Abstract
Exclusive breastfeeding provides optimal nutrition for infants until they are six months old. After six months, infants require complementary foods to meet their nutritional needs. This is when weaning begins. Weaning is the gradual process of introducing complementary foods to an infant’s diet while continuing to breastfeed.

There is no universally accepted or scientifically proven time when all breastfeeding must stop. The timing and process of weaning need to be individualized by mother and child. Weaning might be abrupt or gradual, take weeks or several months, be child-led or mother-led. Physicians need to guide and support mothers through the weaning process. This document replaces a previous Canadian Paediatric Society position statement on weaning published in 2004.

Key Words: Breastfeeding; Breast milk; Complementary foods; Infant; Weaning

Overview
Breast milk is the optimal source of nutrition in infancy. Breastfeeding protects infants from a wide array of infectious and noninfectious diseases. With few exceptions, healthy term infants require only breast milk (with vitamin D supplementation) to meet all their nutritional requirements until they are about six months old. The Canadian Paediatric Society, Dietitians of Canada, Health Canada and the WHO recommend exclusive breastfeeding for the first six months of life and continued breastfeeding with complementary foods for up to two years and beyond (no upper limit has been defined).

This statement addresses issues affecting the weaning process and the different ways weaning can occur. It includes suggestions that physicians can offer to breastfeeding women about weaning and nutritional alternatives and for problems associated with weaning. This statement focuses on healthy term infants and its recommendations may not be appropriate for infants with special circumstances (eg, prematurity, chronic illness, failure to thrive). It replaces the previous Canadian Paediatric Society position statement published in 2004.

A review of the literature was performed using MEDLINE (1966 to 2012), the Cochrane database and relevant websites, including those of the WHO, the Canadian Paediatric Society, Health Canada and the American Academy of Pediatrics. Given the limited nature of the evidence on weaning, the recommendations in this statement are based largely on expert opinion and consensus.

Historical and cultural perspectives
The term “weaning” comes from the Anglo-Saxon word “wenian” meaning “to become accustomed to something different”. Weaning from the breast is a natural, inevitable stage in a child’s development. It is a complex process involving nutritional, immunological, biochemical and psychological adjustments. Weaning may mean the complete cessation of breastfeeding (an “abrupt” or final wean) or, as described here, a gradual process of introducing complementary foods to the infant’s diet while continuing to breastfeed. The first introduction of foods other than breast milk marks, by definition, the beginning of weaning.

Generally, infants were breastfed longer in ancient times than in Western societies today. Aristotle stated that breastfeeding should continue for 12 to 18 months, or when menses restarted in the nursing mother. Mothers in Zulu societies have traditionally breastfed their infants until 12 to 18 months, at which point a new pregnancy would be anticipated. Ancient Hebrews completed weaning at about three years. Around the world it is not uncommon for children to be completely weaned at two to four years of age. Anthropological studies have described final weaning at the following points: when
the infant reaches four times his birth weight; when the infant’s age is six times the length of gestation (ie, 4.5 years); or when the first molar erupts.[9][10]

The early introduction of mixed feedings began in early 19th-century Western society. Prominent contemporary physicians such as American Pediatric Society founders Dr. Luther Emmett Holt and Dr. Job Lewis Smith recommended that weaning begin at around nine to 12 months of age or when the canine teeth appeared. Smith recommended against weaning during the summer months because of the risk of “weanling diarrhea”. As weaning was recommended earlier and earlier, infant mortality increased. Introduction of weaning foods was an important cause of infant mortality in the 19th century. In the early 20th century, mothers were encouraged by the medical community to raise their children scientifically or “by the book”. In the 1920s, the United States government published Infant Care, referred to at the time as the “good book” and read by women from all socioeconomic groups. It recommended cod liver oil, orange juice and artificial feeding.[11]

In 2008, according to the Public Health Agency of Canada, 87% of children were breastfed for some period of time while only 16.4% were exclusively breastfed for six months. Still, this figure represents a steady increase in breastfeeding rates over the previous five years. Breastfeeding duration varies depending on maternal age. Only 11% of infants of mothers aged 25 to 29 years continue to breastfeed exclusively for six months, compared with 20% of infants of mothers 35 years or older.[11] The most common reason mothers give for weaning is a perceived insufficiency in milk supply. Women who breastfeed for longer than three months most often cite return to work as their reason for weaning.[11] Canadian breastfeeding practices may continue to improve because many mothers receiving employment insurance can delay their return to work for 12 months postpartum.

Nutritional and developmental issues
At around four to six months of age, most infants are developmentally ready to handle puréed foods. They are developing the oral motor coordination necessary to accept different food textures. However, they are at risk for choking on chunky food pieces such as nuts, whole grapes and hot dog wheels that require advanced oral motor coordination not achieved before three years of age.

Sucking and chewing are complex behaviours with reflex and learned components. The learned component is conditioned by oral stimulation. If a stimulus is not applied while neural development is occurring, an infant may become a poor eater. There is a relationship between prolonged sucking without solids and poor eating.[12]

While it is ideal for infants to be exclusively breastfed for six months, it is also true that after a certain age, human milk alone cannot supply all of an infant’s nutritional requirements.[9][13] Individual circumstances may make it appropriate for some infants to start complementary feedings as early as four months of age.[13][14]

Age-appropriate intake of calories and micronutrients is important for growth, motor and mental development.[12][13] Delaying the introduction of nutritional solid foods much beyond six months of age puts an infant at risk for iron deficiency anemia and other micronutrient deficiencies.[15] Picciano et al followed older weaning infants (12 to 18 months of age) by collecting data on dietary intake and growth. Many of the study children were ingesting less than the recommended levels of fat (less than 30% of total calories), iron and zinc. Grains, whole milk, dairy products and meats were identified as important sources of iron, vitamin E and zinc.[15]

By four to six months of age, iron stores from birth are diminishing, necessitating the introduction of iron-containing foods at six months of age for all infants.[4] Iron supplementation after the first weeks of life or at four months of age for the exclusively breastfed infant has been recommended by some groups.[14] When there is a delay in introduction of iron fortified foods, oral iron supplementation needs to be considered.[14]

Iron from meat has the best bioavailability[4][17] and can be readily absorbed from the gastrointestinal tract. After six months of age, when breast milk alone cannot provide enough protein, additional protein sources (such as meat, fish, egg yolk, tofu, lentils and cheese) are needed. Roughage should also be introduced to the diet, although it is not clear when adding fibre becomes necessary. There is no conclusive evidence that delaying the introduction of eggs, fish and nuts (including peanuts) beyond four to six months of age helps to avoid food allergies.[13][18][19] As a greater variety of solids and liquids are introduced to a baby’s diet, weaning will progress.
The process of weaning
While the best method for transitioning from fully breastfeeding to complete nutritional independence is not known, the process should meet the needs of both baby and mother. Physicians may refer mothers to the La Leche League’s website and the Canadian Paediatric Society’s Caring for Kids website (see Resources for parents, below). Weaning can be either natural (infant-led) or planned (mother-led).

Gradual weaning (infant-led weaning)
Gradual weaning occurs as the infant begins to accept increasing amounts and types of complementary food while still breastfeeding on demand. With gradual weaning, the complete wean usually occurs between two and four years of age. In Western cultures, there remains a relative intolerance to this type of weaning and many mothers who breastfeed their older baby or child become “closet nurser”. Closet nursing takes place privately, at home. This relative secrecy tends to compound erroneous beliefs about appropriate breastfeeding duration.

Planned weaning (mother-led weaning)
A planned wean occurs when the mother decides to stop exclusive breastfeeding without receiving infant’s cues about readiness for this change. Reasons commonly given for a planned wean include: not having enough milk or concerns about the baby’s growth; painful feedings or mastitis; returning to work; a new pregnancy; wanting a partner or alternate caregiver to give feedings; or the eruption of a baby’s first teeth. These situations may result in premature complete weaning, despite the mother’s original intent to continue breastfeeding. Regardless of whether or not a mother wishes to continue some breastfeeding, the physician should provide information and support her decision. A physician who is unsure about how to provide this support should consider referral to a breastfeeding expert.

See the Appendix for an example of a gradual planned (mother-led) weaning schedule.

Refusal to breastfeed: Nursing strikes
Gradual weaning should not be confused with a “nursing strike”. Nursing strikes are temporary and can result from any number of causes, including the onset of menses, a change in the mother’s diet, soup or deodorant, teething, or infant illness. An infant’s sudden refusal to nurse can occur at any time and may lead to complete weaning. The mother might interpret this as a rejection of breastfeeding and stop offering the breast. Simple steps to manage a nursing strike include:

• Making feeding time special and quiet; minimizing distractions.
• Increasing the amount of cuddling and soothing of the baby.
• Offering the breast when the infant is very sleepy or just waking up.
• Offering the breast frequently using different nursing positions, alternating sides or nursing in different rooms.

If the above steps do not result in restarting breastfeeding, a physician should evaluate the infant to rule out possible illness. Enlisting the help of a breastfeeding consultant should be considered. No attempt should be made to ‘starve’ the infant into submission.

Abrupt or emergency weaning
Occasionally there is a need for abrupt or emergency weaning due to prolonged, unplanned separation of mother and infant, or severe maternal illness. Many mothers are inappropriately advised to wean when they are placed on medication, although very few medications are contraindicated during breastfeeding. Absolute contraindicated drugs include antimetabolites, therapeutic doses of radiopharmaceuticals and most drugs of abuse. Other drugs must be considered individually. The benefits of continued breastfeeding need to be weighed against the risks of exposing an infant to the drug in breast milk. A useful resource is the Motherisk website. A child’s sudden illness need not be a reason for weaning. Physicians should encourage and support mothers to breastfeed or pump and store breast milk until the infant is able to take it.

Infants who are weaned abruptly might refuse a bottle. In these cases, a cup can be offered. The infant may initially refuse any other type of food from the mother, in which case an alternative caregiver may need to feed the infant. The mother should continue to spend time in close physical contact with the infant, if possible, so that weaning is less psychologically traumatic for both mother and child.

Abrupt weaning will likely cause the mother some discomfort, especially if it occurs during the early postpartum period when her milk production is high. She should be advised to take analgesics and to express just enough milk that her breasts feel comfortable. Cold
gel packs, cold cabbage leaves or breast massage are reported to relieve engorgement, though a systematic review of these interventions did not find such treatments to be more effective than a placebo.\textsuperscript{22} Mothers need to watch for signs of a plugged duct (an isolated pea-sized hard or tender area without local heat and systemic symptoms) during weaning, which can lead to mastitis. A comfortable and supportive bra can help to reduce discomfort. Binding the breasts, which will lead to more discomfort and can cause blocked milk ducts, is not recommended. There is no need for fluid restriction. Bromocriptine (Parlodel, Novartis Pharmaceuticals, Canada), a prolactin suppressant, is no longer licensed as a ‘dry-up’ medication. There have been reports of serious adverse drug reactions in the mother, such as seizures, strokes and even death, associated with its use.\textsuperscript{22,23,24,25}

Whenever possible, weaning should be a gradual process. An abrupt wean is traumatic for the infant, uncomfortable for the mother and may result in blocked ducts, mastitis or breast abscesses.\textsuperscript{7}

**Maternal guilt**

While mothers start to breastfeed with the best of intentions, they often encounter obstacles that can lead to weaning prematurely. It is important for physicians to explore a mother’s reasons for weaning and to provide information that will help her to make an educated decision about the process and timing of weaning. Once informed, a mother should not be pressured to breastfeed longer than she feels is appropriate. Also, she should not be criticized for continuing to breastfeed for longer than the ‘norm’ in her culture.

Mothers may experience mixed emotions when starting to wean. While enjoying their newfound freedom, they may also mourn the passing of an especially intimate phase of relationship with their child. It is common for mothers to report feeling loss or sadness, even with gradual weaning.\textsuperscript{11,25,26} Remind mothers that their baby is achieving a new social milestone: that of eating solids and drinking from a cup. As long as a mother approaches the weaning process with flexibility and sensitivity, the experience should be positive. The physician’s role is to support and inform the mother while ensuring adequate nutrition for the infant.

**Recommendations for physicians**

- Support exclusive breastfeeding, with vitamin D supplementation, for the first six months of life.
- Encourage continued breastfeeding for up to two years and beyond while providing appropriate nutritional guidance.
- Advise mothers to introduce iron-fortified foods in the form of meat, fish or iron-fortified cereals as first foods, to avoid iron deficiency.
- Advise slow, progressive, natural weaning whenever possible.
- Inform and support breastfeeding mothers while ensuring adequate nutrition for their babies, regardless of the timing of weaning.

**Resources for parents**

- Canadian Paediatric Society, *Feeding your baby in the first year* and *Weaning your child from breastfeeding*.
- La Leche League Canada: http://www.lllc.ca
- Motherisk: www.motherisk.org/

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**References**


Appendix
A sample schedule for a gradual, planned (mother-led) weaning follows:
• Begin by substituting the child’s ‘least favourite’ feeding. The baby might accept the substitute feeding more readily from an alternative caregiver. Depending on the infant’s age, the substitute can be a complementary food, expressed breast milk, formula or (if age-appropriate) cow’s milk. Keep in mind that it is hard to know how much a baby normally ingests while feeding from the breast: feeding stops when an infant is satisfied. Counsel mothers to resist the impulse to make the infant ‘finish’ what is offered.

  – Whole cow’s milk should be avoided until a baby is at least nine, and preferably 12, months of age. No more than 720 mL (24 oz) of cow’s milk or formula per day should be offered to a one- to two-year-old. Drinking more milk per day can result in iron deficiency anemia,[27] obesity, and a poor appetite for other foods.[15] Water is introduced along with complementary foods when the baby is six months old. Some parents may also wish to give fruit juice (100% fruit juice, not fruit “drinks”) by cup at that time, though whole fruits are preferable to juice. The amount should be limited to no more than 125 mL to 175 mL (four to six oz) per day to avoid interference with the intake of nutritional food.[4][15][28]

• A second substitute feeding can be given once the baby is accepting the first well. This may be within a few days or a few weeks. Subsequent substitute feedings can be offered at a pace ideally determined by mother and baby together.

• The baby should be held and cuddled while feeding from a bottle. Both mother and baby need the extra closeness during the weaning process. Never prop a bottle. Bottle propping can put the baby at risk for choking and causes early childhood caries. Drinking from a cup can be introduced at six months of age.

• Solid foods need to be given at developmentally appropriate times. Initially, a few teaspoonfuls can be offered once a day. Single ingredient foods should be introduced one at a time every two to three days.[12][29] Gradually, the amount and number of servings and the variety of foods can be increased.

• Partial weaning is an option for the mother who wishes to continue breastfeeding. This can work well for the mother who is working or studying outside the home. Early morning, evening and night feedings can continue even if mother and baby are separated during the day. For times spent away from her baby, a mother can express milk. Pumping should allow her to maintain production of milk. If she does not pump but continues to breastfeed, the infant’s weight gain will need to be monitored more closely. Many older babies who have not previously been introduced to the cup or bottle refuse to drink anything while their mother is away. Refusal can cause a great deal of anxiety but is usually temporary. These babies usually take solids in their mother’s absence and increase the frequency and length of breastfeeding when she is home. To encourage the intake of fluids, advise offering the ‘sippy-cup’ or bottle when the child is sleepy, as for a nursing strike. ‘Starving’ the baby into taking the bottle is not recommended. Also, watching closely for signs of dehydration or poor weight gain is imperative if the child refuses to eat or drink in the mother’s absence.[26]

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