vitamin D intake.

Vitamin D

- Vitamin D is a fat-soluble vitamin and pro-hormone essential for building and maintaining strong bones and teeth. (2) It has numerous other roles in the body, such as in cell growth, neuromuscular function, and immune function. (171)

- Vitamin D can be obtained from three sources: food, supplements, and endogenous synthesis (i.e. by exposing bare skin to the sun). (47)

**Vitamin D Requirements**

The following table outlines the recommended dietary allowances (RDA), or adequate intake levels (AI), and upper intake levels (UL) of vitamin D for various age groups. These recommendations are based on minimal sun exposure. (161)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Recommended Dietary Allowance (RDA) or Adequate Intake* (AI) per day</th>
<th>Tolerable Upper Intake Level (UL) per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0 to 6 months</td>
<td>400 IU (10 mcg)*</td>
<td>1000 IU (25 mcg)</td>
</tr>
<tr>
<td>Infants 7 to 12 months</td>
<td>400 IU (10 mcg)*</td>
<td>1500 IU (38 mcg)</td>
</tr>
<tr>
<td>Children 1 to 3 years</td>
<td>600 IU (15 mcg)</td>
<td>2500 IU (63 mcg)</td>
</tr>
</tbody>
</table>

Excessive intake of vitamin D is not a concern with a daily supplement of 400 International Units (IU) (10 mcg). Even with multiple sources of vitamin D (i.e. a 400 IU (10 mcg) supplement taken in combination with commercial infant formula, cow’s milk, and/or other dietary sources) older infants and children are unlikely to exceed the ULs. (3)
Vitamin D Deficiency

Cases of vitamin D deficiency still occur in Canada, and can lead to rickets. (3) Risk of vitamin D deficiency is higher in infants who are:

- born to mothers with low vitamin D stores, risk factors for which include: (47)
  - latitude (i.e. northern regions) and season (i.e. winter)
  - darker skin tone, and covering skin with clothing when outdoors
  - not supplementing with vitamin D
- born premature (172)
- receiving human milk but who are not supplemented with vitamin D or who are only occasionally supplemented with vitamin D (2)

Rationale to Supplement Children Receiving Human Milk

- Sunlight is the primary source of vitamin D for humans, but sun safety practices prevent adequate vitamin D production. (3) At all Canadian latitudes, there is also insufficient ultraviolet radiation from the sun to support adequate vitamin D production in the skin for a large portion of the year (i.e. October to March). (85)
- Human milk is the optimal food to support growth and development in infants. However, human milk is generally not a significant source of vitamin D. (13)
- Daily supplementation of vitamin D to breastfed infants has been recommended in Canada since 1967, and has been shown to be an effective preventive measure against rickets. (3)
- The recommendation to supplement all infants who receiving human milk, including those who receive a combination of human milk and formula, is a conservative approach to achieving adequate vitamin D intakes, and offers a consistent public health message. (2)
- Effects of maternal vitamin D supplementation on the vitamin D content of human milk are dose dependent, and may not be adequate to meet infant needs:
  - Maternal intake of a daily multivitamin, which typically provides between 200 and 800 IU (5 and 20 mcg) of vitamin D, is not likely to raise breast milk vitamin D levels enough to meet infants’ needs. (3)
  - Maternal vitamin D supplementation of 2400 IU (60 mcg) per day, without direct infant supplementation, results in deficient serum levels in infants. (173)
  - Maternal supplementation of high doses of vitamin D (i.e. 6400 IU (160 mcg) per day) has been shown to raise serum levels of breastfed infants to similar levels as with direct infant supplementation of 400 IU (10 mcg) per day. Some
researchers have proposed this as an alternate strategy to direct infant supplementation. (173) However:

- More research has been recommended. (3) (47)
- 6400 IU (160 mcg) per day is above the recommended Tolerable Upper Intake Level for adults, which is set at 4000 IU (100 mcg), above which there may be concerns of possible adverse effects. (159)
- Data is lacking as to whether families can more easily adhere to daily maternal supplementation versus daily infant supplementation. (174)
- With the introduction of complementary foods, human milk (and the vitamin D made available through this source) starts to decrease.

**Differing Recommendations Regarding Vitamin D Intakes**

In Canada, various organizations make differing recommendations about vitamin D supplementation. Key recommendations are summarized in the table below.

<table>
<thead>
<tr>
<th>Source</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nutrition for Healthy Term Infants</strong> (2014)</td>
<td>• Recommends a 400 IU (10 mcg) vitamin D supplement for all infants and young children who receive human milk.</td>
</tr>
<tr>
<td>Joint statement from Health Canada, Canadian Pediatric Society, Dietitians of Canada, and Breastfeeding Committee for Canada (2)</td>
<td>• States that infants who do not receive human milk (i.e. they receive commercial infant formula) do not require a supplement.</td>
</tr>
<tr>
<td></td>
<td>• States that at two years of age, supplementation of breastfed children is no longer recommended if they follow an eating pattern as per Canada’s food guide.</td>
</tr>
<tr>
<td></td>
<td>• States that the vitamin D in 2 cups (500 mL) of cow’s milk has been shown to be sufficient to maintain bone health in most children two to five years old.</td>
</tr>
<tr>
<td><strong>Vitamin D Supplementation: Recommendations for Canadian Mothers and Infants</strong> (Reaffirmed 2017)</td>
<td>• Recommends daily intake (from all sources) of 400 IU (10 mcg) for all infants during the first year of life.</td>
</tr>
<tr>
<td>Canadian Pediatric Society - First Nations, Inuit and Metis Health Committee (172)</td>
<td>• Recommends intake of 800 IU (20 mcg) for infants in northern communities between October to March, or for those infants who have additional risk factors for vitamin D deficiency.</td>
</tr>
<tr>
<td></td>
<td>Note: In practice, this recommendation means that, when risk factors are present, infants who exclusively receive infant formula would be supplemented with 400 IU (10 mcg) of vitamin D per day.</td>
</tr>
</tbody>
</table>
Pediatric Nutrition Guidelines (Six Months to Six Years) for Health Professionals, (2016)
Provincial Health Services Authority (15)

- Recommends a vitamin D supplement for children under two years who receive any amount of human milk.
- Recommends a vitamin D supplement for children 9 months and older whose dietary intake does not provide the recommended intake of vitamin D (i.e. 400 IU (10 mcg) for infants, and 600 IU (15 mcg) for children older than one year).

Note: In practice, this second recommendation would apply to many children, as it is difficult to meet recommended vitamin D intakes through diet alone, given that there are few dietary sources of vitamin D.

Vitamin D Recommendations for Perinatal Women & Healthy Term Infants (Birth – 1 year) (2018)
Provincial Health Services Authority (47)

- Recommends a 400 IU (10 mcg) vitamin D supplement for infants who receive human milk.
- States that “healthy, term infants fed commercial infant formula only, and who were born to mothers with adequate vitamin D status during pregnancy, do not need a liquid vitamin D supplement”.
- For formula fed infants, if maternal vitamin D status during pregnancy was suspected to be insufficient/deficient, recommends supplementation of infants until formula intake reaches 800-1000 mL/day.
- States that “health professionals may recommend higher doses of vitamin D for individual infants to address known or suspected insufficiency/deficiency as a clinical decision.”

BC Guidance Regarding Vitamin D Supplementation
The following table summarizes BC vitamin D supplementation guidance.

<table>
<thead>
<tr>
<th>Age and Feeding Method</th>
<th>Is supplementation recommended?</th>
<th>BC Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving any amount of human milk 0 to 24 months old</td>
<td>Yes</td>
<td>“For healthy, term infants who are exclusively of partially breastfed, recommend a daily liquid vitamin D supplement of 400 IU (10 mcg).” (15) (47) “Health professionals may recommend higher doses of vitamin D for individual infants to address known or suspected insufficiency/deficiency as a clinical decision.” (47)</td>
</tr>
<tr>
<td>Age and Feeding Method</td>
<td>Is supplementation recommended?</td>
<td>BC Guidance</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Not receiving human milk. Receiving commercial infant formula</td>
<td>Generally not required</td>
<td>“Healthy, term infants fed commercial infant formula only, and who were born to mothers with adequate vitamin D status during pregnancy, do not need a liquid vitamin D supplement…. if the mother’s vitamin D status during pregnancy was suspected to be insufficient/deficient, consider a daily liquid vitamin D supplement of 400 IU (10 μg) until the infant is consuming 800 - 1000 mL of commercial infant formula daily.” (47)</td>
</tr>
<tr>
<td>Not receiving human milk</td>
<td>Need is determined by dietary assessment</td>
<td>“For the non-breastfed toddler, recommend a vitamin D supplement* if the intake of commercial infant formula and/or cow milk (vitamin D fortified goat milk) and vitamin D rich foods is below the recommended daily intake of 400 IU (10 μg).” (15)</td>
</tr>
<tr>
<td>*no dose specified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not receiving human milk</td>
<td>Need is determined by dietary assessment</td>
<td>“Recommend a daily liquid vitamin D supplement of 400 IU (10 μg) for toddlers who do not drink 500 mL (2 cups) of cow milk (vitamin D fortified goat milk) and do not eat a variety of other vitamin D rich foods every day to meet the daily recommended intake of 600 IU (15 μg).” (15)</td>
</tr>
<tr>
<td>2 to 6 years old</td>
<td>Need is determined by dietary assessment</td>
<td>“Recommend a 400 IU liquid vitamin D supplement for children who do not drink 500 mL (2 cups) of pasteurized 2%, 1% or skim cow milk (or vitamin D fortified goat milk) or fortified plant-based milk alternatives (e.g. soy, rice, almond beverage) and do not eat a variety of other vitamin D rich foods every day to meet their daily recommended intake of 600 IU (15 μg).” (15)</td>
</tr>
</tbody>
</table>
Vitamin D Supplementation Recommendations

Dosage

- Recommend a daily 400 IU (10 mcg) supplement for children under two years of age who receive any amount of human milk. (2)

- A supplement may also be indicated for children over nine months who do not meet recommended dietary intakes for vitamin D. (15)

- Health professionals may recommend higher total intakes of vitamin D for children with known or suspected insufficiency/deficiency (see “Vitamin D Deficiency”), which may include supplementing infants who consume only commercial infant formula. (47) Encourage parents and guardians to follow the advice of their healthcare provider.

Format

- For infants and toddlers, recommend vitamin D:
  - in liquid form (3) (15)
  - as a sole nutrient (i.e. not combined with other nutrients, such as in a multivitamin) (3)
  - as vitamin D3, due to superior absorption, unless a plant-based source (i.e. vitamin D2) is desired. (3) (174)

- Encourage parents and guardians to obtain a children’s product that provides 400 IU (10 mcg) per dose (i.e. not higher doses such as 1000 IU (25 mcg)). (3)

- Product formats provide 400 IU (10 mcg) per drop, per 0.25 mL, or per 1 mL. (47) Instructions on labels must be followed to ensure proper dosing.

- Many products are available, and costs and ingredients vary. See List of Pediatric Liquid Vitamin D Supplements Available in Northern BC (NH Document Source #10-421-6108).

Access

- Vitamin D supplements are available in pharmacies and in grocery stores. (3)

- Offer support to clients who may be at risk of not providing supplements: (3)
  - mothers with a lower education or income level
  - mothers who are single, divorced, separated, or widowed

- Pregnancy outreach programs and parenting support programs may support access to vitamin D supplements. (47)

- Eligible clients can obtain coverage for vitamin D supplements through the First Nations Health Authority benefits program, with a prescription. (175)
Dietary Sources of Vitamin D

- Few foods are natural sources of vitamin D (e.g. fatty fish, egg). (176)
- A few foods are routinely fortified with vitamin D, such as cow’s milk (store-bought) and margarine. (176)
- Yogurt, cheese, and milk obtained from non-commercial sources, goat’s milk, and plant-based beverages are not consistently fortified with vitamin D. (47) (71)
- Health Canada has proposed a multi-phase strategy to expand vitamin D fortification. The first phase will include a two-fold increase in the mandatory fortification levels of margarine, cow’s milk, and goat’s milk, as well permitting fortification of plant-based beverages and yogurt. (177)
- The table below depicts vitamin D content of common foods, as of October 2018 (i.e. levels for various fortified foods will change when the above proposed changes come into effect). (47) (178)

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving size</th>
<th>Amount of Vitamin D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow’s milk and goat’s milk (fortified)</td>
<td>250 mL (1 cup)</td>
<td>100 IU (2.5 mcg)</td>
</tr>
<tr>
<td>Fortified plant-based beverages (e.g. soy, rice, almond)</td>
<td>250 mL (1 cup)</td>
<td>100 IU (2.5 mcg)</td>
</tr>
<tr>
<td>Salmon</td>
<td>75 g (2.5 oz)</td>
<td>218 – 571 IU (5.5 – 12.3 mcg)</td>
</tr>
<tr>
<td>Rainbow trout</td>
<td>75 g (2.5 oz)</td>
<td>192 – 208 IU (5.1 – 5.2 mcg)</td>
</tr>
<tr>
<td>Sardines</td>
<td>75 g (2.5 oz)</td>
<td>70 – 145 IU (1.8 - 3.6 mcg)</td>
</tr>
<tr>
<td>Mackerel</td>
<td>75 g (2.5 oz)</td>
<td>78 – 343 IU (2 – 8.6 mcg)</td>
</tr>
<tr>
<td>Tuna</td>
<td>75 g (2.5 oz)</td>
<td>36 – 219 IU (0.9 – 5.5 mcg)</td>
</tr>
<tr>
<td>Herring</td>
<td>75 g (2.5 oz)</td>
<td>65 – 161 IU (1.6 – 4 mcg)</td>
</tr>
<tr>
<td>Egg (yolk)</td>
<td>1 egg</td>
<td>32 IU (0.8 mcg)</td>
</tr>
<tr>
<td>Margarine</td>
<td>5 mL (1 tsp)</td>
<td>25 IU (0.6 mcg)</td>
</tr>
<tr>
<td>Fortified orange juice</td>
<td>125 mL (1/2 cup)</td>
<td>50 IU (1.2 mcg)</td>
</tr>
</tbody>
</table>

*Adapted from page 13 of Vitamin D Recommendations for Perinatal Women & Healthy Term Infants (Birth – 1 year), with additional data sourced from the Canadian Nutrient File.

Resources for parents and guardians

- [Vitamin D for Breastfed Infants and Toddlers in Northern BC](#) (NH Document Source #10-421-6020)
- [Vitamin D for Children in Northern BC](#) (NH Document Source #10-421-6028)
- [Food Sources of Calcium and Vitamin D](#) (HealthLink BC)
7. Bibliography


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42. Allergy Nutrition Service. Evidence-Based Key Allergy Prevention Messages for Health Professionals Refreshed. (Presentation). May 7, 2015.

44. Dietitian Services at HealthLink BC. Email communication. June 29, 2015.


105. Cochrane. Fish oil (n-3 or omega-3) for pregnant mothers or breastfeeding mothers to prevent allergies in their young children. [Online] July 2015. https://www.cochrane.org/CD010085/PREG_fish-oil-n-3-or-omega-3-pregnant-mothers-or-breastfeeding-mothers-prevent-allergies-their-young.


