



Breastfeeding Protocols

for Health Care Providers

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Introduction

The Breastfeeding Protocols for Health Care Providers, 2013 are intended for use by health care providers to promote, protect, and support effective breastfeeding for the families of healthy term infants.

Toronto Public Health, which has had copyright of the Breastfeeding Protocols for Health Care Providers since 2005, began the process of updating and revising the document (2007) in 2010 in order to ensure that the protocols reflect current evidence and practice. Whenever possible, evidence was sought from systematic reviews and/or meta-analyses, controlled clinical studies, case controlled studies, current professional lactation texts, and speakers at breastfeeding educational initiatives. Priority was given to the most recent evidence and a small number of older, landmark studies that continue to be referenced in the literature. Input and comments were gathered from current users of the protocols, within both the City of Toronto and beyond.

The revisions were developed by a workgroup of Public Health Nurses working within Toronto Public Health. Some of these Public Health Nurses were also Lactation Consultants whose work focused on the development and provision of breastfeeding support programs and services to breastfeeding mothers and families.

The revision of the protocols was guided by the Baby-Friendly Initiative (BFI), a global campaign of the World Health Organization (WHO) and UNICEF, whose goal is to increase breastfeeding initiation and duration rates by protecting, promoting, and supporting breastfeeding. One of the requirements for BFI designation is to train all health care providers involved in the care of mothers and babies in the skills necessary to implement the (breastfeeding) policy. The Breastfeeding Protocols for Health Care Providers can be viewed as a foundational document for the training of health care providers who provide breastfeeding support services to the community.

Informed decision-making about infant feeding is a key guiding principle of BFI. Therefore, the revised protocols include a newly developed section entitled *Informed Decision-Making about Infant Feeding*. This section provides guidance on the development of policies and procedures that support informed decision-making. Additionally, a new *Prenatal* section has been added, which includes information that further supports informed decision-making, along with important points about prenatal assessments by health care providers and the support of a mother's breastfeeding self-efficacy. Also, information related to the challenges of breastfeeding late preterm infants is included throughout the protocols. The reader will also notice an additional protocol that addresses *Breastfeeding the Older Child*.

These protocols were developed for use by health care professionals when working with clients experiencing breastfeeding challenges. As such, each protocol is written as a stand-alone document. Therefore, the reader will notice that there is significant repetition between protocols and even between sections within one protocol.

A number of individuals contributed to the revisions of the Breastfeeding Protocols for Health Care Providers. They include:

Martha Hackney, RN, BA, BScN, IBCLC, Public Health Nurse, Toronto Public Health, was the lead PHN assigned with the revision work. Her commitment to the provision of high-quality breastfeeding support services has been appreciated.

Susan Gallagher, RN, BScN, Public Health Nurse, Toronto Public Health, took on the challenging work of keeping the workgroup organized and once again oversaw the task of making sure all edits were incorporated into the protocols.

Kathy J. Jacyniak, RN, BScN, IBCLC, Public Health Nurse, Toronto Public Health, contributed her professional expertise to the development of the revisions, and her attention to detail moved us forward.

Kathleen Hume, RN, BScN, Public Health Nurse, Toronto Public Health, provided her front-line experience and expertise to guide us through the revisions.

Kimberley Ogutu, RN, IBCLC, Public Health Nurse, Toronto Public Health, contributed her knowledge and expertise to the development of the revisions.

Bev Gibson, Communications facilitated the production of the document.

Denise Oliver, RN, BScN, MA.Ed, Associate Director, Maternal Infant Health, Toronto Public Health, gave support to the workgroup as the work progressed and has been a valued supporter of the journey towards BFI designation.

It is our continuing hope that the **Breastfeeding Protocols for Health Care Providers, 2013** will guide and enrich the practice of those who support families who have made an informed decision to breastfeed their infants and toddlers.

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Informed Decision-Making about Infant Feeding



Informed Decision – Making about Infant Feeding

One of the guiding principles of the Baby-Friendly Initiative (BFI) is informed decision-making, which supports the belief that all mothers and their families have the right to make a fully informed decision about how to feed and care for their babies (Breastfeeding Committee for Canada, 2011).

Support pregnant and breastfeeding mothers to:

- Make an informed decision about how each mother will feed her infant. An optimal time to explore her infant feeding decision is during the prenatal period (see *Prenatal* section).
- Seek information that is needed in order to make an informed decision about infant feeding, including:
 - Importance of exclusive breastfeeding for 6 months and continued breastfeeding for up to 2 years and beyond;
 - Benefits of breastfeeding for baby, mother, family and community;
 - Health consequences for baby and mother of not breastfeeding;
 - Risks and costs of feeding artificial baby milk (ABM);
 - Contraception compatible with breastfeeding, including the Lactation Amenorrhea Method (LAM);
 - Basic breastfeeding management, including:
 - position and latching
 - hand expression of breast milk
 - expected normal feeding behaviours (frequency of feeds, output)
 - benefits of skin-to-skin contact, especially for the premature infant
 - infant feeding cues
 - no separation of mother and infant, including 24-hour rooming-in (*Protocol #1: The Initiation of Breastfeeding; Protocol #2: Positioning and Latching; Protocol #3: Signs of Effective Breastfeeding; and Protocol #19: Expressing and Storing Breast Milk*);
 - *Integrated Ten Steps & World Health Organization (WHO) Code Practice Outcome Indicators for Hospitals and Community Health Services: Summary* (BCC, 2011b); (Appendix C)
 - Importance of hospitals and community health services having policies and practices that are Baby-Friendly;
- Importance of breastfeeding support programs;
- The right of women to be accommodated in the workplace during pregnancy and breastfeeding (Ontario Human Rights Commission, 2011);
- Medical indications for supplementation or cessation of breastfeeding;
- Supplementing with mother’s own breast milk or human donor milk (where available) when possible;
- Use of pacifiers and artificial nipples; and
- Difficulty of reversing the decision once breastfeeding is stopped.
- Seek further support if infant feeding decisions are based on inaccurate or incomplete information in order to:
 - Clarify inaccurate or incomplete information;
 - Reinforce messages related to informed decision-making.
- Seek further support if the mother lacks confidence in her ability to breastfeed or has a prior history of breastfeeding difficulties:
 - Reinforce key messages about the initiation of breastfeeding to promote breastfeeding success;
 - Provide specific information related to any past breastfeeding difficulties;
 - Provide information about community breastfeeding supports.

General Principles

One of the guiding principles of BFI is informed decision-making. All mothers and their families have the right to make a fully informed decision about how to feed and care for their babies (BFI Step 5, BCC, 2011b).

Health care providers have the responsibility to provide mothers and their families with accurate and unbiased information required to make a fully informed decision about infant feeding. Sufficient opportunities to discuss the benefits and risks of various infant feeding options are important in empowering mothers and their families to engage in informed decision-making. With knowledge, skills and support, the level of satisfaction with their decision, as well as their ability to provide safe and informed care for their child, will be optimized (Ontario Public Health Association, 2007). Unnecessary supplementation with ABM may also be avoided, with its potential impact on the initiation and duration rates of breastfeeding.

A mother brings her own thoughts and expectations to her decision about infant feeding, based on her knowledge and past experience, as well as family and cultural norms. It is important for health care providers to explore these with the mother and support her in understanding how these may impact her breastfeeding experience and success, and to offer accurate information and clarification so that she can make a fully informed decision.

Information required to make an informed decision about infant feeding includes (BCC, 2011b):

- Benefits of breastfeeding and health consequences of not breastfeeding:
 - Infant: decreased risk of Sudden Infant Death Syndrome (SIDS), otitis media, gastroenteritis, childhood Type 1 Diabetes, childhood leukemia, obesity in adolescence and adulthood, as well as a reduced risk of lower respiratory infections in exclusively breastfed full-term infants (TPH, 2010b);
 - Maternal: decreased risk of Type 2 Diabetes in women with no history of gestational diabetes, decreased risk of breast cancer and ovarian cancer (TPH, 2010).
- Feeding ABM and associated risks and costs:
 - Increased expenses and equipment for preparation and storage;
 - A reduction in the supply of breast milk, a decreased confidence in a mother's ability to exclusively breastfeed and a decrease in the duration of breastfeeding;
 - Potential contamination of ABM with bacteria from the manufacturing process, unsafe handling, storage or preparation (WHO, 2007);
 - Illness due to improper dilution of ABM (WHO, 2007);
- An increased risk of various infections (e.g., ear, gastrointestinal, respiratory, diarrhea), chronic diseases and certain cancers among infants and children who are fed ABM (Guise et al., 2005; Ip et al., 2007);
- An increased risk of Type 2 Diabetes and certain cancers (Ip et al., 2007), as well as an increased risk of osteoporosis and a slower return to pre-pregnancy weight among women who fed their infants ABM (American Academy of Pediatrics, 2005).
- Contraception compatible with breastfeeding, including the LAM (TPH, 2007).
- *Integrated Ten Steps & WHO Code Practice Outcome Indicators for Hospitals and Community Health Services: Summary* (BCC, 2011b).
- Importance of exclusive breastfeeding for 6 months and continued breastfeeding for up to 2 years and beyond.
- Basic breastfeeding management:
 - position and latching;
 - hand expression of breast milk;
 - expected normal feeding behaviours, including frequency of feeds and output;
 - benefits of skin-to-skin contact, especially for the premature infant;
 - infant feeding cues;
 - no separation of mother and infant, including 24-hour rooming-in.
- Importance of hospitals and community health services having policies and practices that are Baby-Friendly.
- Importance of breastfeeding support programs.
- The right of women to be accommodated in the workplace during pregnancy and breastfeeding (Ontario Human Rights Commission, 2011).
- Medical indications for supplementation or cessation of breastfeeding (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Supplementing with the mother's own breast milk or human donor milk (where available), when possible.
- Use of pacifiers and artificial nipples.
- Difficulty of reversing the decision once breastfeeding is stopped.

Once an informed decision has been reached, mothers and their families need to be supported in their infant feeding decision and receive appropriate information and guidance to promote the health and well-being of the infant.

- Information is discussed with individual clients who have made a decision to feed their infant ABM; this includes:
 - Safe and hygienic preparation, storage and feeding of ABM;
 - Health hazards of inappropriate preparation, storage and use of ABM;
 - Cue-based feeding with a bottle and the importance of holding the baby to promote development and attachment.

Information on ABM will not be discussed in a group situation. It is important to offer the mother individual support to explore her infant feeding decision, her knowledge of the safe use of ABM,

pacifiers and artificial nipples, and her understanding of the difficulty of reversing the decision not to breastfeed.

- Learning to make a fully informed decision is an important life skill that will support the mother throughout her parenting experience. Throughout her child's lifetime, she will have many more opportunities to make informed decisions as she parents her child, such as those related to immunization, car seats, sunscreen, day care, schools, camps, discipline, etc.;
- Supporting a mother in exploring her cultural beliefs and practices in the context of accurate breastfeeding information will help her to identify how these might support or potentially interfere with breastfeeding success, and enhance her ability to make an informed decision about feeding her baby.

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Prenatal



Prenatal

Inform pregnant women and their families about the importance and process of breastfeeding
(Baby-Friendly Initiative (BFI) Step 3, BCC, 2011)

Encourage the pregnant mother to:

- Share and discuss her goals for breastfeeding and infant feeding. Discuss and explore her attitudes with her partner, including verbalizing her feelings about breastfeeding and infant feeding.
 - Seek information to support making an informed decision about how she wants to feed her baby, including:
 - Importance of exclusive breastfeeding for 6 months and continued breastfeeding for up to 2 years and beyond.
 - Benefits of breastfeeding for baby, mother, family, and community;
 - Health consequences of not breastfeeding for baby and mother;
 - Risks and costs of feeding artificial baby milk (ABM);
 - Contraception compatible with breastfeeding, including the Lactation Amenorrhea Method (LAM);
 - *Integrated Ten Steps & World Health Organization (WHO) Code Practice Outcome Indicators for Hospitals and Community Health Services: Summary* (BCC, 2011) (Appendix C);
 - Basic breastfeeding management, including:
 - position and latching
 - hand expression of breast milk
 - expected normal feeding behaviours (frequency of feeds, output)
 - benefits of skin-to-skin contact, especially for the premature infant
 - infant feeding cues
 - no separation of mother and infant, including 24-hour rooming-in (*Protocol #1: The Initiation of Breastfeeding; Protocol #2: Positioning and Latching; Protocol #3: Signs of Effective Breastfeeding; and Protocol #19: Expressing and Storing Breast Milk*).
 - Medical indications for supplementation or cessation of breastfeeding;
 - Difficulty of reversing the decision once breastfeeding is stopped;
 - Supplementing with the mother's own breast milk or human donor milk (where available) when possible;
 - Use of pacifiers and artificial nipples;
 - Importance of breastfeeding support programs;
 - The right to be accommodated in the workplace during pregnancy and breastfeeding (Ontario Human Rights Commission, 2011).
- Develop an evidence-based plan to initiate breastfeeding.
 - Initiation of breastfeeding immediately after birth. Place the infant skin-to-skin on the mother's chest, uninterrupted, for at least an hour or until completion of the first feeding, or for as long as the mother wishes. The infant might only lick and smell the breast and may not necessarily actively suck in the early stages of breastfeeding. Most procedures can and should be delayed until after the first feeding is completed (BFI Step 4, BCC, 2011);
 - Early feeding cues and cue-based feeding (*Protocol #1: The Initiation of Breastfeeding*);
 - Baby-led latching (*Protocol #2: Positioning and Latching*).
- Understanding the importance of remaining together with the infant 24 hours a day at the hospital unless separation is medically indicated (BFI Step 5, BCC, 2011) (*Protocol #1: The Initiation of Breastfeeding*).
 - Information about normal newborn feeding behaviours (frequency of feeding, output and signs of effective breastfeeding) and cue-based feeding (*Protocol #1: The Initiation of Breastfeeding and Protocol #3: Signs of Effective Breastfeeding*);

- Information about the prevention of engorgement and sore nipples (*Protocol #4: Sore Nipples* and *Protocol #5: Engorgement*);
- Information about physiological jaundice (*Protocol #14: Jaundice in a Breastfed Baby*);
- Information about the importance of avoiding supplements, bottles and pacifiers (*Protocol #1: The Initiation of Breastfeeding*);
- Importance of early assessment by a qualified health care professional;
- Importance of support and linkage with community breastfeeding supports.
- If infant feeding decisions are based on inaccurate or incomplete information:
 - Offer information to clarify the inaccurate or incomplete information;
 - Reinforce messages related to informed decision-making (see *Informed Decision-Making about Infant Feeding*).
- If the mother lacks confidence in her ability to breastfeed or has a history of breastfeeding difficulties:
 - Reinforce key messages about the initiation of breastfeeding to promote breastfeeding success;
 - Offer specific information and support related to any past breastfeeding difficulties;
 - Offer specific information and support related to possible disclosures of partner abuse or mental health issues;
 - Offer information about community breastfeeding supports (see note on breastfeeding self-efficacy in *General Principles*).
- If the mother experiences a lack of breastfeeding support from significant others or is unaware of community breastfeeding supports:
 - Offer information about and facilitate linkage with community breastfeeding supports, including peer support (Dennis et al., 2002);
 - Offer information to significant others and family members about how to support the mother.
- If the mother is experiencing perceived or actual barriers to breastfeeding:
 - Offer support to explore the perceived or actual barriers to breastfeeding;
 - Suggest consultation with a primary health care provider and/or lactation consultant about the potential impact on breastfeeding.

General Principles

In order to improve breastfeeding outcomes for mothers and infants, it is important to discuss infant feeding in the prenatal period. Early pregnancy is an ideal time for pregnant women and their partners to explore their attitudes towards breastfeeding. Expectant parents need to verbalize and address the feelings involved in the decision to breastfeed. Myths and false information need to be explored and clarified (RNAO, 2003);

- During pregnancy, women need to be encouraged to share their goals and perceived barriers about breastfeeding. Providing information, reassurance and assistance to resolve perceived difficulties will help build confidence (RNAO, 2003).
- Health care providers should explore with the pregnant woman her decision about infant feeding.
- The health care provider will provide comprehensive information to support the development of a plan for the initiation of breastfeeding.
 - Benefits of breastfeeding and health consequences of not breastfeeding include:
 - Infant: decreased risk of Sudden Infant Death Syndrome (SIDS), otitis media, gastroenteritis, childhood Type 1 Diabetes, childhood leukemia, obesity in adolescence and adulthood, as well as a reduced risk of lower respiratory tract infections in exclusively breastfed full-term infants (TPH, 2010)
 - Maternal: decreased risk of Type 2 Diabetes in women with no history of gestational diabetes, decreased risk of breast cancer and ovarian cancer (TPH, 2010)
 - Feeding ABM and associated risks and costs include:
 - Increased expense and equipment for preparation and storage;
 - A reduction in the supply of breast milk, decreased confidence in a mother's ability to exclusively breastfeed and a decrease in the duration of breastfeeding;

- Potential contamination of ABM with bacteria from the manufacturing process, and unsafe handling, storage or preparation (WHO, 2007);
- Illness due to improper dilution of ABM (WHO, 2007);
- An increased risk of various infections (e.g., ear, gastrointestinal, respiratory, diarrhea), chronic diseases and certain cancers among infants and children who are fed ABM (Guisse et al., 2005; Ip et al., 2007);
- An increased risk of Type 2 Diabetes and certain cancers (Ip et al., 2007), as well as an increased risk of osteoporosis and a slower return to pre-pregnancy weight among women who fed their infants ABM (American Academy of Pediatrics, 2005).

The prenatal period is an important time for a mother to learn about contraception compatible with breastfeeding, including the LAM, and its relationship to supplementation and exclusive breastfeeding. The health care provider can support the mother in understanding that possible supplementation in hospital can interfere with the contraceptive effect of breastfeeding, and potentially put the mother at risk of an unplanned pregnancy.

Prenatal assessment by a health care provider should include:

- Inquiry about breast changes and breast anatomy.
- Inquiry about plans for infant feeding, i.e., “Have you thought about how you want to feed your baby?”
- Inquiry about confidence related to breastfeeding ability, support for breastfeeding from significant others and awareness of community breastfeeding supports.
- Assessment of any perceived or actual barriers to breastfeeding, including:
 - Past history of breastfeeding difficulties
 - Flat or inverted nipples
 - Unusual breast lump
 - Previous surgery or trauma to the breast
 - Thyroid, pituitary or endocrine issues, including fertility issues
 - Human immunodeficiency virus (HIV) positive status

- Medication(s) contraindicated during breastfeeding
- Disclosure of partner abuse or past history of physical or sexual abuse.

Provide information about normal breast changes and breast anatomy during pregnancy:

- Breasts enlarge and may be tender.
- Areola and nipples darken in pigmentation.
- Blood vessels of the breast enlarge, and may shine blue through a seemingly transparent, more translucent than usual chest wall (Jarvis, 2004).
- Montgomery’s tubercles, located within the areola, contain openings of lactiferous and sebaceous glands that enlarge during pregnancy and lactation in order to lubricate and protect the areola and nipple (Lawrence, 2011; Jarvis, 2004). The secretions also provide olfactory stimuli for infants, playing a key role in establishing behavioural and physiological processes related to breast milk transfer and production (Doucet et al., 2009).
- The hormones estrogen and progesterone are responsible for the increased size and sensitivity of the breasts or mammary glands during pregnancy (see *How the Breast Works*).
- Breastfeeding self-efficacy is the confidence that a mother has in her ability to breastfeed her infant (Dennis, 1999). The mother must believe that she is capable of implementing any technique or strategies that might be suggested (Bowles, 2011). Prenatal breastfeeding education increases breastfeeding self-efficacy (Noel-Weiss et al., 2006).
- Health care providers can enhance a mother’s breastfeeding self-efficacy and exclusive breastfeeding by helping her to:
 - Identify barriers and offer strategies to overcome them.
 - Identify and maximize strengths and sources of support.
 - Envision success and persevere through difficulties (Bowles, 2011).

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How the Breast Works



How the Breast Works

In most cases breasts of different sizes and shapes will produce enough breast milk.

Structure of the Breast

Alveoli

These are clusters of glandular tissue in the breast where breast milk is produced and stored until it is released in response to the infant's sucking. The alveoli are secretory acini cells surrounded by a contractile unit of myoepithelial cells (Riordan, 2010). Gaps between the alveolar cells close 2–3 days after birth, reducing permeability. These alveolar cells contract to eject the breast milk into the ducts during the letdown or breast milk ejection reflex. There is mammary glandular tissue throughout the breast extending into the axilla; much of the glandular tissue is located within a 30 mm radius of the base of the nipple (Ramsay et al., 2005).

Ducts

There are tubular structures where breast milk flows from the alveoli. Ducts and ductules begin branching under the areola and intertwine throughout the breast, surrounded by adipose and glandular tissue, and reaching to the alveoli (Ramsay et al., 2005). Breast milk is ejected into the upper ducts when letdown occurs. There are usually about 9 ducts, ranging from 4 to 14, opening at the surface of the nipple (Ramsay et al., 2005).

These ducts are for the transport of breast milk, rather than for breast milk storage (Geddes, 2007). Previously it was thought that breast milk was stored in widened areas of the ducts, known as milk or lactiferous sinuses, until it was removed through breastfeeding or breast milk expression. However, the work of the Hartmann et al. (1996), using real-time ultrasound imagery, has shown that these sinuses do not exist. The resting diameter of the duct near the areola is the same as the diameter farther up the lobe.

The ducts increase in diameter when letdown or breast milk ejection reflex occurs during breastfeeding or expression. Dilation of the breast milk duct is caused by a combination of shortening and widening of the duct, together with increased

pressure within the duct, due to expulsion of breast milk from the alveoli and a change in the infant's sucking pattern (Ramsay et al., 2004). When breast milk is no longer being removed, duct size returns to the resting diameter within 2 minutes due to the backward flow of breast milk (Ramsay et al., 2004). The breast milk ducts at the base of the alveoli are superficial, very small (1.9 ± 0.6 mm), and easily compressed. They are easily occluded with gentle pressure (Ramsay et al., 2005).

Nipple

The mammary papillae form a conical elevation at the centre of the areola. This tissue is very flexible, able to stretch and mould to conform to the infant's mouth. There are usually about 9, ranging from 4 to 18, duct openings or pores where the breast milk ducts merge and from which breast milk exits the breast (Ramsay et al., 2005). The nerve endings are highly sensitive to stimulation, controlling the release of breast milk from the ductal openings.

Areola

The dark area around the nipple comes in a variety of shapes and sizes. It increases in size and colour in response to hormones during pregnancy and breastfeeding.

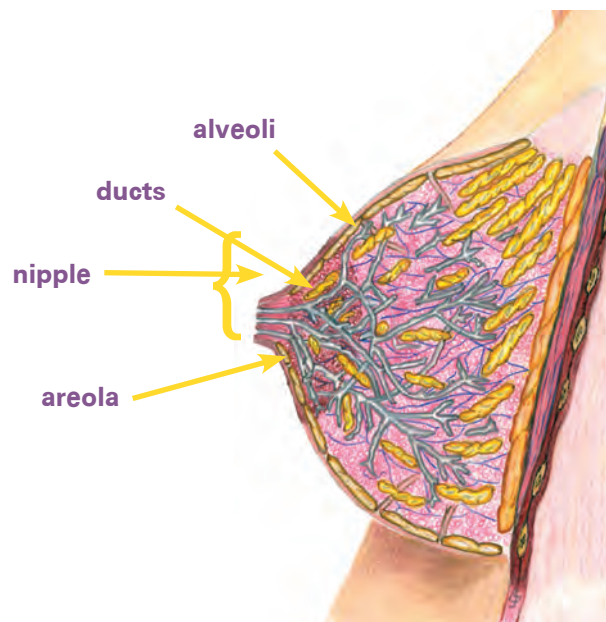
Both the nipple and areola are erectile tissue that responds to tactile, sensory and autonomic nervous stimuli (Lawrence, 2010).

Montgomery's tubercles contain openings of the ducts and sebaceous glands that lubricate the areola. The secretions provide olfactory stimuli for infants, playing a key role in establishing behavioural and physiological processes related to breast milk transfer and production (Doucet et al., 2009).

Breast Changes During Pregnancy

The hormones estrogen and progesterone are responsible for the increased size and sensitivity of the breast or mammary gland during pregnancy. Mammogenesis is the rapid growth and cell development of the alveolar and ductal tissue of the breast that occurs during early pregnancy. These changes are signs that the breasts are preparing to make breast milk. Beginning from mid-pregnancy to late pregnancy, the breast has the capacity to produce the components of breast milk (Lactogenesis I). Lactation is normally inhibited during pregnancy because high levels of estrogen and progesterone inhibit the effect of prolactin. Lactogenesis II, the initial copious secretion of breast milk 2–4 days after childbirth, is triggered by the fall in progesterone and estrogen levels after expulsion of the placenta. This also triggers the closure of the tight junctions between the alveolar cells. At that time, the levels of sodium, chloride and protein drop in breast milk, together with an increase in lactose and breast milk lipid levels. Until then, large molecule immunoglobulins and medications pass easily into breast milk (Hale et al., 2007). The events of the first few days may either promote or delay Lactogenesis II (*Protocol #1: The Initiation of Breastfeeding*). Although the initial copious secretion of breast milk is driven by hormones rather than by breast milk removal, sustained lactation depends on regular breast milk removal (Cregan et al., 2002).

In most cases, breasts of different shapes and sizes will produce more than enough breast milk. Larger breasts have more fatty tissue but not necessarily more of the breast milk producing alveoli tissue. Storage capacity, the amount of breast milk stored between breastfeedings, does appear to be related to breast size but not to the potential for breast milk production. Mothers with smaller storage capacities may need to breastfeed more often and may have less flexibility in the frequency of breastfeeding (Hartmann et al., 1996).



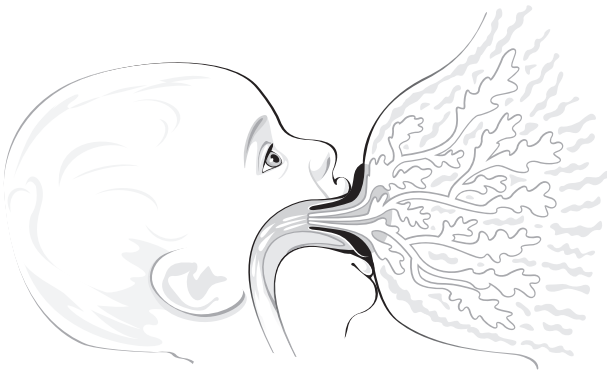
Lactating Breast at Rest

How Breast Milk is Produced

The amount of breast milk produced depends on how often and how effectively the infant removes breast milk from the breast.

More breast milk will be produced when the infant breastfeeds more frequently and has an effective latch and suck. The interaction between storage capacity, the degree of breast fullness or emptiness, and frequency of breast milk removal plays a significant role in breast milk synthesis (Cregan, 1999).

When the nipple and areola are stimulated by infant hand movements and suckling, a cascade of hormones are triggered. Hormones are released into the mother's bloodstream, sending messages to the brain via the hypothalamic-pituitary-adrenal or HPA axis. These trigger breast milk production and the letdown or breast milk ejection reflex, as well as other maternal and infant behaviours. Multiple letdowns occur during a single breastfeeding. Most mothers report sensing the initial letdown but not subsequent ones (Ramsay et al., 2004). Mothers may also not feel letdown but still have a normal letdown response.



Lactating Breast after Letdown

Prolactin is the hormone synthesized, stored and released from the anterior pituitary to stimulate the alveoli to produce and secrete breast milk. The greater the stimulation to the nipple and areola, the more prolactin that is secreted by the anterior pituitary gland, leading to more breast milk being produced. Prolactin levels have diurnal variations following a circadian rhythm, with higher levels occurring at night (Riordan, 2010; Hale et al., 2007). Levels of prolactin are highest in early lactation and decline as lactation progresses (Cox et al., 1996, Hale et al., 2007). Prolactin levels may be regulated by a feedback mechanism known as the Prolactin – Inhibiting Factor (PIF) or Feedback Inhibitor of Lactation (FIL), a dopamine-related substance that inhibits the uptake of prolactin by the prolactin receptors (Lawrence, 2010). Frequent breastfeeding in the early days may stimulate development of prolactin receptors, resulting in greater breast milk output (De Carvalho et al., 1983).

Oxytocin is the hormone that sends messages to the alveoli to eject breast milk into the ducts. In response to suckling and infant hand massage (Matthiesen et al., 2001), the posterior pituitary gland secretes oxytocin, causing breast milk ejection reflex or letdown to contract the myoepithelial cells of the alveoli and eject breast milk into the ducts. The breast milk is drawn down the dilated ducts toward the areola to be removed during breastfeeding or breast milk expression. Oxytocin dilates the ducts during breast milk ejection reflex and also sends messages to the uterus to contract. This helps to prevent maternal haemorrhaging and to promote uterine involution after birth. Mothers may experience

this as cramps or “after pains”. These cramps may continue for up to 20 minutes after a breastfeeding (Riordan, 2010). Oxytocin is also understood to be a neuropeptide that plays a role in influencing emotional and physiological responses. These include cardiovascular, digestion, appetite and metabolism, pain threshold, kidney function, thermoregulation and stress response behaviours (Uvnus-Moberg, 1998), as well as attachment behaviours. These early maternal attachment behaviours promote infant brain development and plasticity (Schore, 2001). A feeling of calm often reported by women during breastfeeding is partly mediated by oxytocin (Riordan, 2010). It has been termed an agent of the calm and connection response (Uvnus-Moberg et al., 2005).

Prolactin and oxytocin play a role in maternal adaptation to stress, whereby the responses of the HPA axis and the sympathetic nervous system to emotional and physical stressors are attenuated or blunted (Slattery et al., 2008), facilitating right-brain and intuitive behaviours.

Other hormones also have significant roles in lactation. These include but are not limited to:

- Glucosteroids, which contribute to alveolar development, the regulation of fat, protein and lactose synthesis, and water transport across cell membranes.
- Cortisol, important to stress mediation and normally lactogenic; the high levels produced during stress may be antagonistic to lactation.
- Thyroid-stimulating hormone, which facilitates mammary growth and lactation.

Breast milk is a dynamic, living substance (Walker, 2010). It has many, many bioactive components, and transitions continually to meet the changing needs of the infant. These transitions occur on a continuum, with the composition of breast milk varying according to the stage of lactation, the time of day, the sampling time during a given feeding, maternal nutrition and individual variation (Lawrence, 2010).

Traditional nomenclature suggests distinct differences between “colostrum”, “transitional milk” or “mature milk”, and between “foremilk” and “hindmilk”, which can imply limited value and use (Lawrence, 2010). Some cultures discard the first milk. However, it is important to acknowledge that all breast milk is “milk” and is valuable for infants.

The first breast milk (sometimes known as

colostrum) is produced during late pregnancy and in the early postpartum period, and provides the infant with nutrition and protection against infectious disease (Lawrence, 2010). Typically, it is a clear yellow, viscous fluid rich in proteins (reflecting the presence of a large number of immunoglobulins), fat soluble vitamins, and some minerals, but has less fat and sugar than mature breast milk (Riordan, 2010). It is produced in tiny volumes; in the first 3 days postpartum the volume per feeding ranges from 2 to 30 ml (Lawrence, 2010). The higher concentrations of proteins and minerals gradually change over the first few weeks to reflect the infant's needs as breastfeeding becomes well established and more mature breast milk is produced (Riordan, 2010). Changes continue in later lactation when increases in sodium and protein, including lactoferrin, lysozyme and secretory IgA (Dewey, 1984; Goldman, 1984) increase to enhance protection from infection for the older infant and toddler.

Breast milk also changes throughout each breastfeeding, particularly related to fat content. At the initiation of a breastfeeding, the breast milk has a small amount of fat, but the fat content rises throughout the breastfeeding in relation to the degree of breast emptiness, not the duration of time at the breast, or the time interval between breastfeedings. The breast milk secreted at the early part of a breastfeeding, sometimes referred to as “foremilk”, has high water and carbohydrate content to help hydrate and energize the infant. It is also a source of water-soluble vitamins (Riordan, 2010). The breast milk produced towards the latter part of a breastfeeding, sometimes referred to as “hindmilk”, has progressively higher fat content, although the fat content of both “fore” and “hind” breast milk increases as the breast is emptied (Daly et al., 1993). There is no clear distinction between foremilk and hindmilk. The composition also varies with the time of day and between breasts (Lawrence, 2010).

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Protocol #1

The Initiation of Breastfeeding



Protocol #1: The Initiation of Breastfeeding

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

(BFI Step 4, BCC, 2011)

Suggestions

Encourage the mother to:

- Initiate breastfeeding immediately after birth. Place the baby skin-to-skin on her chest, uninterrupted, for at least an hour or until completion of the first breastfeeding, or for as long as the mother wishes. Most babies will breastfeed well immediately after birth, while some may only lick and smell the breast and may not necessarily actively suck in the early stages of breastfeeding, and some may lick and sniff later on. Most routine procedures can and should be delayed until after the first breastfeeding is completed.
- Remain together with the baby 24 hours a day at the hospital unless separation is medically indicated.
- Seek assistance to initiate breastfeeding and maintain lactation, particularly if the mother and baby are separated after birth. The mother should be encouraged to express her breasts frequently – at least 8 or more times in 24 hours beginning within 6 hours after birth (BFI Step 5, BCC, 2011) (*Protocol #19: Expressing and Storing Breast Milk*).
- Recognize when the baby is ready to breastfeed.
- Breastfeed when the baby is showing early feeding cues before the baby gets too hungry, is too eager to breastfeed, or is crying. Early feeding cues include:
 - Rapid eye movements under the eyelids.
 - Soft cooing or sighing sounds.
 - Sucking or licking movements.
 - Sucking sounds.
 - Restlessness.
 - Hand-to-mouth movements.

(Adapted from ILCA, 2005)

- Breastfeed according to the baby’s feeding readiness cues. Breastfeedings should be frequent and unrestricted, with no time schedule. In the first

month a baby should be awakened to breastfeed if there are signs of insufficient breastfeeding (i.e., less than 8 effective breastfeedings in 24 hours, or more than one 4–5 hour sleep period in 24 hours, and/or showing signs of inadequate urine/stool output or weight gain) (*Protocol #3: Signs of Effective Breastfeeding*).

- Breastfeed when the mother is calm and comfortable.
- Clothe the baby only in a diaper when breastfeeding to promote skin-to-skin contact.
- Allow the baby to lead the breastfeeding process, including when to breastfeed, latch, and when to finish the breastfeeding. The baby is supported and his trunk is stabilized so that he is able to follow his own reflexes and cues. The baby sets the timing and the pace; the process should not be rushed.
- Allow the baby to breastfeed on the first breast until the baby is no longer sucking and swallowing effectively (i.e., deep and slow sucks) (*Protocol #3: Signs of Effective Breastfeeding*). The second breast should be offered if the baby is interested. This may happen several times during a breastfeeding, when the baby is learning to breastfeed. Once breastfeeding and breast milk supply are established, the baby should be allowed to breastfeed fully from the first breast before changing breasts.
- Understand that during the first few days, breastfeedings may be short and frequent until the breast milk volume increases with the onset of Lactogenesis II. Babies should effectively suck and swallow until they are satisfied.
- Seek assistance to initiate breastfeeding and maintain lactation should the mother face challenges such as ‘separation from her baby’ (Step 5, BFHI). Support the mother to hand express if the baby is not removing breast milk from the breast

(Protocol #19: *Expressing and Storing Breast Milk*).

- Offer both breasts at each breastfeeding, as determined by the baby's interest.
- Avoid supplementation with other fluids or foods in the first 6 months of life, unless medically indicated (Protocol #17: *Indications for Supplementation or Cessation of Breastfeeding*).
- Discuss with her health care provider the Health Canada recommendation to give all breastfed healthy term babies a daily vitamin D supplement (10 µg or 400 IU), starting from birth and continuing until the breastfed baby reaches 1 year of age (Health Canada, 2011).
- Avoid using a soother or bottle. Support the mother in making an informed decision about the use of artificial nipples or pacifiers, and document her decision. If the mother decides to use these, she should be encouraged to wait until breastfeeding and sucking patterns are well established, usually at 4–6 weeks.
- Learn alternative ways to soothe and calm her baby.
- Use proper positioning and latching techniques (Protocol #2: *Positioning and Latching*).
- Watch for signs of effective breastfeeding (Protocol #3: *Signs of Effective Breastfeeding*).

General Principles

- Initiation of breastfeeding immediately after birth is recommended.
- Place babies in uninterrupted skin-to-skin contact with their mothers immediately following birth for at least an hour or until completion of the first feeding or for as long as the mother wishes: encourage mothers to recognize when their babies are ready to breastfeed, offering help as needed.
- Routine procedures, monitoring and measurements are delayed until after the first breastfeeding is completed. (BFI Step 4, BCC, 2011).
- Most mothers will produce enough breast milk to exclusively breastfeed their baby for the first 6 months of life and continue to breastfeed for 2 years and beyond with the introduction of nutrient rich solid foods at 6 months paying particular attention to iron.
- Babies should be breastfed according to their early feeding cues. In the first month most babies need

to breastfeed well at least 8 times in 24 hours. This will ensure that the baby is getting enough breast milk while breastfeeding is being established and help the mother to build a healthy breast milk supply.

- Babies show feeding cues to signal their readiness to feed, as well as the timing and duration of feedings. Mothers are encouraged to recognize the signs that their babies are ready to feed (BFI Step 4, BCC, 2011).
- Babies breastfeed best when they are calm, before they are overly hungry, and before they reach a state of crying. Early feeding cues may be less obvious if the baby has challenges such as jaundice, illness, difficult delivery, etc.

Early Feeding Cues include:

- Rapid eye movements, under the eyelids
- Sucking/licking movements
- Hand-to-mouth movements
- Sucking sounds
- Restlessness
- Soft cooing or sighing sounds
(Adapted from ILCA, 2005)

Late Feeding Cues include:

- Crying
- Fussiness
- Exhaustion
- Falling asleep

(Adapted from Riordan, 2010)

(Protocol #2: *Positioning and Latching* and Protocol #3: *Signs of Effective Breastfeeding*).

Skin-to-Skin

Mother-newborn contact is optimized by skin-to-skin practices or “kangaroo care” for premature babies. Placing the baby directly on the mother's abdomen and chest, skin-to-skin, boosts the baby's cardio-respiratory and thermoregulatory response and provides the mother with the optimum opportunity to become attuned to her baby's behaviour and cues. Skin-to-skin contact promotes colonization of the baby with maternal microbes, for which the baby is familiar and has compatible antibodies (Odent, 2002). Skin-to-skin contact has been demonstrated to result in a significant increase in breast milk volume (Hurst

et al., 1997). The most recent Cochrane Review (Moore et al., 2007) found statistically significant positive effects of early skin-to-skin contact on the success of first breastfeeding, breastfeeding status day 3 post-birth, breastfeeding 1-4 months post-birth, breastfeeding duration, maternal breast engorgement pain, anxiety state, and babies' recognition of their own mother's breast milk, as well as maintenance of infant thermoregulation, crying, blood glucose levels, and other physiological parameters. In addition, it found significant differences in summary scores of affection and touch and contact behaviour with skin-to-skin practice. There were no significant differences in weight gain, heart or breathing rates, hospital stay, or number of breastfeeding problems (Moore et al., 2007). As discussed by Louise Dumas (Dumas, 2011), the temperature reciprocity between mother and baby means that mothers do not overheat (Bergstrom et al., 2007), the baby's temperature is always within normal limits (Mori et al., 2009; Bystrova et al., 2008), cold babies rewarm better than in an incubator (Christensson et al., 1998), time until placental expulsion is decreased (Marin Gabriel et al., 2010), there is reduced pain reaction (Chermont et al., 2009; Weissman et al., 2009), energy is conserved, and babies are better able to self-regulate, showing less signs of stress after birth (Ferber et al., 2004).

- Avoid restricting babies' use of their hands by swaddling, holding the arms, or trapping them between the mother's breasts. It is instinctive for babies to deliberately use their hands to locate, move and shape the nipple area (Genna, 2010).
- Swaddling or bundling may restrict instinctive infant behaviours such as hand movements, as well as seeking and attaching behaviours. Swaddled babies sleep longer and arouse less (Franco et al., 2005), which may decrease breastfeeding frequency. This is particularly significant in the first few hours and days after birth.
- Assist mothers to be comfortable and stress-free to promote breast milk letdown (see *How the Breast Works*).

Babies should be allowed to breastfeed on the first breast until they are no longer sucking and swallowing effectively (i.e., deep and slow sucks) (*Protocol #3: Signs of Effective Breastfeeding*). Finish the first breast first (Renfrew et al., 2004). This will increase the amount of fat the baby receives since breast milk increases in fat content as the breast empties while feeding progresses (Cregan & Hartmann, 1999).

It is no longer recommended to routinely switch breasts after 5–10 minutes as this may decrease the baby's fat intake and result in more frequent breastfeeding (see *How the Breast Works*). The second breast should be offered when the baby shows interest. Let the baby's cues, not the clock, determine how much and how long to breastfeed.

It is not necessary to breastfeed equally from both breasts. The work of the Western Australia/Hartmann group has shown that storage capacity varies between breasts, and although this does not impact the 24-hour volume produced, it can impact the amount of breast milk available between breasts during a single feeding (Daly et al., 1993; Ramsay et al., 2005; Geddes, 2007). The baby's interest is a better indicator in determining how long and how much to breastfeed.

It may be difficult for mothers to recognize swallowing during the first few days until breast milk volume increases with the onset of Lactogenesis II (see *How the Breast Works*).

It may also be difficult for mothers to accept that this small volume of breast milk is the correct amount for the size of their newborn's stomach. Fetal gastric volume near term is tiny (10 ml); it is important to reinforce the message that stomach capacity is small and gastric emptying frequent in newborns. The cycle is about 40 minutes at 32–35 weeks gestation and lengthens to about 80 minutes at term (Sase et al., 2005). Santoro found that newborns ingested only 15 ± 11 g of breast milk in the first 24 hours (Santoro et al., 2010).

Mothers should be supported in understanding the significance of frequent breastfeedings and breast milk removal during the first few days after birth, and their relationship to the establishment of breastfeeding. Babies need frequent small breastfeedings because of their small stomach size and rapid gastric emptying and feeding cycles. The breasts need frequent removal of small amounts of breast milk to promote Lactogenesis II (see *How the Breast Works*). Lack of breast stimulation by sucking or expression leads to a drop in the level of lactogenic hormones. If breast milk is not removed frequently, breast milk stasis will trigger changes at the cellular level that lead to breakdown of the lactocytes, changes in protein and breast milk composition and involution of the breast, thereby reversing Lactogenesis II or the production of breast milk (Hale et al., 2007).

Lactogenesis II may be delayed by a variety of factors that may lead to poor breast milk removal, such as mother-baby separation, traumatic birth, caesarean section, metabolic conditions in the mother or baby, eg., uncontrolled diabetes or thyroid disease, or psychological situations including stress or other mental health concerns. When Lactogenesis II is delayed, there may be delays in the appearance of the initial copious secretion of breast milk, mothers reporting feeling breast fullness, and changes in the baby's stooling frequency and colour until later in the first week, after 4 or 5 days (*Protocol #3: Signs of Effective Breastfeeding*). Although there may be normal variations between women, it is important to assess further whenever there seem to be signs of delay.

After Lactogenesis II, there is an ongoing feedback mechanism to inhibit breast milk release when there is poor breast milk removal at any stage of lactation. The Feedback Inhibitor of Lactation (FIL) is an autocrine control mechanism by a whey protein that regulates the secretion of breast milk if there is already breast milk accumulated in the alveoli (Lawrence, 2010). This may work together with other factors, including insufficient stimulation and/or insufficient breast milk removal, to trigger the Prolactin-Inhibiting Factor (PIF), as discussed in *How the Breast Works*.

Assist mothers to breastfeed and maintain lactation should they face challenges including separation from their babies (BFI Step 5, BCC, 2011). If the baby does not remove breast milk during the first breastfeeding, encourage the mother to use hand expression to remove the breast milk.

Hand expression may be more successful in the first few days after birth due to the viscous nature and small volume of the first breast milk (colostrum). It can be discouraging for a new mother to use an electric pump if the breast milk does not accumulate in the pump's reservoir. It can be more affirming for her to be able to remove her own breast milk by hand into a small container and offer it to the baby by cup or spoon. Some clinicians suggest that the mother offer a teaspoon or "paint" drops of expressed breast milk onto their baby's lips, where it will be absorbed and begin to trigger physiological responses in the newborn, as well as provide nourishment. It is important that pregnant women be taught the skill of hand expression. (*Protocol #19: Expressing and Storing Breast Milk*).

No extra fluids or foods are needed for a healthy breastfed baby in the first 6 months of life unless medically indicated (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Giving extra fluids or foods during this time will decrease the mother's breast milk supply as well as the baby's intake of breast milk.

Health Canada and the Canadian Paediatric Society recommend that all breastfed healthy term babies receive a daily vitamin D supplement of 10 µg (400 IU) starting from birth and continuing until the breastfed baby reaches 1 year of age (Health Canada, 2010).

- There is increasing interest in the importance of adequate intake of vitamin D. The amount of vitamin D in breast milk is dependent on maternal stores during pregnancy and lactation (Wagner et al., 2010). Based on the U.S. Institute of Medicine [IOM] report of the review of the Dietary Reference Intakes (DRIs) for vitamin D and calcium, Health Canada now recommends a daily intake of 600 IU (15mg) for pregnant and lactating women (Health Canada, 2010), ideally met through dietary intake.

Step 9 of the *Integrated Ten Steps of the Baby-Friendly Initiative* (BFI) recommends that mothers be supported to feed and care for their babies without teats or pacifiers (dummies or soothers) (BFI Step 9, BCC, 2011).

Babies need to learn the normal mechanics of sucking at the breast. This includes learning to manage the flow of breast milk from the breast. Feeding only at the breast helps to prevent the baby learning to suck improperly on the breast tissue, which may in turn lead to breast refusal or painful nipples. This "nipple confusion" has not been established in the medical literature (Lawrence, 2010) but there is strong evidence in the psychosomatic literature to support the "imprinting" of sucking behaviours.

Imprinting – The concept of imprinting or "stamping" is sometimes used to explain the incidence of nipple preference. Imprinting is drawn from other sciences such as biology and psychology, where it has been applied to explain attachment behaviours and brain pathway development. In humans, imprinting is oral/tactile (Lawrence, 2010, p. 202) and Gale Mobbs (1989) has identified the mouth as the most significant factor for imprinting in

humans. When babies are exposed to artificial nipples or fingers early they can become accustomed to the feeling of that particular object, e.g., bottle nipple, pacifier, finger, in their mouths and have difficulty accepting another object, such as the mother's nipple, in its place (Righard, 1997, p. 119).

- **Pacifier Use** – In recent years, there have been controversial and contradictory reports about the effects of pacifier use. The evidence had previously shown a strong association between the use of pacifiers and a shortened duration of breastfeeding (Kramer et al., 2001). However, a recent systematic review found that the highest level of evidence does not support an adverse relationship between pacifier use and breastfeeding exclusivity or duration (O'Connor et al., 2009). The Cochrane review concluded that for mothers who are “motivated” to breastfeed their babies, pacifier use before or after breastfeeding was established did not significantly affect the prevalence or duration of exclusive and

partial breastfeeding up to 4 months of age (Jaafar et al., 2011); the report does not, however, define ‘motivated’. As suggested by Howard et al. (2003), pacifier use may be a marker of breastfeeding difficulties or reduced intention to breastfeed. A mother may miss or override early feeding cues if a pacifier is used to delay or shorten breastfeedings. Pacifiers are also associated with an increased risk of otitis media (CPS, 2011; Duffy, 1997). If the mother decides to use artificial nipples and pacifiers, she should be encouraged to wait until breastfeeding and sucking patterns are well established, usually after a few (4–6) weeks (Righard, 1998). The Canadian Paediatric Society advises parents not to start using a pacifier until breastfeeding is fully established, and to talk to their doctor or lactation consultant if they feel their baby needs one at that early stage. CPS also advises an exception for premature or sick babies who may use a pacifier for comfort (CPS, 2007a).

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Protocol #2

Positioning and Latching



Protocol #2: Positioning and Latching

Babies of all ages have the ability to find the breast all by themselves, and to latch on by themselves, just as puppies and kittens do. We don't make our babies learn to latch; we allow them to learn by supporting their innate capacities to self-attach (adapted from Christina Smillie, 2005).

Suggestions

Encourage the mother to:

- Understand that positioning and latching are interactive and reciprocal; both mother and baby respond to each other, sometimes called the breastfeeding conversation (Genna, 2008).
- Understand it is not prescriptive; there are many ways to breastfeed.
- Understand that positioning and latching are unique for each breastfeeding dyad.
- Understand that both the mother and baby bring many competencies, instincts and behaviours to the positioning and latching process.
- Understand that for a mother breastfeeding may be a learned behaviour, but for her baby, breastfeeding is instinctive (Genna, 2008).
- Understand that positional or core stability promotes oral stability.
- Understand that it is a dynamic process, continually changing as the baby grows and develops physically and emotionally.
- When in doubt, try cuddling the baby skin-to-skin.

Positioning

There are many possible positions for mothers and babies to try. These may vary depending on many factors that include baby size and capacity, maternal body size and shape, breast size and shape and preference. Encourage the mother to understand the principles or checkpoints for effective positioning and latching so that she can try a variety of breastfeeding positions.

Checkpoints for Positioning

For any position encourage the mother to check that:

- She is relaxed and comfortable with good posture and correct body alignment.
- Her back and arms are well supported.
- Baby's shoulders and trunk are supported.
- Baby's head is at the level of the breast.
- Baby's ear, shoulder, and hip are in a straight line.
- Baby's chest is facing the mother's chest (not for football hold).
- Baby's body is in full contact with the mother's.
- Baby's nose approaches the mother's nipple, and the baby's chin touches the breast.

The positions that are typically described should not preclude other possibilities.

Biological Nurturing (Semi-Reclined Positions)

Laid-back Nursing, an approach described by Suzanne Colson, suggests that the mother:

- Lean back in a semi-reclined position, finding an angle that feels right for her.
- Feels completely relaxed and supported.
- Place baby tummy down and in full contact with mother's semi-reclined body.
- Cuddle or 'nest' her baby, rather than restrain him.
- Let gravity support the baby.
- Trigger the baby's innate reflexes and feeding behaviours.

Cross-Cradle Position

This position may work well:

- When learning to breastfeed.
- If baby has difficulty maintaining a latch.
- If baby is premature or small.
- If baby has low muscle tone.
- If baby has a weak rooting reflex or weak suck.
- If the baby is late preterm (Walker, 2011).



Important points for effective positioning when using the cross-cradle position:

- Mother sits with a straight back, with her shoulders relaxed and arms at her side. A pillow may be helpful during the early days to support the mother's back and arms or if the baby is small.
- Mother's feet are usually flat on the floor so that her legs are relaxed. A footstool or large book under her feet may help. Her lap is flat or her knees slightly higher than her hips.
- Mother places baby in front, turned completely on its side so that the baby's face, chest, and knees are all facing the mother. The baby's chest is in full frontal contact with the mother's torso/abdomen. A pillow may be helpful during the early days to support the mother's arm when raising a small baby to breast level.
- Mother supports the baby's neck and shoulders with

her hand on the opposite side of the breast where the baby is breastfeeding so the head is able to tilt back slightly; her forearm supporting the baby's back and buttocks (i.e., right hand/forearm when breastfeeding on the left breast).

- Mother may support the breast where the baby is breastfeeding in a relaxed "C" or "U" hold using the same hand (i.e., left hand supports the left breast) (see diagram of "C" or "U" hold in *Latching*).
- Baby's nose approaches the nipple. Baby's chin touches the breast first. When baby's mouth opens wide mother brings the baby close to her breast by pulling the baby's shoulders and buttocks closer, instead of leaning over or pushing the nipple into the baby's mouth.
- Once the baby is latched, the mother may wish to shift to find a more comfortable hold. She may move her hands to support her baby on her wrist or forearm on the same side as the breast where the baby is breastfeeding. Cross-cradle is also known as a *transitional hold*.

Cradle Position

This position may work well:

- When the mother is comfortable with breastfeeding and the baby is latching well.

Mothers may transition the baby into this position after latching in the cross-cradle position.



Important points for effective positioning when using the cradle position:

- Mother sits with her back extended and supported, preferably in a chair, with her shoulders relaxed and arms at her side. Pillows may help to support a small baby, or support mother's back and arms, particularly in the early days.
- Mother's feet are usually flat on the floor so that her legs are relaxed. A footstool or large book under her feet may help. Her lap is flat or her knees slightly higher than her hips.
- Mother places baby in front, turned completely on its side so that baby's face, chest, and knees are all facing the mother. The baby's chest is in full frontal contact with the mother's torso/abdomen. A pillow may be helpful during the early days to support the mother's arm when raising a small baby to breast level.
- Mother supports the baby's body and head along her arm so that the baby's head is tilted back slightly. She uses the arm on the same side as the breast to be breastfed on; her forearm supports the baby's back and her hand supports the buttocks (i.e., left arm and hand when breastfeeding on the left breast).
- Mother may support the breast where the baby is breastfeeding in a relaxed "C" or "U" hold using the opposite hand (i.e., right hand supports the left breast) (see diagram of "C" or "U" hold in *Latching*).
- Baby's nose approaches the nipple. Baby's chin touches the breast first. When baby's mouth opens wide mother brings the baby close to her breast by pushing the baby's buttocks, instead of leaning over or pushing her nipple into the baby's mouth.
- Mothers should avoid using the cradle hold with late pre term infants. These babies often have low muscle tone. In addition, positions that place the baby's neck and body in excessive flexion can cause late pre term infants to be prone to positional apnea due to airway obstruction, increasing the risk of bradycardia and oxygen desaturation (Walker, 2010).

Football Position

This position may work well:

- When learning to breastfeed.
- If baby has difficulty maintaining a latch.
- If baby is premature or small.
- If baby has low muscle tone.

- If baby has a weak rooting reflex or a weak suck.
- If mother has long or heavy breasts.
- If mother has flat or sore nipples.
- If mother had a caesarean birth.



Important points for effective positioning when using the football position:

- Mother sits relaxed with a straight back, with her shoulders relaxed and arms at her side. Pillows may help to support her back and arms. A firm pillow may be placed at her side to support the arm holding the baby.
- Mother's feet are usually flat on the floor so that her legs are relaxed. A footstool or large book under her feet may help. Her lap is flat or knees slightly higher than her hips.
- Mother places baby at her side. Baby is lying either completely on its back or turned slightly towards the breast. Baby is tucked close to mother's side and is directly under the breast. Baby's buttocks rest near mother's elbow with its hips against the back of the chair or bed frame, if sitting up in bed.
- Mother supports the baby's neck and upper back with her hand on the same side as the breast to be breastfed on; her forearm supports the baby's upper back (i.e., left hand/forearm when breastfeeding on the left).

side). Baby's head is able to tilt back slightly in the instinctive position.

- Mother may support the breast where the baby is breastfeeding in a relaxed C or "U" hold using the opposite hand (i.e., right hand supports the left breast) (see diagram of "C" or "U" hold in Latching).
- Baby's nose approaches the nipple. Baby's chin presses into the breast. When baby's mouth opens wide the mother brings the baby close to her breast by pulling the baby's buttocks closer, instead of leaning over or pushing her nipple into the baby's mouth.

Side-Lying Position

This position may work well if:

- Mother finds it too painful to sit.
- Mother wants to rest when breastfeeding (e.g., night feedings).
- Mother had a caesarean birth.
- Mother has long or heavy breasts.



Important points for effective positioning when using the side-lying position:

- Mother lies on her side with a pillow under her head and pillows behind her back so that she can lean back for support. A pillow may be placed between her legs for comfort, especially after a caesarean birth.
- Mother positions baby on the bed parallel to and facing her body. Baby is turned completely onto its side so that its face, chest, and knees are all facing and touching the mother. Baby is oriented slightly below the level of the breast so that the head is able to tilt slightly upward to latch. The baby can be

supported in this position by the mother's arm, a rolled towel, or a baby blanket can be placed behind the baby's shoulders.

- Mother supports the baby's head, back, and buttocks with her arm on the same side as the breast to be breastfed on (i.e., right arm when breastfeeding on the right side). The baby's head can either rest directly on the bed, or on the mother's upper arm. Once breastfeeding is well established and the baby is able to maintain a latch, the mother may remove her arm from under the baby and place it under her own head for more comfort.
- Baby's nose approaches the nipple. Baby's chin presses into the breast. When baby's mouth opens wide, mother pulls the baby close to her breast by pushing baby's buttocks, instead of leaning over or pushing her nipple into the baby's mouth.
- Mother usually rolls over to breastfeed from the other breast. However, she may try to breastfeed from both breasts while lying on one side by breastfeeding from the lower breast first, then pushing it under her torso to breastfeed from the upper breast.
- Mother may wish to support her breast on a small pillow or blanket if she is having difficulty seeing the baby latch. Another approach is for mother to elevate herself on her elbow to see the baby latch. Once the baby is latched, she can readjust to a more comfortable position for breastfeeding.

Mothers may use more than one position during a single breastfeeding (e.g., a mother who prefers to use her right hand can use the football hold for the right breast and then breastfeed from the left breast using cross-cradle hold) (Lauwers et al., 2011).

(For a discussion of several further suggestions see Genna (2008), Walker (2011)).

Latching

1. Checkpoints for Latching – Encourage the mother to check that:

- Both baby and mother are calm.
- Baby is either in a quiet, alert state, or sleeping lightly.
- Baby is supported with head higher than tummy.
- Baby's nose approaches the nipple.

- Baby is able to touch the breast with its chin, tongue, and cheek.
- Baby is supported with shoulders and pelvic girdle stable to facilitate the cascade of behaviours that will support the baby’s inherent capacity to self-attach. See **Baby-Led Latching** in *General Principles*.
- Baby can “search and peck” for the nipple until it latches.
- Mother can settle into a more comfortable position for breastfeeding after a successful latch is achieved.



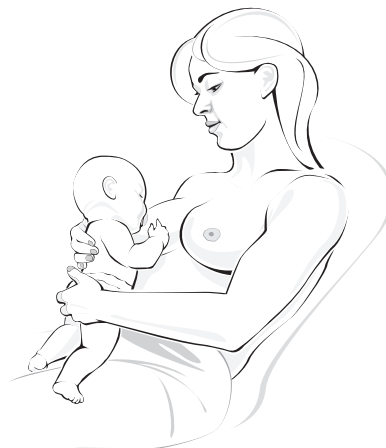
2. Baby-Led Latching

Baby-led latching is a natural and simple way for the baby to get to the breast. It may be helpful when the baby is learning to breastfeed, when baby is not breastfeeding well, when the mother’s nipples are sore, or any time.



- Begin when the baby is calm.
- Mother finds a comfortable position, feeling relaxed, supported and leaning back a little.
- Hold the baby skin-to-skin on mother’s upper chest, between her breasts, so that the baby’s shoulders and hips are stable and head can tilt back slightly.
- Wait, watch, and wonder.

- Baby will start moving his head up and down looking for mother’s breast. This may look like bobbing or pecking.
- Baby will seek the breast, first with his hands and mouth, licking, smelling, nuzzling and nestling; then trying to move towards the breast, sometimes crawling and stepping. Mother may help the baby to move to the nipple.
- Mother supports the baby’s shoulders, neck and buttocks, assisting him while he moves towards her breast.



- Baby will find mother’s nipple.
- Baby will push his chin into mother’s breast, reach up with an open mouth and latch onto her breast.
- It may help to bring baby’s buttocks close to mother’s body and give support to the baby’s back and shoulders.
- Once baby is attached, mother and baby can shift to settle into a more comfortable position.

3. Techniques to support latching

Mother may wish to shape her breast to make it easier for the baby's lower jaw to take in more of the breast tissue. She may shape or "sandwich" the breast in a relaxed "C" or "U" hold, oriented to match the direction of the baby's mouth (Genna, 2008). (see following diagram)

Once breastfeeding is well established and the baby is able to maintain a latch, she may wish to release the breast.



- Mother may support her breast in a relaxed "C" or "U" hold. Her thumb is on top and 4 fingers are below the breast, well away from the areola, shaping the breast in the same direction as the baby's mouth. She should avoid holding her breast too tightly.



- With the baby's head tilted slightly back and nose facing the nipple, mother may brush baby's lower lip with the nipple, and support the baby until the chin touches the breast and the baby's mouth opens wide (like a yawn).



- Mother then quickly brings the baby to the breast by pulling the baby in close to her body. Once the baby is latched, mother and baby can reposition themselves to find a more comfortable position for breastfeeding.

Mother may also tilt or "flip" the nipple up towards the roof of the baby's mouth. This technique is sometimes called "**the Flipple**", originally described by Kathleen Glover. Mother rolls the underside of the breast with a twist of the wrist to present more of the underside of the breast to the baby. As the baby opens its mouth wide, the mother presses on the breast just above the nipple with a finger running parallel to the baby's upper lip. This will tilt or lift the nipple up and help roll more of the breast into the baby's mouth, supporting a deeper latch (Mohrbacher, 2010; Glover & Weissinger in Genna, 2008).

4. Signs of a good latch:

- Baby's mouth is opened wide.
- Baby's lips are curled out and cover more of the area below the nipple (may be less for a small or premature baby).
- Baby's lower lip covers more of the areola than the upper lip.
- Baby's chin is pressed into the breast.
- Tip of baby's nose approaches the breast.
- Baby's head is tilted back slightly in the instinctive feeding position.
- Baby's cheeks appear to be full and rounded (not dimpling in).
- Baby's mouth does not slip off the breast.
- Baby is supported in the chest-to-chest position

(except for football hold) and baby's neck is not turned.

- Mother feels a strong tugging sensation, with no pain.
- Breastfeeding is pain-free.
- Baby shows signs of sucking and swallowing breast milk, e.g., movement of ear or temple.
- Swallowing is audible.
- Baby is comfortable managing the flow of breast milk.

5. Interrupting the Latch

If the mother decides to take her baby off the breast before the baby is finished, suggest that she break the suction first by trying one of these methods:

- Press down on her breast near the baby's mouth.
- Gently insert a finger into the corner of the baby's mouth.
- Gently pull down on the baby's chin.
- Bring the baby in closer to the breast so that the nose is covered briefly with breast tissue; this may be more effective for an older baby.

General Principles

Health care providers can support positioning and latching by encouraging mothers and babies to be left together to relax and connect, facilitating "right-brain" intuitive behaviours.

Wherever possible, support is offered "*hands off*" (BFI Appendix 5.1, BCC, 2011). Support is offered to encourage and provide anticipatory guidance. Prescriptive teaching and labelling may limit possibilities and trigger left-brain behaviours. Teaching specific positioning and attachment skills may inadvertently decrease breastfeeding satisfaction and duration (Henderson, 2003 in Mohrbacher, 2010).

"If it's not broken, don't fix it". It is important for the health care provider to affirm what works for the mother and baby, and offer suggestions for alternatives when something is not working.

Baby-led Latching is an intuitive approach to how babies can learn to latch. It draws on concepts from neurobehavioural literature. There is reciprocity in the mother-baby interaction, with each responding to the other's cues and the mother following the baby's

lead. The baby picks up cues from the mother, such as odours, touch, and eye contact, as well as feeling their own internal cues of hunger and thirst. These elicit the baby's cascade of searching behaviours. As the baby searches for the nipple, the mother supports the baby in a calm state and in a flexed and relaxed position until the baby attaches and begins to suck.

- The mother supports the baby in a vertical, upright, chest-to-chest position in firm frontal contact with her body. This provides the positional or core stability needed to facilitate the baby's normal neonatal neurobehavioural and neuroendocrine responses (Smillie, Genna, 2008). Babies feel most secure supported in the ventral (chest-to-chest) position. The baby's reflexes support the cascade of behaviours that facilitate his inherent capacity to self-attach to the breast:

- Getting to the breast – Stepping and crawling motions
- Finding the breast – Searching and rooting
- Attaching – Rooting and opening the mouth
- Sucking – Stimulated by the presence of the nipple on the palate.

- A calm, attentive state promotes and optimizes baby feeding behaviours.

- Baby-led latching is not prescriptive, but rather is supportive of the baby's inherent capacity to self-attach, with the mother and baby adjusting to each other until they find a comfortable position (Smillie, 2005).

- Optimal positioning and latching will help the baby to suck effectively. These are essential for successful breastfeeding. It is recommended that positioning and latching be assessed before discharge from hospital and when any breastfeeding problems occur.

- Both mother and baby need to be in a comfortable and well supported position.

- Newborns until 3–4 months of age are reliant on positional stability for smooth, calm execution of the complex sequence required for attachment and the suck-swallow-breathe cycle (Smillie in Genna, 2008).

Biological Nurturing, based on the work of Suzanne Colson, promotes maternal postures that facilitate instinctive behaviours and primitive neonatal reflexes that support positive breastfeeding behaviours. The mother leans back in a semi-

reclined position so that she is completely comfortable, feels supported and relaxed, and “nests” the baby on her chest in close apposition with the maternal contour. Colson calls this “body brushing”. This appears to release primitive neonatal reflex-like movements that facilitate breastfeeding; this may even occur when the baby is lightly dressed. In addition, the mother’s posture facilitates release of oxytocin, promoting milk release and stress modulation (Colson, 2010) (see also *How the Breast Works* regarding oxytocin and *Protocol #1: The Initiation of Breastfeeding*).

- Effective positioning and latching will help prevent many breastfeeding problems such as sore nipples, mastitis, low breast milk supply, and poor weight gain of the baby.
- Some babies are able to latch and suck well immediately after birth, while others need more help and practice. It is important for mothers and babies to learn effective positioning and latching in the first few weeks after birth, when breastfeeding is being established, for ongoing breastfeeding success.
- It is important that the baby’s head be tilted slightly back so that the chin touches the breast first. If the chin tilts forward towards the breast, the baby will approach the nipple at a narrow angle, which will result in a shallower, less comfortable, and less effective latch (Wiessinger, 1998).

Instinctive Feeding Position – Baby is stable, head lifted and tilted back, and approaches the breast with the chin and mouth leading. Baby is able to attach in a deep latch, creating a seal that facilitates sucking and transfer of breast milk.

Asymmetric Latch – Describes a “deep latch” where the baby is in the instinctive feeding position, taking in more of the tissue of the lower aspect of the breast. This can help the baby manage the flow of breast

milk. Colson has observed that babies fed in the Biological Nurturing laid-back position may latch more centred on the breast, but are able to self-adjust and manage the flow of breast milk (Colson, 2008).

Terminology – The terms “latching” and “attachment” both appear in reference and resource materials and may be used interchangeably. The term “attachment” tends to be used in Australian and European materials.

- The mother’s hand should not be on the back of the baby’s head, as this often causes the baby to arch away from the breast (Lauwers & Swisher, 2011).
- Some mothers seek specific directions. The four most common positions or holds are described in Genna.
- Breastfeeding is an ever-changing landscape. As the baby grows, the position that the baby and mother find most comfortable for breastfeeding will often change or may need to be reassessed if difficulties arise.
- Some mothers and babies may establish positions that successfully support breast milk transfer but may not reflect any of the positions described here or in any other text. There is no need to intervene or change something that is working for that mother and baby. Remember, “If it’s not broken, don’t fix it.”
- The Baby-Friendly Initiative recommends that most teaching and breastfeeding support should be done in a *hands-off* manner. Since the goal is for mothers to be able to latch their babies independently, it is important for staff to request permission before touching the mother or baby and to take a hands-off approach as much as possible. A *hands-on* approach is only used after asking permission and when additional help is deemed necessary (BFI Step 5, BCC, 2011).

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Protocol #3

Signs of Effective Breastfeeding



Protocol #3: Signs of Effective Breastfeeding

Effective latching, positioning and sucking are keys for successful breastfeeding.

Observation and Assessment

1. Assess and teach the mother how to recognize that her baby is ready for breastfeeding.

Early Feeding Cues:

- Rapid eye movements under the eyelids.
- Soft cooing or sighing sounds.
- Sucking or licking movements.
- Sucking sounds.
- Restlessness.
- Hand-to-mouth movements.

(Adapted from ILCA, 2005)

2. Assess and teach the mother how to recognize that her baby is sucking effectively. Mother is able to observe for signs of breast milk transfer. See also Point 5.

Deep and Slow Sucks:

- At the beginning of the breastfeeding the infant may have shallow and quick sucks that help to stimulate the letdown or breast milk ejection reflex. When letdown occurs, the breast milk flows and the suck pattern changes, becoming deep and slow. There is a pause during the suck when the infant's mouth opens the widest. Once the breast milk flows there

should be deep and slow sucks (open-pause-close), with swallows occurring on every suck to every other suck throughout most of the breastfeeding. See the *Suck Cycle* and diagrams.

While Sucking:

- Mother and baby maintain an effective latch and a comfortable position (*Protocol #2: Positioning and Latching*).
- Mother feels her breast being pulled, with no pain.
- Baby has wide-open mouth.
- Baby sucks, swallows, and breathes in a rhythmic and co-ordinated pattern.
- Baby makes swallowing sounds (e.g., a quietly exhaled “kaa, kaa, kaa”, not clicking or smacking sounds).
- With a small breast milk volume, such as colostrum, swallowing may only be palpable on the baby's throat (Smillie, 2005).
- Baby is able to maintain the latch and the mouth does not slip off the mother's breast.



Mouth opening



Pause when mouth is opened the widest



Mouth closing

3. Assess and teach the mother about adequate output:

Baby's Age	Wet Diapers Each Day	Stools Each Day
1 day old	At least 1 wet diaper (a wet diaper feels like at least 2 tablespoons or 30 ml of water poured on a dry diaper).	At least 1–2 sticky dark green/black stools (meconium).
2 days old	At least 2 wet diapers.	At least 1–2 sticky dark green/black stools (meconium).
3 days old	At least 3 heavy wet diapers (a heavy wet diaper feels like at least 3 tablespoons or 45 ml of water on a dry diaper).	3 or more brown/green or yellow stools.
4 days old	At least 4 heavy wet diapers.	3 or more brown/green or yellow stools.
5–6 days old and older	At least 6 heavy wet diapers with pale yellow or clear urine.	3 or more large, soft, yellow, seedy stools (a large stool is the size of a quarter or larger). Baby should not be passing any meconium at this age.
6 weeks – 6 months	At least 6 heavy wet diapers. At all ages urine should be clear to pale yellow, with almost no odour.	3–4 per day or 1 very large soft, yellow, seedy stool/week. After 6 weeks some breastfed babies may have only 1 very large yellow stool every 1–7 days. This is normal as long as the stool has a consistency like toothpaste, or is seedy and watery, and the baby is healthy. It is also normal for some breastfed babies to have many stools each day.

Source: Adapted by Toronto Public Health from Wilson-Clay, 2008 and Best Start, 2009a.

4. Assess and teach the mother about adequate weight gain. Breastfed babies:

- May lose an average of 7% of their birth weight in the 3 days after birth.
- Should regain their birth weight by 10 days of age.
- Should show a pattern of weight gain by Day 5 onward.
- Should gain 20 – 35 g ($\frac{2}{3}$ – 1¼ oz) per day for the first 3 – 4 months of age.
- Tend to grow more quickly than non-breastfed babies in the first 6 months and grow more slowly in the second 6 months of life.

Source: Adapted from ILCA, 2010, *Dietitians of Canada, 2010, Dewey et al., 1992, and Powers, 2001 & 1999. See discussions regarding 'Weight Loss' and 'Infant Output' in General Principles.*

When the healthy term baby is effectively breastfeeding, the initial post-birth weight loss will stabilize quickly, and then reflect a steady weight gain.

The presence of any of the above weight loss indicators should be a sign that further assessment and support are needed to optimize breastfeeding.

Advise the mother that weight gain is only one of many indicators that will help her know how well her baby is breastfeeding. Her baby's behaviour will give her many signs that she can see every day (see notes in *General Principles*).

5. Assess and teach the mother about other signs of effective breastfeeding or breast milk transfer:

- Baby's mouth is moist and pink.
- Baby is alert and moves actively.
- Baby has a vigorous cry.
- Baby has good skin turgor.
- Baby's fontanels are flat and soft.
- Baby has no fever.
- Baby comes off the mother's breast looking relaxed and sleepy – the baby is satisfied.
- Mother's breasts feel softer and less full after breastfeeding.
- Mother's breasts experience the letdown or breast milk ejection reflex.
- Mother's nipple is elongated after breastfeeding but not pinched, blanched, or damaged.

Support the mother in understanding that the

volume of breast milk transferred is related to the infant's stomach size (*Protocol #1: The Initiation of Breastfeeding*).

6. Assess and teach the mother about the letdown or breast milk ejection reflex.

Signs of the Letdown or Breast Milk Ejection

Reflex

- Tingling sensation or feeling of tightening in the mother's breasts. This may be noticeable with only the first letdown, or they may feel nothing.
- Breast milk leaking or flowing when hearing the baby cry, or leaking from the opposite breast during breastfeeding.
- Filling of the ducts near the areola that can be felt with the fingers.
- Changes in the sucking pattern: sucking slows, pauses, and baby begins to swallow.
- Swallowing is heard.
- Uterine contractions or increased lochia, during or after breastfeeding, for the first few days.
- Mother may feel relaxed or drowsy.

Ideas to Help Initiate the Letdown or Breast Milk Ejection Reflex

When breastfeeding is initiated early, the baby's rooting, sucking and hand movements on the mother's breast are the natural stimuli for letdown.

- Breastfeed in a quiet, relaxed place.
- Mother feels relaxed, comfortable, and supported. Heat may be applied to her back or shoulders.
- Initiate breastfeeding before the baby is stressed and crying (early feeding cues).
- Clothe the baby only in a diaper to promote skin-to-skin contact.

Support the baby in a vertical chest-to-chest position to facilitate the baby's normal reflexes and self-attachment behaviours.

- Mother may massage her breasts. Mother may apply moist or dry heat to her breasts for a few minutes before or during massage until letdown occurs. Heat may be applied with a warm, wet towel or wet disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low or a hot water bottle wrapped in a cloth.

- Hand express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Mother may stimulate her nipples by gently rolling them between the thumb and index finger for several minutes, or until the letdown reflex occurs and breast milk leaks out. Express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).

General Principles

Letdown or the breast milk ejection reflex is essential to ensure that breast milk moves from the alveoli into the dilated ducts and is available to the baby (*How the Breast Works*). When breastfeeding is initiated early, the baby is calm and before the baby becomes overly hungry and begins crying, the baby's rooting and sucking are the natural stimuli for letdown (early feeding cues). Letdown or the breast milk ejection reflex is facilitated when the mother is relaxed and stress-free (*How the Breast Works*).

- Effective latching, positioning, and sucking are key for successful breastfeeding.
- A healthy full-term infant sucks, swallows, and breathes in a rhythmic and co-ordinated manner (Walker, 2011).
- The ratio of suck to swallow to breathe becomes 1:1:1 as the breastfeeding progresses, when letdown or breast milk ejection occurs and breast milk flows (Genna, 2008).
- The sucking rhythm corresponds inversely to the amount of breast milk available (Lauwers et al., 2011).

Infant weight loss and return to birth weight issues are complex. The traditional approach that weight loss must be prevented and controlled is founded on divergent understandings/misunderstandings that may lead to unnecessary supplementation and potentially put breastfeeding at risk (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

A 2008 systematic review found insufficient evidence to determine the normal physiological weight loss for full-term breastfed infants in the first 2 weeks after birth. In fact, it advises against the use of a single absolute number for the maximum weight an infant can lose, as an absolute number does not take ranges or standard deviations from the mean into account. It also cautions that an absolute number may cause health care professionals to miss warning signs (Noel-Weiss et al., 2008).

A recent study further challenges the traditional determination of newborn birth weight and weight loss (Noel-Weiss et al., 2011). This observational study found that neonates appear to experience diuresis and correct their fluid status in the first 24 hours, and recommends that the initial infant weight be measured at 24 hours, instead of at birth, for a baseline when assessing weight change. The study found evidence that maternal IV fluids during parturition are related to neonatal output and newborn weight loss, but this is not something requiring intervention. They found that further weight loss after 72 hours is not likely connected to maternal fluids.

Although many practitioners may have been educated to consider 10% to be an acceptable initial post-birth weight loss, there has been a shift to consider a 7% loss to be the indicator for further and earlier assessment and support for breastfeeding. The Registered Nurses' Association of Ontario *RNAO Best Practice Guidelines* (RNAO, 2002), the International Lactation Consultant Association (ILCA) *Evidence-Based Guidelines for Breastfeeding Management during the First Fourteen Days* (ILCA, 1999), and the American Academy of Pediatrics (2005) indicate that families should seek help if weight loss is greater than 7% and/or continues after Day 3. This is consistent with the recommendations found in the Shrago (2006) and Livingstone (2001) studies.

There is a range of recommendations for what may be considered an acceptable time in which to recover birth weight. Whereas the RNAO recommends that birth weight should be achieved by 2–3 weeks, the 1999 ILCA guidelines advise that there should be a return to birth weight by 14 days. Recently, ILCA has further revised the above recommendations, such that the baby should lose less than 7% by Day 3, be gaining 20–35 gm ($\frac{2}{3}$ – 1 oz) a day by Day 5, and regain birth weight by 10 days (ILCA, 2010). This reflects the understanding that when the healthy term baby is effectively breastfeeding, the initial post-birth weight loss will stabilize quickly, and thereafter reflect a steady weight gain. It is also important to regard the presence of these weight loss indicators as a need for further support to optimize breastfeeding (Macdonald et al., 2003).

Weight gain beyond the first 2 weeks – World Health Organization (WHO) Child Growth Standard Charts (2006)

- Dietitians of Canada, Canadian Paediatric Society,

the College of Family Physicians of Canada, and Community Health Nurses of Canada recommend the adoption of the *Child Growth Standards* WHO growth charts in Canada, replacing previous recommendations to use the growth charts from the American Centers for Disease Control and Prevention (CDC).

- The 2006 WHO Child Growth Standards for birth to 5 years are recommended because they are based on children raised according to current Canadian and international health and nutrition recommendations. Breastfed infants were used as the normative model for growth and development. These charts illustrate the way all healthy children should grow and are considered to be the “gold standard” for assessing the growth of young children. Breastfed infants tend to grow more quickly than non-breastfed infants in the first 6 months and more slowly in the second 6 months of life. Since the WHO Child Growth Standards charts have been constructed based on the growth of infants who have been primarily breastfed, breastfed infants will no longer appear to be growing too rapidly during the first 6 months, nor will they appear to be failing to grow sufficiently from 6 – 12 months, (Dietitians of Canada, 2010).
- Growth charts can be useful tools to understand how one baby’s growth compares to the growth of other babies of the same age, but they can also confuse parents. Growth charts plot a baby’s growth on a series of percentile lines. An average child will be at the 50th percentile for weight and length. A weight that falls at a higher percentile is not necessarily “good” and a weight that falls at a lower percentile is not necessarily “bad”. This is because by definition there will be healthy children at every percentile. The most important point to remember is that a baby’s growth chart should never be considered in isolation. One needs to look at how this one point, i.e., weight compares to the other on the chart, i.e., length. The baby’s growth pattern over days, weeks, and months is what provides an accurate picture of how breastfeeding is going, and if over time the baby’s percentile drops, this is a signal to take a closer look (Mohrbacher, 2010). (See Appendix D and E – WHO Child Growth Standards charts for girls and boys.)

Note regarding infant weight gain: The standard for weight gain for the healthy term infant used in

this protocol is adapted from information in the foundational DARLING study Dewey et al. (1992), as well as from Powers (2001 & 1999), as cited in many breastfeeding studies and texts.

Infant Output as an Indicator of Effective

Breastfeeding – An increased number of daily bowel movements during the first 5 days is associated with positive infant outcomes, including less initial weight loss, earlier regaining of birth weight and heavier weight by Day 14. In addition, earlier transition to yellow, seedy stools (normal human breast milk stools) is also associated with the same positive infant outcomes (Shrago et al. 2006). This is reflected in an expectation that there will be more stools earlier, 3 or more, and up to 6 stools by Day 3. As above, if there are fewer stools or they do not change to soft yellow, seedy stools in the first week, this indicates a need for further early support to optimize breastfeeding.

The frequency and colour of urinary output also plays a role in assessing the effectiveness of breastfeeding as well as infant hydration status. The output chart indicates that the breastfed baby is getting enough breast milk if he produces at least 1 heavy wet diaper on Day 1, increasing by a diaper per day until Day 6, when there should be at least 6 heavy wet diapers with pale yellow or clear urine. A heavy wet diaper feels like at least 2 tablespoons or 30 ml of water poured on a dry diaper (Wilson-Clay, 2008). Urine becomes progressively darker in colour as a baby becomes dehydrated. In addition, the presence of urate or uric acid crystals in the diaper is a signal for further assessment. Uric acid crystals appear as pink, orange or brick-red dust staining the diaper, and may be mistaken for pseudo menses. This may be within normal expectations or it may reflect concentrated urine. Within the first 1–3 days, the presence of crystals is generally not significant (Lauwers, 2011), due to the high load of urate excreted by neonates. However, Passmore suggested that the large load excreted is facilitated by the concentration of urine (Passmore et al., 1974). High basal excretion of uric acid may increase risk of nephropathy (Stapleton, 1983). Further assessment and support are indicated to optimize breastfeeding and breast milk intake.

The Suck Cycle:

- With a wide-open mouth and tongue down, the infant takes the elastic tissue of the nipple, the areola and the surrounding breast tissue deep into

its mouth, taking in more of the lower areola. This forms a “teat” that fills the infant’s mouth.

- The pharynx is open for respiration.
- The infant’s lips are flanged out and together with the cheeks form a seal.
- The tip of the infant’s tongue stays over the gum behind the lower lip. The rest of the anterior tongue cups the areola of the mother’s breast.
- The jaw initially stabilizes the tongue in an upward position.
- As the jaw drops, the mid to posterior portion of the tongue is lowered.
- Decreasing negative pressure (increase in vacuum) is applied to the nipple and soft palate without an accentuated peristaltic motion (Geddes et al., 2008).
- The nipple elongates and is drawn back towards the junction of the infant’s hard and soft palate.
- The vacuum draws a bolus of breast milk to fill the oral space between the nipple and soft palate.
- The tongue then rises towards the palate, the vacuum decreases as negative pressure increases and a bolus of breast milk is moved into the pharynx, stimulating the swallow reflex. There may be a pause in sucks and breaths as the infant

swallows the breast milk.

- The infant lowers its jaw and a new cycle begins of suck, pause, and swallow.
- When the flow of breast milk decreases there will be increased bursts of sucking. This may occur more frequently in the early days because the volume of colostrum is so small (Riordan et al., 2010; Woolridge, 1986).

Nutritive vs. Non-nutritive Sucking:

- Nutritive sucking promotes the transfer of breast milk.
- Non-nutritive sucking promotes little or no breast milk transfer but is significant as it:
 - Stimulates the nipple and areola, triggering the release of prolactin and oxytocin, initiating letdown and flow of breast milk.
 - Increases gastrointestinal peristalsis.
 - Increases the secretion of digestive fluids.
 - Decreases crying; increases calm and comfort for the infant (Riordan et al., 2010).

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Protocol #4

Sore Nipples



Protocol #4: Sore Nipples

Sore nipples is one of the most common complaints of new mothers and one of the most frequent reasons that mothers stop breastfeeding sooner than intended (Riordan et al., 2010). Sore nipples may have one or more underlying causes that may be mother and/or baby related. The most common cause of sore nipples is the way the baby is positioned and latched.

Observation and Assessment

Assess the pain and appearance of the mother's nipples:

- Nipples feel sore, painful, burning and/or itchy.
- Nipples that appear to be abnormally pink or red, bruised, blistered, cracked, shiny, flaky and/or bleeding.
- Discharge from cracks or sores on the mother's nipple.
- A white blister or “bleb” at the opening of one of the ducts on the mother's nipples (*Protocol #6: Plugged Ducts*).
- Timing of the pain. Nipple pain may decrease after the initial latch or may persist throughout the breastfeeding and between breastfeedings.
- Nipples that appear blanched and are painful after breastfeeding.
- Location of the nipple pain.

Possible Causes or Contributing Factors

Assess the mother for possible causes:

- Ineffective positioning and latching techniques (*Protocol #2: Positioning and Latching*).
- Poor latching or tongue thrusting may result in soreness on the top or tip of the nipple.
- A shallow latch places the baby's tongue forward in the mouth, leading to friction as the nipple tip rubs the hard palate.
- Poor timing, i.e., not following the infant's cues, may delay breastfeedings so that the mother hurries latching before the infant is ready.
- Ineffective hand positioning may also result in soreness on the underside of the nipple.
- The position of the mother's hands on her breast

may tip her nipple so that the infant “strokes” the underside of the mother's breast with its tongue.

- Ineffective positioning of the baby.
- Baby is not facing the mother's breast and has to turn his head to swallow.
- Baby's nose is not approaching the mother's nipple and the baby is unable to tilt his head back to latch instinctively.
- Engorged breast (*Protocol #5: Engorgement*).
- Flat or inverted nipples (*Protocol #8: Flat or Inverted Nipples*).
- Taking the baby off her breast before the baby is ready.
- Incorrect or excessive use of breast pumps, e.g., not centering the pump flange over her nipple or using a high suction setting on engorged breasts (*Protocol #19: Expressing and Storing Breast Milk*).
- Wet breast pads or pads with a plastic lining.
- Use of poorly ventilated breast shells.
- Detergent residue on bra or clothing.
- Menstruation or pregnancy (nipples may become sensitive).
- Extremely sensitive nipples.
- Sensitivity to and/or excessive use of nipple creams and ointments.
- Dermatitis, eczema, impetigo, scabies, herpes, or other skin conditions. Advise the mother that these need to be assessed and treated medically.
- Candidiasis, mastitis, or other infections. Advise the mother that these need to be assessed and treated medically.
- A white blister or bleb at the opening of her nipple (*Protocol #6: Plugged Ducts*).

- Nipple vasospasm (i.e., when the baby comes off her breast, the mother's nipple is blanched and there is a burning pain). After several minutes the nipple returns to its normal colour and the burning sensation changes to a throbbing pain. Further assessment is needed to determine if the cause is possibly thrush or Raynaud's phenomenon.

Assess the baby for possible causes:

- Ineffective suck (*Protocol #10: Ineffective Suck*).
- A very aggressive, strong suck that may feel like biting. This may be associated with hypertonicity.
- Short frenulum, i.e., tongue-tie (*Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch* and *Protocol #10: Ineffective Suck*). May result in soreness on top of mother's nipple.
- High, arched palate or cleft palate.
- Candidiasis (*Protocol #15: Candidiasis (Thrush)*).
- Receding chin.
- Use of artificial nipples and other devices, e.g., bottle nipples, soothers, improperly sized nipple shields.
- Teething and biting down on the mother's breast by an older baby.

Suggestions

1. Explore the possible cause(s) of nipple soreness (see previous section on Possible Causes or Contributing Factors).

- Begin with positioning and latching, refer to *Protocol #2: Positioning and Latching*.
- For dysfunctional sucking or a short frenulum, refer to *Protocol #10: Ineffective Suck*.
- For candidiasis or thrush, refer to *Protocol #15: Candidiasis (Thrush)*.
- For engorged breasts, refer to *Protocol #5: Engorgement*.
- For a white blister or bleb at the opening of the mother's nipple, refer to *Protocol #6: Plugged Ducts*.
- For flat or inverted nipples, refer to *Protocol #8: Flat or Inverted Nipples*.

2. Provide the mother with suggestions for breastfeeding with sore nipples.

Before breastfeeding, encourage the mother to:

- Ensure that the letdown or breast milk ejection reflex is initiated. The mother can try the following methods to initiate letdown:
 - Breastfeed in a quiet, relaxed place.
 - Mother feels relaxed, comfortable and supported. Heat may be applied to her back or shoulders.
 - Initiate breastfeeding early, before the baby is stressed and crying (see early feeding cues in *Protocol #1: The Initiation of Breastfeeding*).
 - Clothe the baby only in a diaper to promote skin-to-skin contact.
 - Support the baby in a vertical chest-to-chest position to facilitate the baby's normal reflexes and self-attachment behaviours.
 - The mother can gently massage her breasts. Mother may apply moist or dry heat to her breasts for a few minutes before or during massage until letdown occurs. Heat may be applied with a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low or a hot water bottle wrapped in a cloth.
 - Hand express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
 - The mother may stimulate her nipples, gently rolling them between the thumb and index finger for several minutes or until the letdown reflex occurs and breast milk leaks out. Express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Breastfeed on the pain-free side first until letdown occurs, then switch to the sore side.
- Numb the nipple just before latching by applying ice wrapped in a cloth on the sore nipple for a few seconds. Avoid prolonged exposure to the ice as this can inhibit the letdown reflex or damage the nipple.

During breastfeeding, encourage the mother to:

- Support the baby in a chest-to-chest position to facilitate normal infant reflexes and self-attachment behaviours.
- Try a different position for each breastfeeding to avoid placing pressure on the same area of the breast all of the time. The football or cross-

cradle position may be more comfortable, as these positions allow for maximum control of a baby who is learning or has difficulty latching (*Protocol #2: Positioning and Latching*).

- Assess that the baby is effectively sucking and swallowing throughout the breastfeeding (see *Protocol #3: Signs of Effective Breastfeeding*).
- Use breast compressions if the infant is not effectively sucking and swallowing (see *Protocol #5: Engorgement*, for a description of breast compressions).
- Allow the baby to continue breastfeeding until finished. Do not limit breastfeedings to prevent nipple soreness.
- Avoid pulling the baby off her breast. If the mother wants to end the breastfeeding before the baby is finished, she can break the suction by trying one of the following methods:
 - Press down on her breast near the infant's mouth.
 - Gently insert a finger into the corner of the infant's mouth.
 - Gently pull down on the infant's chin.
 - Bring the baby in closer to her breast so that the nose is covered briefly with breast tissue; this may be more effective for an older baby.

After breastfeeding, suggest the mother:

- Express some breast milk onto her nipples and areolae after each breastfeeding if there are no signs of tissue trauma. Let the breast milk dry before putting on a bra; this is not recommended in the case of nipple trauma or candidiasis, as the yeast *Candida albicans* thrives in breast milk.
- Apply saline compresses to her nipple and areola. As above, allow the area to dry before putting on a bra.
- Wear a breast shell with good ventilation and a wide base under the bra if contact from the bra or clothing on her nipple is too painful (see *General Principles* below).
- Wear a well-fitted bra that is not too tight. Avoid bras with underwire.
- Use nursing pads that have no plastic lining. If the pad is stuck on her nipple, moisten the pad with water before removing it.

- Understand the possible benefits and risks associated with the use of nipple creams, gels, or ointments, if she inquires about using them for sore nipples. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
 - Understand the possible benefits and risks associated with the use of nipple shields if she inquires about using a them for sore nipples. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
 - Wash her nipples once a day during her usual bath or shower, but not before or after each breastfeeding. If there are skin breaks, cracks or fissures, wash her nipples once a day with warm, soapy water and rinse well.
3. If breastfeeding is painful and the mother decides to partially supplement, encourage her to:
- Alternate breastfeeding with feeding expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, or finger feeding (*Protocol #18: Alternative Feeding Methods*).
 - When the baby is not feeding at her breast, the mother should be encouraged to express some breast milk from her breasts frequently – at least 8 or more times in 24 hours – in order to maintain her breast milk supply (*Protocol #19: Expressing and Storing Breast Milk*). The expressed breast milk can be used to feed the baby. If expressed breast milk is not available an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
4. Refer the mother to a breastfeeding expert or breastfeeding clinic for further support if:
- The mother needs further assessment to determine the cause of pain.
 - Nipple trauma is so severe that the mother cannot continue breastfeeding and temporarily stops to allow her nipple time to heal. It will usually heal very quickly.
 - The problem is not resolving and the mother is considering stopping breastfeeding.

General Principles

In the first week mothers may feel some nipple tenderness, particularly at the start of breastfeeding. The discomfort may be related to the initial grasping

of her nipple and stretching of the ducts as they fill with breast milk (Lawrence, 2011). This tenderness may startle a new mother, but should improve daily. Sore nipples are one of the leading causes for women to cease breastfeeding. Therefore it is imperative to identify the cause of soreness.

Ineffective positioning and latching are the two most common causes of sore nipples, and should always be assessed first (Tait, 2000). Direct observation is important for assessment.

Nipple pain is not related to the length and/or frequency of breastfeeding, or to hair and/or skin colour. Nipple pain is also not prevented by prenatal nipple preparation, nipple exercises or use of breast shells (Lawrence, 2011, Enkin, 2000), although there is evidence to support the value of prenatal preparation, including education and breast examination.

Limiting the length of breastfeedings will not prevent nipple soreness. It will only delay soreness. Shortened breastfeedings can prevent the infant from receiving sufficient breast milk, particularly hindmilk. In order to shorten a breastfeeding the mother would likely remove the infant from her breast, possibly causing further nipple trauma (Riordan et al., 2010).

It is neither recommended nor necessary to discontinue breastfeeding to promote healing of a cracked or bleeding nipple unless the pain is intolerable or the trauma is worsening (Riordan et al., 2010). Rapid healing usually occurs once the problem is corrected. Any temporary discontinuation must be accompanied by ongoing assessment and plans for re-establishment of feeding at the mother's breast. It is important that the mother continue to remove breast milk by expression (*Protocol #19: Expressing and Storing Breast Milk*). If the infant is unable to feed at the mother's breast, breast milk may be fed by spoon, cup, or dropper (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

- Swallowed blood from damaged nipples will not harm the baby but the cause of the cracked nipples needs to be investigated.
- A bleb or milk blister, a white dot or bump on the nipple, is an accumulation of milk solids that blocks the breast milk from flowing. It may be painful when the baby latches onto the mother's breast (*Protocol #6: Plugged Ducts*).
- A blister on the mother's nipple may be caused by

friction when her nipple rubs against the baby's hard palate, as a result of ineffective positioning, latching, and sucking. It may contain breast milk products.

Stages of Nipple Trauma – Mohrbacher has developed a four-stage system for rating nipple trauma to standardize the reporting and management of nipple trauma (Mohrbacher, 2010). It is included in several of the current texts (Lauwers & Swisher, 2011; Wilson-Clay et al., 2008 and Walker, 2011).

Stage I – Superficial Intact: Pain or irritation with no skin breakdown. May include redness, bruising, red spots, swelling.

Stage II – Superficial with Tissue Breakdown: May include pain with possible abrasion, shallow crack or fissure, compression stripe, hematoma, and shallow ulceration.

Stage III – Partial Thickness Erosion: Skin breakdown with destruction of epidermis to lower layers of dermis. May include deep fissure, blister, and deep ulceration with more advanced ulceration.

Stage IV – Full Thickness Erosion: Deeper damage through the dermis. May include full erosion of some parts of the dermis.

Management – The best management of nipple trauma is prevention, education and anticipatory guidance to promote effective positioning and latching (*Protocol #2: Positioning and Latching*).

To date, systematic reviews of evidence have yet to determine definitive management of sore nipples, after comparing application of expressed breast milk, lanolin, petroleum jelly, peppermint oil, glycerine gel, ointments, tea bags, antibiotics, antifungals, warm water compresses, hydrogel dressings, polyethylene film, nipple shields, or breast shells. A protocol has been developed by a joint Canadian-British group, but results have yet to be published (Dennis et al., 2009). Removing the cause and facilitating healing is the appropriate treatment for sore nipples (Lawrence, 2011). An individual risk/benefit assessment should be conducted before initiating therapy.

- **Moist Wound Healing** – A moisture barrier covers the wound to promote healing by preventing evaporation and drying. Moist wound healing is a shift in practice from dry wound healing. Cracks or fissures in the nipple result from insufficient moisture in the corpus stratum of the dermis, together with friction. Rapid drying, as in dry

wound healing, causes the stratum to shrink in an irregular manner, increasing tension on any new tissue, causing further cracking and drying. The moisture barrier may be an emollient, occlusive or semi-occlusive dressing, but does not include oil or petroleum products, warm compresses or wet or soiled breast pads. For further information see Walker (2011) and Lawrence (2011).

Expressed breast milk (EBM), sometimes recommended for Stage I nipple trauma as an alternative to nipple creams or ointments, is readily available, free and has antibacterial properties, but is not appropriate if there is broken skin, as EBM dries quickly and does not provide moist wound healing (Mohrbacher, 2010).

Breast milk has bacteriostatic properties. These include secretory antibodies such as SIgA, IgE, and IgM, against specific pathogens, fatty acids and lactoferrin that provide broad spectrum protection, and glyco-conjugates and oligosaccharides that protect against one or more specific pathogens (Newburg et al., 1998; Riordan, 2010).

Saline compresses applied to the nipple and areola are recommended by some practitioners. Although no evidence has been identified to support this practice specifically for breastfeeding, saline is widely used in wound management, is readily available and unlikely to harm mother or infant. Some mothers may prefer to soak their breasts in a warm saline solution (5 ml salt in 250 cc water). As above, allow the area to dry before putting on a bra.

Warm water compresses to prevent sore nipples were recommended in an earlier systematic review (Page et al., 2003). Allow the area to dry before putting on a bra.

Nipple Creams, Gels, and Ointments (Emollients)

– There are a variety of nipple creams and ointments on the market. Some women may find comfort by applying these products. Artificial lubricants are usually unnecessary as lubrication from the glands in the areolar skin keeps a nipple soft and pliable unless the natural lubrication has been disturbed. Some products may be used to promote moist healing by providing a moisture barrier to cover the mother’s nipple and areola, preventing evaporation and drying. However, there is little scientific evidence to support use of these products over prevention to relieve sore nipples (Morland-Schultz et al. 2005). Mothers need to be cautious in deciding whether to use nipple creams

or ointments. There is limited scientific evidence to establish standardized dosages and application or determine the efficacy and possible side effects for both the mother and baby. Specific allergies such as an allergy to wool would preclude the use of lanolin ointment for some women. Creams, gels, and ointments may interfere with normal lubrication or cause contact dermatitis. Local anaesthetics may cause allergies, and interfere with letdown.

The initiation and management of the following products should only be by a breastfeeding expert or breastfeeding clinic.

- Purified anhydrous lanolin is purported to promote moist healing.
 - Suggested as an option for Stage I and II nipple trauma (Mohrbacher, 2010).
- Low-strength antibiotics may be applied to breaks in the skin to prevent mastitis. The evidence does not support the use of antibiotic ointments without signs of a portal of entry for infection (crack, trauma). Local application to the nipples is unlikely to be a risk to the infant as little is transferred to breast milk from topical application (Kristensen in Hale et al., 2007).
 - An option for Stage I, II and III.
- Low-strength topical steroids may be used for inflammation.
 - An option for Stage I, II and III.
- Hydrogels, either glycerin-based or water-based, may be applied in a dressing to sore nipples.
 - An option for any stage of nipple trauma.
- A compounded ointment developed by Canadian paediatrician Dr. Jack Newman, known as all-purpose nipple ointment (APNO), contains an antibiotic, steroid, and antifungal agent (Newman, 2009). It is commonly recommended but not yet researched (Mohrbacher, 2010; Lauwers & Swisher, 2011). Although Mohrbacher suggests it may be an option for Stage I, II and III nipple trauma (Mohrbacher, 2011), dermatologists rarely use a cream with multiple active ingredients because “the bad effects often outweigh the good” (Lawrence, 2010), and it is difficult to determine the source of a negative reaction.

Nipple Shields – If a mother inquires about using a nipple shield to relieve sore nipples, it is important to

first explore with her any possible underlying causes of sore nipples. It is also important to inquire about her current breastfeeding management practices and attempts to manage her sore nipples, and then to offer suggestions to optimize basic breastfeeding management (see earlier discussion regarding management of sore nipples).

A nipple shield is an artificial nipple and areola shaped like a floppy sun hat and made of a synthetic material like silicone. Some women may have success placing one of the newer ultra-thin silicone nipple shields over the breast to facilitate latching and sucking. This has the potential to stimulate the baby's hard palate and thereby elicit the sucking reflex. It may be a familiar stimulus to coax a baby to the mother's breast who has already imprinted preferentially on the supernormal stimulus of an artificial nipple (Wilson-Clay et al., 2008).

Although not the first strategy recommended to manage sore nipples, short-term use of the newer ultra-thin silicone shields has been positively associated with preserving the breastfeeding relationship while mother and baby learn to breastfeed (Meier et al., 2000; Wilson-Clay, 1996).

Although a recent review of the literature reported that the current evidence does not yet demonstrate safe practices for the use of nipple shields (McKechnie et al., 2010), expert practitioners continue to report the use of nipple shields as a possible strategy to bring a baby to the mother's breast who might otherwise refuse her breast. Reasons for refusal may include flat or inverted nipples, prematurity, neuromuscular issues and/or imprinting (*Protocol #8 Flat or Inverted Nipples; Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch; Protocol #10: Ineffective Suck*). Nipple shields may provide temporary relief for a mother who is stressed or overwhelmed and prevent the introduction of a bottle, if she is supported appropriately by a lactation expert (Lauwers et al., 2011). Some mothers may wish to use nipple shields for longer periods; these dyads should be periodically reassessed. Lawrence advises against the use of a makeshift shield.

Historically, there has been mixed evidence reported about nipple shields. Use of the older rubber or latex shields was associated with concerns about inadequate intake of breast milk that resulted in slow weight gain or failure to thrive (Woolridge, 1980). Recent evidence has demonstrated infant weight gain to be similar over 2 months in babies fed with shields

compared to babies fed without shields (Chertock, 2009).

To apply a nipple shield, it is important to use the correct fit and size. If the teat is too long for the baby's mouth it can cause gagging, but if it is too small it may not stimulate active sucking (Mohrbacher, 2010). The teat opening needs to be large enough to accommodate the mother's nipple comfortably; if it is too small it can slow the flow of breast milk, which is counterproductive. Lauwers recommends starting with the smallest shield that accommodates both the baby's mouth and the mother's nipple. Wilson-Clay advises matching the shield size to the baby's mouth, and selecting the shortest available teat with the smallest base diameter (2008).

Clinicians and mothers may try varying methods to directly apply the shield. In one, the mother holds the rim of the shield between her thumb and fingers. Stretching the shield at the junction of the "nipple" and "areola", she places the stretched shield over her nipple and releases the tension. As the stretch releases and the shield returns to its normal shape, it draws the mother's nipple into the nipple cavity of the shield before the baby begins to suck. Some mothers may turn the top half of the shield inside out before placing it over the nipple. It is important to follow the manufacturer's instructions related to care and cleaning of the nipple shield. (For further information see Wilson-Clay, 2008, Lauwers, 2011, and Genna, 2008.)

Nipple shields should not be the first strategy attempted to manage sore nipples and they should only be initiated by a health care provider who has the breastfeeding expertise to thoroughly assess the potential effectiveness and risks of use for that breastfeeding dyad. The practitioner is also responsible for establishing a plan with the mother for the ongoing management and evaluation of the intervention. Practitioners who do not have the capacity, i.e., lactation expertise or time, to continue to support the breastfeeding dyad appropriately should refer the mother to a lactation expert or breastfeeding clinic. The baby's weight gain and the mother's breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of the breastfeeding and the infant's intake of breast milk, plus a plan for re-establishment of feeding at the mother's breast.

Imprinting – The concept of imprinting or "stamping" is sometimes used to explain the observation of nipple preference. Imprinting is drawn

from other sciences such as biology and psychology, where it has been applied to explain attachment behaviours and brain pathway development. In humans, imprinting is oral/tactile (Lawrence, 2011) and Gale Mobbs (1989) has identified the mouth as the most significant factor in imprinting in humans. When babies are exposed to artificial nipples or fingers early they can become accustomed to the feeling of that particular object (bottle nipple, pacifier, finger) in their mouths and have difficulty accepting another object, such as a mother's nipple, in its place (Righard, 1997).

Breast Shells – Plastic breast shells may be worn inside the bra over the mother's nipple and areola. Women may wear them to improve nipple protractility by placing gentle pressure on the areola, which stretches and pushes the nipple forward (*Protocol #8: Flat or Inverted Nipples*). They may be worn with effect in the early weeks of breastfeeding, but prenatal use has been found to be ineffective (Alexander et al., 1992; MAIN, 1994). They may also be worn to protect the tender nipple and areola from rubbing on a bra or clothing. Some mothers may use them to relieve engorgement, when worn about 20 minutes before breastfeedings.

- The bra size should be bigger than the shell to avoid placing too much pressure on the delicate breast tissue. Shells should have multiple openings for air circulation to keep the skin from becoming softened or chapped. Although previously used to collect leaking breast milk and protect clothing, any breast milk collected should be discarded due to potential high bacterial counts.

Ankyloglossia (Tongue-Tie) – A short or tight lingual frenulum may restrict infant tongue movement and may lead to breastfeeding difficulties. Although it may sometimes be associated with speech difficulties, the effect on speech has not been clearly defined (Lalakea et al., 2003). There are many variations in degree of tightness, amount, and type of movement. Coryllos describes four types of tongue-tie ranging from the frenulum attached to the tongue tip; attached behind the tongue tip at the alveolar ridge; attached to the mid-tongue and mid-floor of the mouth; and attached at the back of the tongue (Coryllos et al., 2004). There may be a congenital association.

- Difficulties that may arise with Ankyloglossia:
 - There may be difficulty achieving a deep latch

if the baby's tongue is unable to reach back towards the soft palate junction.

- The mother may experience nipple pain and damage if the tip of the baby's tongue rubs the hard palate and/or if there is reflexive biting.
- There may also be breast refusal and difficulty maintaining the latch.
- If the tongue has difficulty cupping the mother's breast, the infant may have difficulty managing the bolus of breast milk, putting the infant at risk of insufficient breast milk intake and poor weight gain.

Management of ankyloglossia is not straightforward. Disagreement may occur among health care providers regarding the management of ankyloglossia as there are many ways to describe and define this condition. In addition to Coryllos above, Walker includes descriptions of several assessment and management approaches (Walker, 2011).

Conservative management may be possible for breastfeeding with tongue-tie, depending on the degree of tongue movement and pain, through offering assessment and support to facilitate optimal positioning (*Protocol #2: Positioning and Latching*).

If the mother feels unable to continue breastfeeding due to persistent pain, and/or if the baby is at risk of insufficient breast milk intake and poor weight gain related to breast refusal or difficulty latching, a frenotomy, or surgical "clipping" or "snipping" to release the frenulum, may be considered to relieve pain, and facilitate effective latching and breastfeeding. Geddes et al. reported less nipple compression post-frenotomy, associated with improved breastfeeding outcomes, better latching and breast milk transfer, and less maternal pain (Geddes et al., 2008).

Refer to a primary health care provider for further assessment. Not all cases of ankyloglossia will be assessed as appropriate for frenotomy, depending on the degree of tongue movement, infant well-being and breastfeeding difficulty, as well as access to a paediatrician who performs frenotomies (*Protocol #2: Positioning and Latching; Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch; Protocol #10: Ineffective Suck; Protocol #12: Insufficient Breast Milk Supply*).

Vasospasm/Raynaud’s Phenomenon – Mothers report intense pain, stinging, tingling, burning or numbness persisting after breastfeeding. A triphasic or biphasic colour change may occur; the nipple appears blanched after the breastfeeding, and turns blue and/or red before returning to its normal colour.

- Offer assessment and support to optimize effective positioning and latching.
- Suggest that the mother avoid temperature extremes. Some mothers apply a warm compress immediately after breastfeeding, letting it cool on her breast, to facilitate temperature transition.
- Refer to a primary health care provider for further assessment and possible treatment.

Hand Hygiene and Routine Practices

Gloves are rarely needed for breastfeeding support. The Baby-Friendly Initiative recommends that most teaching and breastfeeding support should be done in a hands-off manner. As the goal is for mothers to be able to latch their babies independently, it is important for staff to request permission before touching the mother or baby and to take a hands-off approach as much as possible. A hands-on approach is only used after asking permission and when additional help is deemed necessary (BFI Step 5, BCC, 2011).

Practitioners should follow routine practices (previously universal precautions), which include the appropriate use of gloves and practicing hand hygiene (TPH, 2006), when in contact with body fluids, blood, excretions, secretions, non-intact skin, mucous membranes, or an undiagnosed rash.

If the practitioner does handle breast milk, then gloves should be worn (APIC, 2005). In addition, if the practitioner handles breast tissue that is not intact, such as cracked or bleeding nipples, gloves should be worn. Hands should be cleaned before donning gloves and after removing gloves. It is difficult to ensure the absence of occult blood from breast milk. Similarly, it is difficult to ensure the skin integrity of the practitioner’s hand. This is a change in practice from earlier recommendations from the Centers for Disease Control and Prevention (CDC), which previously had not listed human breast milk as a body fluid requiring special handling precautions (CDC, 2005), based on the fact that occupational exposure to human breast milk has not been shown to lead to transmission of HIV, HBV, or HCV.

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Protocol #5

Engorgement



Protocol #5: Engorgement

Engorgement may have one or more underlying causes that may be mother or baby related.

Observation and Assessment

Breast fullness may sometimes be confused with engorgement. Breast fullness differs from engorgement in the following ways:

Breast Fullness (a normal condition)	Breast Engorgement (an abnormal condition)
<p><i>Assess the mother for:</i></p> <ul style="list-style-type: none">• Breast fullness, heaviness, and some tenderness that begins when the breast milk volume increases 2–4 days after birth.• Breasts that feel soft when pressed (compressible).• Absence of breast pain or fever.	<p><i>Assess the mother for:</i></p> <ul style="list-style-type: none">• Breasts and/or areolae that feel hard beginning 3–6 days after birth or at other times when a mother’s breasts are not effectively emptied.• Breasts that are not compressible.• Generalized breast tightness and pain.• Breasts that appear flushed.• A low-grade fever.• Hands and arms that may be numb and tingling if engorgement is severe. <p><i>Assess the baby for:</i></p> <ul style="list-style-type: none">• Breast refusal or difficulty achieving a latch (<i>Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch</i>).

Possible Contributing Factors or Causes

Engorgement may have one or more underlying causes that may be mother and/or baby related.

Assess the mother for:

- Poor positioning and latching techniques (*Protocol #2: Positioning and Latching*).
- Use of supplements and pacifiers.
- Restricting the frequency and length of breastfeedings. Temporarily stopping breastfeeding without expressing for the missed breastfeedings – including separation of mother and baby.
- Weaning abruptly.

- Underlying abnormal breast pathology, e.g., non-patent breast milk ducts.
- Stress.
- Fatigue.

Assess the baby for:

- Ineffective suck (*Protocol #10: Ineffective Suck*).
- Medical conditions, e.g., jaundice.
- Use of pacifiers (*Protocol #1: The Initiation of Breastfeeding*).

Suggestions

“The best management of engorgement is prevention.” (Lawrence, 2011)

1. Determine the possible cause(s) of the engorgement (see previous section on “Possible Causes”).

- Assess first for ineffective positioning and latching (*Protocol #2: Positioning and Latching*).
- Assess for infrequent or delayed breastfeedings.
- For an ineffective suck, refer to *Protocol #10: Ineffective Suck*.

2. Provide the mother with suggestions for breastfeeding with engorged breasts.

Before breastfeeding, encourage the mother to:

- Breastfeed early, frequently, and without restriction to promote optimal breast milk removal.
- Hold her baby skin-to-skin frequently.
- Soften the areola and ensure that the letdown or breast milk ejection reflex is initiated. The baby’s rooting, sucking and hand movements on the mother’s breast are the natural stimuli for letdown when breastfeeding is initiated early and the baby is calm, before the baby gets overly hungry and begins crying (*Protocol #3: Signs of Effective Breastfeeding*).

A mother can try the following ideas to initiate letdown:

- Breastfeed in a quiet, relaxed place.
- Use relaxation strategies – such as a warm shower, heat applied to the mother’s back and shoulders, relaxation breathing, a warm drink, supportive positions.
- Manage pain to support comfort and relaxation and facilitate breast milk letdown.
- Initiate breastfeeding before the baby is stressed and crying.
- Clothe the baby in a diaper only to promote skin-to-skin contact.
- Support the baby’s head higher than tummy in a chest-to-chest position, with nose approaching the mother’s nipple to facilitate the normal neonatal reflexes and self-attachment behaviours.
- Gently massage her breasts.
- Stimulate her nipples. Gently roll her nipples between the thumb and index finger for several minutes or until the letdown reflex occurs and breast milk leaks.

- Express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Apply heat to her back or shoulders for a few minutes before or during massage until letdown occurs. Some mothers may wish to apply heat to their breasts – see discussion regarding application of heat for engorgement in *General Principles*. Moist or dry heat may be applied with a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low, or a water bottle wrapped in a cloth.

Or alternatively, some women prefer to:

- Apply a cool cloth to their breasts for a few minutes. Try cold compresses or diapers, gel packs, frozen wet towels or frozen vegetable packs, wrapped in a cloth. Limit direct exposure to cold to prevent tissue trauma such as frostbite.

During breastfeeding, encourage the mother to:

- Assess that the baby is effectively positioned and latched (*Protocol #2: Positioning and Latching*).
- Assess that the baby is effectively sucking and swallowing (*Protocol #3: Signs of Effective Breastfeeding*).
- Use breast compressions during breastfeeding if the baby is not effectively sucking and swallowing or if her breast is not softening. Breast compressions will increase the breast milk transfer and encourage the baby to suck effectively.

To use breast compression, encourage the mother to:

- Support the base or middle of her breast using the “C” or “U” hold (see diagram).
- Compress her breast when the baby’s sucking becomes less effective, e.g., no more “deep and slow” sucks (*Protocol #3: Signs of Effective Breastfeeding*).
- Hold the compression but do not press so hard that it hurts.
- Release the compression when the baby pauses and swallows or is no longer effectively sucking, e.g., no more “deep and slow” sucks. Most babies will stop sucking completely when the compression is released and will resume sucking again shortly.
- If the baby does not resume effective sucking, wait a while before compressing again.
- Rotate the position of her hand on all areas of her

breast to ensure that all of the breast milk ducts are compressed.

- Continue with breast compressions until the baby is no longer sucking effectively when her breast is being compressed.
- Offer the other breast using breast compression as needed.



Breast Compression Using the “C” Hold

After breastfeeding, encourage the mother to:

- Express some breast milk for comfort if her breasts are still hard and full, even if the baby has breastfed effectively and is satisfied. Both breasts should feel significantly softer after breastfeeding and/or breast milk expression (*Protocol #19: Expressing and Storing Breast Milk*).
- Apply cold to the softened breasts for a few minutes after breastfeeding to provide comfort and reduce swelling. Limit direct exposure to cold to avoid tissue trauma such as frostbite. Try one of the following methods:
 - A cool wet towel or cloth.
 - A cold gel pack wrapped in a dry towel.

Another practice sometimes suggested when optimal breastfeeding management isn't enough:

- Cabbage Leaves – Some mothers find the use of green cabbage leaves to be helpful for increasing their comfort and reducing engorgement. Caution: This has not been scientifically proven. In addition, due to the possible risk of listeriosis, this may not be an appropriate option for mothers or infants

who are immunocompromised (see notes below in *General Principles*). If cabbage leaves are being used:

- Wash hands well before and after handling cabbage leaves.
- Separate raw, green* cabbage leaves and rinse well with running, drinkable water.
- Slice off any large veins and cut a hole for the mother's nipple.
- Place the leaves directly on her breasts (not her nipples), and wear them inside a bra.
- When the leaves wilt, usually between 2–4 hours, replace them with fresh leaves.
- Discontinue using the leaves once the engorgement is relieved. Overuse may decrease the breast milk supply. Many mothers report some relief from engorgement within 8 hours of application.

* Green cabbage is suggested because purple cabbage leaves can stain skin and clothing.

Strategies to prevent engorgement:

- Observe the baby for early feeding cues to be able to breastfeed early and frequently:
 - when the baby is showing early feeding cues, e.g., rapid eye movements under the eyelids as the baby begins to wake, sucking/licking, hands to mouth, increased body movements, and making small sounds.
 - before the baby is overly hungry or crying.
 - when the mother's breasts become uncomfortable or full.
 - at least 8 times in 24 hours, including overnight, until her breasts are no longer engorged.
- Wear a supportive and well-fitting bra. Avoid bras with underwires.
- Use analgesics as needed, e.g., acetaminophen, ibuprofen. To inquire about the use of acetylsalicylic acid, i.e., aspirin, consult the *Motherisk* program at 416-813-6780, or a breastfeeding expert or breastfeeding clinic. The mother may review information online from *Motherisk* at: <http://www.motherisk.org/women/breastfeeding.jsp>.
- Feed the baby only breast milk. Avoid supplementation unless medically indicated (*Protocol #17: Indications for Supplementation or*

Cessation of Breastfeeding).

- Avoid the use of pacifiers and bottles.

If the baby is unable to breastfeed effectively, encourage the mother to:

- Gently express each breast, until her breasts are soft, each time the baby has been unable to breastfeed effectively. Hand expression is suggested as the mother is less likely to remove enough breast milk to trigger increased breast milk production. If breastfeeding is stopped for any length of time the mother will need to express each breast 8 times or more in 24 hours, including overnight, as long as her breasts are engorged.

The mother should also express if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).

- Soften the areolae before breastfeeding and initiate the letdown reflex by using one of the following techniques:
 - Gently massage her breasts while applying wet or dry heat to the back or shoulders until the letdown reflex occurs. Some mothers may wish to apply heat to their breasts.
 - Wet or dry heat includes a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad, or a hot water bottle. Then, gently express some breast milk until the areolae are soft (*Protocol #19: Expressing and Storing Breast Milk*).
 - Gently roll her nipples between her index finger and thumb for a few minutes or until the letdown reflex occurs. Then gently express some breast milk until the areolae are soft (*Protocol #19: Expressing and Storing Breast Milk*).
- If necessary, feed the baby with the expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, finger feeding (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available then an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Referral to a breastfeeding expert or breastfeeding clinic for further assessment as soon as possible is recommended.

General Principles

Prevention is key to managing engorgement. Fundamental to preventing engorgement is:

- Early initiation of breastfeeding.
- Frequent and unrestricted breastfeeding.
- Effective removal of breast milk from the mother's breasts.
- Effective positioning and latching practices.
- Not supplementing unless medically indicated.

Breast Fullness – Breast fullness is part of the normal physiological process of breast milk production. The mother's breasts usually become fuller between the second to fourth day after birth. A normal full breast will feel heavier and warmer, and may be uncomfortable. For most women this is a reassuring sign that their "milk has come in". Breast fullness does not interfere with breastfeeding.

Breast fullness normally occurs during the initial period of rapid breast milk production. It is due to increased vascular supply and postpartum hormonal shifts following the removal of the placenta (see *How the Breast Works* regarding Lactogenesis II). It will gradually decrease within 2–3 weeks when the baby is breastfeeding well. When breast fullness subsides, the mother's breasts will continue to produce plenty of breast milk despite feeling much softer and flatter. If the mother's breasts are not adequately and regularly emptied, breast fullness can lead to engorgement at any time during lactation.

Breast Engorgement – Breast engorgement is considered to be abnormal in this resource; the mother's breasts become overfull due to failure to remove breast milk effectively or frequently enough (Lauwers et al., 2011). There may be a range of difficulties or pathology in the physiological process. Giuliani identifies three basic components of breast engorgement: accumulation of breast milk, congestion caused by increased vascularization, and edema caused by congestion and obstruction of lymphatic drainage (Giuliani, 2004). The engorged breast feels hot, tender, swollen, and painful. Engorgement may be the result of the mismanagement of breastfeeding and may be a reason for early weaning (Riordan, 2010) (*Protocol #1: The Initiation of Breastfeeding*).

For some women, the production of breast milk may initially exceed the infant's requirements. Engorgement is a result of increased breast milk stasis together with increased blood flow to the mother's breasts. If the excess breast milk is not removed, the alveolar space may become over-distended, exerting pressure on the surrounding tissues, impeding lymph fluid drainage and leading to edema. Engorgement may be areolar engorgement, involving only the areola, and/or peripheral engorgement, involving the surrounding breast tissue, possibly including the ducts located in the axilla. Mothers with smaller breasts have less storage capacity (Daly & Hartmann, 1995) and have been observed to experience greater frequency of engorgement (Robson, 1990). This does not impede their ability to breastfeed successfully when managed effectively.

Engorgement can make it difficult for the baby to latch on the mother's breast, especially if the areola is hard and non-compressible. Unrelieved engorgement may cause mother's breast milk supply to decrease.

Poorly managed engorgement may lead to complications such as:

- difficulty with latching
- sore nipples
- decreased breast milk intake by baby
- decreased breast milk supply
- breast milk-producing cells (alveoli) being destroyed
- breast milk stasis
- plugged ducts
- mastitis, and
- decreased maternal motivation to continue breastfeeding related to pain.

Patterns of Engorgement – The experience of breast engorgement is not the same for every breastfeeding woman (Humenuik et al., 1994). It may be mild, or it may be severe. It may peak early or as late as Day 14 postpartum; it may also occur at a later time due to missed breastfeedings or weaning too abruptly. There may be a single peak or multiple peaks. Humenuik et al. (1994) identified four patterns of early engorgement, the most common being a gradual intense peak followed by a gradual cessation of engorgement. For multiparas it may occur earlier, for shorter periods, and with less intensity because their “milk comes in” earlier (Lawrence, 2011).

As a result of short hospital stays, most women will experience breast fullness or engorgement after they have left the hospital. Anticipatory guidance is essential and should include education about the physiology and the patterns of engorgement as well as information about how to access breastfeeding support after they leave the hospital.

Women who have had birth interventions, including a caesarean delivery, may have a delay in initiation of breastfeeding (TPH, 2010). As a result, they may experience engorgement one to two days later than for a vaginal birth, particularly if there has been a delay in initiation of breastfeeding.

Research Challenges – It is difficult to conduct conclusive scientific research related to engorgement because engorgement will spontaneously resolve as women continue to breastfeed no matter what treatment, if any, is tried (Mangesi et al., 2010). A Cochrane systematic review in 2010 found insufficient evidence to recommend widespread implementation of interventions to treat engorgement. In addition, methodological limitations in the existing research have led to a high risk of bias in the results (Mangesi et al., 2010). The limited number of studies not only meant that the Cochrane review was unable to carry out a meta-analysis, it also meant that several of the studies frequently cited were dated, including some doctoral theses that have not been published in peer review journals (Robson, 1990; Sandberg, 1998).

When Optimal Breastfeeding Management Isn't Enough – In addition to optimal breastfeeding management – frequent breastfeeding and breast milk removal, effective positioning and latching, as well as gentle breast massage – breastfeeding mothers may try and/or breastfeeding experts may suggest a variety of other strategies. The 2010 Cochrane systematic review found that in interventions such as ultrasound, cabbage leaves, and oxytocin, there was no statistically significant evidence that the interventions were associated with more rapid resolution of symptoms; symptoms tended to improve with or without the intervention. In addition, the review did not find evidence strong enough to recommend the use of acupuncture, although some women's symptoms improved after acupuncture.

Heat vs. Cold

- **Heat** applied to engorged breasts has long been used by breastfeeding women to promote letdown and comfort, although concerns have arisen that

the application of heat to the mother's breasts may increase vasocongestion. Robson reported that mothers complained that heat worsened symptoms, causing throbbing and a greater feeling of fullness (Robson, 1990). The Cochrane review does suggest that warm compresses be applied to the engorged breast (Mangesi et al., 2010). Heat may also be applied to the mother's back or shoulders to promote relaxation, comfort, and letdown.

- **Cold** may be applied to engorged breasts to decrease local edema and enhance venous and lymphatic drainage, as well as provide comfort. Although the current evidence is not definitive, the Cochrane review suggested that cold packs may be soothing for some women, and that application of cold does not cause harm and may be associated with symptom improvement (Mangesi et al., 2010). Despite a lack of statistical significance, the evidence continues to suggest clinical benefits. Mothers should protect their skin from direct exposure to extreme cold.

As many women report comfort after applying cold and/or warmth for engorgement, these can be reasonable strategies to suggest provided that they are used conservatively and safely. It is important to prevent tissue trauma or negative physiological effects, such as increased congestion and swelling from too much heat, or possible tissue trauma such as frostbite, or impeding letdown with application of too much cold.

To avoid direct exposure to hot and cold, use a layer of fabric between the skin and the source of cold or heat. To prevent tissue trauma, limit the application time so that the skin does not redden. Some practitioners continue to suggest the application of heat before breastfeeding and cold immediately afterward for relief (Riordan, 2010).

Expression/Pumping – If a mother is expressing breast milk from her breasts (by hand or pump) because she is uncomfortable or the baby has not removed enough breast milk, it is important that she understands that she should remove only enough breast milk to feel comfortable. The mother should not drain her breasts, because it may further stimulate the production of breast milk and possibly increase the engorgement symptoms (*Protocol #19: Expressing and Storing Breast Milk*).

Cabbage Leaves – The application of cabbage leaves to the mother's breasts between breastfeedings to reduce engorgement is another strategy that has been used by

some breastfeeding women but for which the evidence of effectiveness is inconclusive due to methodological limitations. The Cochrane review found no statistically significant evidence that the use of cabbage leaves was associated with a more rapid resolution of engorgement symptoms (Mangesi et al., 2010).

Despite this, many women find the application of cabbage leaves to be soothing. It is not necessary to chill cabbage leaves (Roberts et al., 1995). Mothers should be informed that their breasts might smell or taste like cooked cabbage.

Caution: Safety is an issue. Bacteria such as **listeria** have been identified on many vegetables including raw cabbage (Heisick et al., 1989). Listeriosis can be a very serious disease for pregnant women, newborns, and immunocompromised individuals. Although application to the skin does not have the same risk as ingestion, it is reasonable to suggest that cabbage leaves should not be applied to nipples or breasts with lesions, nor used by mothers with immunocompromised infants, including premature babies.

For all applications, it is essential to:

- Thoroughly wash cabbage leaves in cold, running, drinkable water.
- Wash hands before and after handling cabbage leaves.
- Clean all utensils, cutting boards, and work surfaces with a 10% bleach solution before and after use.

(Source: Adapted from Health Canada, 2008 and 2009)

Saline Soaks – Some practitioners may suggest that a mother soak her breasts in a mild saline solution, or soak in an Epsom salt bath. Although no specific research could be found to support the effectiveness of this practice, it is unlikely to be harmful as long as the baby is not swallowing the solution. Magnesium sulphate treatments are rated as L1 by Hale (2010).

Promoting Areolar Grasp “Reverse Pressure Softening” – For most women, the gentle massage and expression described above in “Suggestions” are enough to soften an engorged areola. If these do not reduce the areolar edema, it may help to try “reverse pressure softening”, as described by Cotterman (2004). Gentle positive pressure is applied by placing the fingertips around the base of the mother's nipple to create a ring of “dimples”. This can temporarily reduce edema by moving some swelling slightly

backward and upward into the breast, softening the areola enough to permit effective latching. It is best done with fingernails trimmed short and immediately before breastfeeding.

Cultural Practices – It is important to acknowledge that some cultures traditionally avoid practices such as “cold” during the postpartum period. Having a conversation with the mother about traditional and cultural practices and exploring their significance for

her can facilitate an informed decision. It creates an opportunity to offer accurate information about how the possible benefits and risks of traditional practices may impact her breastfeeding success. Some women may feel that certain practices are not an option, and for others an explanation of the rationale may lead to the possibility of trying a different treatment.

Prevention – All findings emphasize that prevention of engorgement should remain the key priority.

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Protocol #6

Plugged Ducts



Protocol #6: Plugged Ducts

Plugged or blocked ducts occur when one or more of the collecting ducts within a breast becomes plugged with breast milk and other cellular components. Contributing factors may include breast milk stasis or external pressure applied on specific areas of the mother's breast.

Observation and Assessment

Assess the mother for:

- Unilateral symptoms, localized in one area of the mother's breast.
- Mild tenderness, little or no heat, possible redness of one area of the mother's breast.
- If the plugged duct is close to the skin, there may be a palpable lump in one area of the breast.
- Possible white dot or bleb at the end of the nipple.
- Body temperature < 38.4°C (101°F).
- Gradual onset of symptoms.
- Feeling well otherwise.

Source: Adapted from Lawrence, 2011, and Riordan, 2010.

Possible Contributing Factors or Causes

Plugged ducts may be mother and/or baby related.

Assess the mother for:

- Ineffective removal of breast milk and inadequate drainage of the mother's breast.
- Restricting the frequency and length of breastfeedings.
- Temporarily stopping breastfeeding without expressing for the missed breastfeeds, including separation of mother and baby.
- Engorgement (*Protocol #5: Engorgement*).
- Overabundant breast milk supply (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).
- External pressure on a specific area of the mother's breast:
 - mother's finger pressing her breast
 - constrictive bra or clothing

- straps on a baby carrier
- always sleeping on the same side
- always holding the baby the same way.

- Positioning difficulties.
- Stress.
- Fatigue.
- History of breast trauma or surgery.
- Use of nipple shield within 1 week of symptoms (Fetherston, 1998).

Source: Adapted from Riordan, 2010; Lauwers & Swisher, 2011.

Assess the baby for:

- An ineffective suck (*Protocol #10: Ineffective Suck*).
- Infrequent, hurried, shortened, or missed breastfeedings, including when the baby is ill.
- Weaning.

Suggestions

1. Assess for possible cause(s) of the plugged duct (see the previous section on "Possible Contributing Factors or Causes").
 - If the mother's breasts are engorged, refer to *Protocol #5: Engorgement*.
 - If the mother has an overabundant breast milk supply, refer to *Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*.
2. Provide the mother with suggestions for self-care.
 - Rest as much as possible.
 - Eat and drink according to *Eating Well With Canada's Food Guide* (Health Canada, 2007).
 - Support for herself and her household.
 - Help with care of other children.
3. Provide the mother with suggestions for breastfeeding with plugged ducts.

Before breastfeeding, encourage the mother to:

- Understand that most plugged or blocked ducts will resolve in 1–2 days.
- Follow her baby’s early feeding cues, e.g., rapid eye movements under the eyelids, sucking/licking, hands to mouth, increased body movements, and making small sounds.
- Breastfeed frequently, at least 8 times in 24 hours, including once overnight, to mimic the normal breastfeeding pattern until the plugged duct is cleared. The mother should also try to breastfeed if her breasts become uncomfortable or full. The mother should be encouraged to breastfeed before the baby is overly hungry and crying (*Protocol #3: Signs of Effective Breastfeeding*).
- Avoid missed or shortened breastfeeding. Express the breast if breastfeedings are missed or shortened.
- Gently massage the affected area towards her nipple while applying heat to promote removal of breast milk and drainage of the plugged duct. Heat may be applied during massage in a warm shower or bath, or by immersing the breast in a bowl of warm water.
- Apply moist heat and gentle nipple rolling before breastfeeding if there is a white bleb at the end of the nipple. If the bleb does not open with repeated breastfeedings or if it causes breastfeeding to be painful, then the bleb may need to be opened with a sterile needle at a breastfeeding clinic or by a physician. This should provide nipple pain relief and may clear the plugged duct.

During breastfeeding, encourage the mother to:

- Offer the affected side first at each breastfeeding to ensure strong sucking and drainage of the plugged duct.
- Gently massage the affected area towards her nipple and use breast compressions to promote drainage of the plugged duct. Breast massage or compressions may begin with the ducts closest to the nipple or from behind the plug.
- Avoid prolonged finger or hand pressure on the mother’s breast.
- Rotate breastfeeding positions during breastfeedings to promote drainage of all the ducts in the mother’s breast. Assess that the baby is effectively positioned and latched (*Protocol #2: Positioning and Latching*).

- Assess that the baby is effectively sucking and swallowing throughout each breastfeeding (*Protocol #3: Signs of Effective Breastfeeding*).

Between breastfeedings, encourage the mother to:

- Follow self-care practices – try to rest as much as possible, eat a healthy diet, and seek support to minimize stress.
- Avoid placing prolonged pressure on the breasts, e.g., from restrictive clothing, tight or underwire bras, straps on a baby carrier, always sleeping on one side, or always holding the baby the same way.
- Monitor for signs of mastitis, e.g., changes in body temperature, breast pain, and breast redness (*Protocol #7: Mastitis*).

If the baby is unable to breastfeed effectively, encourage the mother to:

- Gently express each breast after each time the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time the mother will need to express each breast at least 8 times in 24 hours, including overnight, until the plugged duct has cleared. The mother should also express if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).
- Breastfeed the baby with the expressed breast milk using an alternative method, e.g., cup, spoon, syringe, or finger feeding (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Consult a breastfeeding expert or attend a breastfeeding clinic for further assessment as soon as possible.

Recurrent plugged ducts:

- Review possible underlying factors.
 - Try lecithin, either from dietary sources or as a supplement. Contact a Registered Dietitian to discuss dietary sources of lecithin or any other change in diet, such as reducing saturated fat.
- Although there are no scientifically established dosages for use of lecithin in breastfeeding, supplements may be suggested by breastfeeding experts (see *General Principles* regarding lecithin).

General Principles

Continue to breastfeed frequently to promote effective removal of breast milk from the mother's breasts. Most plugged ducts will resolve within 1–2 days.

Support maternal self-care, i.e., rest and diet according to *Eating Well With Canada's Food Guide* (Health Canada, 2007).

Plugged ducts result from local accumulation of breast milk and cellular components in the mother's breast, with inflammation in the surrounding tissue. As there is breast tissue with lactiferous ducts located in the underarm, a plugged duct may also develop in this area.

A bleb or breast milk blister, a white dot or bump on the mother's nipple, is accumulation of breast milk solids that block the breast milk from flowing. It may be painful when the baby latches onto the mother's breast. If there is no pain, no treatment is needed.

There is no specific cause of plugged ducts (Riordan, 2010) but this condition occurs more often in women with an abundant breast milk supply and when their breasts are not adequately emptied. Plugged ducts are observed to occur more frequently in the winter months (Riordan, 2010). This may be related to the cold weather or to constricting clothing. Breast trauma or surgery may have damaged the ducts, interfering with their ability to transport breast milk (Lauwers, 2011).

- Fetherston observed that thicker breast milk may be a predictor of plugged ducts (Fetherston, 1998).
- Some practitioners report that mothers may find it less painful to massage or knead close to the nipple and in front of the plug (Campbell, 2006), rather than push the plug forward.

Antibiotic treatment is not recommended for plugged ducts unless they develop into mastitis. Mastitis is differentiated from plugged ducts by these symptoms: Fever of $>38.4^{\circ}\text{C}$ (101°F), flu-like symptoms, intense pain/redness in the mother's breast, and sudden onset of symptoms (Lawrence, 2011) (see also *Protocol #7: Mastitis*).

Lecithin – It has been suggested by some breastfeeding experts that lecithin may help resolve recurrent plugged ducts if the mother takes lecithin either in her diet or as a supplement. Lecithin is present naturally in breast human milk. It also occurs in the body as an emulsifier for bile salts. It is found

in many foods. A Registered Dietitian can suggest dietary sources of lecithin. However, dietetic texts do not make specific recommendations of lecithin for breastfeeding women. Although there are reports of clinical observations of the successful use of lecithin for plugged ducts with no apparent side effects, at this time there is not enough scientific information about the safety of various supplements and natural products to recommend their general use during breastfeeding. Although the use of lecithin is suggested in many texts (Lauwers, 2011; Riordan, 2010; Humphrey, 2003) and continues to be referenced by Dr. Ruth Lawrence (Lawrence, 2011), no clinical research could be found related to the use of lecithin for plugged ducts. There is not sufficient evidence to determine recommendations of efficacy, dosages, side effects, or risks for either the mother or baby. However, the following are frequently cited in the lactation texts: 1 tablespoon of lecithin, by spoon or in food 3–4 times/day (Lawrence, 2011) or 1–2 capsules (1200 mg) 3–4 times a day (Lauwers, 2011). Breastfeeding women should approach the use of natural health products with caution and always consult with their health care provider with breastfeeding expertise (*Protocol #16: Drugs and Breastfeeding*) for further discussion of natural products.

Ultrasound – References are found that suggest the use of ultrasound for recurrent plugged ducts. However, there is limited published evidence to support this intervention. An early Cochrane review reported equal effects of placebo and ultrasound (Snowden et al., 2001). Although reference was found to a poster abstract of a small retrospective study comparing therapeutic ultrasound as an adjunct to traditional interventions to traditional interventions alone for plugged ducts (Smillie, 2003), the study has not been published in a peer review journal. The study did observe a benefit from the use of ultrasound, but one of the authors later reported that the study clinic staff decreased use of ultrasound because the women viewed ultrasound as stressful and not empowering (Campbell, 2006).

Poorly managed plugged ducts can develop into mastitis (*Protocol #7: Mastitis*).

- Recurrent plugged ducts may be associated with breast cancer. Pregnancy associated breast cancer (PABC) occurs in a small percentage of women in the first year postpartum. It is important to refer

the mother to her primary health care provider to evaluate for possible breast cancer if there is recurrent mastitis or a plugged duct in the same area, febrile mastitis-like symptoms that are unresolved after antibiotic treatment, or a mass not decreasing after 72 hours of optimized

breastfeeding management (Petok, 1995 in Lawrence, 2011). It is recommended that the breast be emptied prior to a diagnostic procedure (Lawrence, 2011).

- Plugged ducts usually resolve with continued unrestricted breastfeeding.

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Protocol #7

Mastitis



Protocol #7: Mastitis

Mastitis is an inflammatory condition of the mother's breast, which may or may not be accompanied by infection.

Observation and Assessment

Assess the mother for possible symptoms:

- Unilateral symptoms occur most often in the upper, outer quadrant but may occur anywhere, including under the axilla.
- Red, hot, swollen.
- Possible red streaks and/or shiny breasts.
- Intense pain.
- Flu-like symptoms, e.g., chills, aches, fatigue.
- Fever $>38.4^{\circ}\text{C}$ ($>101^{\circ}\text{F}$).
- Possible sudden onset.

(Source: Adapted from Lawrence, 2011.)

Possible Contributing Factors or Causes

Mastitis may be mother and/or baby related.

Assess the mother for:

- Inadequate drainage of her breasts.
- Stress and fatigue.
- Plugged ducts (*Protocol #6: Plugged Ducts*).
- Sore, cracked nipples (*Protocol #4: Sore Nipples*).
- Overabundant breast milk supply (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).
- Engorgement and breast milk stasis (*Protocol #5: Engorgement*).
- External pressure on her breast, e.g., from a constrictive bra or clothing, straps on a baby carrier, mother's finger pressing on breast, always sleeping on the same side or always holding the baby the same way.
- Previous history of mastitis in multiparas.

(Source: Adapted from Fetherston, 1998; Riordan, 2010.)

Assess the baby for:

- Ineffective attachment or suck (*Protocol #2: Positioning and Latching; Protocol #10: Ineffective Suck*).
- Infrequent, hurried, or shortened breastfeedings.
- Missed breastfeedings.
- Rapid weaning.

Suggestions

1. Assess for possible cause(s) of the mastitis (see previous section on Possible Contributing Factors or Causes).

- If the mother has plugged ducts, refer to *Protocol #6: Plugged Ducts*.
- If the mother has sore or cracked nipples, refer to *Protocol #4: Sore Nipples*.
- If the mother's breasts are engorged or have breast milk stasis, refer to *Protocol #5: Engorgement*.
- If the mother has an overabundant breast milk supply, refer to *Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*.

2. Provide the mother with suggestions for breastfeeding with mastitis.

Before breastfeeding, encourage the mother to:

- Continue breastfeeding and promote effective breast milk removal.
- Apply heat to the affected area for a few minutes. Moist or dry heat includes a warm shower or bath, a warm, moist towel or disposable diaper, a heating pad on low setting, a hot water bottle or immersing the breast in a bowl of warm water.
- Gently massage the affected area while applying heat to promote breast milk removal (i.e., drainage of that area).
- Apply moist heat and gentle nipple rolling if there is

a white blister or bleb at the end of the nipple. If the blister does not open after repeated breastfeedings or if it causes breastfeeding to be painful, then the blister may need to be opened with a sterile needle at a breastfeeding clinic or by a physician. This should provide nipple pain relief and may clear an underlying plugged duct.

- Apply heat to her back or shoulders for comfort and relaxation.

During breastfeeding, encourage the mother to:

- Offer the affected side first at each breastfeeding to ensure strong sucking and breast milk removal from that area.
- Try the unaffected side first for a short time if it is too painful to breastfeed on the affected side.
- Use a variety of breastfeeding positions to promote drainage of all the ducts in her breast. Try positions that have the baby's chin or nose pointing towards the affected area (ABM Protocol #4, 2008).
- Gently massage the affected area during the breastfeeding to promote breast milk removal from that area. Massage should be directed from the affected area towards the mother's nipple (ABM Protocol #4, 2008).
- Assess that the baby is correctly positioned and latched (*Protocol #2: Positioning and Latching*).
- Assess that the baby is sucking and swallowing long enough to effectively remove breast milk from the breast,

Between breastfeedings, encourage the mother to:

- Observe her baby for early feeding cues to be able to breastfeed early and frequently:
 - when the baby is showing feeding cues, e.g., rapid eye movements under the eyelids, sucking/licking, hands to mouth, increased body movements, and making small sounds (*Protocol #1: The Initiation of Breastfeeding*).
 - before the baby is overly hungry or crying.
 - when the breasts become uncomfortable or full, or at least 8 times in 24 hours, including overnight, until the breasts are no longer engorged.
- Wear a supportive and well-fitting bra.
- Avoid placing prolonged pressure on the breasts, e.g., from a tight or underwire bra, straps on a baby

carrier, always sleeping on one side, or always holding the baby the same way.

- Avoid wearing a bra to bed (Fetherston, 1998).
- Feed the baby only breast milk. Avoid supplementation unless medically indicated (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Avoid pacifiers and bottles.
- Avoid missed or shortened breastfeedings. Express breast milk if breastfeedings are missed or shortened.
- Rest as much as possible and eat and drink according to *Eating Well With Canada's Food Guide* (Health Canada, 2007).
- Apply cold to reduce breast swelling if she wishes. Wrap a cold cloth or cold pack in a towel or cloth to avoid direct exposure to the skin.
- Use analgesics as needed, e.g., acetaminophen, ibuprofen. To inquire about the use of acetylsalicylic acid, i.e. aspirin, consult with the *Motherisk* program at 416-813-6780, or a breastfeeding expert or breastfeeding clinic.

If the baby is unable to latch or breastfeed effectively, encourage the mother to:

- Gently express each breast after each time that the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time, the mother will need to express each breast at least 8 times in 24 hours, including overnight, until the mastitis has cleared. The mother should also express if her breasts become uncomfortable or overly full (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, or finger feeding (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available, an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Attend a breastfeeding clinic or see a breastfeeding expert for further assessment as soon as possible.

Antibiotic treatment:

- Mothers should be assessed without delay regarding the need for antibiotic treatment.

- Antibiotic treatment, e.g., cephalexin, cefaclor, cloxacillin, flucloxacillin, amoxicillin, clavulin acid, clindamycin, and ciprofloxacin is usually effective against *Staphylococcus aureus*. Clindamycin and ciprofloxacin are effective for mothers allergic to penicillin.
- Breastfeeding can and should continue together with any of the above antibiotics. Abrupt discontinuation of breastfeeding for any length of time without regular expression to effectively remove breast milk from the mother's breasts can lead to complications such as engorgement, plugged ducts, prolonged or recurrent mastitis, or an abscess.

General Principles

Frequent breastfeeding is found to be a protective factor against mastitis (Fetherston, 1998). Frequent breastfeeding is necessary to effectively remove breast milk from the alveoli and breast milk ducts, either by breastfeeding or expression.

Effective removal of breast milk from the mother's breast is essential to prevent breast milk stasis. A variety of terms may be used to describe this. Riordan uses the term "removal", as does Lauwers. The Academy of Breastfeeding Medicine uses both the terms "removal" and "drainage", as does the Cochrane Review (Crepinsek, 2010). Lawrence includes the terms "emptying" and 'drainage'. Biancuzzo also uses the terms "removal" and "emptying". Ultimately, to support infant growth and nutrition, the breast milk must be effectively removed from the mother's breast and transferred to the baby.

Mastitis is an acute inflammation or cellulitis of the interlobular connective tissue of the mother's breast, which may or may not be accompanied by infection (Foxman, 2002; WHO, 2000). Lactation mastitis is associated with breast milk stasis in the ducts or alveoli. It may also be associated with or result in infection. Some definitions of mastitis refer to infectious mastitis only (Mass, 2004). Mastitis may be viewed as a continuum, from non-infectious inflammation of the mother's breast to infection that may lead to breast abscess (Crepinsek, 2010).

Non-infectious mastitis can possibly be managed by breastfeeding strategies alone to promote effective removal of breast milk from the mother's breast.

Infectious mastitis is most frequently caused by

Staphylococcus aureus (Jahanfar, 2009; Osterman & Rahm, 2000) and less frequently *Streptococcus* or *Escherichia coli* (WHO, 2000). Although mastitis may be associated with *Candida albicans* that would likely be secondary to a bacterial infection, candidiasis is a fungal infection. Candidiasis may occur following antibiotic treatment for mastitis (*Protocol #15: Candidiasis (Thrush)*).

In addition to effective breast milk removal from the mother's breast, infectious mastitis may also need treatment with antibiotics. Antibiotics that are compatible for both the mother and baby are used whenever possible. A complete course of antibiotics is important to prevent recurrent mastitis (Osterman, 2000; Lawrence, 2011). Although the Cochrane Review did report a study that suggested more rapid symptom relief with antibiotics, its overall conclusion was that there is very little evidence of the effectiveness of antibiotic therapy, and there is an urgent need for high-quality double-blind randomized control trials (Jahanfar, 2009). An immediate referral to a primary health care provider is recommended. Delay may lead to prolonged or recurrent mastitis (Lawrence, 2011).

The composition of breast milk changes during a breast infection. There are cellular changes that increase the risk of vertical transmission of infection, particularly retroviruses (Michie et al., 2003). Anti-inflammatory components increase to protect the baby from mastitic milk (Buescher, 2001 in Riordan). The sodium content increases and the flavour may change. This may lead to a change in the baby's feeding behaviour.

- Mastitis commonly occurs in the first few weeks after birth; however, approximately a third of cases develop after six months.
- Mastitis presents a spectrum of symptoms (Barbosa-Cesnik, 2003), ranging from local inflammation, to systemic symptoms, to an abscess.
- Poorly managed mastitis may develop into an abscess. A small percentage of mothers with mastitis develop an abscess and will need to seek medical attention to remove the collection of pus.

Recurrent mastitis may be associated with breast cancer. Pregnancy associated breast cancer (PABC) occurs in a small percentage of women in the first year postpartum. It is important to refer the mother to her primary health care provider to evaluate for

possible breast cancer if there is recurrent mastitis or a plugged duct in the same area, febrile mastitis-like symptoms that are unresolved after antibiotic treatment, or a mass not decreasing after 72 hours of optimized breastfeeding management (Petok, 1995

in Lawrence, 2011). It is recommended that the breast be emptied prior to a diagnostic procedure (Lawrence, 2011).

- Continue breastfeeding.

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Protocol #8

Flat or Inverted Nipples



Protocol #8: Flat or Inverted Nipples

The best test for nipple protractility is done by the baby at the mother's breast.

Observation and Assessment

- There are a variety of nipple appearances and inversions. Some nipples appear to protrude but will invert when compressed, whereas others will appear to invert but will protrude when compressed.
- Neither visual assessment nor self-reporting of flat nipples is adequate to determine nipple protractility.
- The best test for nipple protractility is done by the baby at the mother's breast. If the baby is breastfeeding well there is no need for further intervention.
- Some practitioners may use the **nipple pinch test** to clarify if a nipple is flat or inverted: Gently compress the areola about 1 inch from the base of the nipple, placing the thumb on one side of the areola and the index finger on the opposite side.



Nipple Pinch Test

- Regardless of how the nipple performs during the nipple pinch test, it is important not to draw conclusions about the potential for breastfeeding success. Babies breastfeed, not nipple feed.
- Some mothers may doubt the functionality of their breasts because of variations in nipple appearance.

It is important to not make any statements to a mother about the suitability of her nipples for breastfeeding, as these may negatively affect her sense of breastfeeding self-efficacy. Language such as labelling a nipple as “flat” can similarly have negative effect on a mother’s self-efficacy. (See *General Principles*.)

Flat Nipple

Assess the mother for:

- A nipple that flattens when the nipple pinch test is done. The nipple may appear to be protruding, flat, or inverted before the test. A nipple that appears flat but protrudes with the nipple pinch test (or with cold or stimulation) is not truly a flat nipple. In this case, no special preparation is needed to draw out the nipple before breastfeeding.

Assess the baby for:

- A difficult latch and/or breast refusal.

Inverted Nipple

Assess the mother for:

- A nipple that inverts when the nipple pinch test is done. The mother's nipple may appear to be protruding, flat, or inverted before the test. A nipple that appears inverted but protrudes with the nipple pinch test, or with cold or stimulation, is not truly an inverted nipple. In this case, no special preparation is needed to draw out the nipple before breastfeeding.
- A decreased breast milk supply. A truly inverted nipple may have fewer breast milk ducts. In addition, the nipple ducts may collapse or become occluded due to areolar edema as a result of breast engorgement or high suction by the baby (Wilson-Clay, 2011).

Assess the baby for:

- A difficult latch and/or breast refusal.

Possible Contributing Causes or Factors

Flat or inverted nipples may have one or more possible causes.

Assess the mother for:

- An areola that is non-elastic and difficult to compress. This type of areola will make it more difficult for the baby to latch onto the mother's breast.
- An engorged areola that may flatten a normally protruding nipple. This is most likely the case if the mother did not have a flat nipple until after birth.

The following are additional explanations for flat or inverted nipples:

- Adhesions that connect the nipple to the inner breast tissue.
- Less dense connective tissue located beneath the nipple.
- History of breast surgery or nipple piercing.

Suggestions

- Assess for possible cause(s) of a flat or inverted nipple (see previous section on Possible Contributing Causes or factors).
- If the baby is unable to latch onto the mother's breast, refer to *Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch* to rule out any other cause(s) for the latch problem.
- If the baby is able to latch onto the mother's breast but is not sucking effectively, refer to *Protocol #10: Ineffective Suck*.
- Provide the mother with suggestions for breastfeeding with flat or inverted nipples.

Provide the following suggestions only if nipple flatness, lack of protrusion or inversion are interfering with breastfeeding.

Before breastfeeding, encourage the mother to:

1. Try to express some breast milk to soften the areola. She may wish to apply wet or dry heat to her breasts for a few minutes if the areola is difficult to compress. Heat may also be applied to the mother's back and shoulders. Heat may be applied with a warm wet towel or disposable diaper, a warm shower

or bath, a bowl of warm water, a heating pad on low, or a hot water bottle. To express breast milk, refer to *Protocol #19: Expressing and Storing Breast Milk*.

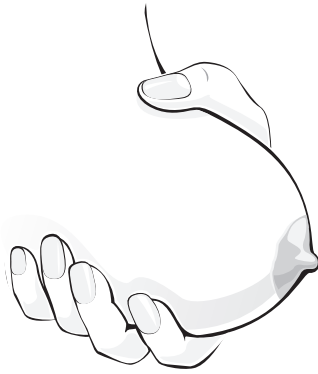
2. Try one of the following techniques to help the nipple to protrude:

- If the mother's nipple can be pulled out, grasp and roll the nipple between the thumb and index finger for a couple of minutes.
- Briefly touch the nipple with a damp, cold cloth for a few seconds to help it protrude and to reduce swelling. Avoid prolonged exposure to the cold cloth as this can inhibit the letdown reflex or cause tissue trauma.
- Use a breast pump immediately before feeding, just long enough to help draw out the nipple.

3. Try to promote areolar grasp with reverse pressure softening – For most women, gentle massage and expression are enough to soften a swollen areola. If these do not reduce the areolar edema it may help to try reverse pressure softening, as described by Cotterman (2004). Positive gentle pressure is applied by placing the fingertips around the base of the nipple to create a ring of “dimples”. This can reduce the swelling temporarily, enough to permit effective latching. It is best done with short nails and immediately before breastfeeding.

During breastfeeding, encourage the mother to:

- Express some breast milk onto her nipple and areola to entice the baby to latch.
- Try shaping her breast to create more definition to the nipple. Compress her breast and areola between two fingers and the thumb to provide as much nipple as possible. This is sometimes referred to as a “nipple sandwich” (Wiessinger, 1998).
- Use a “C” or “U” hold to support her breast and slightly apply pressure with the thumb and fingers, pulling back towards the chest to help the nipple to protrude when latching.



“C” hold

- Try gently pulling back on the breast tissue to create more nipple definition.
- Check for effective positioning and latching (*Protocol #2: Positioning and Latching*).
- Try using different positions to support the baby to achieve and maintain a deep latch, e.g., semi-reclined, football, or cross-cradle positions (*Protocol #2: Positioning and Latching*).

If the baby breastfeeds well on one breast but is unable to breastfeed on the other side, encourage the mother to:

- Continue to breastfeed on one breast, but offer the other breast. Then express from the other side after each breastfeeding. A rented hospital-grade electric breast pump is the most effective device for expressing and drawing out the nipple (*Protocol #19: Expressing and Storing Breast Milk*).
- Hold her baby skin-to-skin, with or without attempting to latch.

Refer to a breastfeeding expert or breastfeeding clinic for further assessment as soon as possible.

If in the rare case that both nipples are flat and or inverted and the baby is unable to breastfeed on either side, encourage the mother to:

- Begin to express regularly as soon as possible after birth and preferably within the first 6 hours after birth. Feed the baby with the expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, or finger feeding (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available, then an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

- Express each breast after each time that the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time, the mother will need to express each breast on a regular basis in order to maintain her breast milk supply. Generally, this should be at least 8 times a day in 24 hours, with a minimum of 1 expression overnight, to mimic a normal feeding pattern. The mother may need to express more often if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).
- Hold her baby skin-to-skin, with or without attempting to latch.
- Refer to a breastfeeding expert or breastfeeding clinic for further assessment.

If the mother continues to experience difficulties related to flat or inverted nipples, she may wish to consider the alternative strategies suggested below. Encourage her to:

- Understand the possible benefits and risks associated with the use of nipple shields if she inquires about using them for flat or inverted nipples. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
- Understand the possible benefits and risks associated with the use of breast shells if she inquires about using them for flat or inverted nipples. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
- Hold her baby skin-to-skin, with or without attempting to latch.
- Continue to follow strategies to optimize breastfeeding.

General Principles

Nipple protractility cannot be visually assessed (Wilson-Clay & Hoover, 2008). There are a variety of nipple appearances and inversions. Some nipples appear to protrude but will invert when compressed, whereas others appear to invert but will protrude when compressed.

Approximately 10% of pregnant women have flat or inverted nipples (Alexander et al., 1992). In many cases these nipple variations do not prevent the baby from breastfeeding effectively since the baby needs to latch onto the areola and not the nipple to

breastfeed. In addition, hormonal changes during pregnancy increase skin elasticity, which improves nipple protrusion. Most women will have good nipple protrusion by the end of their pregnancy. Generally, nipple protrusion improves with each pregnancy and breastfeeding experience.

Flat or inverted nipples are associated with sub-optimal early breastfeeding behaviour and with delayed onset of lactation (Dewey et al., 2003).

The baby may struggle at the mother's breast if he is unable to draw her nipple up and back into contact with the hard palate, interfering with the instinctive stimulus to suck (See *Suck Cycle* in *Protocol #3: Signs of Effective Breastfeeding*). The baby may also be frustrated if unable to create and sustain a seal, interfering with the ability to transfer breast milk and increasing the risk of low breast milk supply and low weight gain. It is important to offer early and ongoing assessment and support to optimize breastfeeding management as well as infant weight gain.

Compressing the mother's breast and areola between two fingers and thumb to stimulate a nipple helps to offer the baby as much breast as possible (Lawrence, 2011). Some women try the C hold described above. This has been described by Wiessinger using a "sandwich" analogy (Wiessinger, 1998). The mother holds her breast near the areolar border, with her fingers underneath and thumb on top of the breast. She presses in with the thumb and fingers while simultaneously pushing back towards the chest wall. This elongates and narrows the areola, giving the baby a "sandwich" or more breast tissue to latch onto.

Breast Shells – Breast shells are two-piece plastic devices that may be worn inside a bra over the nipple and areola. Women may wear them to improve nipple protractility by placing gentle pressure on the areola, which stretches and pushes the nipple forward (*Protocol #8: Flat or Inverted Nipples*). They may be worn with effect in the early weeks of breastfeeding, but prenatal use has been found to be ineffective (Alexander et al., 1992, MAIN Group, 1994). A wide-based shell may be worn to protect the tender nipple and areola from rubbing on a bra or clothing. Some mothers may use shells to relieve engorgement, worn about 20 minutes before feedings to redistribute fluid edema. Occasionally they may be marketed as a device for catching leaking breast milk between breastfeedings, although this is not recommended because of the risk of bacterial contamination

(Riordan, 2010). Some women may use them to collect leaking breast milk during a breastfeeding or pumping session.

The bra size should be bigger than the shell to avoid placing too much pressure on the delicate breast tissue. Such pressure increases the risk of plugged ducts. Shells should have multiple openings for air circulation to keep the skin from becoming softened or chapped. Although previously used to collect leaking breast milk and protect clothing, any breast milk collected should be discarded due to potential increased bacterial counts.

Nipple Shields – If the mother inquires about using a nipple shield to manage flat or inverted nipples, it is important to first explore with her any possible contributing factors related to flat or inverted nipples, as well as her breastfeeding self-efficacy related to her nipple shape. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage her flat or inverted nipples, and then offer suggestions to optimize basic breastfeeding management before adding further interventions such as nipple shields (see earlier discussion regarding management of flat or inverted nipples).

Although not the first strategy recommended to manage flat or inverted nipples, short-term use of the newer ultra-thin silicone shields has been positively associated with preserving the breastfeeding relationship while the dyad learns to breastfeed (Meier, 2000; Wilson-Clay, 1996). Although a recent review of the literature reported that the current evidence does not yet demonstrate safe practices for the use of nipple shields (McKechnie et al., 2010), expert practitioners continue to report the use of nipple shields as a possible strategy to bring babies to the mother's breast who might otherwise refuse the breast. Reasons for refusal may include flat or inverted nipples, prematurity, and/or imprinting (*Protocol #4: Sore Nipples; Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch; Protocol #10: Ineffective Suck*). Nipple shields may provide temporary relief for a mother who is stressed or overwhelmed and prevent the introduction of a bottle, if she is supported appropriately by a lactation expert (Lauwers et al., 2011). Some mothers may wish to use nipple shields for longer periods; these dyads should be periodically reassessed. Lawrence advises against the use of a makeshift

shield; nor should shields be altered for use.

A nipple shield is an artificial nipple and areola shaped like a floppy sun hat and made of a synthetic material like silicone. Some women may have success placing one of the newer ultra-thin silicone nipple shields over the breast to facilitate latching and sucking. This has the potential to stimulate the baby's hard palate and thereby elicit the sucking reflex. It may be a familiar stimulus to coax a baby to the mother's breast who has already imprinted preferentially on the supernormal stimulus of an artificial nipple (Wilson-Clay et al., 2008).

Historically, there has been mixed evidence reported about nipple shields. Use of the older rubber or latex shields was associated with concerns of inadequate intake of breast milk that resulted in slow weight gain or failure to thrive (Woolridge, et al. 1980). Recent evidence has demonstrated weight gain to be similar over 2 months in babies fed with shields compared with babies fed without shields (Chertock, 2009).

To apply a nipple shield, it is important to use the correct fit and size. If the teat is too long for the baby's mouth it can cause gagging, but if it is too small it may not stimulate active sucking (Mohrbacher, 2010). The teat opening needs to be large enough to accommodate the mother's nipple comfortably; if it is too small it can slow the flow of breast milk or create friction and sore nipples. Lauwers recommends starting with the smallest shield that accommodates both the baby's mouth and the mother's nipple. Wilson-Clay advises matching the shield size to the baby's mouth, selecting the shortest available teat with the smallest base diameter (Wilson-Clay, 2011).

Clinicians and mothers may try varying methods to directly apply the shield. In one, the mother holds the rim of the shield between her thumb and fingers. Stretching the shield at the junction of the nipple and areola, she places the stretched shield over her nipple and releases the tension. As it releases and the shield returns to its normal shape, it draws the mother's nipple into the nipple cavity of the shield before the baby begins to suck. Some mothers may turn the top half of the shield inside out before placing it over the nipple. It is important to follow the manufacturer's instructions related to care and cleaning of the nipple shield. (For further information see *Wilson-Clay, 2011, Lauwers, 2011, and Genna, 2008*)

Nipple shields should not be the first strategy

recommended to manage flat or inverted nipples, and they should only be initiated by a health care provider who has the breastfeeding expertise to thoroughly assess the potential effectiveness and risks of use for that breastfeeding dyad. The practitioner is also responsible for establishing a plan with the mother for the ongoing management and evaluation of the intervention. Practitioners who do not have the capacity, i.e., lactation expertise or time, to continue to support the dyad appropriately should refer the mother to a lactation expert or breastfeeding clinic. The baby's weight gain and the mother's breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of breastfeeding and the infant's intake of breast milk, plus a plan for re-establishment of feeding at the breast.

No Prenatal Intervention – Previously, it was a common practice to encourage women with inverted nipples to wear breast shells or perform nipple exercises prenatally to draw out the nipple. Breastfeeding experts no longer recommend these practices. They have not proven to be effective and may damage a mother's confidence in her ability to breastfeed (Alexander et al., 1992; MAIN Group, 1994). As well, nipple exercises can damage delicate breast tissue and may stimulate uterine contractions during pregnancy. Emphasis is now being placed on providing pregnant women with information about proper positioning and latching techniques as well as getting skilled breastfeeding assistance in the early weeks after birth.

Mothers and practitioners have been creative over the years in trying to promote nipple eversion. In addition to the interventions described above, there are a variety of techniques described in the literature to promote nipple eversion, including application of inverted syringes, both home-made and commercial versions, rubber bands (Chakrabarti et al., 2011), and surgery. For further information see Lauwers (2011), Wilson-Clay (2008), Lawrence (2011) and Walker (2011). There is limited scientific research to support the use of these strategies. If a mother inquires about using these interventions, refer her to a lactation consultant or breastfeeding clinic for further assessment and support.

Breastfeeding self-efficacy is the confidence that a mother has in her ability to breastfeed her infant (Dennis, 1999). The mother must believe that she is capable of implementing any information or strategies that might be suggested (Bowles, 2011).

Many flat or inverted nipples will resolve before the end of pregnancy with no intervention, or may be resolved over time by the baby latching and sucking. For any intervention that is suggested, it is important to consider the mother's breastfeeding goals, her capacity to manage the intervention, the

baby's capacity to continue, how long it may take, and whether the baby can be kept at the mother's breast until the nipples evert, as well as how the baby will be fed in the meantime (*adapted from Wilson-Clay, 2008*).

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Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch



Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch

Breast refusal or difficulty achieving a latch can occur at any stage of breastfeeding and is not limited only to the early weeks of birth.

Observation and Assessment

Assess the baby for:

- Repeated inability to achieve or maintain a latch.
- Pushing away from the mother's breast with arms and legs.
- Arching and crying when brought to the mother's breast.
- Latching and sucking a few times, then letting the nipple slide out of the mouth.
- Refusal of one or both breasts.

Possible Contributing Factors or Causes

- Breast refusal or difficulty achieving a latch may be mother and/or baby related.

Early Breast Refusal

1. If the baby began refusing the mother's breast in the first 1–2 days after birth,

Assess the mother for:

- Ineffective positioning and latching techniques (*Protocol #2: Positioning and Latching*).
- Flat or inverted nipples, especially with a hard and non-compressible areola (*Protocol #8: Flat or Inverted Nipples*).
- Long or elongated nipples, especially if the baby is small.
- Birth interventions, trauma or stress that may delay Lactogenesis II or interfere with breast milk production, e.g., caesarean delivery, lengthy labour, intravenous therapy, pain (*Protocol #10: Ineffective Suck*).
- Breast edema related to intravenous therapy in labour.

Assess the baby for:

- Birth interventions, trauma, stress, and medications, e.g., bruising from a forceps or vacuum extraction

delivery, nerve damage related to birth injury, anaesthesia, intravenous therapy, lengthy labour.

- Medical condition, e.g., jaundice, dehydration, hypoglycemia, sepsis.
- Neurological conditions affecting muscle tone, e.g., hypertonia, hypotonia, prematurity.
- Abnormal nasal, oral, or facial structure, e.g., narrowing or blockage of the nasal airway (choanal atresia), cleft lip/palate, other alterations in palatal structure, receding chin.
- Abnormal tongue, e.g., ankyloglossia, large or short tongue, tongue curling up to the roof of the mouth, tongue thrusting, decreased tongue peristalsis. With an abnormal tongue, the tongue may not be able to extend past the lower gumline and cup the areola during breastfeeding. This can be assessed by pulling back slightly on the baby's lower lip when the baby is at the mother's breast. There may also be dimpling of the cheeks or clicking/smacking sounds when the baby sucks. Any of these signs would indicate a latching or sucking problem due to the incorrect use of the tongue during breastfeeding (*Protocol #10: Ineffective Suck*).

- Swaddling that entraps the baby's hands and interferes with the baby's instinctive behaviours in finding the breast, triggering letdown and latching.

2. If the baby began refusing the mother's breast between the age of 2–4 days old,

Assess the mother for:

- Engorgement (*Protocol #5: Engorgement*).
- Breast edema related to intravenous therapy in labour.
- Birth interventions, trauma or stress that may delay Lactogenesis II or interfere with breast milk production, e.g., caesarean delivery, lengthy labour, intravenous therapy, pain (*Protocol #10: Ineffective Suck*).

- Forceful letdown or breast milk ejection reflex (*Protocol #13: Overabundant Breast Milk Supply/ Forceful Letdown or Breast Milk Ejection Reflex*).
- Delayed letdown reflex.
- Inappropriate parental response to infant behaviour and feeding cues.
- Stress.

Assess the baby for:

- Medical conditions, e.g., jaundice, hypoglycemia, sepsis.
- Swaddling that entraps the baby’s hands and interferes with the baby’s instinctive behaviours in finding the breast, triggering letdown and latching.

Later Breast Refusal

3. If the baby began refusing the mother’s breast between the age of 1–4 weeks old,

Assess the mother for:

- Forceful letdown or breast milk ejection reflex (*Protocol #13: Overabundant Breast Milk Supply/ Forceful Letdown or Breast Milk Ejection Reflex*).
- Delayed letdown or breast milk ejection reflex.
- Decreased breast milk supply.
- Missing or ignoring the baby’s feeding cues.
- Change in the taste of her breast milk, from onset of menses, mastitis, medications, nipple creams, exercise, smoking, previously frozen breast milk, or consumption by the mother of new or strongly flavoured foods that the baby may dislike. Strongly flavoured foods may temporarily cause a baby to refuse the mother’s breast. The baby usually returns to the mother’s breast by 24 hours after the ingestion of the food (Lawrence, 2011). Most babies will accept a variety of flavours.
- Ingestion of a food or drug that the baby may be sensitive to, e.g., cow’s milk, cigarette smoke, caffeine, or other drugs (see *Protocol #11: Crying and Colic in the Breastfed Baby* for information regarding sensitivity to cow’s milk or cigarette smoke, and *Protocol #16: Drugs and Breastfeeding* for information regarding caffeine and other drugs).
- Stress – feeling overwhelmed, experiencing coping difficulties related to possible postpartum adjustment and/or breastfeeding difficulties.

Assess the baby for:

- Preference for an artificial nipple, i.e., nipple confusion when the baby has imprinted preferentially on the stimulus of an artificial nipple.
 - Finger feeding and if the baby has imprinted preferentially on the stimulus of the finger.
 - Medical conditions, e.g., jaundice, candidiasis, ear infection, dehydration, hypoglycemia, sepsis.
 - Swaddling that entraps the baby’s hands and interferes with the baby’s instinctive behaviours in finding the breast, triggering letdown and latching.
4. If the baby began refusing the mother’s breast after the age of 1 month,

Assess the mother for:

- Overly rigorous attempts to breastfeed the baby on a schedule and ignoring the baby’s feeding cues.
- Decreased breast milk supply, due to regular bottle supplements, offering other foods or fluids before 6 months of age, medications (*Protocol #12: Insufficient Breast Milk Supply*).
- Missing or ignoring the baby’s feeding cues.
- Forceful letdown reflex (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Refle*).
- Use of a new soap, shampoo, hair spray, perfume, detergent, or other products that the baby may dislike or be sensitive to.
- Change in the taste of her breast milk from the onset of menses, mastitis, medications, nipple creams, exercise, smoking, or new or strongly flavoured foods that the baby may dislike. Strongly flavoured foods may cause a baby to temporarily refuse the mother’s breast. The baby usually returns to the mother’s breast by 24 hours after the ingestion of the food. Most babies will accept a variety of flavours.
- Ingestion of a food or drug that the baby may be sensitive to, e.g., cow’s milk, cigarette smoke, caffeine, or other drugs (*Protocol #11: Crying and Colic in the Breastfed Baby* for information regarding sensitivity to cow’s milk or cigarette smoke, and *Protocol #16: Drugs and Breastfeeding* for information regarding caffeine and other drugs).
- Pregnancy.

- The baby biting when the mother has responded by screaming at or startling the baby.
- Stress, emotional distress, feeling overwhelmed or experiencing coping difficulties related to possible postpartum adjustment or inadequate support.

Assess the baby for:

- Medical conditions, e.g., candidiasis, ear infection, gastroesophageal reflux.
- Oral discomforts, e.g., teething, cold sores.
- Discomfort when being held, after an injection or injury.
- Distractibility due to developmental changes; at 4–5 months babies may turn away from the mother’s breast because they are developmentally more interested in looking at their surroundings.
- Emotional upsets, stress, or overstimulation, e.g., radical changes in daily routines, family crisis, baby frequently left to cry.

Suggestions

1. Assess for possible cause(s) of breast refusal or difficulty latching (see previous section on Possible Contributing Factors or Causes).

- The baby will need to be assessed by a primary health care provider for any possible medical condition, e.g., jaundice, candidiasis, ear infection, hypertonia/hypotonia, cleft lip/palate, tight frenulum.
- If the mother’s breasts are engorged, refer to *Protocol #5: Engorgement*.
- If the mother’s nipple is flat or inverted, refer to *Protocol #8: Flat or Inverted Nipples*.
- If the mother has a forceful letdown reflex, refer to *Protocol #13: Overabundant Breast Milk Supply/ Forceful Letdown or Breast Milk Ejection Reflex*.
- If the baby is showing signs of incorrect tongue use during breastfeeding, refer to *Protocol #10: Ineffective Suck* for information on suck assessment and management, e.g., tongue does not extend past the lower gumline and does not cup the areola, dimpling of the cheeks, or clicking/smacking sounds when the baby sucks.
- If a tight frenulum is suspected and all other possible causes have been ruled out or corrected, the baby should be medically assessed to determine whether the frenulum needs to be clipped (frenotomy).

2. Provide the mother with suggestions to help persuade the baby to take her breast.

Before breastfeeding, encourage the mother to:

- Breastfeed in a quiet, relaxed place where she can be comfortable and well supported.
- Initiate breastfeeding before the baby is overly hungry or frantically crying. Breastfeed early when the baby is beginning to show early feeding cues and is calm, e.g., rapid eye movements under the eyelids, sucking/licking, hands to mouth, increased body movements, and making small sounds.
- Clothe the baby only in a diaper when breastfeeding to promote skin-to-skin contact (*Protocol #1: The Initiation of Breastfeeding*).
- Ensure that the baby is calm before each attempt to latch.
- Support the baby in a vertical position, chest-to-chest, with nose at the level of the mother’s nipple, to facilitate the normal neonatal reflexes and baby-led self-attachment behaviours.
- Ensure that the letdown or breast milk ejection reflex is initiated. The natural stimuli for letdown are the baby’s rooting, sucking, and hand movements at the mother’s breast. If necessary, she may try using one of the following techniques:
 - Apply heat to her back and shoulders for comfort and relaxation.
 - Gently massage the breasts while applying moist or dry heat to her breasts for a few minutes or until the letdown reflex occurs. Heat may be applied with a warm wet towel or disposable diaper, a warm shower or bath, a bowl of warm water, a heating pad on low, or a hot water bottle. Then express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
 - Gently roll the nipples between the index finger and thumb for a few minutes or until the letdown or breast milk ejection reflex occurs. Then express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Try using reverse pressure massage to move some of the fluid away from the areola if there is breast or areolar edema (*Protocol #5: Engorgement*).

During breastfeeding, encourage the mother to:

- Use effective positioning and latching techniques (*Protocol #2: Positioning and Latching*).
- Try different breastfeeding positions. Some babies may prefer certain positions.

The football, cross-cradle, or biological nurturing positions may be particularly effective for latching the baby onto the mother's breast as they provide better support for the baby's neck and shoulders. When using the cross-cradle position, suggest that the mother try supporting her breast in the "U" hold instead of the "C" hold when latching the baby. Using the "U" hold with this position may help to make latching easier. See diagram of the "U" hold (*without* the index finger and thumbs bent slightly forward).

- Express some breast milk onto the mother's nipple to entice the baby to take her breast (*Protocol #19: Expressing and Storing Breast Milk*).
- Try breastfeeding in motion. Some babies accept the breast if the mother is moving, e.g., walking, rocking (Mohrbacher, 2010).
- Avoid stroking the baby's face after the baby is latched as this may elicit the rooting reflex and cause the baby to turn away from the mother's breast.
- Try the slide-over technique if the baby is able to breastfeed in the cross-cradle position on one breast but refuses the other side (Mohrbacher, 2010) i.e., after breastfeeding in the cross-cradle or cradle position on one breast, suggest the mother slide the baby over to the other breast without changing the side that the baby is lying on.
- Try the Dancer hand-hold position if the baby is able to achieve but not maintain a latch, (for babies with low muscle tone or weak muscle development).

For the Dancer hand-hold position, the baby is held in an upright sitting position facing the mother's breast. The mother first supports her breast in a variation of the "U" hold and brings her hand forward to support her breast with the first three fingers. She supports the baby's chin in the area of her hand between her thumb and index finger. See diagram of "U" hold. The mother then bends her index finger slightly so that it gently holds the baby's cheek on one side, while her thumb shields the other cheek. The mother uses gentle, steady, equal pressure

while holding her baby's cheeks to avoid triggering the rooting reflex. This will provide steady support to the baby's jaws and chin to help maintain the latch (Lauwers & Swisher, 2011).



"U" hold with index finger and thumb slightly bent forward



Dancer hand-hold position

If the baby continues to have difficulty latching onto the mother's breast after trying the above suggestions, encourage the mother to:

- Have someone drip expressed breast milk from a clean eyedropper, spoon, or syringe onto her nipple or in the corner of the baby's mouth while latching the baby to her breast.
- Consider use of a lactation aid on her breast, using expressed breast milk, if the baby is still unable to

maintain a latch (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available, an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

- Consider offering expressed breast milk using another alternative feeding method, e.g., cup, spoon, syringe, or finger feeding (*Protocol #18: Alternative Feeding Methods*) if the baby is unable to latch using the lactation aid on the mother's breast. If expressed breast milk is not available, an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Understand the possible benefits and risks associated with the use of a nipple shield if she inquires about using them for breast refusal or difficulty achieving a latch. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
- Express each breast on a regular basis if breastfeeding is stopped for any length of time. Generally this is at least 8 times in 24 hours, with a minimum of 1 expression overnight, to mimic a normal feeding pattern. The mother may need to express more often if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).
- Continue to follow strategies to optimize breastfeeding.
- Hold her baby skin-to-skin, with or without attempting to latch.

A referral to a breastfeeding expert or breastfeeding clinic is recommended as soon as possible.

General Principles

Optimizing breastfeeding by following the principles of early and frequent feeding, feeding when the baby is calm and showing early feeding cues, ensuring effective positioning and latching techniques that include baby-led latching and skin-to-skin contact, and finishing the first breast first (Renfrew et al., 2004), will often prevent or help a mother to manage a latching difficulty or breast refusal before it becomes a chronic situation.

The mother may feel frustrated, rejected and/or inadequate when her baby refuses her breast. She

will need support and encouragement to continue breastfeeding and to not take the baby's behaviour personally.

Breast refusal or difficulty achieving a latch can occur at any stage of breastfeeding and is not limited only to the early weeks after birth. The baby may have been breastfeeding well for a length of time and then suddenly refuse one or both breasts for no apparent reason; however, this is rare. The baby's age and the circumstances under which the baby begins to refuse the mother's breast can be helpful clues for determining the cause of breast refusal.

Birth Interventions and Breast Refusal or Difficult Achieving a Latch

– The events experienced during birth can impact the breastfeeding process. The normal mechanical forces of labour on the cranial nerves and facial muscles can affect the baby's comfort and ability to achieve a latch, as well as his ability to suck, swallow and transfer breast milk, a situation that may be further complicated by forceps, vacuum, and surgical interventions (Smith, 2010 & 2007). A long labour can be stressful and tiring for both mother and baby, and may be associated with interventions such as intravenous hydration, analgesia, epidurals and instrumental deliveries. Caesarean deliveries may lead to stress and pain, as well as separation of mother and baby. IV fluids may be associated with breast or areolar edema, which can make it difficult for a baby to latch, although research has yet to establish the degree of association (Smith, 2010). Pain is stressful and can interfere with the mother's comfort as well as breast milk production (see *How the Breast Works*). Although research has not yet established a direct link between specific medications used for intrapartum pain management and breastfeeding initiation, practitioners continue to question whether medication may affect the baby's capacity to suck effectively. In addition, it is important to consider the impact of the birth process on the mother's breastfeeding self-efficacy.

- **Ankyloglossia (Tongue-Tie)** – A short or tight lingual frenulum can restrict infant tongue movement and may lead to breastfeeding difficulties. Although it may sometimes be associated with speech difficulties, the effect on speech has not been clearly determined (Lalakea et al., 2003). There are many variations in degree of tightness, amount and type of movement. Coryllos

describes four types of tongue-tie, ranging from the frenulum attached to the tongue tip; attached behind the tongue tip at the alveolar ridge; attached to the mid-tongue and mid-floor of the mouth; and attached at the back of the tongue (Coryllos et al., 2004). There may be a congenital association.

- There may be difficulty achieving a deep latch if the baby's tongue is unable to reach back towards the soft palate junction.
- Nipple pain and damage may occur if the tip of the baby's tongue rubs the hard palate and/or from reflexive biting.
- There may also be breast refusal and difficulty maintaining the latch.
- If the tongue has difficulty cupping the mother's breast, the infant may have difficulty managing a bolus of breast milk, putting the infant at risk of insufficient milk intake and poor weight gain.

Management is not straightforward. Disagreement may occur among health care providers regarding the management of ankyloglossia as there are many ways to describe and define ankyloglossia. In addition to Coryllos above, Walker includes descriptions of several assessment and management approaches (2011). Conservative management may be possible for breastfeeding with tongue-tie, depending on the degree of tongue movement and pain, through offering assessment and support to facilitate optimal positioning and latching (*Protocol #2: Positioning and Latching*).

- If the mother feels unable to continue breastfeeding due to persistent pain, and/or if the baby is at risk of insufficient breast milk intake and poor weight gain related to breast refusal or difficulty latching, refer to assess for a possible frenotomy (surgical clipping or snipping to release the frenulum) may be considered to relieve pain, and facilitate effective latching and breastfeeding. Geddes et al. reported less nipple compression post-frenotomy, associated with improved breastfeeding outcomes, better latching and breast milk transfer, and less maternal pain (2008).
 - Refer to a primary health care provider for further assessment. Not all cases of ankyloglossia will be assessed as appropriate for frenotomy, depending on the degree of tongue movement, infant well-being and breastfeeding difficulty, as well as access to a

paediatrician who performs frenotomies.

(*Protocol #2: Positioning and Latching; Protocol #10: Ineffective Suck; Protocol #12: Insufficient Breast Milk Supply*)

Nipple Shields – If the mother inquires about using a nipple shield to manage breast refusal or difficulty achieving or maintaining a latch, it is important to first explore with her any possible contributing factors related to the difficulty in achieving or maintaining a latch, as well as her breastfeeding self-efficacy related to the breast refusal or latching difficulties. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage the difficulty in achieving or maintaining a latch, and then to offer suggestions to optimize basic breastfeeding management before adding further interventions such as nipple shields (see earlier discussion regarding management of flat or inverted nipples).

Although not the first strategy recommended to manage difficulty achieving or maintaining a latch, short-term use of the newer ultra-thin silicone shields has been positively associated with preserving the breastfeeding relationship while the pair learns to breastfeed (Meier, 2000; Wilson-Clay, 1996). Although a recent review of the literature reported that the current evidence does not yet demonstrate safe practices for the use of nipple shields (McKechnie et al., 2010), expert practitioners continue to report the use of nipple shields as a possible strategy to bring babies to the mother's breast who might otherwise refuse her breast. Causes for refusal may include flat or inverted nipples, prematurity, neuromuscular issues and/or imprinting (*Protocol #4: Sore Nipples; Protocol #8: Flat or Inverted Nipples; Protocol #10: Ineffective Suck*). Nipple shields may provide temporary relief for a mother who is stressed or overwhelmed and prevent introduction of bottle feeding, if she is supported appropriately by a lactation expert (Lauwers et al., 2011). Some mothers may wish to use nipple shields for longer periods; these situations should be periodically reassessed. Lawrence advises against use of a makeshift shield; nor should shields be altered for use.

A nipple shield is an artificial nipple and areola shaped like a floppy sun hat and made of a synthetic material like silicone. Some women may have success placing one of the newer ultra-thin silicone nipple shields over the breast to facilitate latching

and sucking. This has the potential to stimulate the baby's hard palate and thereby elicit the sucking reflex. It may be a familiar stimulus to coax a baby to the mother's breast who has already imprinted preferentially on the supernormal stimulus of an artificial nipple (Wilson-Clay et al., 2008).

Historically, there has been mixed evidence reported about nipple shields. Use of the older rubber or latex shields was associated with concerns of inadequate intake of breast milk that resulted in slow weight gain or failure to thrive (Woolridge, 1980). Recent evidence has demonstrated weight gain to be similar over 2 months in babies fed with shields as for babies fed without shields (Chertock, 2009).

To apply a nipple shield, it is important to use the correct fit and size. If the teat is too long for the baby's mouth it can cause gagging, but if it is too small it may not stimulate active sucking (Mohrbacher, 2010). The teat opening needs to be large enough to accommodate the mother's nipple comfortably; if it is too small it can slow the flow of breast milk or may create friction and sore nipples. Lauwers recommends starting with the smallest shield that accommodates both the baby's mouth and the mother's nipple. Wilson-Clay advises matching the shield size to the baby's mouth, and selecting the shortest available teat with the smallest base diameter (2008).

Clinicians and mothers may try varying methods to directly apply the shield. In one, the mother holds the rim of the shield between her thumb and fingers. Stretching the shield at the junction of the nipple and areola, she places the stretched shield over her nipple and releases the tension. As it releases and the shield returns to its normal shape, it draws the mother's nipple into the nipple cavity of the shield before the baby begins to suck. Some mothers may turn the top half of the shield inside out before placing it over the nipple. It is important to follow the manufacturer's instructions related to care and cleaning of the nipple shield. For further information see *Wilson-Clay, 2008, Lauwers, 2011, and Genna, 2008*.

Nipple shields should not be the first strategy recommended to manage flat or inverted nipples and they should only be initiated by a health care provider who has the breastfeeding expertise to thoroughly assess the potential effectiveness and risks of use for that breastfeeding dyad. The practitioner is also

responsible for establishing a plan with the mother for the ongoing management and evaluation of the intervention. Practitioners who do not have the capacity, i.e., lactation expertise or time, to continue to support the dyad appropriately should refer the mother to a lactation expert or breastfeeding clinic. The baby's weight gain and the mother's breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of breastfeeding and the infant's intake of breast milk, plus a plan for re-establishment of feeding at the breast.

Flavours in Breast Milk – Mothers may be quick to blame breast refusal on something they have eaten or done. In fact, most babies will accept a variety of flavours in their mother's breast milk, reflecting the mothers' dietary choices (Beauchamp et al., 2011). Flavours from the mother's diet are transmitted to the amniotic fluid prenatally and later to breast milk. Mennella et al. (2001) suggest that prenatal flavour experiences enhance the acceptance and enjoyment of similar flavours after birth. Pregnancy, changes in sodium content related to mastitis, or elevated lactic acid levels related to exercise may also temporarily change the taste of breast milk. However, Wallace et al. (2002) found that moderate or high-intensity exercise did not impede infant acceptance of breast milk when consumed an hour post-exercise.

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Protocol #10

Ineffective Suck



Protocol #10: Ineffective Suck

An ineffective suck is usually related to two general problem areas: attachment (position and latch) or a sucking problem.

Observation and Assessment

Assess the mother for:

- Little or no pulling sensation on the mother's breast when the baby sucks despite effective positioning and latching.
- Pain throughout the entire breastfeeding despite effective positioning and latching (*Protocol #2: Positioning and Latching, Protocol #15: Candidiasis (Thrush)*).
- Persistent sore nipples and/or frequent plugged ducts despite effective positioning and latching (*Protocol #4: Sore Nipples, Protocol #6: Plugged Ducts*).
- Mastitis despite effective positioning and latching (*Protocol #7: Mastitis*).
- Unrelieved engorgement lasting more than 48 hours, followed by a rapid reduction of the mother's breast milk supply.

Assess the baby for:

- Quick and shallow sucks with excessive pauses, not changing to slow and deep sucks, demonstrating mostly non-nutritive sucking (*Protocol #3: Signs of Effective Breastfeeding*).
- Few or no swallowing sounds, i.e., swallowing should sound like a quietly exhaled "kaa, kaa, kaa".
- Clicking or smacking sounds when sucking.
- Dimpling of the cheeks when sucking.
- Fluttering of the chin or chin not pressed into the mother's breast.
- Eyes that remain closed during the entire breastfeeding.
- Sleepiness at the mother's breast, fussiness, frequent and/or long breastfeedings without signs of effective breast milk transfer.
- Inadequate output and/or weight gain (*Protocol #3: Signs of Effective Breastfeeding*).

- Visually assess the infant's sucking and mouth movements. It may be helpful to adjust the baby's position in order to stimulate the baby to open his mouth and optimize visualization of the baby's mouth.

Possible Contributing Factors or Causes

An ineffective suck may have one or more underlying causes that may be mother and/or baby related.

Assess the mother for:

- Ineffective positioning and latching techniques (*Protocol #2: Positioning and Latching*).
- Decreased breast milk supply (*Protocol #12: Insufficient Breast Milk Supply*).
- Overabundant breast milk supply (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).
- Delayed letdown or breast milk ejection reflex.
- Forceful letdown reflex (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).
- Engorgement (*Protocol #5: Engorgement*).

Assess the baby for:

- Overheating due to being overdressed or the room temperature being set too high.
- Birth interventions, trauma, stress and medications, e.g., caesarean section, bruising from forceps or vacuum delivery, anesthesia, intravenous therapy, lengthy labour.
- Sleepiness possibly related to jaundice.
- Medical conditions, e.g., jaundice, dehydration, hypoglycemia, sepsis, candidiasis, genetic anomalies.
- Neurological conditions affecting muscle tone, e.g., hypertonia, hypotonia, developmental immaturity in

preterm and/or almost term birth.

- Abnormal nasal, oral, or facial structure, e.g., narrowing or blockage of the nasal airway (choanal atresia), cleft lip/palate or other alterations in palatal structure, receding chin.
- Abnormal tongue, e.g., ankyloglossia, large or short tongue, tongue curling up to the roof of the mouth, tongue sucking/thrusting, decreased tongue peristalsis (*Protocol #9: Breast Refusal or Difficulty Achieving and Maintaining a Latch*).
- An abnormal tongue may not be able to extend past the lower gumline and cup the areola during breastfeeding. This can be assessed by slightly pulling back on the baby's lower lip when the baby is at the mother's breast. There may also be dimpling of the cheeks or clicking/smacking sounds when the baby sucks.
- Preference for sucking on an artificial nipple, e.g., nipple confusion or imprinting (*Protocol #1: The Initiation of Breastfeeding*).

Suggestions

The Baby-Friendly Initiative recommends that wherever possible, breastfeeding support is offered “hands-off” (BFI Appendix 5.1, BCC, 2011). As the goal is for mothers to be able to latch their babies independently, it is important for practitioners to request permission to touch the mother or baby and to take a hands-off approach as much as is possible. Hands-on is only used after asking permission and when additional help is necessary (BCC, 2011).

1. Assess for possible cause(s) of the ineffective suck (see the previous section on *Possible Contributing Factors or Causes*). The baby will need to be assessed by a primary health care provider for any medical condition, e.g., jaundice, dehydration, hypertonia/hypotonia, cleft lip/palate, ankyloglossia.
2. Provide the mother with suggestions to help the baby suck effectively.

Foundational (Non-Invasive) Suggestions

Before breastfeeding, encourage the mother to:

- Breastfeed early and frequently whenever the baby is showing early feeding cues (e.g., rapid eye movements under the eyelids as the baby begins to wake, sucking/licking, hands to mouth, increased body movements and making small sounds).

- Breastfeed when the baby is calm, before the baby gets too hungry and cries. A ravenous baby may latch more vigorously and initiate a more active letdown reflex and/or lead to sore nipples.
- Clothe the baby in a diaper only when breastfeeding to promote skin-to-skin contact.
- Support the baby's back in a vertical chest-to-chest position, with the nose approaching the mother's nipple to facilitate the normal neonatal reflexes and self-attachment behaviours.
- Lightly brush the baby's lips with her nipple to encourage the baby's mouth to open wide and to help bring out the baby's tongue over the lower gumline when latching.
- Try expressing some breast milk and dripping expressed breast milk onto the mother's breast to encourage the baby's mouth to open wide.

During breastfeeding, encourage the mother to:

- Check that the baby is effectively positioned and latched (*Protocol #2: Positioning and Latching*).
- Breastfeed in a calm and quiet environment.
- Avoid overheating the baby, e.g., overdressing the baby or setting the room temperature too high.
- Clothe the baby only in a diaper when breastfeeding to promote skin-to-skin contact.
- Use techniques to help wake a sleepy baby, e.g. gently massage the baby's back and feet, gently sit the baby up, talk to the baby, change the baby's diaper.
- Use breast compressions to help increase sucking and swallowing (*Protocol #5: Engorgement*).
- Try alternate breast massage – alternating massage at the base of the breast with the baby's bursts of sucking (Bowles et al., 1988).

If the baby is still sucking ineffectively, encourage the mother to:

- Express each breast on a regular basis if breastfeeding is stopped for any length of time. Generally this should be at least 8 times a day, with a minimum of 1 expression overnight, to mimic the normal infant feeding pattern. The mother may need to express more often if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with expressed breast milk using

an alternative feeding method, e.g., spoon, cup, syringe, finger feeding, or lactation aid on the mother's breast (*Protocol #18: Alternative Feeding Methods*).

- Using a lactation aid on the mother's breast is recommended if the baby is able to latch and make a seal, because the baby is feeding on the mother's breast while receiving the expressed breast milk. This technique also provides stimulation to the mother's breasts. If expressed breast milk is not available, an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*). A referral to a breastfeeding expert or breastfeeding clinic is recommended for further assessment as soon as possible.
- Understand the possible benefits and risks associated with the use of nipple shields if she inquires about using them for managing an ineffective suck. Offer further assessment and refer for further support as needed (see notes in *General Principles*).

If the baby is still not sucking effectively after trying the foundational suggestions above, further assessment is recommended.

- If it is assessed that the baby has more significant sucking difficulties or may need suck evaluation and therapy, refer the mother to a primary care provider, a breastfeeding expert with specific training in oral-motor evaluation and therapy or, breastfeeding clinic for further assessment. A parent may be taught to use interventions such as mouth and tongue exercises if she or he is assessed to have the capacity to use them appropriately. Strategies may be initiated depending on the parent's level of comfort with the interventions but only by practitioners who have specific training in oral-motor evaluation and therapy, e.g., a speech pathologist, occupational therapist and/or paediatrician. (see also *General Principles*).
- Support the parent to make an informed decision, understanding the possible benefits and risks of the proposed intervention.

Support the mother in understanding that:

- These interventions have the potential to be invasive and may overwhelm a baby, or lead to further resistance unless the baby's cues are respected.

- These suggestions follow a sequence of increasing degrees of intervention and invasiveness.

Minimal Level Intervention Suggestions

- Wash the hands and ensure that the nails are clean and trimmed.
- A parent who has been taught by an oral-motor expert may place a clean index finger in the baby's mouth to pacify him or to initiate rhythmic sucking.
- Use a supplemental feeding device either at the mother's breast or finger feeding to help ensure that the baby is getting adequate calories and fluid intake (*Protocol #18: Alternative Feeding Methods*).

Moderate Level Intervention Suggestions

- Wash the hands and ensure that the nails are clean and trimmed.
- A practitioner specifically trained in oral-motor evaluation places a gloved index finger in the baby's mouth to assess the oral cavity and the suck, after obtaining parental permission.
- Use a supplemental feeding device to offer adequate calories and fluid intake (*Protocol #18: Alternative Feeding Methods*).
- Place finger pad-side up into the baby's mouth. Slight pressure is placed on the middle of the tongue while pulling the finger out slowly to encourage the baby to suck it back in.
(Adapted from Lauwers, 2011)

Higher Level Intervention Suggestions

- Wash the hands and ensure that the nails are clean and trimmed.
- Expert practitioners may recommend mouth and tongue exercises to promote effective sucking. These can be enjoyable for both parent and baby.
- Support the family to follow instructions taught by an oral-motor expert.
- A practitioner who specifically initiates the use of these interventions is responsible for assessing effectiveness and risks. The practitioner is also responsible for the ongoing management and evaluation of that intervention (see *General Principles* for information regarding possible tongue exercises).

General Principles

Optimize breastfeeding by following the principles of early and frequent feeding, breastfeeding when the baby is calm and showing early feeding cues, and ensuring effective positioning and latching techniques, including baby-led latching and skin-to-skin contact. Following these principals will help to minimize the degree of any intervention, and support the baby's own sense of control and inherent capacity to self-attach and suckle. This can often prevent or resolve an ineffective suck situation.

A baby with an ineffective suck does not demonstrate an effective sucking pattern, i.e., no “deep and slow” sucks. Effective sucking technique is defined as the infant having:

- a wide-open mouth,
- with the tongue over the gums, and
- transfer of breast milk from the mother's breast by slow, deep sucks (Righard & Alade, 1992) (*Protocol #3: Signs of Effective Breastfeeding*).

The baby may suck well initially, then suck less effectively as the breast milk volume decreases during the breastfeeding.

Ineffective positioning and latching practices may contribute to an ineffective suck, and therefore these should always be assessed first (*Protocol #2: Positioning and Latching*).

An ineffective suck is usually related to two general problem areas: attachment (position and latch) or a sucking problem.

The effectiveness of the suck will determine the amount and composition of breast milk that the baby will receive. The less effective the suck, the less breast milk will be removed and the less high-fat breast milk the baby will receive during the breastfeeding.

An ineffective sucking pattern may be transitory due to labour medications/anesthesia or a medical condition that may temporarily cause the baby to be sleepy or have a decreased neurological function.

Birth Interventions and Ineffective Suck – The events experienced during the birth process can impact the breastfeeding process. The normal mechanical forces of labour on the cranial nerves and facial muscles can affect the baby's comfort and ability to achieve a latch, as well as his ability to

suck, swallow, and transfer breast milk, a situation that may be further complicated by forceps, vacuum, and surgical interventions (Smith, 2010 & 2007). Long labours can be stressful and tiring for both mother and baby, and may be associated with interventions such as intravenous (IV) hydration, analgesia, epidurals, and instrumental deliveries. IV fluids may be associated with breast or areolar edema, which can make it difficult for a baby to latch, although research has yet to establish the degree of association (Smith, 2010). Pain is stressful and can interfere with the mother's comfort as well as breast milk production (see *How the Breast Works*). Although research has not yet established a direct link between specific medications used for intrapartum pain management and breastfeeding initiation, practitioners continue to question whether medication may affect the baby's capacity to suck effectively. In addition, it is important to consider the impact of the birth process on the mother's breastfeeding self-efficacy.

Nipple Shields – If the mother inquires about using a nipple shield to manage breast refusal or difficulty achieving a latch, it is important to first explore with her any contributing factors related to ineffective suck, as well as her breastfeeding self-efficacy. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage an ineffective suck and then offer suggestions to optimize basic breastfeeding management (see earlier discussion regarding management of ineffective suck).

A nipple shield is an artificial nipple and areola shaped like a floppy sun hat, and made of a synthetic material like silicone. Some women may have success placing one of the newer ultra-thin silicone nipple shields over the breast to facilitate latching and sucking. This has the potential to stimulate the baby's hard palate and thereby elicit the sucking reflex. It may be a familiar stimulus to coax a baby to the mother's breast who has already imprinted preferentially on the supernormal stimulus of an artificial nipple (Wilson-Clay et al., 2008).

Historically, there has been mixed evidence reported about nipple shields. Use of the older rubber or latex shields was associated with concerns of inadequate intake of breast milk that resulted in slow weight gain or failure to thrive (Woolridge, 1980). Recent evidence has demonstrated weight gain to be similar over 2 months in babies fed with shields as for babies fed

without shields (Chertok, 2009).

Although nipple shields should not be the first strategy recommended to manage an ineffective suck, short-term use of the newer ultra-thin silicone shields has been positively associated with preserving the breastfeeding relationship while the dyad learns to breastfeed (Meier, 2000; Wilson-Clay, 1996). Although a recent review of the literature reported that the current evidence does not yet demonstrate safe practices for the use of nipple shields (McKechnie et al., 2010), expert practitioners continue to report the use of nipple shields as a possible strategy to bring a baby to the mother's breast who might otherwise refuse her breast. Causes for refusal may include flat or inverted nipples, an ineffective suck, prematurity, neuromuscular issues and/or imprinting (*Protocol #4: Sore Nipples; Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch*). Nipple shields may provide temporary relief for a mother who is stressed or overwhelmed and prevent introduction of bottle feeding if she is supported appropriately by a lactation expert (Lauwers et al., 2011). Some mothers may wish to use nipple shields for longer periods; these situations should be periodically reassessed. Lawrence advises against the use of a makeshift shield; nor should shields be altered for use.

To apply a nipple shield, it is important to use the correct fit and size. If the teat is too long for the baby's mouth it can cause gagging, but if it is too small it may not stimulate active sucking (Mohrbacher, 2010). The teat opening needs to be large enough to accommodate the mother's nipple comfortably; if it is too small it can slow the flow of breast milk, which is counterproductive. Lauwers recommends starting with the smallest shield that accommodates both the baby's mouth and the mother's nipple. Wilson-Clay advises matching the shield size to the baby's mouth, selecting the shortest available teat with the smallest base diameter (2008).

Clinicians and mothers may try varying methods to directly apply the shield. In one, the mother holds the rim of the shield between her thumb and fingers. Stretching the shield at the junction of the "nipple" and "areola" of the shield, she places the stretched shield over her nipple and releases the tension. As it releases and the shield returns to its normal shape, it draws the mother's nipple into the nipple cavity of the shield before the baby begins to suck. Some mothers may turn the top half of the shield inside out before

placing it over the nipple. It is important to follow the manufacturer's instructions related to care and cleaning of the nipple shield. (For further information see *Wilson-Clay, 2008, Lauwers, 2011, and Genna et al., 2008*).

Nipple shields should not be the first strategy recommended to manage an ineffective suck, and they should only be initiated by a health care provider who has the breastfeeding expertise to thoroughly assess the potential effectiveness and risks of use for that breastfeeding dyad. The practitioner is also responsible for establishing a plan with the mother for the ongoing management and evaluation of the intervention. Practitioners who do not have the capacity, i.e., lactation expertise or time, to continue to support the dyad appropriately should refer the mother to a lactation expert or breastfeeding clinic. The baby's weight gain and the mother's breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of breastfeeding and the infant's intake of breast milk, plus a plan for re-establishment of feeding at the breast.

Imprinting – The concept of imprinting or "stamping" is sometimes used to explain the observation of nipple preference. Imprinting is drawn from other sciences such as biology and psychology, where it has been applied to explain attachment behaviours and brain pathway development. In humans, imprinting is oral/tactile (Lawrence, 2011) and Gale Mobbs (1989) has identified the mouth as the most significant factor for imprinting in humans. When babies are exposed to artificial nipples or fingers early they can become accustomed to the feeling of that particular object (bottle nipple, pacifier, finger) in their mouths and have difficulty accepting another object in its place (Righard, 1997), such as a mother's nipple.

For information about the normal suck cycle, see *Protocol #3: Signs of Effective Breastfeeding*.

A specially trained oral-motor practitioner can teach parents exercises that may help some babies with establishing an effective suck, including:

- Tongue massage (*see Genna et al., 2008*)
- Pushing the tongue down and out (*see Mohrbacher, 2010*)
- Walking back on the tongue (*see Mohrbacher, 2010*)

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Protocol #11: Crying and Colic in the Breastfed Baby



Protocol #11: Crying and Colic in the Breastfed Baby

Crying evokes distress in both parents and babies. Parents may label persistent crying as “colic”. Colic is not a disease, but a syndrome characterized by periods of inconsolable crying. Being unable to soothe her baby’s crying can negatively impact a mother’s sense of self-efficacy.

Observation and Assessment

Assess the baby for:

- Prolonged periods of persistent, inconsolable crying, irritability, or fussiness that may be concentrated in the afternoon and evening.
- A cry characterized by a high-pitched wail or scream as if the baby were in pain (St. James-Roberts, 1999).
- Breastfeeding and gaining weight well.
- Being healthy aside from the colic.
- A tense body with fists clenched and legs pulled up.
- A hard abdomen that may be distended.
- Frequently falling into a deep sleep after a crying period.
- Breastfeeding frequently for short periods, then pulling away crying.
- Being soothed at least temporarily by prompt attention such as holding, gentle rocking, walking, or breastfeeding.
- Any other possible causes of persistent crying, e.g., illness, hunger, cold, injury, comfort, etc.

Possible Contributing Factors or Causes

- The cause of colic is unknown. Colic or persistent crying may be associated with a feeding problem (e.g., overfeeding, underfeeding, excessive air swallowing), and rarely intolerance to a food in the mother’s or baby’s diet. It is reported in equal frequency in both breastfed and non-breastfed babies.
- Crying and colic in the breastfed baby may have one or more underlying factors.

Assess the mother for:

- Knowledge of normal baby crying and breastfeeding behaviours.
- Maternal breastfeeding self-efficacy, stress and coping challenges, including available support.

- Ineffective positioning and latching practices (*Protocol #2: Positioning and Latching*).
- Switching breasts before the baby is finished breastfeeding from the first breast, i.e., the baby is finished the first breast when he is no longer sucking and swallowing effectively, and the breast feels significantly softer (*Protocol #3: Signs of Effective Breastfeeding*).
- An overabundant supply/forceful letdown or breast milk ejection reflex (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).
- Cigarette smoking.
- Maternal medication or substance use.
- Ingestion of a food or beverage to which the baby may be sensitive (rare).

Suggestions

1. Offer information to the mother about normal baby crying and breastfeeding behaviours.

Encourage the mother in understanding that:

- Babies cry to signal a need for comfort, warmth, food, mother’s presence, or to be held.
- Babies cry an average of 2–2½ hours a day, peaking at around 2 months, and gradually decreasing by the fourth or fifth month (Barr, 2006).
- Babies may cry for long periods, with no obvious cause, and may be inconsolable.
- Babies may look like they are in pain even when they are not.
- Babies may cry more in the afternoons and evenings.
- Crying is a late signal of hunger.
- Breastfeedings are frequent and sometimes in clusters.

Encourage the mother to:

- Respond promptly to her baby’s crying.
- Understand that she is not spoiling her baby when she responds promptly to crying and/or holds her baby.

2. Offer information on soothing techniques.

Encourage the mother to try soothing techniques such as:

- Holding the baby skin-to-skin (chest-to-chest).
- Cuddling or rocking the baby.
- Carrying the baby in a carrier.
- Wrapping the baby loosely in a blanket to reduce stimuli.
- Breastfeeding the baby.
- Burping the baby.
- Changing the baby’s diaper.
- Giving the baby a bath.
- Giving the baby a massage.
- Taking the baby to a quiet room.
- Placing the baby near “white noise”, e.g., vacuum cleaner, kitchen or bathroom fan, running water, clock, hairdryer, bubbling fish tank.
- Laying the alert baby in a prone position and patting the baby’s back. The alert baby may lie prone in the crib, across the mother’s lap or along her forearm with the baby’s head and chest well supported by her hand.

Young babies who are not able to turn over from their back to their abdomen on their own should not be left on their abdomen or side to sleep. A back sleeping position has been associated with a decreased risk for Sudden Infant Death Syndrome in young babies. For further information see *Safe Sleep for Your Baby* (PHAC, 2010).

3. Offer information and support for the mother’s breastfeeding self-efficacy, including assessment of her coping capacities and resources.

Encourage the mother in understanding that:

- Crying and colic are not reflective of the baby’s feelings about her.
- Crying is unlikely to be related to breastfeeding when her baby is gaining weight well.

4. Assess the baby for ineffective positioning and

latching practices (*Protocol #2: Positioning and Latching*).

Encourage the mother in understanding that:

- Ineffective positioning and latching practices increase the likelihood that the baby will swallow excessive air.

Encourage the mother to:

- Use effective positioning and latching practices.

5. Assess whether the mother switches breasts before her baby has finished the first side i.e., the baby is finished with the first breast when he is no longer actively sucking and swallowing and the breast feels significantly softer (*Protocol #3: Signs of Effective Breastfeeding*).

Encourage the mother in understanding that:

- The fat content of breast milk changes during a breastfeeding. The baby initially receives breast milk that is lower in fat and there is a disproportionate ratio of lactose (milk sugar) to fat. As the breastfeeding progresses and the breast empties, the fat content of the breast milk increases.
- If she switches breasts before the baby is finished with the first breast, then the baby may receive mostly lower fat breast milk at that breastfeeding. The lower fat content of the diet may cause rapid gastric emptying and too much lactose reaching the intestines too soon.
- If there is not enough of the enzyme lactase in the baby’s digestive system to break down and absorb this rapid loading of lactose, the baby may have symptoms of lactose malabsorption that may resemble lactose intolerance, e.g., crying, gas, and explosive watery-greenish bowel movements.
- A baby who reacts to an overload of lower fat breast milk is not lactose intolerant and does not need to be switched to a lactose-free formula. The breastfeeding mother does not need a lactose-free diet.

Encourage the mother to:

- Allow her baby to finish breastfeeding from the first breast before offering the other side. The baby is finished with the first breast when no longer sucking and swallowing effectively and the breast feels significantly softer.

- Use breast compressions while breastfeeding to encourage the baby to suck and swallow effectively (see *Protocol #5: Engorgement* for a description of breast compressions).
- Alternate the breast she offers first at each breastfeeding.

6. Assess the mother for an overabundant breast milk supply/forceful letdown reflex (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*).

If the mother has an overabundant breast milk supply/forceful letdown, inform her that:

- A baby who receives too much breast milk too quickly may become fussy and swallow excessive air as a result of struggling with the breast milk overflow. The baby may choke, cough, or struggle at the breast shortly after beginning the feed.
- The baby may come off the breast several times during the breastfeeding and often the mother's breast milk will spray.
- The baby may partially or completely refuse the breast over time. This typically occurs at 3–6 months of age.

Encourage the mother to:

- Try the suggestions outlined in *Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk-Ejection Reflex*.

7. Assess whether the mother smokes cigarettes.

- Smoking is not recommended in breastfeeding mothers.

If the mother smokes cigarettes, inform her that:

- Colic has been associated with parental smoking independent of the type of feeding (Reijneveld et al., 2000).
- Nicotine rapidly concentrates in breast milk immediately after smoking. Nicotine and major metabolites have also been found in the breast milk of mothers who are exposed to second-hand smoke.
- Excessive nicotine in breast milk may irritate the baby's gastrointestinal system and may cause vomiting, diarrhea, increased heart rate, and fussiness.
- Nicotine may also decrease breast milk supply.

Note: Breastfeeding is still recommended over artificial baby milk if the mother smokes.

Encourage the mother to:

- Try to quit smoking or decrease the number of cigarettes she smokes. Information about smoking cessation is available from the Smokers' Helpline at 1-877-513-5333 or online at: <http://www.smokershelpline.ca/>.
- Try to smoke immediately after breastfeeding when the baby is sleeping for longer periods (the half-life of nicotine in breast milk is between 60–90 minutes) (AAP, 2005).
- Avoid exposing the baby to second-hand smoke from any source. Do not smoke indoors or in the car. Children exposed to second-hand smoke have an increased risk for health problems such as asthma, bronchitis, pneumonia, ear infections, and Sudden Infant Death Syndrome (*Protocol #16: Drugs and Breastfeeding*). (Adapted from information from *Motherisk* and *CAMH*.)

8. Assess for a family history of food allergies. First rule out all other possible causes of crying.

Encourage the mother in understanding that:

- Diet is rarely the cause of colic. There is some evidence that cow's milk proteins may play a role in infant colic (CPS, 2011), although much of the research is infant formula-based. It is possible that some foods in the mother's diet may be passed on to the breast milk and may cause the baby to be colicky, although this is unusual. This is more likely if there is a family history of allergies. The most common foods that may affect the baby are made from cow's milk, although other proteins have been implicated, e.g., beef, eggs, fish, soy, peanuts, nuts, wheat (and related glutens such as triticale, barley, and oats) and high-acid fruits or vegetables.
- A sensitivity to cow's milk proteins does not mean that the baby is lactose intolerant. A mother who is lactose intolerant herself should continue to breastfeed.
- A food and symptoms diary may help to identify any relationships between activities, times of day and/or foods eaten by the mother with the baby's crying.
- To prevent possible nutrient deficiencies it is important that any elimination of foods be done in consultation with a Registered Dietitian. For

example, calcium is a specific concern if milk products are removed from the diet. A Registered Dietitian can offer counselling and nutrition advice to ensure a healthy and balanced diet.

Encourage the mother to:

- Keep a food and symptom diary for a few days. Make specific note of the times of crying, associated activities, mother’s diet, and the baby’s stool and gastrointestinal symptoms.
- Consult a Registered Dietitian before proceeding with an elimination diet.

9. Ensure that the baby is medically assessed for possible health problems that may aggravate the crying or colic or may actually be the underlying cause of the colicky symptoms, e.g., ear infection, diaper rash, urinary tract infection.

General Principles

Crying and colic can be a significant source of stress for a mother. She may feel guilty, believing that it is something she did or ate that is to blame for her baby’s distress. She may seek to identify causes such as food sensitivities or allergies in herself or her baby, however rarely they may occur. Most significant, she may feel overwhelmed and frustrated, unable to help her baby, which undermines her self-confidence and negatively impacts her maternal self-efficacy.

It is important for parents to understand normal infant crying, as well as normal breastfeeding, so that they can develop realistic expectations for their babies’ behaviours. Maternal knowledge about infant crying may increase with educational materials such as the *Purple Period of Crying* program developed by the National Centre on Shaken Baby Syndrome (Barr, 2009).

Colic is not a disease, but a syndrome whereby the baby has periods of inconsolable crying with no apparent physical cause (see the section in *Observation and Assessment* for a list of colic symptoms).

Colic usually begins about 2–3 weeks after birth, peaks in the second month, and subsides by 3–6 months. A medical condition may be present if colic continues beyond 3–4 months. The cause of colic is unknown. Colic may be defined in many ways, making it difficult to establish definitive conclusions about colic, as noted in a systematic review (Lucassen et al., 2001). It is frequently defined in the research by

Wessel’s “Rule of Threes”: Crying for more than 3 hours a day, for more than 3 days a week and for more than 3 weeks (Wessel (1954) in Barr, 2006).

Aside from the periods of inconsolable crying, a colicky baby is otherwise healthy, breastfeeding and gaining weight well. The baby should be assessed for any breastfeeding or health problem that may aggravate the colic or actually be the underlying cause of the crying episodes, e.g., poor positioning and latching, ear infection, diaper rash, urinary tract infection.

Colic is often confused with fussiness. A fussy baby is fussy most of the time, whereas a colicky baby is usually fussy only during the colic spells; either may be normal infant crying behaviours.

Colic is reported with equal frequency in babies who are fed breast milk, infant formula, and/or mixed feeding. (Lawrence, 2011).

Colic-like behaviours have been associated with neurologic hypersensitivity. High responsiveness during a neurobehavioural assessment predicted those infants who cried frequently and met a definition of colic (St. James-Roberts et al., 2003).

Colic-like behaviours have been associated with maternal medication and substance use (Ito, 2000; Lauwers & Swisher, 2011; Leung et al., 2004).

Crying is a common reason that a new parent will seek medical attention.

“Caring for a baby who cries persistently can exhaust and undermine the confidence of any mother” (Pauli-Potti, 2000 in Riordan). It is important to assess and monitor the mother’s emotional well-being and to help her identify possible sources of physical and emotional support. The significance to the mother of feeling that she has the right support cannot be underestimated.

A systematic review of treatments for colic found some treatments to be effective, but further and more rigorous scientific evaluation needs to be done to determine the efficacy of most treatments. The review found limited evidence to support the use of pharmaceuticals such as simethicone (Garrison et al., 2000).

The evidence regarding the benefits of hypoallergenic diets by breastfeeding mothers is inconclusive. There is limited evidence to support the use of soy formula for formula fed babies.

- The evidence is inconclusive regarding behavioural

interventions such as carrying, car rides, parent training, and infant stimulation.

- There are concerns regarding the use of herbal teas for babies because prolonged use may lead to decreased breast milk intake (Garrison, 2000). In addition it is always important that there is caution regarding any use of natural health products because there is not enough scientific information about the safety of various herbs and natural health products for either the mother or baby to recommend their general use in breastfeeding (see *Protocol #16: Drugs and Breastfeeding* for further information

regarding natural health products).

Stress related to persistent crying and colic can negatively impact a mother's breastfeeding experience. Stress may interfere with the hormones of lactation, potentially negatively affecting breast milk letdown and production (see *How the Breast Works*). Mothers of infants diagnosed with colic were less likely to find breastfeeding to be an effective way to comfort their babies. Howard et al. found that breastfeeding to comfort a crying baby had a protective effect on the duration of partial but not exclusive or full breastfeeding (Howard et al., 2006).

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Protocol #12

Insufficient Breast Milk Supply



Protocol #12: Insufficient Breast Milk Supply

“Not enough milk” is one of the most common worries of new mothers and reasons given for early discontinuation of breastfeeding. It is rarely related to a maternal physical condition but is more frequently related to inadequate removal of breast milk from the mother’s breast. There may be low breast milk supply or a misunderstanding of the baby’s feeding behaviour; it may be actual or perceived. Ultimately, the question becomes “Is the baby getting enough breast milk?”

Observation and Assessment

1. The baby may have one or more signs that may indicate a problem of inadequate breast milk intake.

Assess the baby for:

- Absence of effective sucking and swallowing at the mother’s breast (e.g., few or no deep and slow sucks).
- Inadequate urine and stool output (*Protocol #3: Signs of Effective Breastfeeding*).
- A loss of more than 7% of birth weight in the first 3 days of life.
- Inadequate weight gain. A weight gain of less than 20–35 g ($\frac{2}{3}$ – 1¼ oz) per day for the first 3 – 4 months of age (after the initial weight loss in the first 3 days of life and showing a pattern of gaining by 5 days of life). Breastfed babies tend to grow more quickly than non-breastfed babies in the first 6 months and grow more slowly in the second 6 months of life. (*Protocol #3: Signs of Effective Breastfeeding*).
- Birth weight that is not regained by 10 days of age.
- Possible lethargy, irritability, and/or breast refusal. However, some babies with inadequate weight gain may mistakenly appear to have a personality that is content and placid.
- Signs of dehydration, e.g., sunken fontanelle, sunken eyes, dry mucus membranes, poor skin turgor, ketonic odour, uric acid crystals (*Protocol #3: Signs of Effective Breastfeeding*).

2. The mother may have one or more signs that may indicate a problem with **actual low breast milk supply or lactation failure**.

Assess the mother for:

- No signs of the breast milk ejection or letdown reflex. Mothers may not recognize a letdown reflex unless they feel it but may recognize when the baby’s sucks change from shallow and quick to deep and slow (*Protocol #3: Signs of Effective Breastfeeding*).
- No breast changes after birth (e.g., no breast engorgement or breast milk coming in).
- No breast changes during pregnancy (e.g., no tenderness, darkening of the areola, enlargement, or leaking).
- No or minimal breast changes during puberty.
- One breast that is markedly different in size and/or shape from the other.
- Unusually shaped breasts or widely spaced breasts, e.g., cone shaped breasts (Wilson-Clay, 2008).
- Breast injury, surgery, or biopsy in which major nerves and ducts in the mother’s breasts are damaged, e.g., burns to the mother’s breast, breast reduction with incisions to the areola and/or nipple. Breast implants usually do not affect breast milk supply.
- History of fertility concerns or metabolic conditions, e.g., diabetes, thyroid, polycystic ovary syndrome (PCOS).
- Loss of sensation in the mother’s breast.

Possible Contributing Factors or Causes

Assess the baby for:

- Delay in the initiation of breastfeeding after birth (*Protocol #1: The Initiation of Breastfeeding*).

- Ineffective positioning and latching (*Protocol #2: Positioning and Latching*).
- Medical conditions that may compromise the baby's suck (e.g., jaundice, dehydration, hypertonia/hypotonia, cleft lip/palate, abnormal tongue, birth trauma) (*Protocol #10: Ineffective Suck* and *Protocol #14: Jaundice in a Breastfed baby*). The baby needs to be assessed by a primary health care provider to rule out any medical condition.
- Ineffective or weak suck (*Protocol #10: Ineffective Suck*).
- Inadequate frequency and duration of breastfeedings (*Protocol #3: Signs of Effective Breastfeeding*).
- Supplementation (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Use of bottles and pacifiers.

Assess the mother for:

- Knowledge of normal lactogenesis (breast milk production) and infant feeding and sleep behaviours.
- Ineffective breastfeeding management, e.g., infrequent breastfeeding, inadequate breast milk removal.
- Lack of confidence in her ability to breastfeed.
- Supplementation for inadequate breast milk supply or perceived inadequate breast milk supply (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Engorgement lasting for more than 48 hours (*Protocol #5: Engorgement*).
- Uncontrolled pain.
- Significant stress.
- Delayed Lactogenesis II due to postpartum or intrapartum complications (e.g., lengthy labour, birth interventions, postpartum hemorrhage, retained placenta, Sheehan's syndrome (pituitary insufficiency due to severe blood loss and shock during childbirth). (see *Protocol #10: Ineffective Suck* regarding birth interventions).
- Maternal medical conditions that may delay or decrease breast milk supply, e.g., diabetes, anemia, hypertension, untreated hypothyroidism, pituitary disorders.
- Use of herbs and medications that decrease breast

milk supply (e.g., sage, contraceptives containing estrogen, ergot alkaloids, thiazide diuretics, cold preparations such as decongestants) (Hale, 2010).

- Cigarette smoking.
- Excessive alcohol consumption.
- Acute dehydration or excess fluid intake.
- Use of a pacifier to delay breastfeedings.
- Pregnancy.
- Congenital insufficient glandular tissue (see *General Principles*).
- Breast injury, surgery, or biopsy in which major nerves and ducts in the mother's breasts are damaged (e.g., burns to the mother's breast, breast reduction with incisions to the areola and/or nipple). Breast implants usually do not affect breast milk supply.

Suggestions

1. Assess whether the mother has a perceived or an actual insufficient breast milk supply. If the exclusively breastfed baby has adequate urine and stool output and is gaining weight well, offer reassurance to the mother that she does have sufficient breast milk supply.
2. Reassure her that the following signs do not indicate an insufficient breast milk supply:
 - Fussiness with adequate weight gain (*Protocol #11: Crying and Colic in the Breastfed Baby*).
 - Frequent breastfeedings (at least 8 times within 24 hours).
 - Increased breastfeedings during a growth spurt. Growth spurts may occur at any time. These are commonly described as occurring at, but are not limited to, 10 days to 2 weeks, 6–8 weeks, 3 months, and later (Lauwers et al., 2011).
 - Cluster breastfeedings. These are periods when the baby breastfeeds frequently, followed by periods when the baby sleeps longer between breastfeedings. These are most common in the late afternoon and evening.
 - Baby takes a bottle after breastfeeding (many babies will suck on anything even if they are full because they find sucking pleasurable).
 - Breasts that normally soften 10–14 days after birth due to the mother's breasts adjusting to the baby's needs.

- Lack of sensation when the letdown reflex occurs, or a decreased letdown reflex sensation. The mother should also look for other signs of the letdown reflex such as when the baby’s sucks change from shallow and quick to deep and slow.
- Breasts that have little or no leaking.
- Mother reports expressing no breast milk or only a small amount of breast milk.

If the mother is assessed to have an actual insufficient breast milk supply, assess for possible cause(s) for this condition (see the previous section on *Possible Contributing Factors or Causes*).

3. If the baby is showing signs of inadequate weight gain, the baby needs to be assessed by a primary health care provider to rule out any possible medical condition such as jaundice, dehydration, urinary tract infection, hypertonia/hypotonia, cleft lip/palate, abnormal tongue, or birth trauma.

- If the baby has an ineffective suck, refer to *Protocol #10: Ineffective Suck*.

- If the mother’s breasts are engorged, refer to *Protocol #5: Engorgement*.

4. If breastfeeding management is assessed to be ineffective or not optimal, offer suggestions to optimize breastfeeding management (*Protocol #3: Signs of Effective Breastfeeding*). It is always appropriate for the breastfeeding to be assessed and optimized.

5. If the baby is showing signs of failure to thrive, the baby needs to be referred to a primary health care provider for further assessment and monitoring. Immediate supplementation may be medically indicated if the baby is truly failing to thrive (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

- Offer information to the mother so that she can recognize and observe signs of slow weight gain as differing from failure to thrive (see chart below)

<i>Slow weight gain</i> Gains weight slowly and consistently	<i>Failure to thrive</i> Very low, erratic, or no weight gain
<ul style="list-style-type: none"> • alert, responsive, healthy appearance • normal muscle tone • good skin turgor • pale, diluted urine, 6 or more times/day • frequent seedy stool, or infrequent large stool • breastfeeding well • 8 or more breastfeedings/day • good suck • good letdown reflex • weight gain consistent but slow 	<ul style="list-style-type: none"> • apathetic, lethargic, or weak cry • poor muscle tone • poor skin turgor • concentrated “strong” urine, few times/day • infrequent scant stools • difficult or ineffective breastfeeding, often from birth • fewer than 8 breastfeedings/day, usually brief • may have poor suck • no signs of functioning letdown reflex • poor or erratic weight gain (\leq 3rd percentile or crosses down two percentile lines); may lose weight

(Adapted from Giuliani, 2002, and Lawrence, 2010)

6. If the mother is assessed to have an actual insufficient breast milk supply, then provide her with suggestions to increase her breast milk supply.

Before breastfeeding, encourage the mother to:

- Follow early feeding cues to breastfeed frequently (*Protocol #3: Signs of Effective Breastfeeding*).
- Ensure that the letdown reflex is initiated. The baby's rooting, sucking and hands on the mother's breasts are the natural stimuli for letdown when breastfeeding is initiated early, before the baby is overly hungry and begins crying (see early feeding cues in *Protocol #3: Signs of Effective Breastfeeding*).

The mother can try the following ideas to initiate letdown:

- Breastfeed in a quiet, relaxed place.
- Use relaxation strategies, such as a warm shower, heat applied to her back and shoulders, relaxation breathing, a warm drink, supportive positions.
- Manage pain to support, comfort, and relax to facilitate breast milk letdown.
- Initiate breastfeeding early, before the baby is stressed and crying.
- Clothe the baby in only a diaper to promote skin-to-skin contact.
- Support the baby in a vertical chest-to-chest position, with the nose approaching the mother's nipple, to facilitate the baby's reflexes and self-attachment behaviours.
- Gently massage her breasts. Apply moist or dry heat to her breasts for a few minutes before or during massage until letdown occurs. Heat may be applied with a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low, or a hot water bottle wrapped in a cloth. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Stimulate the nipples. Gently roll her nipples between the index finger and thumb for several minutes or until the letdown reflex occurs. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).

During breastfeeding, encourage the mother to:

- Breastfeed frequently—at least 8 times a day, including at least once overnight, if the baby is younger than 6 months old.

- Dress the baby in a diaper only when breastfeeding to promote skin-to-skin contact.
- Use effective positioning and latching practices (*Protocol #2: Positioning and Latching*).
- Ensure that the baby is sucking and swallowing effectively at each breastfeeding.
- Offer both breasts at each feeding to increase stimulation to the mother's breasts.
- Try “switch nursing” if the baby is sleepy or loses interest quickly. Offering each breast 2–3 times during a feeding to keep the baby interested as the baby's sucking slows down, can help to optimize the amount of time the baby actively sucks and swallows. The term “switch nursing” has been used by La Leche League leaders (LLLI, 2011).
- If the baby breastfeeds on only one side, encourage the mother to express some breast milk from the other breast. This will ensure that both breasts are stimulated at each feeding.
- Use breast compressions to help stimulate sucking and swallowing (see *Protocol #5: Engorgement* for a description of breast compressions).
- Feed the baby only breast milk for the first 6 months of life unless supplementation is medically indicated (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Breastfeed the baby first, then offer solid foods once the baby has begun taking solid foods. Breast milk is the primary source of nutrition.

Note: Mothers are advised to exclusively breastfeed their babies to 6 months of age and to introduce nutrient-rich solid foods, with particular attention to iron, at 6 months, with continued breastfeeding for up to 2 years and beyond (TPH, 2010).

After breastfeeding, encourage the mother to:

- Eat and drink according to *Eating Well With Canada's Food Guide* (Health Canada, 2007).
- Avoid using bottles and pacifiers.
- Avoid smoking, alcohol, and caffeine.
- Express both breasts after breastfeeding to increase stimulation to the mother's breasts (*Protocol #19: Expressing and Storing Breast Milk*).
- Get help from family and friends with cleaning, cooking, caring for the baby, caring for other children.

If the baby is unable to breastfeed effectively, encourage the mother to:

- Express each breast after each time that the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time, encourage the mother to express each breast regularly in order to maintain her breast milk supply. Generally, this should be at least 8 times in 24 hours, with a minimum of 1 expression overnight, to mimic the normal pattern of feeding. The mother may need to express more often if her breasts become uncomfortable or overly full (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, finger feeding, lactation aid on the mother’s breast. Using a lactation aid on the mother’s breast is recommended over the other alternative feeding methods if the baby is able to latch onto the mother’s breast. This method allows the baby to remain at the mother’s breast and provides the mother’s breasts with stimulation (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available and it is assessed that supplementation is medically indicated, then an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Consult a breastfeeding expert or breastfeeding clinic for further assessment as soon as possible.

If the mother and baby are unresponsive to non-pharmacological strategies to optimize breast milk supply and the mother inquires about the use of a galactagogue, encourage her to:

- Understand the possible benefits and risks associated with the use of galactagogues if she inquires about using such medications or herbs for managing an insufficient breast milk supply. It is important that mothers be aware of this information in order to make a fully informed decision about the use of galactagogues. Offer further assessment and refer for further support as needed (see notes in *General Principles*).
- Continue to support strategies that optimize breastfeeding.
- Mothers should consult a breastfeeding expert or breastfeeding clinic.

Before the use of galactagogues is considered, it is essential to optimize all non-pharmacological measures to optimize breastfeeding management, including a thorough breastfeeding assessment. If the mother inquires about using a galactagogue to increase breast milk supply, it is important to first explore with her any possible underlying causes of insufficient breast milk supply. It is also important to inquire about her current breastfeeding management practices and attempts to manage her breast milk supply, and then offer suggestions to optimize basic breastfeeding management and to support her in making a fully informed decision.(see *General Principles*).

7. If the mother has had breast surgery such as augmentation or reduction mammoplasty, breast injury, or is suspected of having congenital insufficient glandular tissue, she should be referred to a breastfeeding expert or breastfeeding clinic for a thorough assessment. She should be encouraged to attempt breastfeeding, as full or partial lactation is often possible.

General Principles

A common concern that mothers have in the early postpartum period is that they do not have enough breast milk for their baby. This is one of the most common reasons given by mothers for discontinuing breastfeeding or for supplementing with artificial baby milk.

It is often the case that insufficient breast milk supply is a perceived and not an actual problem. This may be due in part to a lack of knowledge regarding normal infant behaviours and cues, and the normal process of breastfeeding, e.g., growth spurts, clusters, and frequent breastfeedings.

Riordan defines insufficient breast milk as “insufficient breast milk production to sustain normal infant weight gain despite appropriate breastfeeding routines, maternal motivation to continue breastfeeding, and skilled assistance with breastfeeding problems” (Riordan, 2010).

Very few mothers experience actual insufficient breast milk supply if breastfeeding is appropriately managed from birth (*Protocol #1: The Initiation of Breastfeeding*).

Insufficient breast milk supply that is permanent and irreversible can be caused by congenital insufficient glandular tissue, or breast injury, surgery, or biopsy in which the major nerves and ducts in the mother's breasts are damaged, e.g., burns to the mother's breast or breast reduction with incisions to the areola and/or nipple. Breast implants usually do not affect breast milk supply. Mothers with breast injury or surgery may be able to breastfeed exclusively, whereas women with true congenital insufficient glandular tissue will need to use supplementation with breastfeeding (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

It is rare for a woman to be born with congenital insufficient glandular tissue. This condition is referred to as primary lactation failure and is due to the underdevelopment of the alveoli (breast milk producing cells) and lactiferous ducts. A mother with this condition will often report that she experienced no changes to her breasts during pregnancy or after birth, e.g., no enlargement, tenderness, or breast milk coming in. Each breast may also be markedly different in size and/or shape, with one breast being much larger than the other. One or both breasts may also be unusually shaped, e.g., cone shaped.

Slow weight gain/failure to thrive/inadequate breast milk intake – Low intake of breast milk means low caloric intake, which compromises weight gain, height, and most significantly head circumference. In turn these have been associated with compromised development and cognition.

Galactagogues

If the mother inquires about the use of medications or herbs to increase breast milk supply, it is important to first explore with her any contributing factors related to insufficient breast milk supply, as well as her breastfeeding self-efficacy. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage her insufficient breast milk supply, and then offer suggestions to optimize basic breastfeeding before introducing further interventions (see notes above).

If she is unresponsive to non-pharmacological measures to enhance breast milk supply, refer her to a breastfeeding expert or breastfeeding clinic. Before using any substance to increase breast milk supply a thorough assessment of breastfeeding, including breast milk supply and breast milk transfer, is essential. There continues to be limited

data in the form of controlled trials regarding the use of medications and herbs as galactagogues to establish standardized dosages, to determine the mechanism of action, efficacy and potential risks for the baby, or possible interactions with other medications. There is a lack of rigorous evaluations and standardizations (Zuppa et al., 2010). A frequently cited study by Swafford and Berens that reported a significant increase in breast milk volume with use of fenugreek was only an observational study of 10 women, and was not published beyond a conference abstract (Swafford et al., 2000). The updated Protocol of the Academy of Breastfeeding Medicine reports that emerging data suggest more caution be exercised in recommending galactagogues than in its previous edition (ABM, 2011). Both the Academy of Breastfeeding Medicine *Protocol #9* (2011) and Lawrence (2011) include appendices that present the current “minimal specific data” known for common galactagogues (ABM, 2011).

Galactagogues should not be the first strategy recommended to manage an insufficient breast milk supply and they should only be initiated by a health care provider who has the breastfeeding expertise to thoroughly assess the potential effectiveness and risks of use for the breastfeeding pair. The practitioner is also responsible for establishing a plan with the mother for the ongoing management and evaluation of the intervention. Practitioners who do not have the capacity, i.e., lactation expertise or time, to continue to support the dyad appropriately should refer the mother to a breastfeeding expert or breastfeeding clinic.

It is important that mothers be aware of this information in order to make an informed decision as well as how to monitor themselves and the baby for possible side effects. See the Academy of Breastfeeding Medicine's *Protocol #9: Use of Galactagogues in Initiating or Augmenting Maternal Milk Secretion* (ABM, 2011) (*Protocol #16: Drugs and Breastfeeding*).

Health Canada has regulations to ensure the quality, effectiveness, and safety of natural health products (herbs). Natural health products approved under these regulations will have a Natural Product Number (NPN) or Drug Information Number – Homeopathic Medicine (DIN-HM) on the label. Few products have been tested for safety in pregnancy and breastfeeding and are thereby not recommended by Health Canada for use in breastfeeding.

Other messages about the use of herbs and natural remedies are mixed. According to Riordan, the use of herbs to stimulate breast milk production is “extraordinarily common today”; however, scientific evidence for their use is minimal (Riordan, 2010). Many herbal remedies have been used throughout history to enhance breast milk supply. Most have not been scientifically evaluated but traditional use suggests safety and possible efficacy (ABM, 2011). In the absence of scientific studies on herbs in lactation, many lactation experts turn to the work of Sheila Humphrey (2003). Humphrey has developed a body of information about the use of herbs in lactation, but it does not include controlled studies.

Riordan also advises practitioners to honour cultural practices as well as to advise mothers that herbs may have pharmacological effects on their baby.

At this time there is not enough scientific information about the safety of various herbs and natural health products to recommend their general use during breastfeeding. Breastfeeding women should use natural products with caution and always consult with *Motherisk* (2011) and their health care provider with breastfeeding expertise.

Medications that may increase breast milk supply (galactagogues): Refer mothers to a health care provider with breastfeeding expertise.

Domperidone (Motilium) is a medication that may increase breast milk supply by stimulating the production of prolactin. It is traditionally used to treat disorders of the gastrointestinal tract. The evidence for use of domperidone as a galactagogue, although limited, is the strongest available evidence, with a few small sample size controlled trials (Da Silva, 2004; Wan, 2008; Campbell-Yeo, 2010). Recommendation as a galactagogue is considered “off label” use in Canada. The American Food and Drug Administration (FDA) has warned against the use of domperidone by lactating women. The FDA warnings were based on reports of increased risk of cardiac arrhythmia and sudden death in patients receiving high-dose intravenous domperidone concurrently with chemotherapy. In this case it was used as an antiemetic, not a galactagogue. Domperidone does not easily pass the blood-brain barrier (Zuppa, 2010; Lawrence, 2011). Da Silva notes that only a minimal amount of domperidone passes into breast milk and is ingested by the infant, and advises that the use of domperidone is appropriate for lactating women

with low breast milk supply who are unresponsive to non-pharmacological measures (Da Silva, 2004). Wan et al. (2008) found that domperidone only increased the breast milk supply in about two-thirds of mothers. Hale (2010) states it is the ideal galactagogue and rates it as L1. A prescription is required.

It is essential that mothers be aware of the risks associated with high dosages as well as other side effects, along with the benefits of domperidone, when making a decision to use it. Side effects of domperidone in the mother include dry mouth, skin rash, itching, headache, thirst, abdominal cramps, diarrhea, and drowsiness (Hale, 2010).

Metroclopramide (Maxeran) is a medication that is also used to increase breast milk supply, although its primary use is as a gastrointestinal stimulant. Not all women respond to it and the effects are dose dependent. Hale rates it as L2. Side effects that include fatigue, irritability, and depression may limit compliance (Hale, 2010). It is known as Reglan in the USA. A prescription is required.

Herbs that may increase breast milk supply (possible galactagogues): Refer mothers to a breastfeeding expert or breastfeeding clinic.

Fenugreek and blessed thistle are two herbs that have been traditionally recommended by some breastfeeding experts for increasing breast milk supply without apparent adverse effects. Hale rates both fenugreek and blessed thistle as L3 or moderately safe (Hale, 2010). This expert opinion is based on clinical observation, including anecdotal evidence. Currently there are no clinical trials to establish efficacy or dosage, risks to the mother or baby, or possible interactions with other medications. Other herbs that have been used traditionally include borage, goat’s rue, milk thistle (*Silybum marianum*), dandelion, millet, oats, anise, basil, marshmallow and others (ABM, 2011). Herbs may be included in traditional foods for breastfeeding mothers.

Breastfeeding women should consider the use of herbs and natural health products with caution and always consult with their health care provider with breastfeeding expertise.

There are no clinically determined or standardized safe dosages:

- Hale suggests a dosage of fenugreek of 6 grams per day (Hale, 2010). Lawrence suggests a usual dosage as 1–4 capsules (580–610 mg) 3–4 times a day, or

a cup of tea (¼ tsp seeds crushed in 8 oz water) 3 times a day, although there is no standardized dose (2010).

- Hale says blessed thistle lacks justification as a galactagogue, although he does state that it is virtually nontoxic (2010). Lawrence says it is not a galactagogue and is confused with milk thistle (2011). There have been reported concerns related to allergic reactions (Hale, 2010) and lowering of blood sugar. He suggests an adult dose of 1.5 to 3 grams in tea up to 3 times a day. At this time both Health Canada and Medline advise against the use of blessed thistle in breastfeeding women due to a lack of reliable research and limited safety information.

Mothers may also find information about the use of galactagogues available on the Internet. This may include information from Thomas Hale, a

pharmacist with expertise related to medications and breastfeeding at:

- Thomas Hale’s website for parents:
<http://www.infantrisk.com/category/breastfeeding>.

See also handouts from Dr. Jack Newman, who has been a pioneer in supporting breastfeeding mothers with information about galactagogues:

- Domperidone:
<http://www.breastfeedingonline.com/Dom19abcombinedpdf.pdf>.
- Herbs for increasing milk supply are discussed in his handout “Miscellaneous Treatments” available from: <http://www.breastfeedingonline.ca/content.php?pagename=doc-HRMS>

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Protocol #13
**Overabundant Breast Milk Supply/
Forceful Letdown or
Breast Milk Ejection Reflex**



Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex

Sometimes the supply of breast milk exceeds the baby's needs or ability to breastfeed. It may be combined with a forceful letdown or breast milk ejection reflex. The baby may become distressed trying to cope with too much breast milk flowing too quickly. Signs of difficulty may occur at different phases of breastfeeding or ages of the baby. Optimizing breastfeeding will help the baby to manage the breast milk flow related to an overabundant breast milk supply or a forceful letdown.

Observation and Assessment

Initial Phase (the first 3 months)

Assess the mother for:

- An overabundant breast milk supply.
- Pain with the initial letdown or breast milk ejection reflex, which is usually the most forceful. The pain is due to stretching of the breast milk ducts.
- Breast milk spraying or squirting from one breast while the baby is feeding on the other breast.
- Breast milk leaking between feedings.
- Recurrent plugged ducts and mastitis.

Assess the baby for:

- Choking, gulping, or sputtering when the mother's breast milk lets down forcefully.
- Fussiness and gassiness due to excessive air being swallowed during and/or after breastfeeding.
- Spitting up excessively after breastfeeding.
- Coming off the mother's breast several times during the breastfeeding with the mother's breast milk spraying.
- A poor latch on the nipple or only on a small portion of the areola.
- A poor suck and swallow pattern when the mother's breast milk lets down forcefully. This may continue throughout part or all of the breastfeeding.
- The inability to "comfort suck" on the mother's breast. The baby may use other methods for comfort such as sucking on the thumb and fingers.
- A strong suck that maintains or increases an abundant breast milk supply.

- Adequate urine/stool output or weight gain.
- Explosive and watery green stools. This may occur because the baby receives too much lower fat breast milk too fast. This may happen when a baby is switched to the second breast too soon, i.e. before the baby is allowed to finish the first breast. The baby is finished with the first breast when she is no longer sucking and swallowing effectively and the mother's breast feels significantly softer. (See General Principles for further discussion of 'explosive' and watery green stools. See also *Protocol #3: Signs of Effective Breastfeeding*, and *Protocol #11: Crying and Colic in the Breastfed Baby*).

Later Phase (3 - 6 months)

Assess the mother for:

- Decreased breast milk supply (*Protocol #12: Insufficient Breast Milk Supply*).
- Diminished letdown reflex.
- Delaying breastfeeding even when the baby is showing feeding cues.

Assess the baby for:

- Ineffective breastfeeding for some or all breastfeedings. Assess the suck-swallow coordination.
- Partially or completely refusing the mother's breast.
- Inadequate weight gain.
- Dehydration.

Possible Contributing Factors or Causes

Assess the mother for:

- Switching the baby from one breast to the other side

before the baby is finished the first breast. The baby is finished with the first breast when he/she is no longer sucking and swallowing effectively and the mother's breast feels significantly softer (*Protocol #3: Signs of Effective Breastfeeding*).

◦ Switching breasts too soon may:

- Increase stimulation to the mother's breasts which may increase breast milk production.
 - Cause the baby to receive more lower fat breast milk from two breasts instead of feeding from one breast long enough to receive the fat as more breast milk is removed from the breast.
- Knowledge of infant breastfeeding behaviours.
 - Delaying or scheduling breastfeedings.
 - Waiting for the baby to cry before offering the mother's breast. Crying is a late sign of hunger (*Protocol #3: Signs of Effective Breastfeeding for Early Feeding Cues*).

Assess the baby for:

- Being overly hungry and frantic, showing signs of late feeding cues, i.e. crying, fussiness, exhaustion, falling asleep (*Protocol # 1: The Initiation of Breastfeeding*).
- Ineffective positioning and latching.

Suggestions

1. Assess for possible cause(s) of an overabundant breast milk supply/overactive letdown reflex (see previous section on *Possible Contributing Factors or Causes*).
2. Provide the mother with suggestions for breastfeeding with an overabundant breast milk supply/forceful letdown reflex.

Initial Phase (the first 3 months)

Encourage the mother to:

- Breastfeed early and frequently whenever the baby shows early feeding cues, e.g., rapid eye movements under the eyelids as the baby begins to wake, sucking/licking, hands to mouth, increased body movement, and making small sounds.
- Breastfeed when the baby is calm, before the baby gets too hungry or frantic. A ravenous baby may latch more vigorously and cause a more active

letdown reflex.

- Breastfeed in a calm and relaxed atmosphere.
- Clothe the baby in a diaper only when breastfeeding to promote skin-to-skin contact.
- Support the baby's back so that the baby is in a vertical position, chest-to-chest with the mother, with the baby's nose approaching the mother's nipple.
- Use effective positioning and latching techniques, i.e., the baby is supported in a vertical chest-to-chest position so that the baby's head is able to tilt back slightly and the chin touches the mother's breast first. This will direct the flow of breast milk upward towards the hard palate and not to the back of the baby's throat, making it more comfortable for the baby to manage the breast milk flow (see *Protocol #2: Positioning and Latching* for a discussion on Baby-led latching).
- Finish the first breast first (Renfrew et al., 2004). Allow the baby to breastfeed on the first breast until he is no longer sucking and swallowing effectively. Offer the second breast if the baby is interested.

Some mothers may:

- Offer only one breast at each breastfeeding.
- Offer the same breast from the previous breastfeeding again if the baby wants to breastfeed within 1–1½ hours of the last breastfeeding.
- Offer one breast for two breastfeedings if the breast milk supply is overly abundant.

This will gradually decrease the breast milk supply by decreasing stimulation and breast milk removal from the mother's breasts, so that the breasts can calibrate down to meet the baby's needs. The mother should be informed that as the breast milk supply decreases over a period of weeks or months she may need to begin to offer both breasts at each breastfeeding.

- If the breast where the baby is not feeding becomes uncomfortably full, the mother should express just enough breast milk to relieve the pressure. It is important she understands that she should avoid expressing breast milk between breastfeedings unless absolutely necessary for her comfort.

Additional suggestions to try if the baby is still experiencing difficulty. Encourage the mother to:

- Try using a position that will reduce the force of gravity on the mother's breasts to decrease the flow of breast milk and give the baby more control over the breast milk flow:
 - side-lying
 - semi-reclined – leaning back in a sitting position to breastfeed
 - lying on the her back with the baby lying face down on the mother's breast
 - sitting while the baby sits upright facing the mother's breast and straddling one of the mother's legs.
- Burp the baby frequently, especially if the baby is continuously gulping loudly throughout the breastfeeding.
- Try the following ideas to initiate letdown prior to a breastfeeding and to relieve the initial letdown before the baby latches:
 - Breastfeed in a quiet, relaxed place.
 - Use relaxation strategies – such as a warm shower, heat applied to her back and shoulders, relaxation breathing, a warm drink, supportive positions.
 - Manage pain to support comfort and relaxation, and facilitate breast milk letdown.
 - Initiate breastfeeding before the baby is stressed and crying.
 - Clothe the baby in a diaper only to promote skin-to-skin contact.
 - Support the baby's head higher than tummy in a chest-to-chest position, with the nose approaching the mother's nipple, to facilitate the normal neonatal reflexes and self-attachment behaviours.
 - Gently massage her breasts.
 - Gently stimulate the nipples. Gently roll the nipples between the thumb and index finger for several minutes or until the letdown reflex occurs and breast milk leaks.
 - Express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).

- Express some breast milk first before putting the baby on the mother's breast, as the first letdown reflex is usually the most forceful (*Protocol #19: Expressing and Storing Breast Milk*). Wait to place the baby on the mother's breast until after the sprays of breast milk from the first letdown subside to drips. This may help to prevent the baby from choking on the first forceful letdown. Some mothers may continue to experience a forceful letdown throughout the breastfeeding.
- Use relaxation breathing exercises or take an analgesic such as acetaminophen or ibuprofen, if the letdown reflex is painful. To inquire about the use of acetylsalicylic acid, i.e., aspirin, the mother should consult with the *Motherisk* program at 416-813-6780 or her primary health care provider.

If the baby still refuses the breast after trying the above suggestions, encourage the mother to:

- Express her breasts after each time that the baby is unable to breastfeed effectively.
 - If breastfeeding is stopped for any length of time, encourage the mother to express each breast regularly in order to maintain her breast milk supply. Generally, this should be at least 8 times a day, with a minimum of 1 expression overnight, to mimic the normal feeding pattern.
- If the mother's breasts become uncomfortable or full before the next expression, she should express just enough breast milk to relieve the pressure (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with expressed breast milk using an alternative feeding method, e.g., cup, spoon, syringe, finger feeding (*Protocol #18: Alternative Feeding Methods*). If expressed breast milk is not available, then an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- If the mother inquires about the use of nipple shields to manage overabundant breast milk flow, she should be supported in understanding the possible benefits and risks associated with their use. Offer further assessment and refer for further support as needed (see notes in *General Principles of Protocol #10: Ineffective Suck*).
- Seek assistance from a breastfeeding expert or breastfeeding clinic as soon as possible.

Between breastfeedings, encourage the mother to:

- Express just enough breast milk to relieve pressure if the mother's breasts are uncomfortably full.
- Avoid expressing breast milk unless absolutely necessary for her comfort.
- Seek assistance from a primary health care provider, breastfeeding expert or breastfeeding clinic if the above suggestions do not help with an overabundant breast milk supply/overactive letdown reflex. An evaluation for prolactinoma is recommended if the hyperlactation persists for more than 1–2 weeks.
- Hold her baby skin-to-skin, with or without attempting to have the baby latch. A baby may be so stressed trying to cope with the flow that the baby becomes disorganized. Holding the baby in a prone position on the mother's chest can help the baby to become calm and to self-regulate.

Later Phase (3–6 months)

- If the baby is refusing the mother's breast, refer to *Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch*.
- If the mother is experiencing decreased breast milk supply, refer to *Protocol #12: Insufficient Breast Milk Supply*.

General Principles

Optimizing breastfeeding by following the principles of early and frequent feeding, breastfeeding when the baby is calm and showing early feeding cues, ensuring effective positioning and latching techniques, including baby-led latching and skin-to-skin contact, and finishing the first breast first to promote a balanced breast milk production, can often prevent or help a mother to manage an overabundant breast milk supply or forceful letdown.

The Feedback Inhibition of Lactation (FIL) factor will reduced breast milk production to calibrate it to match the baby's needs. The amount remaining in the mother's breast represents what the baby does not need as long as the mother does not further express breast milk to drain her breast (see *How the Breast Works*). The mother should feel she needs to remove just enough breast milk for comfort, not to drain the breast.

Some mothers may produce more breast milk than is required for their babies' immediate needs. This may or may not combine with an overactive or forceful letdown reflex, causing the baby to receive too much

breast milk too quickly.

A baby who gets too much breast milk too quickly may become fussy and swallow too much air as a result of struggling with the breast milk overflow. The baby may choke, cough, or struggle at the breast shortly after beginning the breastfeeding. Coping with this may exhaust the baby and the baby may even come off the breast several times during the breastfeeding. Often the mother's breast milk will spray.

An overabundant breast milk supply or forceful letdown may lead to an ineffective latch and suck pattern. The baby may be unable to obtain or maintain an effective latch. The baby may swallow enough breast milk at the beginning of the letdown reflex and may never establish a coordinated suck-swallow-breathe pattern.

When latched effectively, the baby is better able to maintain the latch and manage the flow of breast milk. Supporting the baby to latch in a vertical chest-to-chest position, so that the nose is approaching the nipple and the chin touches the mother's breast first, ensures that baby's head will be able to tilt back slightly. This tilt of the head will direct the flow of breast milk upward at the hard palate and not directly to the back of the throat. For an adult this might compare to experiencing difficulty swallowing when water is squirted from a hose or sports water bottle towards the back of the throat. The adult would be able to swallow more easily if the water were squirted up at the roof of the mouth.

For the baby, it means that he simply gulps from the flow and does not have to suckle, thereby not initiating the tongue movements that are an important part of the suck cycle (*Protocol #3: Signs of Effective Breastfeeding* regarding the suck cycle, and *Protocol #2: Positioning and Latching*).

Untreated overabundant breast milk supply/overactive letdown reflex may lead to partial or complete breast refusal and a decreased breast milk supply at about 2–3 months after birth. Breastfeeding may have become a chronic negative experience for the baby and/or there may be cumulative effects of inadequate removal of breast milk from the breasts.

An overabundant breast milk supply and/or forceful letdown may mask a baby's weak or ineffective suck, when the baby does not need to suckle to obtain breast milk. If optimizing breastfeeding has not

improved the situation, the baby should be assessed further by the primary health care provider and/or breastfeeding expert.

Explosive and watery green stools may be a sign of pseudo lactose malabsorption caused by the baby receiving too much lower fat breast milk too fast. Historically, there may have been a misunderstanding that the breast milk flowing at the start of a feeding (sometimes called foremilk) has a higher level of lactose than the later breast milk (hindmilk). In fact, the concentrations of protein and lactose remain constant throughout the breastfeeding; it is only the fat concentration that varies, rising progressively during the breastfeeding. In effect, the low-fat breast milk feedings result in rapid gastric emptying, which in turn may lead to frequent breastfeedings. A high feeding frequency means that the baby receives a higher volume of lower fat breast milk thereby, increasing the lactose load (Woolridge & Fisher, 1988).

The fat content of breast milk changes during a breastfeeding. The baby initially receives breast milk that is lower in fat and there is a disproportionate ratio of fat to lactose (milk sugar). As the breastfeeding progresses, the fat content of the breast milk increases inversely proportional to breast emptiness.

When the mother switches breasts before the baby is finished with the first breast, the baby may receive mostly lower fat breast milk at that breastfeeding. The lower fat content in the diet may cause rapid gastric emptying and too much lactose reaching the intestines too soon.

If there is not enough of the enzyme lactase in the baby's digestive system to break down and absorb this rapid loading of lactose, the baby may show symptoms of lactose malabsorption that may resemble lactose intolerance, e.g., crying, gas, and explosive watery-greenish bowel movements.

A baby who receives large amounts of lower fat, low-calorie breast milk may present with inadequate weight gain. The maximum capacity for volume may be reached before the baby is able to obtain adequate calories (Woolridge & Fisher, 1988).

A mother expressing breast milk for comfort should limit the amount to avoid stimulating the breast to produce more breast milk.

A mother with an overabundant breast milk supply/forceful letdown reflex is more prone to recurrent plugged ducts and mastitis due to inadequate removal

of breast milk from the breast.

An overabundant breast milk supply/forceful letdown reflex that is treated will usually resolve within a few days or weeks. If the above strategies have not improved the situation, Lawrence suggests that the mother should be evaluated by her health care provider for a possible prolactinoma (2011).

Block Feeding – If the overproduction of breast milk has not improved by optimizing breastfeeding management (early and frequent feeding, breastfeeding when the baby is calm and showing early feeding cues, ensuring effective positioning and latching techniques, including baby-led latching and skin-to-skin contact, and finishing the first breast first), some lactation practitioners may recommend block feeding or Full Drainage and Block Feeding (FDBF) to reduce the oversupply. This treatment sequence was originally described by van Veldhuizen-Staas (2007) and is also described by Wilson-Clay (2008). It begins with “as-complete-as-possible” mechanical drainage of both breasts (for some women, mechanical drainage may be enough). Mechanical expression is more efficient and faster than hand expression, although possibly, may not keep up with the pace of breast milk replacement. The baby, now able to latch onto the drained breast, is offered both drained breasts until satisfied. The rest of the day is divided into equal blocks of time of 3, 4, 5 or more hours. The same breast is offered without restriction throughout each time block. At the end of a time block or a multi-hour sleep, the baby will be offered the other breast for all feedings within the next time block – one breast per time block. Intervals between the blocks will gradually increase as symptoms decrease (van Veldhuizen-Staas, 2007, and Wilson-Clay, 2008).

Dysphoric Milk Ejection Reflex (D-MER) – Some women experience a feeling of abrupt dysphoria or negative emotions that occurs just before breast milk release, usually continuing for no more than a few minutes. It may be related to inappropriate dopamine activity at the time of letdown, and may disappear suddenly or dissipate slowly. No research has been published yet, only case reports (Heise, A. M. Wiessinger, 2011). Lawrence advises that antidepressant therapy seems to work, and some clinicians suggest herbal remedies (2011).

There is a website where mothers may connect with each other: http://www.d-mer.org/Home_Page.html.

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Protocol #14

Jaundice in a Breastfed Baby



Protocol #14: Jaundice in a Breastfed Baby

Jaundice is a yellowish discoloration of the skin and whites of the eyes (sclera). It is a sign of elevated levels of bilirubin in the blood (hyperbilirubinemia) caused by the breakdown of red blood cells. Physiologic jaundice occurs as part of the normal physiologic changes after birth. In the breastfed baby this process may be prolonged to 3 weeks or longer. Breastfeeding can and should continue. When there are breastfeeding difficulties or inadequate breast milk intake, it may be known as “starvation” jaundice (Gartner, 2001). Pathologic Jaundice is due to underlying medical conditions (see General Principles).

Observation and Assessment

Physiologic Jaundice (Normal)	Pathologic Jaundice (Abnormal)
<p>Assess the baby for:</p> <ul style="list-style-type: none"> • Elevated bilirubin levels that normally develop between 2–5 days after birth, peaking on the third to fifth day of life. • Prolonged physiologic jaundice; elevated bilirubin levels rise or continue after the first week of life and peak between 10–21 days after birth. • Yellowing of the sclera, mucous membranes and/or skin, progressing from the head to the upper body. • Yellow urine. • Difficulty arousing for feeds, not showing obvious early feeding cues. • Sleepiness during breastfeeding. • Hydration status. • Effective breastfeeding and adequate weight gain. • Delay in passing of meconium. 	<p>Assess the baby for:</p> <ul style="list-style-type: none"> • Elevated bilirubin levels that are usually evident at birth or develop within 1–2 days after birth. • Bilirubin levels rising rapidly at 8.5 µmol/L (0.5 mg/dL) or more per hour (Lawrence, 2011). • Yellowing of the sclera, mucous membranes and/or skin, progressing from the head to the extremities. • Brown urine. • Difficulty arousing for feeds, not showing obvious early feeding cues. • Sleepiness during breastfeeding. • Delay in passing of meconium. • Abdominal distension. • Ineffective breastfeeding and inadequate weight gain. • A medical condition that: <ul style="list-style-type: none"> ◦ increases the breakdown of red blood cells, e.g., Rh or ABO blood incompatibility, Coombs +ve. ◦ interferes with the liver’s ability to process bilirubin, e.g., galactosemia, hypothyroidism, or ◦ increases the reabsorption of bilirubin by the bowels, e.g., gastrointestinal obstruction.

Adapted from Biancuzzo, 2003; Mohrbacher, 2010; Lauwers, 2011; Lawrence, 2011; Riordan, 2010.

Possible Contributing Factors or Causes

Physiologic Jaundice (Normal)

- The normal breakdown of red blood cells (hemolysis) after birth.
- The normal high levels of bilirubin in the meconium are reabsorbed by the intestines into the blood.
- The newborn's immature liver has a limited capacity to process the high levels of bilirubin that normally accumulate after birth.

Pathologic Jaundice (Abnormal)

Assess the baby for a possible medical condition that:

- Increases the breakdown of red blood cells (hemolysis), e.g., Rh or ABO incompatibility.
- Interferes with the liver's ability to conjugate bilirubin, e.g., G6PD deficiency, galactosemia, hypothyroidism.
- Increases the reabsorption of bilirubin by the intestines, e.g., gastrointestinal obstruction.

Factors that may be associated with hyperbilirubinemia in either physiologic or pathologic jaundice:

- Delayed initiation of breastfeeding.
- Infrequent breastfeedings.
- Inadequate intake of breast milk.
- Supplementation with water or sugar water.
- Mother's breast milk taking longer than usual to come in (i.e., delayed Lactogenesis II).
- Medical conditions, e.g., dehydration, sepsis.
- Prematurity.
- Low birth weight.
- Ethnicity.
- Birth interventions, trauma, pain, and stress.
- Urinary tract infection.

Suggestions

1. Assess whether the baby may have physiologic or pathologic jaundice (see *General Principles*). The baby will need to be assessed by a primary health care provider to rule out any medical condition, e.g., Rh or ABO blood incompatibilities, G6PD deficiency, galactosemia, hypothyroidism,

gastrointestinal obstruction.

2. Reassure and encourage the mother to continue to exclusively breastfeed unless medically contraindicated, e.g., presence of galactosemia (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

3. Reassure the mother that most healthy full-term babies recover from jaundice with no short- or long-term health effects.

4. Provide the mother with suggestions to help decrease the baby's bilirubin levels.

Encourage the mother to:

- Breastfeed frequently:
 - 8 times or more per day with no more than one 4–5 hour sleep period in 24 hours, including at least once overnight, until the jaundice is cleared.
 - The baby may need to be awakened to breastfeed if the baby is lethargic or sleeping for long periods.
- Understand that early feeding cues may be masked or diminished when a baby is jaundiced.
- Understand that she may need to anticipate possible breastfeeding opportunities when the baby is more easily aroused, based on the normal gastric emptying time of 90 minutes together with infant sleep cycles.
- Use effective positioning and latching practices (*Protocol #2: Positioning and Latching*).
- Ensure that the baby is sucking and swallowing effectively, transferring breast milk throughout the duration of each breastfeeding (*Protocol #3: Signs of Effective Breastfeeding*).
- Increase the amount of higher fat breast milk the baby receives by finishing the first breast before changing breasts. The higher fat breast milk will promote faster excretion of bilirubin in the stools.
- Allow the baby to breastfeed on the first breast until he is no longer actively sucking and swallowing. Then offer the second breast if the baby is interested.
- Use breast compressions to help increase effective sucking and swallowing and increase the amount of higher fat breast milk the baby receives (see *Protocol #5: Engorgement* for a description of

breast compressions).

- Use techniques to wake a sleepy baby, e.g., dress baby in a diaper only to promote skin-to-skin contact, gently massage the baby’s back, feet or hands, gently sit the baby up, talk to the baby, change the baby’s diaper, or change position.
- Ensure that the baby has adequate urine and stool output and is gaining weight appropriately (*Protocol #3: Signs of Effective Breastfeeding*).
- Discontinue any use of medications by the mother or baby that may increase the risk of kernicterus (brain damage), e.g., aspirin and other salicylates, and certain sulpha drugs.
- Avoid supplementing with water or sugar water, as this does not promote stooling.
- If the baby is assessed to need supplementation, first offer expressed breast milk (EBM). If EBM is not available, refer to *Protocol #17: Indications for Supplementation or Cessation of Breastfeeding* for discussion of appropriate alternatives.

If the baby is unable to breastfeed effectively, encourage the mother to:

- Express both breasts after each time that the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time, encourage the mother to express each breast regularly to maintain her breast milk supply. Generally, this should be at least 8 times a day, with a minimum of 1 overnight expression, to mimic the normal feeding pattern (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with EBM using an alternative feeding method, e.g., cup, spoon, syringe, finger feeding, or lactation aid on the breast (*Protocol #18: Alternative Feeding Methods*). Using a lactation aid on the breast is recommended first over the other alternative feeding methods if the baby is able to latch onto the breast. This method allows the baby to remain on the breast and provides the breasts with stimulation. If EBM is not available, refer to *Protocol #17: Indications for Supplementation or Cessation of Breastfeeding* for discussion of appropriate alternatives.
- Avoid supplementing with water or sugar water, as this does not support stooling.
- If phototherapy is required, the baby’s hydration status will need to be closely monitored. Phototherapy may place the baby at risk for

dehydration due to increased water loss through the stool and skin.

- Seek further assessment and follow-up from a breastfeeding clinic or breastfeeding expert as soon as possible.

General Principles

Jaundice is a symptom of hyperbilirubinemia—increased levels of unconjugated (indirect) fat-soluble bilirubin in the blood that deposits in the skin, muscles, and mucous membranes. Bilirubin is a yellow pigment that is a byproduct of the breakdown of red blood cells by the liver. The immature newborn liver may be unable to conjugate the large number of red blood cells that break down immediately after birth. The bilirubin must be eliminated in the stool or it will be readily reabsorbed in the intestine (Lawrence, 2011).

This yellowing of the skin is known as jaundice or icterus. It progresses in a cephalo-caudal pattern from the head to the trunk then to the extremities. As it may be less visible in darker pigmented skin, blanching of the skin may promote visibility.

Jaundice becomes visible in the sclera (eye) when the bilirubin level reaches about 5 mg/dL. As jaundice continues down the body the bilirubin level increases progressively. Jaundice from the head to the shoulders corresponds to bilirubin levels of approximately 5–7 mg/dL. Between the shoulders to the umbilicus, levels range between 7–10 mg/dL. Between the umbilicus to the knees, levels range between 10–12 mg/dL. Below the knees bilirubin levels are greater than 15 mg/dL (Kramer, 1969 in Lauwers, 2011).

The significance of the level of bilirubin must be considered in relation to many factors: the gestational age of the baby (< 37 weeks), the birth weight of the baby (< 2500 gm), the baby’s age at the onset of jaundice, whether the baby is healthy or has a medical condition, i.e., acidosis, anoxia, asphyxia, hypothermia, hypoglycemia, or infection (Lawrence, 2011 and CPS, 2011).

Bilirubin levels are screened using non-invasive methods such as transcutaneous bilirubinometers or “flash” to determine the need for more invasive diagnostic tests to evaluate serum blood levels.

While more than half of all newborns will develop jaundice within the first week of life (Gartner, 2010), most cases of jaundice in the healthy full-term baby

are part of a normal physiological condition that will resolve within a few days or weeks with no phototherapy treatment required.

Birth interventions, trauma, pain, and stress may delay or interfere with frequent breastfeeding or be associated with increased bleeding, e.g., caesarean birth, bruising from forceps or vacuum delivery, shoulder dystocia, cephalhematoma, internal bleeding.

In recent years there have been changes in the clinical assessment and management of baby hyperbilirubinemia. A less aggressive approach to treatment has been followed since Newman and Maisels reported a low risk of toxicity for healthy term newborns with physiologic jaundice (Newman et al., 1992). There was an understanding that lower levels of physiologic jaundice could be managed by increased breastfeeding without phototherapy. Shorter hospital stays and higher breastfeeding rates have led to a re-examination of the significance of clinical jaundice (CPS, 2011).

Bilirubin levels often peak post-discharge. In the first week, the clinical significance of jaundice is evaluated relative to risk factors such as baby age by hour, weight, gestational age, sepsis, need for resuscitation, and hemolysis. In addition, the significance of successful establishment of breastfeeding is recognized. More frequent breastfeeding during the first few days has been associated with lower bilirubin levels (Clarke et al., 2003).

Extreme hyperbilirubinemia may result in permanent brain damage, known as bilirubin encephalopathy or kernicterus.

Supplementation with water interferes with mechanisms to prevent and decrease jaundice. Supplements interfere with the successful establishment of breastfeeding that is limiting the intake of colostrum and breast milk important for enhancing stool output (de Carvalho in Biancuzzo, 2003). Water and dextrose water supplements have been associated with increased bilirubin levels in term breastfed babies (Nicoll in Lawrence, 2011).

The evidence is inconclusive to support direct exposure to sunlight for the treatment of jaundice. The Australian Medical Association found no controlled trials comparing exposure to sunlight against either no treatment or exposure to artificial light and suggests

that the use of sunlight may be based on anecdotal reports (Johnson et al., 2003). Moreover, the promotion of sunlight is contradictory to other public messages for parents to limit sun exposure (Harrison et al., 2002). Maisels advises that sunlight will lower serum bilirubin level, but the practical difficulties involved in safely exposing a naked newborn to the sun either inside or outside (and avoiding sunburn) preclude the use of sunlight as a reliable therapeutic tool (Maisels et al., 2008).

Mothers may perceive any jaundice as a serious medical problem and prematurely discontinue breastfeeding. They may feel guilty and believe that their breastfeeding caused the jaundice (Hannon et al., 2001). It is important to assess the maternal interpretation of information as well as to reinforce the importance of frequent breastfeeding to help resolve physiologic jaundice.

There are two major categories of jaundice: Physiologic (normal) or pathologic (abnormal).

Physiologic Jaundice (Normal)

- Physiologic jaundice usually develops between 2–5 days after birth, peaking on the third to fifth day of life.
- Bilirubin levels range between 104–291 μmol (7–17 mg/dL) (Dennerly et al., 2001).
- It is caused by a combination of 3 factors:
 - the normal breakdown of excess red blood cells (hemolysis) after birth.
 - the normal high levels of bilirubin (in the meconium), which is reabsorbed by the intestines into the blood, and
 - the newborn's immature liver which has a limited capacity to process the high levels of bilirubin after birth.
- The normal lysis may be exaggerated following birth trauma.
- In most cases, physiologic jaundice is a normal clinical condition in the healthy full-term baby that usually resolves in a few days or weeks when the baby's liver matures and eventually processes the excess bilirubin.
- Phototherapy treatment is usually not required in cases of physiologic jaundice unless the bilirubin levels become exaggerated due to breastfeeding difficulties and inadequate intake of breast milk (*Protocol #1: The Initiation of Breastfeeding*).

- Physiologic jaundice is more prevalent and may appear later among babies whose ethnic background is Chinese, Japanese, Korean, or Native American (Lawrence, 2011, Brown et al., 2011).
- Physiologic jaundice that appears or continues after the first week of life in conjunction with appropriate weight gain was previously referred to as “late onset” or “breast milk jaundice”. Physiologic jaundice that is prolonged beyond the first week of life is now recognized as a normal extension of physiologic jaundice in the healthy full-term baby who is breastfed.
- One third of all breastfed babies are clinically jaundiced in the third week (Gartner, 2010). Prolonged physiologic jaundice will peak between 10–21 days after birth and may last for up to 3 months. Any pathological cause of jaundice will need to be ruled out. The breastfed baby with prolonged physiologic jaundice will be breastfeeding and gaining weight well and is generally healthy. Phototherapy treatment is usually not required in cases of prolonged physiologic jaundice. Breastfeeding can and should continue whether the baby is treated or not.
- Offering support for early and frequent breastfeeding is the preferred approach.

Pathologic Jaundice (Abnormal)

- Pathologic jaundice is usually evident at birth or develops within 1–2 days after birth with high or rapidly rising bilirubin levels at a rate of 8.5 µmol/L (0.5 mg/dL) or more per hour (Lawrence, 2011).
- It is caused by a medical condition that:
 - Increases the breakdown of red blood cells (hemolysis), e.g., Rh or ABO blood incompatibility, alloimmunity or antibody mediated hemolysis (+ve direct Coombs test).
 - Interferes with the liver’s ability to process bilirubin, e.g. G6PD, galactosemia, hypothyroidism, or
 - Increases the reabsorption of bilirubin in the intestines, e.g., gastrointestinal obstruction.
- Pathologic jaundice may need immediate medical treatment, including possible exchange transfusion. The baby will also need to be treated for the underlying medical condition causing the jaundice.
- Breastfeeding can and should continue during treatment, with the rare exception of galactosemia, for which the baby will need to be placed on a lactose-free artificial baby milk. Galactosemia is an inherited metabolic disorder that results in the inability to metabolize lactose.

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Protocol #15

Candidiasis (Thrush)



Protocol #15: Candidiasis (Thrush)

Candidiasis is an infection caused by a fungus or yeast called Candida albicans. It may infect the baby's mouth, anus or buttocks, the mother's breasts, vagina and/or hands. It can be passed back and forth between mother and baby. It can interfere with the success of breastfeeding. Both mother and baby must be treated simultaneously regardless of concurrent symptoms.

Observation and Assessment

With a Candida infection symptoms can appear in the mother and/or baby.

Assess the mother for:

- Persistent cracked or painful nipples that do not heal despite proper positioning and latching as well as effective sucking and swallowing (*Protocol #3: Signs of Effective Breastfeeding*).
- Painful nipples that develop suddenly when breastfeeding was previously going well.
- Severe nipple pain that lasts throughout the entire feeding and immediately after breastfeeding.
- Sharp shooting or burning pain in the mother's breast during or after breastfeedings.
- Nipples that may be red, sore, cracked, itchy, burning, or painful.
- Areolae that may be red, swollen, flaky/scaly, or shiny in appearance.
- Recurrent mastitis.

Assess the baby for:

- Change in breastfeeding behaviour.
- Temperament change, e.g., gassy, cranky behaviour.
- Breast refusal, e.g., repeated pulling off the mother's breast, making clicking sounds, or refusing to breastfeed because the baby's mouth is sore (Hafner-Eaton in Mohrbacher, 2003).
- Frequent breastfeeding.
- White patches or plaque on the tongue, gums, inner cheeks, or soft palate that cannot be wiped off with a clean damp cloth.
- Slow weight gain (*Protocol #12: Insufficient Breast Milk Supply*).
- Diaper rash that has raised, red, sore-looking pustules or red, scalded-looking buttocks (Riordan,

2010), or a rash that does not respond to zinc oxide treatment.

Possible Contributing Factors or Causes

Candidiasis may be associated with one or more underlying factors that may be mother and/or baby related.

Assess the mother for:

- A current Candida infection, e.g., vaginal.
- A history of recurrent vaginal yeast infection.
- A vaginal yeast infection during pregnancy, after delivery, or in recent weeks.
- Nipple trauma.
- Diabetes.
- Repeated or recent antibiotic therapy.
- Repeated use of plastic-lined nursing pads, which create a warm and moist environment for the growth of Candida albicans.
- Use of oral contraceptives containing estrogen.
- Repeated or long-term use of steroids, such as for asthma.

Assess the baby for:

- A current Candida infection.
- Repeated or recent antibiotic therapy.
- Repeated use of a pacifier.

Suggestions

1. Assess for possible cause(s) of the candidiasis (see previous section on *Possible Contributing Factors or Causes*). The mother and baby may need further assessment by a physician for diagnosis and treatment of the infection.

2. Provide the mother with suggestions for breastfeeding with candidiasis. Breastfeeding can and should continue during a Candida infection and throughout the course of antifungal treatment.

Before breastfeeding, encourage the mother to:

- Ensure that the letdown or breast milk ejection reflex is initiated. The baby's rooting, sucking and hand movements on the mother's breast are the natural stimuli for letdown when breastfeeding is initiated early and the baby is calm, before the baby is overly hungry and begins crying (*Protocol #3: Signs of Effective Breastfeeding*).

The mother can try the following techniques to initiate letdown:

- Breastfeed in a quiet, relaxed place.
- Use relaxation strategies, e.g., a warm shower, heat applied to her back and shoulders, relaxation breathing, a warm drink, supportive positions.
- Manage pain to support comfort and relaxation and facilitate breast milk letdown.
- Initiate breastfeeding early, before the baby is stressed and crying.
- Clothe the baby in only a diaper to promote skin-to-skin contact.
- Support the baby in a vertical chest-to-chest position, with the nose approaching the mother's nipple, to facilitate the baby's reflexes and self-attachment behaviours.
- Gently massage the mother's breasts. Apply moist or dry heat to the mother's breasts for a few minutes before or during massage until letdown occurs. Heat may be applied with a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low, or a hot water bottle wrapped in a cloth. Some mothers may prefer to apply a cool cloth if her breasts are feeling itchy or irritated. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Stimulate the nipples. Gently roll the nipples between the index finger and thumb for several minutes or until the letdown reflex occurs. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- If only one side is sore, try breastfeeding on the pain-free side first until the letdown reflex occurs. Then switch to the sore side.

- Numb her nipple if it is sore just before latching by applying ice wrapped in a clean cloth to the sore nipple for a few seconds. Avoid prolonged exposure to the ice; this can inhibit the letdown reflex and cause tissue trauma.

During breastfeeding, encourage the mother to:

- Check for effective positioning and latching practices (*Protocol #2: Positioning and Latching*).
- Check for effective sucking and swallowing (*Protocol #3: Signs of Effective Breastfeeding*).
- Avoid pulling the baby off her breast. If the mother decides to take the baby off her breast before the baby is finished, suggest that she break the suction by trying one of these methods:
 - Press down on her breast near the baby's mouth.
 - Gently pull down on the baby's chin.
 - Gently insert a finger into the corner of the baby's mouth.
 - Bring the baby in closer to her breast so that the nose is covered briefly with breast tissue; this may be more effective for an older baby.

After breastfeeding, encourage the mother to:

- **Wash her hands frequently** to avoid spread of the candidiasis. Wash hands in warm, soapy water before and after breastfeeding, before and after handling her breasts or expressing breast milk, as well as before and after diapering the baby.
- Wash her breasts and nipples with clear water at the end of each breastfeeding and then air dry. Do not apply or leave expressed breast milk on her breast. Breast milk left on her breast may encourage the growth of *Candida albicans*.
- Apply a cool cloth for comfort. Some practitioners suggest that the mother apply a cool cloth soaked in vinegar to her breasts. Discontinue use if the mother's breasts become irritated.
- Avoid using breast pads if possible. If used, change breast pads after each breastfeeding or more often if they become wet.
- If breast pads are needed for leaking, use 100% cotton, not plastic-lined pads. 100% cotton breast pads are more breathable and reduce trapping of moisture against the nipples.
- Use well-ventilated breast shells between

breastfeedings if her nipples are too painful when they come in contact with a bra or clothing.

- Express both breasts after each time the baby is unable to breastfeed effectively. If breastfeeding is stopped for any length of time, encourage the mother to express each breast on a regular basis in order to maintain breast milk supply. Generally, this is at least 8 times a day, including once overnight, or more often if her breasts become uncomfortable or overly full (*Protocol #19: Expressing and Storing Breast Milk*).
- Avoid saving and freezing expressed breast milk (EBM) during a candidiasis outbreak. EBM can be used on the day that it is expressed.
- Sterilize all breast pump parts that touch the breast each day. Wash all items in hot soapy water first. Rinse thoroughly. Boil in a covered pot of water for 10 minutes. Allow the items to air dry.

Antifungal Precautions

Encourage family members to:

- **Wash their hands frequently** to avoid the spread of candidiasis. Wash hands in warm, soapy water before and after handling breasts, breast milk or infant feeding equipment, as well as before and after diapering the baby.
- Thoroughly wash and then boil once a day all items that come in contact with the baby's mouth, e.g., toys, pacifiers, bottle nipples, teethingers.
 - Wash items daily in hot, soapy water first. Rinse thoroughly. Boil in a covered pot of water for 10 minutes. Allow the items to air dry.
 - Frequently wash toys that cannot be boiled in very hot, soapy water and rinse well.
- Pacifiers, bottle nipples, and teethingers should be discarded and replaced with new ones after one week of antifungal treatment (see the following section on *Antifungal treatment*).
- Avoid antibiotics unless absolutely necessary. When necessary, a short course of antibiotics should be used.
- Inform the sexual partner of the possibility of concurrent yeast infections and the need to be treated for candidiasis if there is a history of recurrent vaginal yeast infections. Use of condoms is recommended.
- Avoid bathing with other family members.

- Avoid sharing personal items with other family members (e.g., toothbrush, cup).
- Eat a well-balanced diet that follows *Eating Well With Canada's Food Guide* (Health Canada, 2007).

Antifungal treatment:

- Support the mother to make an informed decision about the use of antifungal treatment. It is important that she understand the benefits and risks associated with treatment for candidiasis to enable her to make a fully informed decision.
- Breastfeeding can and should continue throughout the course of antifungal treatment.
- Both the mother and baby need to be treated simultaneously with antifungal medication even if one of them is asymptomatic. Treatment may be needed even when cultures are negative for both the mother and baby.
- With antifungal treatment, the symptoms may worsen first before improving. The more severe the infection, the longer it will take the treatment to work.
- Topical treatments are usually the first course of treatment.
- Systemic treatments may be needed for recurrent or ongoing candidiasis.

Over-the-Counter Treatments

- Gentian violet (topical)
- Miconazole (topical)
- Ketoconazole (topical)

Treatments that Require a Prescription

- Nystatin (topical or oral)
- Medications including "azole", e.g., clotrimazole (topical), miconazole (topical), itraconazole (oral), ketoconazole (topical or oral), and fluconazole (oral).
- All Purpose Nipple Ointment (APNO)

For further information see *General Principles*.

- Although specific research has not been found to support the use of vinegar as a disinfectant in breastfeeding, it is readily available, inexpensive, and the idea for its use is suggested from other sciences such as microbiology and dentistry (Pinto, 2008). Some practitioners suggest using it

to disinfect items and clothing (Riordan, 2010; Tait, 2000; Pinto et al., 2008). However, it should be noted that some women may find it irritating to their skin (Hanna et al., 2011).

- Other creative suggestions found in the literature include application of tea bags and essential oils such as peppermint or tea tree oil. Although the evidence of their effectiveness is mixed (Abdul-Rahman et al., 2005; Agarwal et al., 2007; Devkotte et al., 2005; Inouye et al., 2009), many of these substances have been used traditionally in many cultures.
- Systemic antifungals may not combine well with some other medications. Before taking any other medicine or over-the-counter preparation, the mother should consult her primary health care provider or *Motherisk* at 416-813-6780.
- Some experts may recommend other topical preparations based on clinical observations. These may include mupirocin, grapefruit seed extract, or mixtures of mupirocin, betamethasone ointments, and miconazole powder.
- Controlled clinical trials for efficacy and appropriate treatment are not available (Lawrence, 2011). A review of Hale (2010a) indicates that there are no American Academy of Pediatrics (AAP) ratings for many antibiotics and steroids; their effects on the baby are unknown.
- It is also very important not to confuse grapefruit seed extract with grape seed, which can be very toxic.

General Principles

Candidiasis is a fungal infection caused by a yeast called *Candida albicans*. If the infant's infection is oral it may be known as monilia or thrush. In lactating women it may also be called Mammary candidiasis. *Candida* is a commensal organism colonizing the oropharynx, gastrointestinal tract, vagina and skin, usually without ill effect until a change disrupts the balance (Lawrence, 2011). It thrives in warm, moist areas such as the mother's nipples, breast milk ducts and vagina, and the baby's mouth and diaper area.

Candidiasis should be suspected if a mother has persistent sore nipples (Riordan, 2010), sometimes with no identified problems with latching, positioning, or sucking.

Riordan refers to candidiasis as a "family disease", because of the easy communicability and cross-

infection between family members (Riordan, 2010). Simultaneous treatment is recommended for all members with or without symptoms.

It is important to reassess positioning, latching, and sucking if candidiasis is suspected, before and after treatment.

Diagnosis is usually based on clinical signs and symptoms (Francis-Morrill et al., 2004). A survey of members of the Academy of Breastfeeding Medicine indicated that most physicians do not use laboratory cultures for diagnosis (Brent, 2001). Cultures are problematic because it takes several weeks for results and it is difficult to differentiate an infection from normal skin bacterial colonization (Chetwynd, 2002) because *Candida* is part of the normal flora. Francis-Morrill et al. (2004) reported that the predictive value of colonization was highest when combined with three or more signs or symptoms (Francis-Morrill et al., 2004).

Candidiasis must be treated with antifungal medication. Both the mother and the baby must be treated simultaneously even if one of them is asymptomatic. Breastfeeding can and should continue during a *Candida* infection and during the course of antifungal treatment.

Over-the-Counter Treatments

Gentian violet (topical) – Historically gentian violet has been observed to be an exceptionally effective antifungal and antimicrobial treatment for candidiasis, with few apparent adverse effects. Hale rates gentian violet as L3 (moderately safe). It is available without prescription. It often provides some relief of symptoms within hours of the first treatment and usually complete relief of symptoms within 3–4 days. Readily accessible, it is recommended with increasing frequency by lactation experts (Hale, 2010a & b; Lawrence, 2011; Riordan, 2010; Mohrbacher, 2010). However, mothers should be informed that controlled clinical trials for efficacy and toxicity are not available.

- Application – Gentian violet diluted to 0.25–0.5% solution is painted onto the affected areas using a fresh ear swab (Q-tip) once a day, for a course of no more than 3–7 days. The baby can suck on the swab after the feeding. Alternately, the mother can apply gentian violet directly to her breast before a feeding. Do not repeat without further assessment (Adapted from Hale, 2010a & b).

- Gentian violet treatment is messy. It is a strong purple dye that is difficult to remove. Mothers should also be informed that if gentian violet is over-used or is in an over-concentrated solution, it may cause ulceration of the baby’s mouth, resulting in refusal to feed.

Miconazole or clotrimazole (topical) – Cream or lotion applied to the mother’s nipples or areole 2–4 times a day for 7 days (Amir et al., 2002). It is rated as L2 (safer), as very little is absorbed systemically (0.1%) and there is poor oral absorption (Hale, 2010a).

Ketoconazole (topical) – Cream or lotion applied directly to the mother’s nipples or areolae 2 to 4 times a day until at least 2 days after symptoms have disappeared (Amir et al., 2002).

Treatments that Require a Prescription

Nystatin (topical or oral) – Previously the most common medication prescribed for *Candida albicans*, although its effectiveness is questionable (Hale, 2010b; Chetwynd, 2002). Hale reports that some studies suggest that nystatin resistance is increasing and only 45% of strains are sensitive to nystatin (Hale, 2010b). Nystatin cream is applied to the mother’s nipples and areole. Nystatin suspension may be applied to the baby’s mouth, but is poorly absorbed orally (Hale, 2010b). If nystatin is prescribed, the cream and suspension will need to be applied to the appropriate areas after every breastfeeding for a course of 2 weeks. The cream will also need to be applied on the baby’s buttocks if a diaper rash is present. Due to poor oral absorption, there is little likelihood that it would get into the breast milk (Hale, 2010b). Hale rates it as L1 (safest) (2010a).

Fluconazole/diflucan (oral) – Fluconazole is used for mothers when topical treatments are ineffective. Hale advises that it is cleared for use in infants 6 months and older but not for neonates (Hale, 2010b).

Medications including the “azoles” – Includes clotrimazole (topical), miconazole (topical), itraconazole (oral), ketoconazole (topical or oral), and fluconazole (oral). (For further discussion see Hale, 2010b and CPS, 2007.)

All purpose nipple ointment – A compounded ointment developed by Canadian paediatrician Dr. Jack Newman, known as all-purpose nipple ointment (APNO) contains an antibiotic, steroid, and antifungal (Newman, 2009). It is commonly recommended but not yet researched (Mohrbacher,

2010; Lauwers & Swisher, 2011). Although Mohrbacher suggests it may be an option for Stage I, II and III nipple trauma (Mohrbacher, 2010), dermatologists rarely use a cream with multiple active ingredients because “the bad effects often outweigh the good” (Lawrence, 2011), and it is difficult to determine the source of a negative reaction.

Mothers may also find information about the management of *Candida albicans* available on the Internet. This may include information from Thomas Hale, a pharmacist with expertise related to medications and breastfeeding at:

- Thomas Hale’s website for parents:
<http://www.infantrisk.com/category/breastfeeding>.

And/or handouts from Dr. Jack Newman, who has been a pioneer in supporting breastfeeding mothers:

- *Candida protocol*: <http://www.breastfeedinginc.ca/content.php?pagename=doc-CP>.
- *Using gentian violet*:
<http://www.breastfeedinginc.ca/content.php?pagename=doc-UGV>.

Freezing breast milk contaminated with *Candida* will temporarily deactivate the yeast but will not destroy it (Riordan, 2010). If contaminated frozen expressed breast milk is fed to the baby after the treatment of candidiasis is completed, this could cause the infection to recur. It should be noted that freshly expressed breast milk can be fed to the baby during a candidiasis outbreak.

The **Antifungal Precautions** discussed above are based on the understanding that fungi like *Candida albicans* are considered to be microbes that require “intermediate-level disinfection”. Disinfection is a process that kills nearly all disease-producing organisms, including fungi, but not resistant bacterial spores (CPSO, 2004).

There is inconsistency among the recommendations regarding the cleansing and sterilization of equipment and toys.

The Canadian Paediatric Society recommends that parents boil items for 10 minutes (Sacks, 2009). Some practitioners recommend boiling items for 20 minutes when there is recurrent infection (Mohrbacher, 2010; Lauwers et al., 2011).

Some practitioners recommend boiling or treating items only when there is recurrent infection

(Mohrbacher, 2010; Riordan, 2010), recognizing that the amount of work is stressful for the family. The effectiveness of pharmaceutical treatment should be evaluated first.

Dietary recommendations – It is very important that lactating women eat a well-balanced diet that follows *Eating Well With Canada's Food Guide* (Health Canada, 2007). Some experts may recommend specific dietary changes to reduce the potential for recurrent candidiasis. It is important that the mother be encouraged to consult a Registered Dietitian before making any dietary changes:

- Examples include recommendations to reduce the ingestion of dairy products, heavily sweetened

foods and artificial sweeteners; to reduce the ingestion of alcohol, cheese, bread, wheat products, sugar, honey, and condiments; or to eat plain yogurt with active acidophilus or take acidophilus supplements, as these may decrease the recurrence of candidiasis.

- According to Heinig et al. (1999), these recommendations are not supported by the current scientific evidence. No studies were found of specific nutritional interventions among lactating women (Heinig et al., 1999).

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Protocol #16

Drugs and Breastfeeding



Protocol #16: Drugs and Breastfeeding

Most drugs can be safely used by breastfeeding mothers, but a risk-benefit assessment for both mother and baby is required prior to use. With the proper choice of medication, maternal conditions should be treated and breastfeeding can continue during drug therapy. In contrast, the risks to the infant of artificial baby milk (ABM) are significant and should not be trivialized (Adapted from Hale, 2010 Hale, 2010).

Suggestions

Encourage the mother in understanding:

1. There are possible benefits and risks related to the use of a medication during breastfeeding and that she may require support from a health care provider to make a fully informed decision.

2. It is rarely appropriate for a mother to forego the benefits of necessary pharmacological therapy in order to breastfeed. This includes physical and mental health therapies.

3. If the use of a drug is necessary or it can be postponed, e.g., for a medical condition that does not need to be urgently diagnosed or treated.

4. Medications and herbs not absolutely necessary should be avoided (Hale, 2010b).

5. When it is necessary for her to take a drug, the drug that is chosen should ideally:

- Be compatible with breastfeeding.
- Be taken with at minimum dose that is effective and for the shortest duration.
- Be used in paediatric drug therapy.
- Have the least toxic effect on the baby.
- Have the shortest half-life.
- Have the least concentration in breast milk, e.g., low breast milk-to-plasma ratio.
- Have the poorest oral bioavailability to limit oral absorption.
- Have published controlled studies.

6. Before the mother takes any drug, it should be checked for compatibility with breastfeeding with:

- the prescribing health care provider, or
- the *Motherisk* program at the Hospital for Sick Children at 416-813-6780, the *Motherisk* Helpline

at 1-877-327-4636, or online: <http://www.motherisk.org/women/breastfeeding.jsp>, or

- Thomas Hale's website: <http://www.infantrisk.com/category/breastfeeding>, or
- a breastfeeding clinic.

7. Before she takes a drug there should be an evaluation of the age, stability, and condition of the baby to determine if the baby can handle exposure to the medication.

8. If the drug chosen is compatible with breastfeeding, she should be encouraged to take the drug during or immediately after breastfeeding, especially at times when the baby sleeps for longer periods. This will maximize the clearance of the drug from the breast milk before the next feeding.

9. If she is prescribed a necessary drug that is contraindicated with breastfeeding, she should inquire whether there is an alternative drug that is compatible with breastfeeding. Information about specific drugs and breastfeeding can be obtained from:

- the prescribing health care provider
- the *Motherisk* program at the Hospital for Sick Children 416-813-6780, the *Motherisk* Helpline at 1-877-327-4636, or online: <http://www.motherisk.org/women/breastfeeding.jsp>
- Thomas Hale's website: <http://www.infantrisk.com/category/breastfeeding>
- a breastfeeding clinic.

10. If she is prescribed a necessary **drug that is contraindicated with breastfeeding** and there is no alternative drug that is compatible with breastfeeding, she should be encouraged to:

- Discontinue breastfeeding until it is safe to resume.

- Express both breasts on a regular basis in order to maintain her breast milk supply. Generally, this should be at least 8 times a day, with a minimum of 1 expression overnight, to mimic the normal feeding pattern. The mother may need to express more often if her breasts become uncomfortable or full. Discard the expressed breast milk (EBM) (*Protocol #19: Expressing and Storing Breast Milk*).
- Feed the baby with a supplement using an alternative method not at the breast, e.g., cup, spoon, syringe, finger feeding (*Protocol #18: Alternative Feeding Methods*). EBM that was collected prior to the use of the drug can be used as the supplement. If previously collected EBM is not available, an appropriate supplement should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

11. The following drugs should be avoided or limited when breastfeeding:

Tobacco

If the mother smokes cigarettes, inform her that:

Smoking is not recommended in breastfeeding mothers.

- Breastfeeding remains the recommended method of infant feeding even if the mother smokes.
- Nicotine rapidly concentrates in breast milk immediately after smoking. Nicotine and its major metabolites have also been found in the breast milk of mothers who are exposed to second-hand smoke.
- Excessive nicotine in breast milk may irritate the baby's gastrointestinal system and may cause vomiting, diarrhea, increased heart rate, and fussiness.
- Smoking can affect breast milk production and may negatively impact infant growth and alter the baby's sleep patterns in the short term (Health Canada, 2012).

Encourage the mother to:

- Decrease the number of cigarettes she smokes or try to quit smoking. Information about smoking cessation is available from the Smokers' Helpline at 1-877-523-5333 or <http://www.smokershelpline.ca/>.
- Try to smoke immediately after breastfeeding when the baby is sleeping for longer periods (the half-life of nicotine in breast milk is between 60–90 minutes (AAP, 2001)).
- Avoid exposing the baby to second-hand smoke

from any source. Do not smoke indoors or in the car. Children exposed to second-hand smoke have an increased risk of health problems such as asthma, bronchitis, pneumonia, ear infections, and Sudden Infant Death Syndrome. (*Adapted from information from Motherisk (2005) and CAMH (2003)*).

Caffeine

If the mother consumes caffeinated beverages, encourage her in understanding that:

- Caffeine passes into breast milk and reaches peak levels within 60–120 minutes of maternal consumption (Hale, 2010a).
- Excessive caffeine in breast milk may cause the baby to become overstimulated, e.g., wide-eyed, active, alert, have difficulty sleeping, and unusually fussy (Mohrbacher, 2010).
- Caffeine can be found in many foods and drugs in addition to beverages, e.g., foods containing chocolate, some analgesics and cold remedies, coffee, tea, most cola soft drinks, and some energy drinks. (*Source: Adapted from Health Canada, Fact Sheet – Caffeine It's Your Health, 2011 and Fact Sheet – Caffeine in Food, 2011.*)

Encourage the mother to:

- Limit her intake of caffeine to 300 mg per day from all sources. On average (where 1 cup is equal to 8 fluid ounces or 250 ml), 300 mg of caffeine would be contained in:
 - less than 2 cups of filter drip coffee
 - 3 cups of instant coffee
 - 6 cups of tea
 - 6 cans of cola beverages (where a can is 12 fluid ounces or 355 ml)
- Try to consume caffeinated beverages, foods or drugs immediately after breastfeeding when the baby is sleeping for longer periods. (*Source: Adapted from Health Canada, Fact Sheet – Caffeine It's Your Health, 2011 and Fact Sheet – Caffeine in Food, 2011.*)

Alcohol

Moderate, occasional alcohol consumption is not likely to pose a problem to an infant, but heavy alcohol consumption is to be avoided. Wait at least 2 hours before breastfeeding the baby to avoid unnecessary infant exposure (*Motherisk, 2003; Best Start, 2005*).

If the mother consumes alcohol, inform her that:

- Alcohol passes into breast milk. Any alcohol consumed by a breastfeeding mother will pass into her breast milk in concentrations similar to her own bloodstream.
- Alcohol is not stored in breast milk.
- Just moderate levels of alcohol in breast milk have potential or proven adverse effects for the baby.
- Alcohol has been associated with impaired motor development.
- Alcohol has been associated with altered sleep patterns in the baby.
- Alcohol has been associated with a risk of hypoglycemia in the baby.
- Alcohol may inhibit the letdown reflex (Coiro et al., 1992, and Cobo, 1973).
- Alcohol may alter the odour or taste of breast milk (Mennella, 1998, 1993).
- Alcohol has been associated with decreased breast milk intake by the baby (Mennella, 2001).
- Excessive alcohol consumption may impair her ability to care for her baby.
- Alcohol content in non- or low-alcohol beverages may be higher than declared (Goh et al., 2010).
- 1 drink = 340 g (12 oz) of 5% beer, or 141.75 g (5 oz) of 11% wine, or 42.53 g (1.5 oz) of 40% alcohol (Koren, 2002; Best Start, 2005).

Encourage the mother to:

- Avoid or limit her intake of alcohol to an occasional drink.
- If the mother decides to consume alcohol on a limited basis, advise her that she can ensure that her baby is not exposed to any alcohol by:
 - careful planning of the breastfeeding schedule, i.e., breastfeed first, drink after (CAMH, 2003),
 - storing EBM before drinking, and/or
 - waiting for complete alcohol elimination (Ho et al., 2001). For further information, refer the mother to the *Motherisk* Helpline: 416-813-6780 or 1-877-327-4636.

12. The following drugs should be avoided when breastfeeding:

- **Cannabis**, e.g., marijuana, hashish

- **Cocaine**, e.g., coke, crack
- **Club drugs**, e.g., rohypnol, ketamine

(Please see *Protocol #12: Insufficient Breast Milk Supply* for a discussion regarding the use of galactagogues.) (Adapted from information from *Best Start (2005), Motherisk (2005), and CAMH (2003).*)

General Principles

Most drugs are quite safe to be used by breastfeeding mothers. The hazards of using artificial baby milk (ABM) are well documented (Hale, 2010a).

Although most drugs will pass into breast milk to some degree, the amount is low and the majority of prescription and over-the-counter drugs are compatible with breastfeeding. Only rarely does the amount transferred into breast milk produce clinical doses in the infant (Hale, 2010a).

Avoid using medications that are not necessary. Herbs, high-dose vitamins and supplements, etc. are not necessary and should be avoided (Hale, 2010a).

It is rarely necessary for a mother to discontinue breastfeeding in order to take a medication. Similarly, it is rarely appropriate for a mother to forego the benefits of necessary pharmacological therapy in order to breastfeed.

When a drug is incompatible with breastfeeding, there is usually an alternative drug that can be safely prescribed.

Drugs that are generally safe when breastfeeding include:

- Drugs that are safely prescribed for babies, e.g., antibiotics, analgesics.
- Drugs that are inhaled or applied to the skin, eyes, or nasal passages. They are poorly absorbed and rarely reach significant maternal plasma levels. Doses given by intravenous therapy or intramuscular generally accumulate in breast milk faster.
- Drugs with low oral bioavailability are not readily absorbed in the stomach or intestines of the mother or baby.
- Drugs with a large molecular structure do not readily pass through the alveolar membranes of the breast into breast milk.
- Drugs that have short half-lives.

Drugs that are usually considered contraindicated or incompatible with breastfeeding include:

- Antineoplastics and immune suppressants.
- Chemotherapy drugs, which can be toxic to an infant at very low levels.
- Anticonvulsants. Only a few anticonvulsants are excreted in high concentrations into breast milk, e.g., phenobarbital, ethosuximide, and primidone.
- “Street” drugs, e.g., cocaine, marijuana, heroin, amphetamines (Motherisk, CAMH).
- Benzodiazepines.
- Radiopharmaceuticals including iodide (I-131).
- Bromocriptine.
- Lithium.
- Ergotamine alkaloids (with the exception of methylergonovine on a short-term basis, which is compatible with breastfeeding).

Caution is recommended regarding the use of oral contraceptives. Estrogens have a long but poorly documented history of suppressing breast milk production; Riordan (2010) reports variable sensitivities among mothers. Progesterone has a poor oral bioavailability; however, Hale advises that the effect on breast milk production is poorly studied (Hale, 2010). Low-dose progestin-only birth control pills are suggested for use after breast milk supply is established or at about 6 weeks postpartum. All mothers should be advised to wait to start oral contraceptives for as long as possible and to observe for a possible reduction in breast milk supply.

PPD – A mother affected by postpartum depression (PPD) should discuss the risks and benefits of various treatment options with her health care provider. It is important to support mothers in understanding that medications may be necessary but that breastfeeding can continue. It is important to provide prompt and effective breastfeeding support so that there is minimal impact on a new mother’s mental health (TPH, 2011).

The above list is not inclusive and may have been updated since the printing of these protocols. In addition, some drugs that are usually contraindicated may be given on an individual basis if closely monitored by a physician. Before the mother takes any drug, it should be checked for compatibility with breastfeeding with their prescribing health care

provider, the Motherisk program at the Hospital for Sick Children at 416-813-6780, Motherisk Helpline at 1-877-327-4636, online: <http://www.motherisk.org/women/breastfeeding.jsp>, or a breastfeeding clinic.

Drugs that should be avoided or limited when breastfeeding include:

- Tobacco (nicotine)
- Caffeine
- Alcohol
- Cannabis – Although there is limited scientific data available about the passage of delta-9 tetrahydrocannabinol (THC), the principal psychoactive compound in marijuana, into breast milk, both the Centre for Addiction and Mental Health (CAMH) and *Motherisk* report that it appears to be excreted into breast milk in moderate amounts. However, it is stored in fat and can be detected for up to a month after use in chronic users. Similarly, THC can accumulate in breast milk to high concentrations with chronic use, potentially affecting infant brain development. Cannabis exposure via breast milk has not been shown to increase risk to the baby, but babies need close monitoring. *Motherisk* recommends that lactating mothers should refrain from consuming cannabis (Adapted from Djulus, 2005 and CAMH et al., 2007).
- Cocaine – Cocaine passes into breast milk in notable concentrations and it may accumulate in infants, as they are less able to metabolize it. Although there is limited data about cocaine in breast milk, irritability, trembling, vomiting, diarrhea, and seizures have been observed in infants. *Motherisk* advises that breastfeeding mothers should avoid cocaine use (Adapted from Moretti et al., 2000 and CAMH, 2007).
- Opioids – At therapeutic levels, most opioids are excreted into breast milk in minimal amounts and can be compatible with breastfeeding. However, toxicity may occur when the mother is abusing a drug. Recent research suggests that codeine may not be safe for all breastfed babies, as there is a minority of mothers who may metabolize codeine into morphine. Infants and mothers need to be observed for central nervous system [CNS] depression. It is now advised that pain management beyond Day 4 postpartum be changed to a non-codeine analgesic, or the dose of codeine

be decreased. Methadone is compatible with breastfeeding (Adapted from Madadi, 2009 and CAMH et al., 2007).

- Non-alcoholic beverages – Previous research supported recommendations to choose non-alcoholic beverages as a safer choice over alcohol; Mennella found that infants consumed 23% less breast milk following maternal ingestion of alcohol compared with a non-alcoholic option (Mennella et al., 1993). However, more recent research has found that it may be difficult for women to make a safe choice, as the amount of ethanol (alcohol) was higher than stated in almost 30% of the non-alcoholic beverages tested (Goh et al., 2010).
- Alternative therapies, natural health products (herbs) and over-the-counter preparations – Both clients and health care professionals must approach the use of over-the-counter and natural health products with caution. At this time, there is not enough scientific information about the safety of various herbs and natural health products to either determine standardized dosages, mechanisms of action or recommend their general use during breastfeeding. Breastfeeding women should always consult with their health care provider and/or a breastfeeding expert knowledgeable about the use of herbs and natural products in breastfeeding mothers for information, as well as a risk-benefit assessment for both mother and baby.

If the mother inquires about the use of medications or herbs when she is breastfeeding, it is important to first explore with her any contributing factors related to her concerns, as well as her breastfeeding self-efficacy. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage her concerns, and then offer suggestions to optimize basic breastfeeding.

It is important for mothers to understand the possible benefits and risks associated with the use of herbs and natural health products in order to make an informed decision about their use.

Caution is recommended regarding the use of alternative therapies or natural products such as herbs when breastfeeding, as many contain chemical substances that may be dangerous to the baby (Hale, 2010a). Similar caution applies to the use of over-the-counter medications. All of these products contain chemical substances that may be dangerous to an

infant. There is mixed evidence to support their use. Limited information is available from formal scientific research to establish dosages, benefits, and risks, or possible interactions with other medications. However, several products have traditionally been used in breastfeeding (*Protocol #12: Insufficient Breast Milk Supply; Protocol #6: Plugged Ducts; Protocol #15: Candidiasis (Thrush)*).

Health Canada has regulations to ensure the quality, effectiveness, and safety of natural health products (herbs). Natural health products approved under these regulations will have a Natural Product Number (NPN) or Drug Information Number – Homeopathic Medicine (DIN-HM) on the label. Few products have been tested for safety in pregnancy and breastfeeding and are therefore not recommended by Health Canada for use in breastfeeding.

Health Canada follows the precautionary principle, advising that breastfeeding women should consult with their health care provider before using any natural health products to minimize possible risk (2011c). However in the most recent edition of *Medications and Mothers' Milk* (Hale, 2010a), Thomas Hale lists some herbs commonly used in breastfeeding management as rated L3 (moderately safe) for use by breastfeeding women. For example, blessed thistle and fenugreek are rated L3.

For advisories and warnings about specific drugs and health products, go to the following Health Canada website: <http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/index-eng.php>.

It is important to note that herbal products may not be standardized, so there may be different doses of the active ingredient used by various manufacturers. In addition, there may be increased risk of allergic reactions because the product may contain pollen, mould, or mould spores.

If a mother inquires about the use of alternative therapies or natural health products, refer her to a health care provider and/or breastfeeding expert knowledgeable about the use of herbs and natural products in breastfeeding mothers. These products should only be used under the supervision of a health care provider with breastfeeding expertise. It is essential that there be a comprehensive plan that includes a thorough assessment to clarify need, screening for contraindications and side effects, discussion of the information (or lack thereof) regarding efficacy, safety, timing of dosages, and

potential risks, and appropriate follow-up assessment.

General concerns about drugs and breastfeeding include:

- Whether the drug will affect the baby’s health.
- Whether the drug will affect breastfeeding, e.g., decrease breast milk supply, change the quality of the breast milk, or inhibit the letdown reflex.
- Whether there is a risk of weaning and how this may impact the mother and baby, e.g., severe engorgement and mastitis resulting from abrupt weaning, or baby may refuse supplementation.
- Whether there are other options to taking the drug, e.g., avoid taking the drug if it is not necessary or find alternative drugs that are compatible with breastfeeding.
- Whether there is the potential for impairment in care of the baby if the mother’s judgment of her level of sedation is affected.

Drugs will have less impact on breastfed babies who are:

- Heavier.
- Older.
- Born as healthy and full-term versus premature (the more premature the baby is, the more impact the drug will have).
- Taking solid foods at an appropriate age in addition to breastfeeding.

The impact of a drug on the breastfed baby will also depend on the mother’s kidney and liver function. If the mother’s kidneys and/or liver are compromised, the clearance of the drug from breast milk may be impaired and prolonged.

If the baby becomes drowsy as a result of a drug or substance ingested by the mother, the baby may show less interest in breastfeeding or may not suck as effectively.

Subramanian (1988) found that alcohol did not alter baseline serum prolactin levels. It was associated with an inhibition of suckling-induced prolactin release and milk consumption in rats. These results have shaped our understanding of the relationship between alcohol and lactation. Research has also identified a link between a family history of alcoholism in first degree relatives of non-alcoholic lactating women with a blunted prolactin response to

breast stimulation (suckling); mothers with a positive family history also reported more frequent daily breastfeeding (Mennella et al., 2010).

For more comprehensive discussions about medications and breastfeeding please refer to:

- “Drug Therapy and Breastfeeding” by Thomas Hale, in Riordan’s *Breastfeeding and Human Lactation* (4th ed.) (2010).
- “Medications” in Hale and Hartmann’s 2007 *Textbook of Human Lactation*.
- “Medications, Herbal Preparations, and Natural Products in Breast Milk” by Ruth Lawrence, in *Breastfeeding: A Guide for the Medical Profession* (2011).
- Further references or websites as cited below.

For a discussion of specific medications, please refer to:

- Prescribing health care provider.
- *Medications and Mothers’ Milk* (2010a) by Thomas Hale, as cited below.
- *Motherisk* at: 416-813-6780 *Motherisk helpline*: 1-877-327-4636 or online at: <http://www.motherisk.org/women/breastfeeding.jsp>.
- Thomas Hale’s website for professionals: <http://www.ibreastfeeding.com/>.
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Protocol #17

Indications for Supplementation or Cessation of Breastfeeding



Protocol #17: Indications for Supplementation or Cessation of Breastfeeding

Support mothers to exclusively breastfeed for the first 6 months, unless supplements are medically indicated (BFI – Step 6, BCC, 2011). Supplementation – any food or drink other than that received from the breast – is rarely necessary and should only be given when medically indicated. Unnecessary supplementation is associated with shortened duration of breastfeeding. Wherever possible, the goal of supplementation is to return to feeding at the breast.

Observation and Assessment

The following is a list of indications for consideration of possible supplementation or cessation of breastfeeding (temporary and complete cessation). It is adapted from *BFI Integrated 10 Steps Practice Outcome Indicators Appendix 6.2* (BCC, 2011) together with *Protocol #3: Hospital Guidelines for the Use of Supplementary Feedings in the Healthy Term Breastfed Neonate* from the Academy of Breastfeeding Medicine (ABM, 2009).

Medical Indications for the Possible Supplementation or Cessation of Breastfeeding

Assess the baby for:

- A medical condition for which the baby should not receive breast milk or other milk except specialized formula:
 - Classic galactosemia – Needs a special galactose-free formula
 - Maple syrup urine disease – Needs a special formula free of leucine, isoleucine and valine
 - Phenylketonuria – Needs a special phenylalanine-free formula (some breastfeeding may be possible with careful monitoring).
- A medical condition for which breast milk remains the best feeding option but which may need supplementation with other food for a limited period, together with support to optimize the breastfeeding.
- Birth weight less than 1500 g (very low birth weight):
 - Born at less than 32 weeks gestation (very preterm)
 - At risk of hypoglycemia related to impaired metabolic adaptation or increased glucose demand, e.g., preterm, small for gestational age, experiencing significant intrapartum hypoxic and/or ischemic stress, illness, born to a diabetic mother if blood sugar fails to respond to optimal breastfeeding or breast milk feeding
- Significant weight loss in the presence of clinical indications (mother's breast milk production not established)
- Birth weight not regained by 10 days after birth
- Clinical indications of insufficient breast milk intake, e.g., no stools or fewer than one stool per day (in the first few weeks of life), or meconium 5 or more days after birth, dehydration that does not respond to optimizing the frequency and effectiveness of breastfeeding
- Inadequate average weight gain – less than:
 - 20–35 g ($\frac{2}{3}$ – 1¼ oz) per day for the first 3–4 months of age (post Lactogenesis II)
 - 115 g/week for the first 2–4 months
 - 85 g/week for the first 4–5 months
 - 60 g/week from 6–12 months
(*Protocol #3: Signs of Effective Breastfeeding*)
- A medical condition that may require special considerations for breastfeeding, e.g., neuromuscular difficulties such as Down's syndrome or cleft lip/palate, where the baby is unable to create enough negative pressure when sucking on the breast.
- Separation from mother due to illness or surgery.
- Inability to latch and breastfeed effectively (*Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch; Protocol #3: Signs of Effective Breastfeeding*).

Assess the mother for:

- Medical conditions that may justify avoidance or complete cessation of breastfeeding.
- Severe illness such as sepsis, psychosis, eclampsia or shock that prevents her from caring for her infant.
- Herpes simplex 1 (HSV-1) that necessitates avoidance of direct contact between lesions on the mother's breasts and the baby's mouth until all active lesions have resolved. The baby may continue to feed on the other breast if there are no lesions.
- Human immunodeficiency virus (HIV) infection in developed countries.
- Human T-lymphotropic virus.
- Maternal medications including:
 - sedating psychotherapeutic drugs, anti-epileptic drugs and opioids and their combinations. These may cause side effects such as drowsiness and respiratory depression and are better avoided if a safer alternative is available
 - radioactive iodine-131. It is better avoided given that safer alternatives are available – a mother can resume breastfeeding about two months after receiving this substance
 - excessive use of topical iodine or iodophors (e.g., providone-iodine), especially on open wounds or mucous membranes. These can result in thyroid suppression or electrolyte abnormalities in the breastfed infant and should be avoided
 - cytotoxic chemotherapy. This requires that a mother stop breastfeeding during therapy
- Insufficient breast milk supply due to primary glandular insufficiency (*Protocol #12: Insufficient Breast Milk Supply*).
- Insufficient breast milk supply due to breast injury or surgery in which major nerves and ducts in the breasts are damaged (e.g., burns to the breast, breast reduction surgery with incisions to the areola and/or nipple) (*Protocol #12: Insufficient Breast Milk Supply*).
- Delayed Lactogenesis II (Day 5 or later) and inadequate intake by the baby.
 - Retained placenta
 - Sheehan syndrome – postpartum hemorrhage followed by absence of lactogenesis
- Separation from the baby due to illness or surgery.
- Maternal conditions that are of concern, but during which breastfeeding may continue:
 - Breast abscess – Breastfeeding should continue on the unaffected breast; feeding can resume on the affected breast once treatment has begun;
 - Hepatitis B – Babies should receive Hepatitis B vaccine within 48 hours of birth or as soon as possible after birth;
 - Hepatitis C – There is no definite case of mother to baby transmission via breast milk (Riordan 2010);
 - Mastitis – If breastfeeding is very painful, breast milk must be removed by expression to prevent progression of the condition;
 - Substance use – Maternal use of nicotine, alcohol, cocaine, amphetamines and related stimulants have been demonstrated to have harmful effects on babies. Alcohol, opioids, benzodiazepines and cannabis may cause sedation in both the mother and baby. Mothers should be encouraged not to use these substances and offered opportunities and support to abstain and apply harm reduction principles.
- A medical condition that may make it difficult to breastfeed more frequently, such as intolerable pain that is unrelieved by intervention.

Supplementation is not medically indicated but the situation must be assessed and support offered to optimize breastfeeding management for:

- A sleepy baby with fewer than 8 feedings in the first 24 to 48 hours, less than 7% weight loss and no signs of illness.
- An infant with bilirubin levels ≤ 20 mg/dL 72 hours after birth, but is breastfeeding and stooling well.
- An infant who is fussy at night and/or constantly breastfeeding for several hours.
- A sleepy or tired mother.
- Mother treated with antibiotics for an infection.
- An infant with a weight loss of greater than 7% associated with maternal fluid overload following perinatal bolus IV therapy. (*Source: Adapted from ABM Protocol #3, 2009.*)

Note: Large volumes or a bolus of intravenous fluids during labour may artificially increase the infant's birth weight and may lead to an artificially large weight loss. See note in *General Principles*.

Suggestions

1. The baby should be referred to a primary health care provider/physician for assessment to determine or rule out any medical condition that may be an indication for supplementation, e.g., hypoglycemia, dehydration, phenylketonuria, maple syrup urine disease.

2. Assess the mother and baby for indications to supplement breastfeeding (see the section on “Medical Indications for the Possible Supplementation or Cessation of Breastfeeding” under *Observation and Assessment*).

Depending on the severity of the following cases and the baby’s condition, breastfeeding should be optimized and increased in frequency before determining if supplementation is required for:

- Birth weight loss of more than 7% in the first 3 days of life.
- Failure to regain birth weight within 10 days of age.
- Inadequate weight gain of less than:
 - 20–35 g ($\frac{2}{3}$ – 1¼ oz) per day for the first 3–4 months of age
 - 115 g/week for the first 2–4 months
 - 85 g/week for the first 4–5 months
 - 60 g/week from 6–12 months
(*Protocol #3: Signs of Effective Breastfeeding*)
- A medical condition, e.g., hypoglycemia, dehydration.

3. Offer assessment and support to optimize breastfeeding management, including effective positioning and latching, as well as effective sucking and swallowing, including breast milk transfer (*Protocol #2: Positioning and Latching*, and *Protocol #3: Signs of Effective Breastfeeding*).

Indications for the Supplementation of Breastfeeding

If the supplementation of breastfeeding is medically indicated, provide the mother with suggestions to help her maintain and preserve lactation while supplementing. Before initiating the use of a supplement or alternative feeding method, the practitioner is responsible for assessing the possible benefits and risks of that intervention for the breastfeeding dyad. The practitioner is also responsible for establishing a plan with the mother for the ongoing management and evaluation of the

intervention.

During breastfeeding, encourage the mother to:

- Offer the breast first, whenever possible. Allow the baby to finish the first breast before breastfeeding from the other breast, so that the baby transfers higher fat breast milk as the first breast progressively empties.
- Use expressed breast milk (EBM) as a supplement to breastfeeding, whenever possible.
- Avoid supplementation with artificial baby milk (ABM) or sugar water, whenever possible. Supplementation with ABM may increase the baby’s risk for developing allergies. Supplementation with sugar water has been associated with rebound hypoglycemia, weight loss, and increased bilirubin levels in babies (*Protocol #14: Jaundice in a Breastfed Baby*). Refer to the “Supplemental Fluid Guideline for Healthy Term Infants” chart that follows.
- Feed the baby with the supplement using an alternative feeding method (e.g., cup, spoon, syringe, finger feeding, or lactation aid) (*Protocol #18: Alternative Feeding Methods*). Using a lactation aid on the breast may be preferable to other alternative feeding methods because it allows the baby to remain at the breast and provides the breasts with stimulation. Encourage the mother to offer the breast first before initiating an intervention. The practitioner who initiates the use of an alternative feeding method is responsible for assessing the benefits and risks of that intervention as well as for establishing a plan with the mother for the ongoing management and evaluation of the intervention. The baby’s weight gain and the mother’s breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of the breastfeeding and the infant’s intake of breast milk, plus a plan for re-establishment of feeding at the mother’s breast.
- Offer the supplements in amounts to mimic the normal volume and frequency of breastfeeding, following the baby’s cues of satiation. Frequent and small quantities, instead of less frequent and larger quantities, can prevent the baby from skipping an entire breastfeeding session.

After breastfeeding, encourage the mother to:

Express her breasts to obtain breast milk to be used

as a supplement to breastfeeding if this is appropriate (*Protocol #19: Expressing and Storing Breast Milk*).

Indications for the Temporary Cessation of Breastfeeding

If the temporary cessation of breastfeeding is necessary, offer the mother suggestions to help her maintain and preserve lactation.

Encourage the mother to:

- Express breast milk from each breast regularly to maintain her breast milk supply. Generally, this will be at least 8 times in 24 hours, with a minimum of 1 expression overnight, to mimic the normal feeding pattern. The mother may need to express more often if her breasts become uncomfortable or full (*Protocol #19: Expressing and Storing Breast Milk*).
- Discard the expressed breast milk if the mother is taking a drug that is incompatible with breastfeeding or if there are herpes lesions on the breast. This will prevent the baby from consuming breast milk contaminated with an incompatible drug or with HSV-1. Previously expressed breast milk that is not contaminated may be used as a supplement in these situations.

- Choose an appropriate supplemental fluid (refer to the chart below). Feed the baby with the supplement using an alternative feeding method, e.g., lactation aid on the breast, cup, spoon, syringe, or finger feeding (*Protocol #18: Alternative Feeding Methods*).

- If the mother is taking a drug that is incompatible with breastfeeding or if there are herpes lesions on the areola, a lactation aid on the breast should not be used. This is to prevent the baby from consuming breast milk contaminated with an incompatible drug or direct contact with the herpes simplex virus.

4. Assess the mother and baby for indications to completely cease breastfeeding (see *Observation and Assessment*). If the complete cessation of breastfeeding is necessary provide the mother with suggestions for weaning (*Protocol #21: Weaning*).

5. Encourage the mother to consult the *Motherisk* program at the Hospital for Sick Children at 416-813-6780, a breastfeeding expert or breastfeeding clinic for inquiries regarding whether a drug or medical condition requires supplementation or cessation of breastfeeding.

Supplemental Fluid Guideline for Healthy Term Infants

First Choice: Mother's own expressed breast milk (EBM).

EBM is not appropriate if:

- a) the baby has a medical condition that contraindicates breastfeeding, e.g., galactosemia, poorly controlled phenylketonuria, or maple sugar urine disease. Appropriate ABM should be used.
- b) the mother is taking a drug incompatible with breastfeeding or if she has herpes lesions on her breasts.

Second Choice: Artificial Baby Milk (ABM)

Do not supplement with water or sugar water.

BFI recommends human donor milk as the second choice of breast milk supplement, if available from a Human Milk Bank Association of North America (HMBANA) milk bank. See discussion in *General Principles*.

Note: There may be variations in the use of this guideline based on the baby's condition or individual physician practice.

General Principles

Whenever interruption or cessation of breastfeeding is considered, the benefits of breastfeeding should be weighed against the risks posed by the use of breast milk substitutes and the need to intervene because of the presenting medical condition (BCC, 2011).

There are few situations that require breastfeeding to be supplemented or temporarily discontinued. There are even fewer situations where breastfeeding is contraindicated and should not be initiated or continued if the baby is already breastfeeding. The primary health care provider should assess the mother and infant dyad and consider all the data when determining whether the clinical benefits of supplementation or temporary cessation of breastfeeding outweigh the potential negative consequences of such feedings (ABM, 2009).

When the healthy term baby is effectively breastfeeding, the initial post-birth weight loss will quickly stabilize and thereafter reflect a steady weight gain. The presence of weight loss indicators should be a sign that further assessment and support are needed to optimize breastfeeding (*Protocol #3: Signs of Effective Breastfeeding*).

Unnecessary supplementation increases the risk of early discontinuation of breastfeeding (Lawrence, 2010).

If a mother has received a bolus of intravenous fluids during labour there may be a fluid shift to the fetus. This may artificially increase the infant's birth weight (Lauwers & Swisher, 2011), and may lead to a more than 7% post-birth weight loss. This may also lead to breast edema, making it difficult for the infant to latch (Smith, 2010 & 2007; Riordan, 2010; Biancuzzo, 2003) (see *Protocol #3: Signs of Effective Breastfeeding* for discussion of the impact of birth interventions).

Wherever possible, the goal of medically indicated supplementation is to return to feeding at the breast. If the mother has made a fully informed decision to continue to use supplements, she is to be supported in feeding her baby in a safe and nurturing way (see *Informed Decision-Making about Infant Feeding*).

EBM is the first choice as a supplement for most babies, especially breast milk that is expressed after the baby has breastfed. When the mother expresses after a feeding she may be able to drain her breasts as much as possible and produce breast milk that is high in fat and will provide the baby with extra calories (Rodriguez et al., 2005). The second choice is ABM. For

infants with special needs, there are specific formulas as discussed above.

BFI recommends human donor milk as the second-best choice for supplementation, if it is available from a milk bank that is a member of HMBANA. HMBANA is a non-profit association of human donor milk banks established in 1985 to set standards for and facilitate establishment and operation of milk banks in North America. This website provides information on milk banking and how to contact a milk bank to donate milk or to order human donor milk. This site is also a resource for health care providers and others seeking information on HMBANA's resources and services. Further information is available from: www.hmbana.org.

In Canada, human donor milk is not a feasible option for general use. Currently, there are three HMBANA milk banks in operation in Vancouver, Calgary and Toronto. Attempts to establish additional milk banks have been slow to come to fruition due to concerns related to safety. A few hospitals import human donor milk from American milk banks for premature babies.

It is not appropriate for mothers to informally share EBM.

Supplementation with water or sugar water should be avoided. Supplementation with sugar water has been associated with rebound hypoglycemia (Heck, Erenberg in Lawrence, 2010) and weight loss in babies. Even in hot weather, water supplementation is not necessary for the baby; the mother can drink more fluids and offer more breast milk if she is concerned.

Volume of Supplementation:

- The amount of supplementation necessary must be determined on an individual basis. The principle is to mimic the volume and frequency of normal breastfeeding (Wight, 2005), and to follow the baby's cues of satiation.
- The amount of supplementation offered in the first few days should correspond to the normal intake of early breast milk or colostrum by the healthy term infant, as well as to the newborn's gastric capacity (*Protocol #1: The Initiation of Breastfeeding* for discussion of gastric capacity). The average intake of breast milk in the first 24 hours is low. It has been reported as 6 g per feeding and 6 feedings in the first 24 hours (Saint et al., 1984), or as 6 ml/kg/24 hours for Day 1, 25 ml/kg/24 hours for Day 2, 66 ml/kg/24 hours at Day 3 and 106 ml/kg/24 hours for Day 4 or 96 hours post-birth (Evans et al., 2003).

- The Academy of Breastfeeding Medicine (ABM, 2009) suggests supplement intakes for the first few days as:
 - First 24 hours 2–10 ml/feed
 - 24–48 hours 5–15 ml/feed
 - 48–72 hours 15–30 ml/feed
 - 72–96 hours 30–60 ml/feed
- For the older baby, the amount of supplementation should be determined by the baby’s cues of satiation.
- Supplementation may negatively affect the contraceptive effect of lactation due to reduced stimulation of the breast.
- When supplementation or temporary cessation of breastfeeding is necessary, efforts should be made to maintain and preserve lactation.
- Offer a supplement using an alternative method that will promote a return to the breast (*Protocol #18: Alternative Feeding Methods*).
- The mother should be encouraged to regularly express her breasts to maintain her breast milk supply whenever breastfeeding is stopped for any length of time (*Protocol #19: Expressing and Storing Breast Milk*).

Most drugs are safe for the mother to take while breastfeeding. When there is a drug that is incompatible with breastfeeding, there is usually an alternative drug that can be prescribed that is compatible with breastfeeding (*Protocol #16: Drugs and Breastfeeding*).

There are very few maternal illnesses that contraindicate breastfeeding, including infections. Since the majority of infections are viral, the mother would already have exposed the baby to the virus before she even knew she was ill. The continuation of breastfeeding will pass antibodies to the baby to provide protection against the viral infection.

In the absence of breast lesions, breastfeeding is not contraindicated by maternal hepatitis C virus (HCV) (PHAC, 2009). Breastfeeding may also continue in the presence of maternal hepatitis B virus (HBV) if the infant has been immunized according to the recommendations of the Public Health Agency of Canada (PHAC, 2010).

Human immunodeficiency virus type I (HIV-I) is transmitted through breast milk. Mothers who have been counselled and tested for HIV should be provided with full information about the benefits and risks of the infant feeding options available to enable them to make an appropriate decision about feeding their baby. This includes information on HIV transmission, including vertical transmission, factors affecting risk of HIV transmission and ways to decrease this risk, as well as treatment options. World Health Organization (WHO) Principles and Recommendations for the management of infant feeding when mothers are HIV-positive recognize that national authorities should decide whether health services counsel and support mothers to breastfeed and receive antiretroviral interventions or to avoid all breastfeeding (WHO, 2010). In Canada, where there is an acceptable, feasible, affordable, sustainable and safe breast milk substitute (commercial infant formula), mothers who are HIV-positive are advised to avoid breastfeeding. If breastfeeding has begun before the mother is tested for HIV, she should continue until the results are known. If she is found to be HIV-positive, she should discuss her concerns and whether she should continue or discontinue breastfeeding with her primary health care provider (TPH, 2002).

Research indicates that infants who are exclusively breastfed have less risk of vertical transmission of HIV than infants who are partially breastfed mixed with ABM (Coutsoudis et al., 2002). Mothers who are HIV-positive should be advised that breastfeeding and ABM feeding at the same time may increase the risk of passing HIV to her baby. The choice of feeding method may be a difficult and value-laden decision for the mother. It is important that mothers are supported to feed their babies in a safe and nurturing way.

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Protocol #18

Alternative Feeding Methods



Protocol #18: Alternative Feeding Methods

Cup feeding, spoon feeding, syringe feeding, lactation aids, finger feeding, and paced bottle feeding are alternative feeding methods that allow oral supplementation of the baby who is unable to obtain a sufficient amount of breast milk from the breast. For most babies these are temporary measures, and the ultimate goal is to establish feeding at the breast.

Suggestions

1. Assess whether supplementation and the use of an alternative feeding method are required (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Provide the mother with information about the various alternative feeding methods:

- cup feeding
- spoon feeding
- syringe feeding
- lactation aid at the breast
- finger feeding
- paced bottle feeding.

2. It is important to support the mother in understanding the possible benefits and risks associated with the use of an alternative feeding method, so that she is able to make an informed decision about an appropriate method for supplementation. Offer further assessment and refer for additional support as needed.

Wilson-Clay suggests **Criteria for Selecting an Alternative Method of Infant Feeding:**

- It does not harm the baby.
- It is a good match for the baby's stamina, physical condition, and level of maturity.
- It is easy for the parents to manage.
- It involves equipment that the parents can easily obtain and clean.
- It is a suitable intervention for the length of time needed to remediate the feeding problem.
- It will help the baby learn to breastfeed.

(Source: Adapted from Wilson-Clay et al., 2008)

3. Before initiating an alternative feeding method, support the mother in identifying a plan to facilitate the baby feeding at the breast. The following information will assist the mother to consider her options.

Cup Feeding

Support the mother in understanding that:

- Cup feeding is most successful when it follows the principles of baby-led practices and the baby is able to control the pace and amount of the milk flow.
- The baby sips or laps the milk from the cup.
- Cup feeding is the preferred choice as an alternative oral feeding method.
- Cup feeding encourages the baby's tongue to move downward and forward to sip or lap (like a kitten) up the supplement from a small cup.
- Cup feeding should be used on a short-term basis and be evaluated frequently.
- Cup feeding can be a relatively easy process. However, some mothers may find it challenging to handle the equipment. Support from a family member may be helpful.
- There may be some spillage and it can be messy.
- The equipment is easier to clean than bottles or tubes.
- The baby may only take 5–10 ml of the supplement at first. However, the amount of supplement taken will depend on many factors, e.g., the baby's satiation, the reason for cup feeding, age and status of the baby. The baby may hold the milk in his mouth until there is enough volume for a bolus to trigger swallowing.
- The baby always leads and controls the pace.

Equipment

- Small cup or glass, e.g., plastic medicine cup, shot glass
- Cloth to be placed under the baby's chin
- Supplement fluid: expressed breast milk (EBM) or artificial baby milk (ABM) if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

1. Wash hands before handling the equipment.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. Ensure that the baby is awake and alert.
5. Fill the cup about half full with the supplement.
6. Support the baby in a semi-upright sitting position on the lap. Support the baby's neck and upper back with one hand. Place a cloth under the baby's chin.
7. Bring the cup to the baby's mouth, tipping it so that the supplement just touches the baby's lips. The supplement should not be poured into the baby's mouth. The baby's tongue will move forward and sip or lap up the supplement like a kitten.
8. Keep the cup tipped throughout the entire feeding so that the supplement is always touching the baby's lips. This will allow the baby to control the pace of the feeding.



Baby Cup Feeding

Cleaning Instructions When Using Cup Feeding

For Healthy Full-Term Babies at Home

- After each feeding, wash the cup in hot soapy water, then rinse well and air dry. Store the cup in a dry and clean area away from food preparation.

For Premature or Hospitalized Babies and Mothers and/or Babies with Candidiasis

- Use a new plastic medicine cup after each feeding. The cup cannot be sterilized by boiling. Hospital policies may vary.
- If a cup is used at home and it can be boiled, e.g., a shot glass, it should be boiled after each feeding.
- The cup should first be washed in hot soapy water and rinsed well. Next it should be boiled in a covered pot of boiling water for 10 minutes (*Protocol #15: Candidiasis (Thrush) and CPSO, 2004*), and then removed from the pot to air dry. The cup should be stored in a dry and clean area away from food preparation. (*Source: Adapted from Lauwers, 2011, and Mohrbacher, 2010*)

Spoon Feeding

Support the mother in understanding that:

- Offering a small amount of supplement on a spoon can calm a fussy baby or awaken a drowsy baby (Wilson-Clay, 2008). It can be used when a small cup is not available.
- A spoon is an easy and accessible way to offer a small volume of milk to a baby, such as the early breast milk (colostrum).
- Spoon feeding is most successful when it follows the principles of baby-led practices and the baby is able to control the pace of the milk flow.
- The baby may only take 5–10 ml of the supplement at first. However, the amount of supplement taken will depend on many factors, e.g., the baby's satiation, reason for spoon feeding, age of the baby.
- The baby always leads and controls the pace.

Equipment

- Small clean spoon
- Cloth to be placed under the baby's chin
- Supplement fluid: EBM or ABM if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

1. Wash hands before handling the equipment.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. Ensure that the baby is awake and alert.
5. Fill the spoon with a mouthful of the supplement.
6. Support the baby in a semi-upright sitting position on the lap. Support the baby's neck and upper back with one hand. Place a cloth under the baby's chin.
7. Bring the spoon to the baby's mouth, tipping it so that the supplement just touches the baby's lips. The supplement should not be poured into the baby's mouth. The baby's tongue will move forward and lap up or sip the supplement.
8. Give the baby time to swallow before refilling the spoon and offering more. This will allow the baby to control the pace of the feeding.
9. Clean the spoon according to the same instructions for cleaning a cup as above.

(Source: Adapted from Lauwers, 2011 and Mohrbacher, 2010)

Syringe or Eye-Dropper Feeding

Support the mother in understanding that:

- Syringe feeding is somewhat similar to cup feeding. An eye-dropper can also be used.
- Syringe or eye-dropper feeding is most successful when it follows the principles of baby-led practices and the baby is able to control the pace of the milk flow.
- The baby may only take 5–10 ml of the supplement at first. However, the amount of supplement taken will depend on many factors, e.g., the baby's satiation, reason for syringe feeding, age of the baby.
- The baby always leads and controls the pace.

Equipment

- Syringe or eye-dropper that will hold the amount of supplement needed
- Cloth to be placed under the baby's chin
- Supplement fluid: EBM or ABM if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

1. Wash hands before handling the equipment.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. Ensure that the baby is awake and alert.
5. Wrap the baby securely to prevent his hands from hitting the syringe.
6. Fill the syringe or eye-dropper with the supplement.
7. Support the baby in a semi-upright sitting position on the lap. Place a cloth under the baby's chin.
8. Support the baby's head and upper back with one hand. Bring the syringe or eye-dropper to the baby's mouth. Gently drip the supplement slowly into the baby's mouth.
9. Give the baby time to swallow before offering more. This will allow the baby to control the pace of the feeding.
10. Clean the syringe or eye-dropper according to the same instructions given previously for cleaning the cup.

(Source: Adapted from Mohrbacher, 2010)

Lactation Aid at the Breast

There are three types of lactation aids:

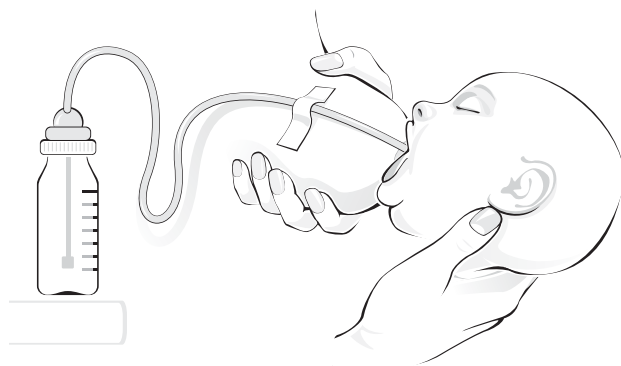
1. Lactation aid using a bottle
2. Lactation aid using a syringe
3. Commercial lactation aid.

Support the mother in understanding that:

- A lactation aid at the breast provides additional breast milk during breastfeeding if the baby is able to latch and **form a seal at the breast**. It provides stimulation to the breast and helps to increase breast milk supply. The lactation aid at the breast allows the baby to receive a supplement and breastfeed at the same time. The lactation aid is a feeding tube connected to a supply of either EBM or ABM.
- A lactation aid at the breast may be the method of choice to supplement breastfeeding if the baby is able to latch onto the breast and if breastfeeding or breast milk are not temporarily contraindicated, e.g., a maternal drug that is contraindicated with

breastfeeding, herpes lesions on the breasts, or cracked nipples when the mother is hepatitis C positive.

- The lactation aid at the breast will deliver a faster flow of milk, which may reward and encourage the baby to continue breastfeeding when the breast milk supply is low or when the baby has difficulties sustaining suction (Wilson-Clay, 2008). **Caution:** A flow that is too fast can overwhelm and discourage a baby.
- The lactation aid at the breast may help to train and stimulate the baby's nutritive sucking reflexes to improve oral coordination. It also helps to increase maternal confidence and promote maternal-infant bonding, since the baby is on the breast while receiving the supplement.



Lactation Aid Using a Bottle

Equipment

- Baby bottle
- Artificial nipple for the bottle
- 36-inch #5 French feeding tube
- Scissors
- Tape
- Small syringe for cleaning the tube after each feeding
- Supplement fluid: EBM or ABM if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

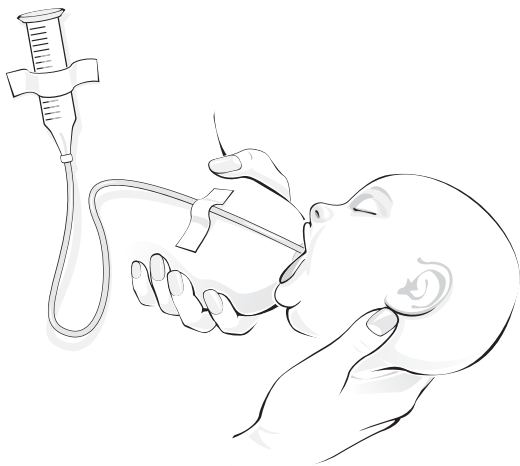
1. Wash hands before handling the equipment.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. Enlarge the hole on the artificial nipple by cutting it with clean scissors.
5. Insert the tip of the feeding tube through the bottom of the hole on the artificial nipple.
6. Place the larger end of the tip of the feeding tube into the bottom of the bottle.
7. Place the required amount of supplement into the bottle, ensuring that the open end of the feeding tube is submerged in the supplement fluid.
8. Screw the nipple and cap onto the bottle.
9. Position the bottle on a surface that is level with the baby's head. Alternatively, place the bottle in a pocket of the mother's shirt that is level with the baby's head. **Caution:** If the position is too high, the milk flow will be too fast and the baby may choke. If the position is too low, the baby will need more energy to suck and may tire easily and become frustrated.
10. Tape the feeding tube onto the breast so that the tip of the tube is level with the end of the nipple. Then latch the baby. Alternatively, latch the baby first and then slip the uncut tip of the tube into the corner of the baby's mouth over the tongue while the baby is sucking. Ensure that both holes of the tube are inside the baby's mouth.

When the baby sucks on the breast, the supplement will be drawn through the feeding tube and into the baby's mouth.

Encourage the mother to choose a comfortable position. The football or cross-cradle position may allow the mother to provide optimum support of the baby's neck and shoulders when learning to use a lactation aid.

Inform the mother that the lactation aid is working properly when the baby is effectively sucking and swallowing milk.

(Source: Adapted from *Lactation Aid at the Breast*, (TPH, 2003a))



Lactation Aid Using a Syringe

Equipment

- 20 cc syringe with the plunger removed
- 36-inch #5 French feeding tube
- Tape – pieces of tape
- Small syringe for cleaning the tube after each feeding
- Supplement fluid: EBM or ABM if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

1. Wash hands before handling the equipment.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. With the plunger removed from the 20 cc syringe, insert the syringe tip into the larger end of the feeding tube.
5. Tape the feeding tube onto the breast so that the tip of the tube is level with the end of the nipple. Then latch the baby. Alternatively, latch the baby first and then slip the tip of the tube into the corner of the baby's mouth over the tongue while the baby is sucking. Ensure that both holes on the tube are inside the baby's mouth.
6. Pour the required amount of supplement into the syringe. If the supplement starts to flow, pinch the end of the tube.
7. Secure the syringe to the mother's shoulder or chest with tape.

When the baby sucks on the breast, the supplement will be drawn through the feeding tube and into the baby's mouth.

Encourage the mother to adopt a comfortable position. The football or cross-cradle position may allow the mother to provide optimum support of the baby's neck and shoulders when learning to use a lactation aid.

Inform the mother that when the lactation aid is working properly, it will generally require 15–20 minutes for the baby to take one ounce or 30 ccs of supplement from the syringe.

(Source: Adapted from *Lactation Aid at the Breast*, (TPH, 2003a))

Cleaning Instructions When Using the Lactation Aid with a Bottle or Syringe

For Healthy Full-Term Babies at Home

- After each feeding, fill a small syringe with clean hot water.
- Insert the syringe into the larger end of the feeding tube. Push the plunger to force water into the tube 3–5 times to clean it out. It is not necessary to use soapy water, but if soapy water is used, the tube must be thoroughly rinsed out.
- Force 1–2 plungers of air through the tube to clear out any remaining water.
- Air dry the feeding tube in a clean area away from food preparation.
- Use a new feeding tube frequently, and especially if the tube becomes stiff, brittle or discoloured.
- Wash all other items in hot soapy water, then rinse well and air dry after each feeding. Store items in a dry and clean area away from food preparation.

(Source: Adapted from *Lactation Aid at the Breast*, (TPH, 2003a))

For Premature or Hospitalized Babies and Mothers and/or Babies with Candidiasis

- Use a new feeding tube and 20 cc syringe (if applicable) for each feeding. The tube cannot be sterilized by boiling. Hospital policies may vary.
- After each feeding at home (if applicable), wash the bottle and artificial nipple in hot soapy water and

rinse well. Then boil the items in a covered pot of water for 10 minutes (*Protocol #15: Candidiasis (Thrush) and CPSO, 2004*). Remove the items from the pot and allow them to air dry. Store items in a dry and clean area away from food preparation.

- In the hospital, sterilized bottles and artificial nipples may be provided for each feeding.

Commercial Lactation Aid

Follow the manufacturer's instructions for use.

Finger Feeding

Support the mother in understanding that:

- Finger feeding is a temporary feeding method when the baby is unable to latch or it is necessary to discontinue breastfeeding temporarily. A feeding tube is attached to one of the caregiver's fingers and is connected to a supply of EBM or ABM to provide supplementation to the baby.
- Finger feeding can facilitate proper use of the oral muscles, promoting coordination of suck-swallow-breathing (Hazelbaker in Riordan, 2010) to help the baby develop effective rooting, latching, and sucking patterns.
- There are some concerns that it is invasive and may be addictive (Riordan, 2010). To minimize the possibility of imprinting and in the absence of evidence-informed practices, it is prudent to advise that finger feeding should be used infrequently, for short periods of time, e.g., one day at a time, and evaluated before continuing.
- Before initiating finger feeding, it is important to first explore with the mother any possible contributing factors related to the need for possible supplementation, as well as her breastfeeding self-efficacy. It is also important to inquire about her previous breastfeeding history, current breastfeeding management and attempts to manage or establish breastfeeding, and then to offer her suggestions to optimize basic breastfeeding management before introducing interventions. It is also important to include discussion of her capacity to manage the equipment associated with an intervention.
- It is important to support the mother in understanding the possible benefits and risks associated with the use of finger feeding if she inquires about the use of finger feeding for supplementation. Offer further assessment and

refer for additional support as needed (see notes in *General Principles*).

- Whenever possible, the use of a lactation aid at the breast is preferred over finger feeding because the baby is at the breast and stimulation to the breast is provided. Finger feeding is used when the baby is unable to latch onto the breast or if breastfeeding is temporarily contraindicated, e.g., a maternal drug that is contraindicated with breastfeeding, herpes lesions on the breasts, or cracked nipples when the mother is hepatitis C positive.
- With finger feeding, the motion of the tongue and jaw is similar to when the baby breastfeeds.
- Finger feeding is working properly when the baby is effectively sucking and swallowing milk.



Baby Finger Feeding

Equipment

- Baby bottle
- Artificial nipple for the bottle
- 36-inch #5 French feeding tube
- Scissors
- Tape
- Small syringe for cleaning the feeding tube after each feeding
- Supplement fluid: EBM or ABM if breast milk is unavailable or not appropriate (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Procedure

1. Wash hands with soap and water. Ensure that the nail of the index finger used for finger feeding is trimmed and clean.
2. Assemble equipment on a clean surface.
3. Prepare the supplement and begin the feeding process before the baby gets overly hungry or fussy.
4. Enlarge the hole on the artificial nipple by cutting it with clean scissors.
5. Insert the tip of the feeding tube through the bottom of the hole on the artificial nipple
6. Place the larger end of the feeding tube into the bottom of the bottle.
7. Place the required amount of supplement into the bottle, ensuring that the larger end of the feeding tube is submerged in the supplement fluid
8. Screw the nipple and cap onto the bottle.
9. Place the bottle on a surface that is level with the baby's head. Alternatively, place the bottle in a pocket of the mother's shirt that is level with the baby's head. **Caution:** If the position is too high, the flow of milk will be too fast and the baby may choke. If the position is too low, the baby will need more energy to suck and may tire easily and become frustrated.
10. Place the baby in a comfortable position, such as the cross-cradle position.
11. Line up the feeding tube so that it sits on the soft part of the index finger. The tip of the feeding tube should be level with the fingertip. Tape the tubing onto the finger behind the second joint to prevent the baby from sucking on the tape.
12. Gently touch the baby's lips with a finger until the mouth opens wide. Then allow the baby to suck, and draw the index finger with the feeding tube in past the baby's gumline with the nail side down on the tongue. In most cases the baby will begin to suck as soon as the finger pad reaches the middle of the hard palate. Try to keep the index finger flat in the baby's mouth (not pointing towards the palate). This will help to stimulate the tongue and jaw movements, which simulates breastfeeding by flattening the baby's tongue down and moving the lower jaw forward.

(Source: Adapted from Finger Feeding, (TPH, 2003b))

Cleaning Instructions When Using Finger Feeding

For Healthy Full-Term Babies at Home

- After each feeding, fill the small syringe with clean hot water.
- Insert the syringe into the larger end of the feeding tube. Push the plunger to force water into the feeding tube 3–5 times to clean it out. It is not necessary to use soapy water, but if soapy water is used, the tube must be thoroughly rinsed out.
- Force 1–2 plungers of air through the tube to clear out any remaining water.
- Hang the feeding tube to air dry in a clean area away from food preparation.
- Use a new feeding tube frequently, and especially if the tube becomes stiff, brittle or discoloured.
- Wash all other items in hot soapy water, then rinse well and air dry after each feeding. Store items in a dry and clean area away from food preparation.

(Source: Adapted from Finger Feeding, (TPH, 2003b))

For Premature or Hospitalized Babies and Mothers and/or Babies with Candidiasis

- Use a new feeding tube for each feeding. The tube cannot be sterilized by boiling. Hospital policies may vary.
- After each feeding at home, wash the bottle and artificial nipple in hot soapy water and rinse well. Then boil the items in a covered pot of water for 10 minutes (*Protocol #15: Candidiasis (Thrush) and CPSO, 2005*). Remove the items from the pot and allow them to air dry. Store items in a dry and clean area away from food preparation.

Paced Bottle Feeding

- Paced bottle feeding is an approach to feeding a baby with a bottle when the baby is unable to feed at the breast and the mother has made an informed decision to feed with a bottle (see *Informed Decision-Making about Infant Feeding*).
- For infants who may struggle to cope with the flow of milk from a bottle, paced bottle feeding can be less stressful.

Encourage the mother to:

- Watch for the baby's early feeding cues, (*Protocol #3: Signs of Effective Breastfeeding*) so that the

baby can be fed in a calm state, before becoming overly hungry or fussy. “Watch the baby, not the clock.”

- Hold the baby in an upright position, supporting the shoulders and neck, so that the baby’s neck can extend back into the natural drinking position, like breastfeeding.
- Use a slow-flow nipple
- Wait for an indication of the baby’s readiness to accept the bottle – opening the mouth.
- See that the entire nipple is in the baby’s mouth.
- Tip the bottle just enough that there is milk in the nipple. At the beginning of the feeding, the bottle will be almost horizontal, and slowly becomes more angled as the feeding progresses.
- Watch the baby for coordinated breathing, sucking and swallowing – or signs of distress. Pause the feeding frequently (about every 3 swallows) to mimic the pattern and pace of breastfeeding. To pause, try lowering the tilt of the bottle or removing the bottle from the baby’s mouth.
- Let the baby determine how much milk to take and when to stop feeding. Do not try to encourage the baby to finish the bottle. The feeding will likely take as long as an effective breastfeeding, once breastfeeding is established.

General Principles

Alternative feeding methods allow the mother to provide oral supplementation to her baby. Alternative feeding methods include cup feeding, spoon feeding, syringe feeding, the use of a lactation aid at the breast, finger feeding or paced bottle feeding. Alternative feeding methods are contraindicated if the baby does not have a suck, swallow, or gag reflex

It is important to support the mother in understanding the possible benefits and risks associated with the use of an alternative feeding method, so that she is able to make an informed decision about an appropriate method for supplementation. It is important to include discussion of her capacity to manage the intervention (see *Criteria for Selecting an Alternative Method of Infant Feeding* above).

Some mothers may find it overwhelming to manage the care and handling of the equipment associated with alternative feeding interventions. Offer further assessment and refer for additional support as needed.

Breastfeeding Self-Efficacy is the confidence that

a mother has in her ability to breastfeed her infant (Dennis, 1999). The mother must believe that she is capable of implementing any techniques or strategies that might be suggested (Bowles, 2011).

The evidence about alternative feeding methods is limited and is based upon the results of research involving feeding preterm infants that has been extrapolated to feeding healthy term infants.

Cue-based and baby-led practices should be applied in the use of alternative feeding methods wherever possible. Watching for the baby’s early feeding cues (*Protocol #3: Signs of Effective Breastfeeding*) and following the baby’s signals for readiness to accept food promotes a more normal feeding experience as well as facilitating a return to the breast.

A plan to wean from the alternative feeding method to feeding at the breast should be identified before the method is initiated. The plan should include regular (daily) monitoring by a health care professional with breastfeeding expertise to reassess when the breast milk supply has increased or that the baby’s latching and sucking has improved. The practitioner who initiates the use of an alternative feeding method is responsible for assessing the benefits and risks of that intervention, as well as for establishing a plan with the mother for the ongoing management and evaluation of the intervention. The baby’s weight gain and the mother’s breast milk supply need to be monitored closely. There must be a comprehensive plan that includes periodic reassessment of the breastfeeding and the infant’s intake of breast milk, as well as the re-establishment of feeding at the mother’s breast.

Although readily available, the bottle or artificial nipple is not the ideal method for most babies. Using a method other than the bottle reinforces the non-verbal message to parents that supplementation is temporary (Wight, 2005). An artificial nipple may cause the baby to become confused, particularly if breastfeeding is not well established. The process of suckling is complex and the mechanics of sucking at the breast and the bottle are different. “Nipple confusion” refers to a baby’s difficulty in achieving the correct oral configuration, latching technique, and suckling pattern necessary for successful breastfeeding after bottle feeding or other exposure to an artificial nipple (Neifert et al., 1995). See also *Protocol #1: The Initiation of Breastfeeding* regarding learning to suck and imprinting.

Babies need to learn the normal mechanics of sucking at the breast. This includes learning to manage the flow of milk from the breast. Feeding only at the breast helps to prevent the baby from learning to suck improperly on the breast tissue, which may in turn lead to breast refusal or painful nipples. As stated in Lawrence (2010), this “nipple confusion” has not been established in the medical literature, but there is strong evidence in the psychosomatic literature related to “imprinting” of sucking behaviours that supports the concept.

Imprinting – The concept of imprinting or “stamping” is sometimes used to explain the observation of nipple preference. Imprinting is drawn from other sciences, such as biology and psychology, where it has been applied to explain attachment behaviours and brain pathway development. In humans, imprinting is oral/tactile (Lawrence, 2010) and Gale Mobbs (1989) identified the mouth as the most significant factor in imprinting in humans. When babies are exposed to artificial nipples or finger early, they can become accustomed to the feeling of that particular object (bottle nipple, pacifier, finger) in their mouths and have difficulty accepting another object, such as a mother’s nipple, in its place (Righard, 1997).

Cup feeding has been found to support infant physiological stability and to be both effective and time efficient (Howard et al., 1999). It is the preferred alternative method for supplementing the non-breastfeeding baby (BFI Appendix 9, BCC, 2011). Gomes et al. (2006) found that babies use the same mouth and facial muscles for both cup feeding and breastfeeding. It is simple, safe, inexpensive, and non-invasive (Gupta et al., 1999). Cup feeding has been practiced traditionally around the world and therefore is familiar to many new Canadians. Howard et al. also found that cup feeding was a better way than bottle feeding to supplement babies born by caesarean section (Howard, 2003). Although some research found that cup feeding protects oxygen saturation rates (Renfrew et al., 2009) or may lead to oxygen desaturation (Rocha, 2002), the evidence is mixed (Collins et al., 2008). It is important that both parents and practitioners follow the baby’s cues to prevent him from being overwhelmed by the flow of milk

Finger Feeding – There is very limited research available to support the use of finger feeding as an alternative method of supplementation when a

baby is not feeding at the breast. Although some believe the mechanics of finger feeding are more like breastfeeding and it is used by some experts to evaluate the baby’s suck reflex, these have not been systematically evaluated. Nor is there data to establish safe practices for finger feeding. The adult finger is firmer and narrower than the breast. Some babies may find the feel of a feeding tube on their hard palate to be distracting (Wilson-Clay, 2008).

Although parents do not need to wear gloves, health care professionals should wear gloves before inserting anything into the baby’s mouth.

A Lactation Aid at the Breast enables the baby to stimulate the breast by sucking at the breast, as well as simulate the experience of remaining on the breast while receiving the supplement.

Paced Bottle Feeding – Paced bottle feeding is an approach to feeding a baby with a bottle when the baby is unable to feed at the breast and the mother has made an informed decision to feed with a bottle. With paced bottle feeding, the baby is better able to control the milk flow and set the pace of the feeding of either EBM or ABM. It supports cue-based feeding practices and transitioning to feeding directly at the breast.

Paced bottle feeding is physiologically similar to the pattern of breastfeeding. Breastfed babies normally exhibit a coordinated sucking and breathing pattern – “suck-swallow-breathe” – ideally in a 1:1:1 ratio. However, babies may not pause to breathe regularly when they are trying to cope with the fast flow of milk from a bottle. They may appear to be hungrily gulping the milk, when they are actually having trouble coordinating breathing and swallowing. These babies may become distressed.

The paced bottle feeding approach was originally used in NICUs for transitional feedings with premature babies. There is growing interest in extending this approach to any baby being bottle fed. Not only is it more comfortable for the baby to have the sucking, swallowing, and breathing coordinated, it helps to avoid overfeeding. When the baby controls speed, the baby also controls volume.

(Adapted from ABA, 2009; Wilson-Clay 2008 and Lauwers et al., 2011)

Supplementation may be provided in addition to breastfeeding or temporarily in place of breastfeeding until breastfeeding can be resumed (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

EBM is the first choice as a supplement for most babies, particularly breast milk that is expressed after the baby has breastfed. When the mother expresses after a feeding, she may be able to drain

her breasts as much as possible and produce breast milk that is high in fat. This can provide the baby with extra calories. See *Protocol #17: Indications for Supplementation or Cessation of Breastfeeding* for further information.

If EBM is not available, then an appropriate supplement, ABM, should be offered (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

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Protocol #19

Expressing and Storing Breast Milk



Protocol #19: Expressing and Storing Breast Milk

The expression or collection of breast milk is a learned skill. The reason the mother is expressing her breast milk will determine the method she uses, whether and how she stores the breast milk, and whether it is long-term or occasional.

Observation and Assessment

Indications for expressing and storing breast milk

Assess the mother for:

- Separation from the baby, e.g., due to return to work or school, illness, or surgery.
- A decreased breast milk supply that she wants to increase (*Protocol #12: Insufficient Breast Milk Supply*).
- Engorged breasts that are too hard for the baby to latch onto (*Protocol #5: Engorgement*).
- Use of a medication that is incompatible with breastfeeding and for which there is no safe alternative (*Protocol #16: Drugs and Breastfeeding*).

Assess the baby for:

- Separation from the mother such as prematurity, illness, or surgery.
- Inability to latch and breastfeed effectively (*Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch; Protocol #10: Ineffective Suck; Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

Suggestions

Expressing Breast Milk

1. Assess the mother and baby for indications for expressing and storing breast milk (see *Observation and Assessment*).
2. Encourage the mother in understanding information to support her choice of a method of expression:
 - Expression, both by hand and mechanically, is a learned skill. It will become easier and faster as she gains experience.
 - Hand expression is a foundational skill for the breastfeeding mother, and is particularly important in the first 24 hours postpartum, when the volume

of breast milk is very small. It is recommended that all mothers learn how to hand express prenatally (BFI Step 3, BCC, 2011) or before they leave hospital (BFI Step 5, BCC, 2011). Waiting until the last few weeks of pregnancy (37+ weeks) to practice hand massage on the mother's breasts will decrease any potential risk of triggering preterm labour.

- It is easier to see a positive output with hand expression for a small volume of breast milk. The volume may be too small to collect in the reservoir of a mechanical pump. This may negatively impact the mother's breastfeeding self-efficacy, leading her to believe that she is not able to produce enough breast milk. It can be more affirming for the mother to express her breast milk into a small reservoir such as a medicine cup or shot glass.
- See Methods of Breast Milk Expression chart that follows.

Methods of Breast Milk Expression

Method	General Comments	Advantages	Disadvantages
A. Hand Expression	<ul style="list-style-type: none"> • Hand expression is an effective method for expressing breast milk when done correctly. • As with any form of breast milk expression, hand expression is a skill that the mother will need practice to do effectively. • All mothers should be shown hand expression before leaving hospital (BFI Step 3, BCC, 2011). 	<ul style="list-style-type: none"> • Can be less time-consuming than using a breast pump, as there are no parts to be put together or washed. • Some mothers may find it easier to trigger the hormones that control lactation with the skin-on-skin contact from her hands on her breast rather than from a plastic pump on her breast. • Involves no cost. • Always available anywhere, anytime. 	<ul style="list-style-type: none"> • May be difficult to sustain adequate breast milk supply during a prolonged period of time or separation. • May trigger hand cramping in mothers prone to repetitive strain injury if they don't pause periodically to relax their hands.

Methods of Breast Milk Expression (continued)

Method	General Comments	Advantages	Disadvantages
<p>B. Hospital Grade Electric Pump</p>	<ul style="list-style-type: none"> • This is the most effective type of pump to increase or maintain a breast milk supply, especially if breastfeeding is stopped for any length of time. These pumps are useful to establish a breast milk supply when the mother and baby are separated after birth or to maintain a breast milk supply if breastfeeding is temporarily stopped due to a medication or illness. • In general, this type of pump generates a maximum of 220 mm Hg of suction at between 48–60 cycles per minute, which most closely mimics a baby’s sucking rate. Each cycle represents a suction and release of pressure to simulate one suck. Pumps that generate more cycles per minute tend to be more effective than those that produce fewer cycles. • Pumps that generate 30 cycles per minute or less may cause nipple damage because of the prolonged time that the nipple is drawn in by the suction. 	<ul style="list-style-type: none"> • Most effective type of breast pump. • Easy to use due to the automatic regulation of suction and release on the pump. • Suction control allows the mother to adjust the suction to her own comfort level. • Allows the use of a double-pump kit that decreases pumping time by half and increases the likelihood that lactation will be sustained for a longer period of time. • Closed system; breast milk cannot reach the motor. Safe for multiple users, when used with a separate pump kit for each user. • Has a quiet motor. • May be covered by some insurance plans or social assistance. 	<ul style="list-style-type: none"> • Heavy to transport (11–22 lbs). • Requires an electrical outlet. • Can be expensive to use over a long period of time. • May cause nipple trauma if the flange is incorrectly sized, or if too much suction is used. • May become a reservoir for microbes if it is not cleaned appropriately.

Methods of Breast Milk Expression (continued)

Method	General Comments	Advantages	Disadvantages
C. Mid-Size Automatic Electric Piston Pump	<ul style="list-style-type: none"> • Less powerful than the full-size automatic electric piston pump. • Appropriate for mothers who have an established breast milk supply but need to pump on a regular basis, e.g., while at work. • In general, this type of pump generates less than 220 mm Hg of suction at between 30–60 cycles per minute. 	<ul style="list-style-type: none"> • Less heavy to transport than a full-size automatic electric piston pump (5–7 lbs). • An electrical outlet is not needed if the pump uses a rechargeable battery or has a separate battery pack (this feature costs extra). • Some models offer a speed control that regulates the speed of the cycling rate. This feature can enhance the letdown reflex in some women. • Easy to use due to the automatic regulation of suction and release on the pump. • Suction control allows the mother to adjust the suction to her own comfort level. • Allows the use of a double-pump kit that decreases pumping time by half and increases the likelihood that lactation will be sustained for a longer period of time. • Closed system; breast milk cannot reach the motor. Safe for multiple users, when used with a separate pump kit for each user. • Has a quiet motor. • May be able to operate with one hand, leaving the other free. • May be covered by some insurance plans or social assistance. 	<ul style="list-style-type: none"> • Not as effective as a full-size automatic electric piston pump. • May require an electrical outlet if the pump does not use a rechargeable battery or does not have a separate battery pack. • Can be expensive to use over a long period of time. • May cause nipple trauma if the flange is incorrectly sized, or if too much suction is used. May become a reservoir for microbes if it is not cleaned appropriately.

Methods of Breast Milk Expression (continued)

Method	General Comments	Advantages	Disadvantages
D. Portable Automatic Electric Diaphragm Pump	<ul style="list-style-type: none"> • This pump has a lower suction power and cycling rate than automatic electric piston pumps. • Appropriate for mothers who have an established breast milk supply but need to pump on a regular basis, e.g., while at work. 	<ul style="list-style-type: none"> • Easy to transport; has a carrying case and built-in cooler to help keep expressed breast milk cool. • Can be powered from an electrical outlet, battery (may cost extra), or automobile using a special adapter (purchased separately). • Easy to use due to the automatic regulation of suction and release on the pump. • Suction control allows the mother to adjust the suction to her own comfort level. • Allows the use of a double-pump kit that reduces pumping time by half and increases the likelihood that lactation will be sustained for a longer period of time. • Possible to operate with one hand, leaving one hand free. 	<ul style="list-style-type: none"> • Available for purchase only and is expensive. • May involve extra cost for batteries. • Recommended for a single user only by the manufacturer. Internal diaphragm cannot be replaced and may be a source of potential cross-contamination. • May cause nipple trauma if the flange is incorrectly sized, or if too much suction is used. • May become a reservoir for microbes if it is not cleaned appropriately.

Methods of Breast Milk Expression (continued)

Method	General Comments	Advantages	Disadvantages
E. Small Motorized Single Pump	<ul style="list-style-type: none"> • This pump has a lower suction power and suction/release cycle rate than automatic electric diaphragm pumps. It operates with a small electric motor that provides continuous suction and release. • Appropriate for short-term or occasional use by a mother who has an established breast milk supply. • Some models require that the mother intermittently interrupt the suction to simulate the baby's suck pattern by placing a finger over the suction and release valve or by depressing a lever or button. 	<ul style="list-style-type: none"> • Small, light, and easy to transport. • Some models are very quiet. • An electrical outlet is not needed when a battery is used. • Can double pump if the mother has two pumps and can manage to use one hand to operate each pump separately. 	<ul style="list-style-type: none"> • The models that require the mother to simulate the baby's suck pattern can take time to practice and master. • Models that generate 30 cycles per minute or less may cause nipple damage because of the prolonged time that the nipple is drawn in by the suction. • Some models are noisy. • May cause nipple trauma if the flange is incorrectly sized, or if too much suction is used. • May become a reservoir for microbes if it is not cleaned appropriately. Recommended for a single user only by the manufacturer. Internal diaphragm cannot be replaced and may be a source of potential cross-contamination.

Methods of Breast Milk Expression (continued)

Method	General Comments	Advantages	Disadvantages
<p>F. Hand Pumps</p> <ul style="list-style-type: none"> ◦ One-hand operated handle squeeze pumps ◦ Two-hand operated pumps ◦ Cylinder pumps ◦ Rubber bulb pumps (Not recommended) 	<ul style="list-style-type: none"> • Appropriate for short-term or occasional use by a mother who has an established breast milk supply. • Portable; can be used with one or two hands, depending on model. • More affordable than the other types of pump; however, not all hand pumps are effective. • Squeezing and releasing a handle creates suction in the pump. 	<ul style="list-style-type: none"> • Small, light, and easy to transport. • No batteries or electrical outlet needed. • Some models have air vents to regulate the suction to safe levels (cylinder and rubber bulb pumps do not have this feature). • Easily cleaned. <p>One-hand operated squeeze pumps</p> <ul style="list-style-type: none"> • Can double pump if the mother has two pumps and can manage to use one hand to operate each pump separately. 	<ul style="list-style-type: none"> • Models that do not have a self-regulating suction/release feature will require the mother to practice simulating the baby's suck pattern. • Can tire the hands and wrist, so should not be used by mothers with hand, wrist, or arm problems, e.g., carpal tunnel syndrome. • Two-hand operated pumps do not allow for double pumping. <p>Cylinder pumps</p> <ul style="list-style-type: none"> • Difficult to regulate the suction. • Have a rubber gasket that may crack and harbour bacteria if not removed and cleaned properly after each use. <p>Rubber bulb pumps</p> <ul style="list-style-type: none"> • Very difficult to regulate the suction. • High risk of breast milk contamination as the bulb is hard to clean. <p>Not recommended</p>

General Suggestions for Breast Milk Expression

Before expressing, encourage the mother to:

- Wash her hands with soap and water.
- Clean all collection equipment that will have contact with her breast or breast milk.
- Have container(s) ready to store the breast milk. For healthy full-term babies use clean, air-dried glass, or hard plastic containers. For premature or hospitalized babies use sterilized glass or hard plastic containers. See *Cleaning Instructions* below.
- Express in the morning when the breasts feel the fullest or after breastfeeding, when the letdown reflex has already occurred. If the mother is single pumping and her baby is with her, she may pump one breast while breastfeeding the baby on the other side.
- Allow enough time to express to avoid feeling rushed –approximately 20–30 minutes with single pumping (10–15 minutes per breast) or 10–15 minutes with double pumping.
- Sit in a familiar and comfortable setting.
- Decrease distractions, e.g., turn off the phone and TV, and close the door.
- Have something to eat or drink available.
- Use relaxation techniques, e.g., play relaxing music, use breathing exercises to minimize stress that could interfere with the hormones that control lactation (see *How the Breast Works*).
- Use stimuli that remind her of her baby, such as a picture of the baby, recording of the baby sounds, or an article of clothing with the baby’s smell. If the baby is present, suggest that she keep the baby close to her when expressing.
- Hold her baby skin-to-skin before trying to express breast milk, in order to relax and help trigger the hormones that control lactation.
- Initiate the letdown or breast milk ejection reflex by using one of the following techniques:
 - Use relaxation strategies to be calm, e.g., a warm shower, heat applied to her back and shoulders, relaxation breathing, a warm drink, or supportive positions.
 - Manage pain to increase comfort and relaxation and facilitate breast milk letdown.

- Gently massage the breasts. Apply moist or dry heat to her breasts for a few minutes before or during massage until letdown occurs. Heat may be applied with a warm, wet towel or disposable diaper, a warm bath or shower, a bowl of warm water, a heating pad on low, or a hot water bottle wrapped in a cloth. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).
- Stimulate the nipples. Gently roll the nipples between the index finger and thumb for several minutes or until the letdown reflex occurs. Then gently express some breast milk (*Protocol #19: Expressing and Storing Breast Milk*).

During expressing, encourage the mother to:

- Visualize the direction of breast milk flowing out of her breast.
- Use a rhythmic motion that mimics the baby’s suck rhythm.
- Massage her breast(s) as described above.
- Switch breasts several times during the expression, whenever the flow of breast milk decreases, if she is expressing one breast at a time. This will stimulate several letdown reflexes more effectively than continuously expressing each breast for a specified time.
- Be aware that she may only get a few drops when first learning to express, especially in the early days after birth, when her breasts are producing breast milk in small amounts.

Hand Expression

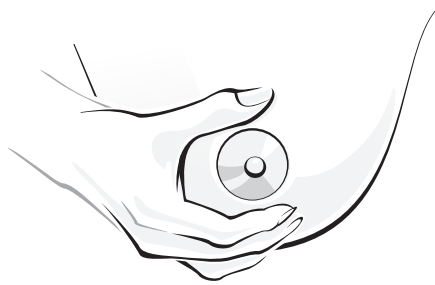
Encourage the mother to:

- Wash her hands with soap and water.
- Have a clean, dry bowl or glass measuring cup ready to collect the expressed breast milk.
- Stimulate the letdown reflex as discussed above, especially if her breasts are engorged.
- Gently massage her breasts to soften them and to encourage the breast milk to move down toward the areola. She may try one or more ways to massage her breasts. For example, some women massage their breasts in a warm shower or bath. Some women may use their fingertips; others may support their breast with one hand while stroking the breast with the other hand.
- Place the thumb and fingers about 1–1½ inches

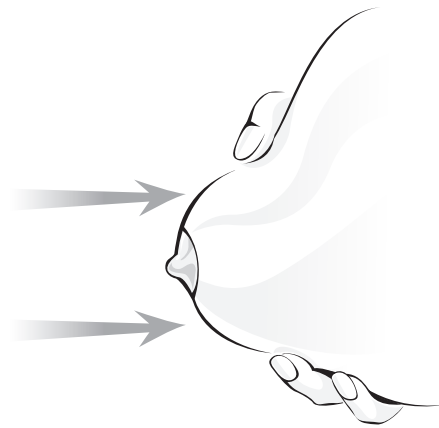
behind the nipple or along the edge of the areola. The thumb and fingers are on opposite sides of her breast (see the diagram *Position for Hand Expression* below).

- Massage using small circles to rotate all around her breast.
- Push straight back towards the chest wall.
- Gently compress the breast between the thumb and fingers and roll the fingers toward her nipple; then relax her fingers. If no breast milk comes, shift the thumb and finger placements either further from or closer to the nipple and compress again; this will help the mother identify the sweet spots or ducts that will yield breast milk (Mohrbacher, 2010). Rotate her fingers and thumb around the breast.
- Repeat the above procedures in a rhythmic motion that mimics the rhythm of the baby's suck, e.g., position, push back, compress and/or roll, relax.
- Some practitioners may suggest that mothers compress their fingers using a pulsating motion.
- Switch breasts whenever the flow of breast milk decreases, which may occur several times during the expression. This will stimulate several letdown reflexes more effectively than continuing on one side for a set time before switching.
- Rotate the thumb and fingers in different positions around the nipple to ensure that all the breast milk ducts are emptied.
- Expect that it may take about the same time as it does to breastfeed, about 20 minutes or more, to effectively hand express at the beginning. It may become faster once she is more proficient.

(Source: Adapted from Riordan, 2010; Biancuzzo, 2003; Mohrbacher, 2010.)



Position for Hand Expression



Push Back



Compress and/or Roll Forward

Breast Pumps

Encourage the mother to:

- Wash her hands with soap and water.
- Assemble the breast pump according to the manufacturer's instructions.
- Moisten her breast with water before positioning the breast shield over the nipple to help create a better seal.
- Position the breast shield on her breast so that it is centred over the nipple.

For electric breast pumps, set the pump to the lowest setting before turning it on. The mother can gradually increase the setting during the pumping session. Inform the mother that an increased setting that causes her discomfort can inhibit the letdown reflex. The pump should also be kept on the minimal setting if the mother's breasts are engorged. Once the areola has softened, the mother can gradually increase the setting according to comfort. Using

a setting that is too high may contribute to nipple trauma. The container should be changed when it is three quarters full to prevent breast milk from backing up into the pump.

Pump each breast until the breast is effectively drained, or just until softened if pumping to relieve engorgement:

- Double pumping is recommended, if possible, as this will decrease the pumping time in half and increase the mother's prolactin levels.
- If the mother is single pumping, encourage her to switch breasts whenever the flow of breast milk decreases, which may occur several times during the pumping session. This will help to stimulate several letdown reflexes.
- When finished, the breast shield should be slowly and carefully removed from her breast.

Cleaning Instructions for Breast Pumps and Collection Equipment

For Healthy Full-Term Babies at Home

- Wash your hands with soap and water before touching the breast milk containers.
- **Prior to first use**, sterilize all pump parts that come in contact with your breast or breast milk. Sterilization may not be necessary if you have purchased a pump that indicates that it is already sanitized or sterilized.
- Sterilization can be achieved by boiling pump parts for ten minutes, by using an electric sterilizer, by using a sterilizer made for the microwave, or by washing them in the top rack of a dishwasher.
- **After each use**, rinse all pump parts in cool water to remove breast milk residue and then wash them with hot water and mild soap or detergent. Avoid using bottle brushes, abrasives or chemicals because they might scratch or damage the pump parts. Rinse the pump parts thoroughly with clear water and air dry them on a clean towel or dish rack. Cover parts with a clean towel when not in use. Avoid storing wet or damp parts.
- Cleaning the tubing is necessary only if condensation or breast milk appears in the tubing. If condensation appears in the tubing, continue running the pump for another 1–2 minutes. If breast milk gets in the tubing, remove the tubing from the

pump, wash in warm soapy water and rinse in cold, clear water. To dry, shake out the droplets and hang to air dry or reattach the tubing and run the pump for 1–2 minutes.

For Premature or Hospitalized Babies/Mother and/or Babies with Candidiasis

- All breast pump and collection parts should be sterilized after each pumping session (hospital policies may vary).
- At home, the parts should first be washed in hot soapy water and rinsed in hot water. The pump parts should then be boiled in a covered pot of boiling water for 10 minutes, then removed from the pot to air dry (*Protocol #15: Candidiasis (Thrush) and CPSO, 2005*).

Frequency of Breast Milk Expression

- If breastfeeding is stopped for any length of time, encourage the mother to express each breast on a regular basis in order to maintain breast milk supply. Generally, this is at least 8 times a day, with a minimum of 1 expression overnight. The mother may need to express more often if her breasts become uncomfortable or full. A rented hospital-grade electric breast pump is the most effective device for maintaining breast milk supply if breastfeeding is stopped for any length of time.
- During the first 24 hours, if the baby is not effectively transferring breast milk, expression should be initiated, beginning within 6 hours of birth and continuing 8 or more times in 24 hours to promote establishment of lactation (BFI Step 6, BCC, 2011). The preferred method is hand expression during the first 24 hours after birth.

Storage of Breast Milk

Provide the mother with information regarding the storage of breast milk.

Containers for Storing Breast Milk in the Refrigerator or Freezer

- Glass or BPA-free hard plastic containers with an airtight lid should be used. Most mothers use containers manufactured specifically for breast milk collection, but small jars and bottles with lids, such as Mason jars, may be used. The mother can also use specially manufactured breast milk freezer bags.
- Disposable bottle liners should be avoided because

they are made from a thin plastic that may break when frozen. These bags also do not have an airtight seal and can contaminate the breast milk or leak. Bottle liner bags are made for bottle feeding and not for storage.

Note: If most of the baby’s nutrition is from expressed breast milk, glass containers are the first choice for freezing, followed by hard plastic containers. Fewer antibodies are lost with glass than with plastic when freezing breast milk.

Cleaning Instructions for Storage Containers

For Healthy Full-Term Babies at Home

- Containers should be washed in hot soapy water, then rinsed in hot water and allowed to air dry. Once the containers are dry, they should be covered and stored in a dry, clean area away from food preparation until they are needed.

For Premature or Hospitalized Babies/Mothers and/or Babies with Candidiasis

- Containers should first be washed in hot soapy water and rinsed well in hot water. They should then be boiled in a covered pot of boiling water for 10 minutes, and removed from the pot to air dry. In the hospital, sterilized containers may be provided.

Storage Tips

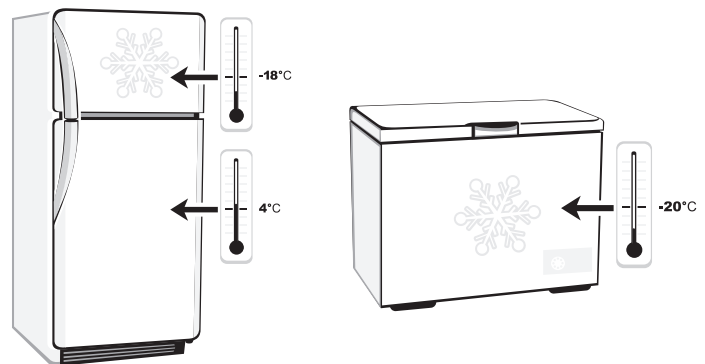
Encourage the mother to:

- Refrigerate or chill freshly expressed breast milk within 1 hour of expression if it is not going to be used within 6–8 hours.
- Expressed breast milk left at room temperature for more than 6–8 hours should be discarded.
- Store breast milk in small portions to minimize waste, e.g., 60–120 ml (2–4 ounces).
- Combine smaller amounts of chilled breast milk expressed on the same day to get the desired amount.
- Always chill freshly expressed breast milk before adding it to frozen breast milk. This will prevent the frozen breast milk from thawing, and prevent potential bacterial growth.
- Place the breast milk at the back of the fridge or freezer, where it is coldest.
- When freezing, leave a 1 inch space at the top of the storage container or breast milk freezer bag because

breast milk will expand when frozen. If a breast milk freezer bag is used, remove as much air as possible from the bag. Label each container with the date and time. Add the child’s name if being used outside of the home.

Storage Times

- Room Temperature: ≤ 25°C or 77°F for 6–8 hours.
- Insulated cooler with ice pack: 24 hours.
- Refrigerator: ≤ 4°C or 40°F: 5 days



Freezer of a refrigerator

–18°C or 0°F:
3–6 months

Chest or Upright freezer

–20°C or –4°F:
6–12 months

(Source: Adapted from ABM, 2010 and TPH, 2011)

Thawing Frozen Breast Milk

- Check the date on the container to make sure that the storage time has not expired (see previous section on *Storage Times*). Any expired breast milk should be discarded.
- Use the container with the earliest date first.
- Thaw the frozen breast milk by using one of the following techniques:
 - Place the container in the refrigerator for 4–24 hours;
 - Place the container under running water or in a bowl of water. Do not permit the tap or water to touch the opening of the container.

Caution: Frozen breast milk should never be left to thaw at room temperature, as this will increase the bacterial count in the breast milk.

- Do not thaw frozen breast milk on the stove top or in a microwave. Extreme heat from the stove or microwave will destroy vitamin C and antibodies in breast milk.
- Use the thawed breast milk immediately or store it in the refrigerator for no longer than 24 hours.
- Never refreeze thawed breast milk.
- Shake the thawed breast milk. Breast milk that has been frozen and thawed will separate into layers, with the fat rising to the top. The breast milk can be gently shaken or mixed before it is fed to the baby. Thawed breast milk may have a different smell and taste than freshly expressed breast milk. It is still safe for use if the date of the thawed breast milk has not expired.
- Warm the thawed breast milk by placing it in a bowl of warm water. Do not heat it in a microwave.
- The warmed breast milk should then be used within an hour. Do not return to the fridge after it has been warmed. It can be offered using an alternative feeding method (*Protocol #18: Alternative Feeding Methods*).

General Principles

The establishment of a healthy breast milk supply requires early breast stimulation and frequent removal of breast milk from the mother's breasts, beginning soon after birth (*Protocol #1: The Initiation of Breastfeeding*). Early and frequent breast stimulation causes the mother's blood prolactin levels to rise, which contributes to increased breast milk production (see *How the Breast Works*).

When breast milk is not regularly removed from the mother's breasts, the mother may be at risk for developing complications such as engorgement, plugged ducts, mastitis, and decreased breast milk supply. In addition, unrelieved engorgement may cause the mother's breast milk supply to decrease (*Protocol #5: Engorgement*).

Elicit the letdown or breast milk ejection reflex before initiating any method of breast milk expression (Riordan, 2010).

If the baby is not frequently and effectively breastfeeding, the expression of breast milk will be necessary to either establish or maintain a breast milk supply. Breast milk expression may be achieved by hand or with a mechanical device such as a breast pump.

Hand expression is a foundational skill for the

breastfeeding mother, and is particularly important in the first 24 hours postpartum, when the volume of breast milk is very small. It is recommended that all mothers know how to hand express prenatally (BFI Step 3, BCC, 2011) or before they leave hospital (BFI Step 5, BCC, 2011). Waiting until the last few weeks of pregnancy (37+ weeks) to practice hand massage of the mother's breasts will decrease any potential risk of triggering preterm labour.

It is easier to see a positive output with hand expression for a small volume of breast milk. The volume may be too small to collect in the reservoir of a mechanical pump. This may negatively impact the mother's breastfeeding self-efficacy, leading her to believe that she is not able to produce enough breast milk. It can be more affirming for the mother to express her breast milk into a small reservoir, such as a medicine cup or shot glass.

A recent qualitative descriptive study reflects a concern expressed by some lactation experts that there is a growing over-dependence on breastfeeding technology by both practitioners and parents (Buckley, 2009). Buckley interviewed experienced lactation consultants (LCs), who observed that with increased medical interventions and technology in births, there has been an increased use of breast pumps, as a consequence. She reported a perception that pump use increased a mother's control over feedings. In addition, it quantifies breast milk. Some mothers plan to purchase breast pumps prior to birth, in anticipation and expectation that they will need them, and before they know specifically how they will use them. The assumption that a pump is needed can further undermine a mother's breastfeeding self-efficacy.

Double pumping (pumping both breasts at the same time) with a hospital-grade electric breast pump is the most effective method for increasing or maintaining breast milk supply if breastfeeding is stopped for any length of time. Double pumping also decreases pumping time by half and increases the mother's blood prolactin levels when compared to single pumping or pumping one breast at a time (Neifert & Seacat, 1985 in Riordan, 2010).

The suction from the breast pump removes breast milk but does not completely empty the breast. Combining pumping and breast massage has been shown to increase breast milk production in research conducted by Jane Morton, MD, Stanford University, and

Lucile Packard Children's Hospital. She found that using both breast massage and "hands-on pumping" increased a mother's average daily volumes by 48% (Morton et al., 2009).

Breast milk expression is physical as well as psychological in nature. When the mother expresses breast milk, the physical cues that she would receive from her baby for a letdown reflex to occur are absent. The mother needs to understand that breast milk expression does not replicate putting her baby to her breast to remove breast milk. She will need continued support and practice to successfully express breast milk.

Chilled or thawed previously frozen breast milk may be reported to be sour, rancid, or have a soapy odour, and may be rejected by the infant. This has been attributed to a change in the lipid structure during the freeze-thaw process, but does not mean that the breast milk is spoiled or unsafe. Some women may have more lipase activity than others. Lawrence reports that when these mothers heated their breast milk to scalding (not boiling) prior to chilling the effect was not apparent and the breast milk was accepted by their infants (Lawrence, 2010). To avoid the disappointment of discarding large amounts of expressed breast milk, a mother could first chill a small amount of expressed breast milk to ensure that it does not smell or taste rancid before planning to freeze large amounts of it.

Storage times recommended for breast milk depend on when the breast milk will be used, the conditions under which it is collected and stored, and a balance between preventing contamination and protecting the physiochemical and antibacterial properties of breast milk. Most contamination of stored breast milk occurs during collection regardless of how it is stored (Orgundele, 2002).

- Breast milk should be refrigerated or chilled within 1 hour of expression if it will not be used within 6–8 hours.
- Breast milk should be frozen immediately if it will not be used within 5 days.

Room Temperature – Although the recommended storage times for breast milk at room temperature vary from 4 hours at 25°C (77°F) to 24 hours at 15°C (59°F) (Hamosh, 1996), up to 8 hours (Orgundele, 2002) and up to 10 hours at 19–22°C (66–71°F) (Barger & Bull, 1987 in Mohrbacher, 2010), the Academy of

Breastfeeding Medicine recommends storage at 6–8 hours at room temperatures from 16–29°C (60–85°F) under very clean conditions (ABM Protocol #8, 2010).

Refrigerator – Similarly, there is variability in the recommended times for refrigerator storage of breast milk. Pardou (1994) found that storage at 0–4°C was safe for up to 8 days, Health Canada proposed 3 days in its updated *Nutrition for Healthy Term Infants* (Health Canada, 2012), and Lawrence recommends 48 hours in the refrigerator (Lawrence, 2010). The Academy of Breastfeeding Medicine recommends that breast milk may be safely stored in a refrigerator for up to 72 hours in optimal conditions (not defined), or for up to 5 days if it is collected under very clean conditions (ABM, 2010). Toronto Public Health recommends that the refrigerator temperature be ≤ 4°C or 40°F (TPH, 2011). Breast milk should be stored at the back of the refrigerator, furthest away from the door.

Freezer – The type of freezer determines the recommended storage times for frozen breast milk. A freezer with a separate door is able to maintain a more stable temperature. The less frequently a freezer is opened, the longer the breast milk can be stored safely. A deep freezer, chest, or upright freezer at ≤ –20°C or –4°F can safely store breast milk for 6–12 months. A refrigerator/freezer with separate doors at ≤ –18°C or 0°F will store breast milk safely for 3–6 months. A freezer compartment located within a fridge can store frozen breast milk for only 2 weeks (CDC, 2010) because the door opens frequently and the temperature varies. Breast milk should be stored at the back of the freezer, furthest away from the door.

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Protocol #20

Breastfeeding the Older Child



Protocol # 20: Breastfeeding the Older Child

As the baby grows older, changing needs and developmental norms often alter the breastfeeding relationship. Being able to anticipate and understand these changes can facilitate ongoing maternal/child cohesion and the mother's breastfeeding self-efficacy.

Observation and Assessment

Assess the baby for:

- Breast refusal
- Change in behaviour
- Altered attention span
- Developmental milestones including appropriate growth (see Appendix D and E: WHO Growth Charts)
- Health status
- Signs of teething
- Changes in breastfeeding patterns
- Signs that the baby is ready for introduction to solids.

Assess the mother for:

- Breastfeeding expectations and goals

- Sore nipples
- Changes in breast milk supply
- Maternal breastfeeding self-efficacy, stress and coping challenges, including available support
- Ineffective latching (*Protocol #2: Positioning and Latching*)
- Return to work or school/change in routine
- Maternal infant separation
- Changes in fertility and menstruation

Suggestions

1. Offer information to the mother about expected developmental changes in her baby and the impact developmental changes can have on breastfeeding (Riordan & Waumback, 2010).

General Developmental Principles

Age	Breastfeeding Behaviour
First day postpartum	<ul style="list-style-type: none">– may or may not breastfeed following delivery– sleepy, learning to suckle– can generally maximize the use of basic reflexes to self-latch
1 month	<ul style="list-style-type: none">– becoming efficient at suckling– breastfeeds at least 8 times per day
2 months	<ul style="list-style-type: none">– easily pacified by frequent breastfeeding
3 months	<ul style="list-style-type: none">– will interrupt breastfeeding to turn to look at the father or another familiar person coming into the room or to smile at the mother
4–5 months	<ul style="list-style-type: none">– continues to enjoy frequent breastfeeding at the breast– beginning of teething; may interrupt breastfeedings due to sore gums

General Developmental Principles (continued)

Age	Breastfeeding Behaviour
7–8 months	<ul style="list-style-type: none"> – will breastfeed anytime and anywhere – actively attempts to get to the breast, i.e., tries to unbutton mother’s shirt
9–10 months	<ul style="list-style-type: none"> – easily distracted by surroundings and interrupts breastfeeding frequently – may hold the breast with one or both hands while breastfeeding
11–12 months	<ul style="list-style-type: none"> – tries “acrobatic” breastfeeding
12–15 months	<ul style="list-style-type: none"> – uses top hand to play while breastfeeding, e.g., forces a finger into the mother’s mouth, plays with her hair or pinches her other nipple – hums or vocalizes while breastfeeding – vocalizes the need to breastfeed; may use “code” word
16–20 months	<ul style="list-style-type: none"> – verbalizes delight with breastfeeding – takes mother by her hand and leads her to favourite breastfeeding place
20–24 months	<ul style="list-style-type: none"> – stands up at times while breastfeeding – breastfeeds more for comfort than for nourishment – when asked to do so by the mother, willing to wait until later for breastfeeding

Encourage the mother in understanding that:

- Growth spurts are rapid periods of growth in which the baby will breastfeed more often in response to an increased caloric need. The mother should breastfeed in response to infant feeding cues. Her breast milk supply will increase accordingly (Walker, 2011). It can be expected that babies will increase the number and lengths of breastfeeding during the second and third week of life. This can also happen at around 6 weeks and 3 months (Mohrbacher et al., 2010). It is very important to keep in mind that each infant is an individual and may present a range of breastfeeding behaviours that change over time i.e., may experience growth spurts at different times, may gain weight differently, may prefer one breast over the other, may start solids at different times, and may wean at different times (Walker, 2011).
- Growth spurts can affect the baby’s temperament and sleeping patterns, but are temporary.
- Teething can cause changes in established breastfeeding patterns due to the baby’s painful

gums (Mohrbacher, 2010).

- Babies who breastfeed during teething have been shown to experience less discomfort (The Nigerian Dental Journal, 2009).
- Older babies may bite as a result of learning/ exploring the new capabilities of their growing and changing bodies, and not out of “meanness” (Mohrbacher, 2010).
- Many babies never bite.
- There comes a time when breastfeeding alone will no longer fulfill the baby’s nutritional needs and solids should be introduced (Riordan and Wambach, 2010).

Encourage the mother to:

- Respond promptly to the cry of her older baby. She will not spoil the baby by being attentive to his/her needs.
- Breastfeed in a quiet, dimly lit room, if possible, giving the baby her focused attention.

- Learn to notice cues that the baby is finished breastfeeding to limit the opportunity for the baby to bite.
 - Ensure baby is well latched.
 - Keep breast milk supply high by avoiding unnecessary/over-supplementation.
 - Pump according to her regular breastfeeding pattern when away from the baby to maintain her breast milk supply.
 - Make note of behaviours that precede biting.
 - Make breastfeeding a relaxed and positive experience. Pressuring the baby to breastfeed can cause breast refusal and biting, as well as other feeding concerns in the future.
 - If biting does occur, stop breastfeeding and offer the baby something suitable to bite, or quickly set the baby on the floor or in a safe place away from her.
 - Continue to be in tune to baby's hunger and satiety cues. A baby-led approach during both breastfeeding and introduction to solids can help to ensure that feeding remains a positive experience (Mohrbacher, 2012).
 - Offer nutrient-dense complementary solid foods, with particular attention to iron, at 6 months of age (TPH).
 - As baby's intake of solid foods increases, the intake of breast milk will proportionally decrease.
 - Continued frequent breastfeeding is encouraged for babies over a year old as they still receive essential nutrients from breast milk, e.g., essential fatty acids, vitamin A, calcium and riboflavin (Mohrbacher, 2012).
 - Approach breastfeeding times with patience, encouragement, and eye contact and do not be too concerned about breast milk quantity (Mohrbacher, 2012).
2. Offer information that supports the mother as her body changes.

Encourage the mother in understanding that:

- As baby's body and needs change, so does her body.
- If she has a large storage capacity the baby will more likely sleep through the night, but if her storage capacity is small, night breastfeedings may be necessary for many months.

- Breast tissue is at its peak at 1–6 months postpartum. It decreases between 6–9 months. Decrease in breast tissue is not reflective of breast milk production.
- At 15 months postpartum, breast tissue has usually returned to pre-pregnancy size.
- Health issues can change breast milk supply after the first weeks postpartum. These include, but are not limited to, hormonal, thyroid, and pituitary problems, PCOS, pregnancy, serious illness or stress, routine, and drugs that change breast milk supply.
- Other factors can cause breastfeeding issues in older babies and need to be assessed. These include:
 - Overabundant breast milk supply (*Protocol #13: Overabundant Breast Milk Supply/Forceful Letdown or Breast Milk Ejection Reflex*)
 - Insufficient breast milk supply (*Protocol #12: Insufficient Breast Milk Supply*)
 - Mastitis (*Protocol #7: Mastitis*)
 - Candida albicans (*Protocol #15: Candidiasis (Thrush)*)
 - Breast disease, i.e., cancer.

3. Offer information that supports the breastfeeding mother while she returns to fertility.

Encourage the mother in understanding that:

- Return of menstruation can also alter the baby's breastfeeding behaviour.
- Decreased estrogen levels and increased prolactin levels during exclusive breastfeeding will impact her fertility.
- Lactation Amenorrhea Method (LAM) has been shown to be 98% effective when used within parameters that maintain/ensure this hormonal balance. Mothers can be taught to appropriately use LAM by frequently evaluating and re-evaluating these questions:
 1. Have your menses returned?
 2. Are you supplementing or allowing long periods (more than 6 hours during the night, 4 hours during the day) without breastfeeding?
 3. Is your baby more than 6 months old?

(Mohrbacher, 2010)

If the mother answers “yes” to any of the questions above, another form of birth control should be used.

- Light spotting is the first indication that she is becoming fertile again (Morbacher, 2010).
- She can continue to breastfeed if she becomes pregnant; breast milk still contains nutrition for children of any age.
- Breast milk may change in taste as a result of hormonal changes from menstruation and pregnancy, and the baby may refuse to breastfeed. This is especially true late in the second trimester of pregnancy, when the components of mature breast milk begin to resemble colostrum, which is more viscous, contains more sodium, and is smaller in volume.
- Breast/nipple changes during pregnancy may cause discomfort in breastfeeding.
- Breastfeeding throughout a healthy pregnancy has not been shown to pose a risk to the mother or the fetus. The mother must remain well nourished and take supplements.
- The mother may notice uterine contractions during breastfeeding or intercourse due to increased oxytocin levels. These contractions have not been shown to cause complications or concerns in a healthy pregnancy. Women with high-risk pregnancies or a history of prenatal concerns should consult their health care practitioners for guidance.
- The mother may need to adopt new breastfeeding positions as her abdomen grows (Mohrbacher, 2010).

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Protocol #21

Weaning



Protocol #21: Weaning

Weaning is a process. Ideally, the process begins when it is mutually agreeable for both mother and baby. Like all other aspects of breastfeeding, it is most successful when it is baby-led.

Observation and Assessment

Signs of Natural Weaning (Baby-Led)

Assess the baby for:

- Gradual lack of interest in breastfeeding that takes place over a period of weeks or months, and generally occurs between the ages of 2 and 4 years.
- Absence of any other cause for breast refusal (*Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch*).

Signs that are Commonly Mistaken as the Need to Wean (Mother-Initiated)

- Baby is teething.
- Mother is feeling overwhelmed with caring for the baby. Caring for a baby may be challenging regardless of the method of feeding.
- Mother develops mastitis (*Protocol #7: Mastitis*).
- Mother plans to return to work or school. If breastfeeding the baby or expressing breast milk at work is not feasible, the mother can still breastfeed her baby when she is home.
- Mother is prescribed a drug that is incompatible with breastfeeding. When there is a drug that is incompatible with breastfeeding, there is usually an alternative drug that can be prescribed (*Protocol #16: Drugs and Breastfeeding*).
- Mother or baby are ill/hospitalized. In the case of an ill baby, the anti-infective properties of breast milk will aid in the baby's recovery. If temporary weaning is medically indicated, the mother can express breast milk to maintain her breast milk supply until breastfeeding can be resumed (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).
- Mother is pregnant with no complications.

Signs of “Nursing Strikes” (NOT Weaning):

- Baby had been breastfeeding several times a day.

- Baby suddenly refuses to breastfeed (*Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch*).

- Is usually temporary.
- Can occur at any age.

Suggestions

1. Assess whether the decision to wean is baby- or mother-initiated (see previous section on *Observation and Assessment*). If the decision is mother-initiated and she is sure that she wants to wean, then her decision should be respected.
2. Assess whether weaning is necessary (i.e., related to a medication that is not compatible with breastfeeding or to a procedure that may separate the mother and baby).
3. If the decision to wean is made, provide the mother with suggestions to facilitate the weaning process.

General Tips for Weaning

Encourage the mother to:

- Not offer the breast, but also not refuse to breastfeed.
- Postpone breastfeeding if she feels that the baby can wait. This is a useful technique to encourage weaning if the baby breastfeeds irregularly and the mother finds it difficult to gradually eliminate certain breastfeedings.
- Shorten the breastfeedings that she wants to eliminate before she actually stops.
- Change daily routines that trigger or usually precede a breastfeeding (e.g., avoid sitting in the place where breastfeeding usually occurs).
- Offer substitutions and distractions during the times when breastfeeding is anticipated (e.g., offering a snack, reading, singing, or going to the park before the child has a chance to think about breastfeeding). Ask other family members to help provide substitutions and distractions.

Gradual Weaning

Encourage the mother to:

- Eliminate breastfeeding gradually. Suggest she eliminate one breastfeeding at a time every so often until the selected or all breastfeeding(s) are eliminated over a period of time (several weeks, months or years). Begin by eliminating the breastfeeding(s) the baby is least interested in. Early morning and late night feedings are usually the most difficult for the baby to give up. If the baby is younger than 9–12 months, replace the eliminated breastfeeding(s) with artificial baby milk (iron fortified infant formula). If the baby is more than 9–12 months and is eating a variety of foods, the eliminated breastfeeding(s) can be replaced with appropriate food and beverages. A cup may be introduced at between 6–9 months of age (Best Start, 2011).
- Express only enough breast milk for comfort as needed (*Protocol #19: Expressing and Storing Breast Milk*). Avoid expressing breast milk unless absolutely necessary. This gradual approach will slowly decrease the mother's breast milk supply and minimize breast fullness and discomfort.
- Observe for signs of engorgement, plugged ducts, and mastitis (*Protocol #5: Engorgement; Protocol #6: Plugged Ducts; and Protocol #7: Mastitis*).

Abrupt Weaning

If weaning is due to an incompatible medication, a medical procedure, or separation, encourage the mother to:

- Express only enough breast milk for comfort as needed (*Protocol #19: Expressing and Storing Breast Milk*). Avoid expressing breast milk unless absolutely necessary. Inform the mother that she will gradually express less breast milk at fewer intervals until her breast milk supply dries up within a couple of weeks.
- Observe for signs of engorgement, plugged ducts, and mastitis (*Protocol # 5: Engorgement; Protocol #6: Plugged Ducts; and Protocol #7: Mastitis*).
- Apply a cold wet cloth to the breasts after expressing to provide comfort and reduce swelling.
- Wear breast pads, if necessary, for leaking.
- Wear a firm bra for support. Avoid bras with underwire.

- Eat and drink a balanced diet according to *Eating Well with Canada's Food Guide* (Health Canada, 2007).
- Drink when thirsty. There is no need to restrict fluid intake.
- Avoid binding the breasts as this has not been proven to be effective. Binding may increase breast discomfort as well as the risk of plugged ducts and mastitis.
- Avoid drugs used to decrease breast milk supply (e.g., bromocriptine). These drugs can have serious side effects such as strokes and seizures.
- Consult her primary health care provider or breastfeeding expert to discuss alternative medications compatible with breastfeeding or a plan for temporary cessation that includes expression and discarding of breast milk.

Nursing Strikes

To encourage the baby to return to the breast, suggest that the mother:

- Give the baby more eye-to-eye contact.
- Clothe the baby in a diaper only to promote skin-to-skin contact.
- Breastfeed in a quiet, relaxed place with few distractions.
- Initiate breastfeeding before the baby is stressed and crying (see early feeding cues in *Protocol #3: Signs of Effective Breastfeeding*).
- Write down a record of changes in both diet and activities. This may help to show if there has been an illness, teething, or a different food, clothing, or product used.
- Express some breast milk for comfort if her breasts are too full. Offer expressed breast milk from a cup.
- Relax. Be patient. Be reassured that the baby will usually resume breastfeeding in a few hours or days.

General Principles

Weaning begins when the baby is introduced to sources of foods other than breast milk and completely ends with the last breastfeeding. Babies are developmentally ready to begin the introduction of complementary foods at about 6 months of age. Foods other than breast milk that are introduced before 6 months will compromise the mother's

breast milk supply and may deprive the baby of nutrients. Breast milk feedings should not be replaced prematurely by foods such as infant cereals or other “first foods” as these may displace breast milk, resulting in inadequate energy and nutrient intake and depriving the baby of some of the long-term benefits of breastfeeding. Early use of complementary foods may interfere with the bioavailability of iron in breast milk and may increase the risk of iron deficiency anemia (ADA & DC, 2000). For the healthy term infant there is no nutritional or developmental advantage from introducing other foods before 6 months.

Ideally, weaning is a joint decision shared by the mother and baby and is based on the nutritional and developmental needs of the baby. In North America, weaning commonly takes place during the first year and tends to be mother-led. Historically, this mother-led weaning occurred when the mother returned to work or school routines. Weaning that is naturally initiated by the baby will usually occur between the ages of 2 and 4 years and will take place over a period of weeks or months (Dettwyler, 2004).

If the baby is less than a year old and is refusing to breastfeed, it is unlikely that this is natural weaning (see *Nursing Strikes* above and *Protocol #9: Breast Refusal or Difficulty Achieving or Maintaining a Latch*).

Although breastfeeding beyond a year has not been common practice in Western society, later breastfeeding continues to provide benefits to both the mother and baby. The importance of breastfeeding includes:

- For the baby, reduced risk of:
 - Sudden infant death syndrome
 - Gastrointestinal, ear, and respiratory infections during infancy and childhood
 - Diabetes
 - Childhood obesity (TPH, 2010)
- For the mother, reduced risk of:
 - Diabetes
 - Breast cancer
 - Ovarian cancer (TPH, 2010)

There are three types of weaning:

- Partial
 - Selected breastfeeding session(s) are replaced with other sources of foods.
 - Partial weaning can be reversed and the mother can return to more frequent breastfeedings at a later time.
- Complete
 - All breastfeedings are replaced with other sources of foods.
- Temporary
 - Occasionally breastfeeding may be interrupted temporarily, such as when either the mother or child is ill or separated. Breast milk is expressed manually or by pump (see *Protocol #19: Expressing and Storing of Breast Milk*). If breastfeeding is interrupted due to an incompatible medication or procedure, breast milk should be discarded.

There are two methods of weaning:

- Gradual
 - Weaning takes place over a period of time (several weeks, months, or years).
 - Least traumatic for both the mother and baby and minimizes complications (e.g., plugged ducts, mastitis).
- Abrupt
 - Weaning occurs immediately.
 - May be more traumatic for both mother and baby.
 - Increases the risk of complications (e.g., plugged ducts, mastitis, and depression due to the sudden drop in prolactin levels).
 - May be necessary due to medical reasons (*Protocol #17: Indications for Supplementation or Cessation of Breastfeeding*).

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Appendix A

ELEMENTS OF MAKING AN INFORMED DECISION – INFANT FEEDING (CHECKLIST)

Key Elements for staff to discuss with Client	Prenatal Period	Postnatal Period
<i>Importance of exclusive breastfeeding for six months and continued breastfeeding up to two years and beyond</i>	✓	✓
<i>Benefits of breastfeeding</i>	✓	✓
<i>Health consequences of not breastfeeding</i>	✓	✓
<i>Risks and costs of feeding artificial baby milk (ABM)</i>	✓	✓
<i>Contraception compatible with breastfeeding including LAM (Lactation Amenorrhea Method)</i>	✓	✓
<i>Difficulty of reversing the decision once breastfeeding is stopped</i>	✓	✓
<i>Breastfeeding support programs</i>	✓	✓
<i>Employment rights of pregnant and/or breastfeeding women</i>	✓	✓
<i>Basic breastfeeding management:</i> <ul style="list-style-type: none"> – positioning and latching – hand expression of breast milk – expected normal feeding behaviours (frequency of feeds, output) – benefits of skin-to-skin care, especially premature infant – infant feeding cues 	✓	✓
– 24-hour rooming-in	✓	
<i>The importance of hospitals and community health services having policies and practices that are to become Baby-Friendly</i>	✓	
<i>Medical indications of supplementation or cessation of breastfeeding</i>		✓
<i>Supplementing with mother's own breast milk or donor human milk (where available) when possible</i>		✓
<i>Use of pacifiers and artificial nipples</i>		✓

Appendix B

Summary of the International Code of Marketing of Breast Milk Substitutes

**World Health Organization
Geneva, 1981**

The Code includes these 10 important provisions:

1. No advertising of these products to the public.
2. No free samples to mothers.
3. No promotion of products in health care facilities.
4. No company mothercraft nurses to advise mothers.
5. No gifts or personal samples to health workers.
6. No words or pictures idealising artificial feeding, including pictures of infants, on the labels of the products.
7. Information to health workers should be scientific and factual.
8. All information on artificial feeding, including the labels, should explain the benefits of breastfeeding, and the costs and hazards associated with artificial feeding.
9. Unsuitable products, such as sweetened condensed milk, should not be promoted for babies.
10. All products should be of a high quality and take account the climatic and storage conditions of the country where they are used



The National Authority for the Baby-Friendly Initiative

Integrated 10 Steps & WHO Code Practice Outcome Indicators
for Hospitals and Community Health Services: Summary

The WHO 10 Steps to Successful Breastfeeding (1989) and
the Interpretation for Canadian Practice (2011)

Step 1	WHO	Have a written breastfeeding policy that is routinely communicated to all health care staff.
	Canada	Have a written breastfeeding policy that is routinely communicated to all health care providers and volunteers.
Step 2	WHO	Train all health care staff in the skills necessary to implement the policy.
	Canada	Ensure all health care providers have the knowledge and skills necessary to implement the breastfeeding policy.
Step 3	WHO	Inform pregnant women and their families about the benefits and management of breastfeeding.
	Canada	Inform pregnant women and their families about the importance and process of breastfeeding.
Step 4	WHO	Help mothers initiate breastfeeding within a half-hour of birth. WHO 2009: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed.
	Canada	Place babies in uninterrupted skin-to-skin ¹ contact with their mothers immediately following birth for at least an hour or until completion of the first feeding or as long as the mother wishes; encourage mothers to recognize when their babies are ready to feed, offering help as needed.

¹ The phrase « skin-to-skin care » is used for term infants while the phrase « kangaroo care » is preferred when addressing skin-to-skin care with premature babies.

Appendix C cont.

BCC Integrated Ten Steps Practice Outcome Indicators May 2012

2

Step 5	WHO	Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.
	Canada	Assist mothers to breastfeed and maintain lactation should they face challenges including separation from their infants.
Step 6	WHO	Give newborns no food or drink other than breastmilk, unless medically indicated.
	Canada	Support mothers to exclusively breastfeed for the first six months, unless supplements are <i>medically</i> indicated.
Step 7	WHO	Practice rooming-in - allow mothers and infants to remain together 24 hours a day.
	Canada	Facilitate 24 hour rooming-in for all mother-infant dyads; mothers and infants remain together.
Step 8	WHO	Encourage breastfeeding on demand.
	Canada	Encourage baby-led or cue-based breastfeeding. Encourage sustained breastfeeding beyond six months with appropriate introduction of complementary foods.
Step 9	WHO	Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
	Canada	Support mothers to feed and care for their breastfeeding babies without the use of artificial teats or pacifiers (dummies or soothers).
Step 10	WHO	Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.
	Canada	Provide a seamless transition between the services provided by the hospital, community health services and peer support programs. Apply principles of Primary Health Care and Population Health to support the continuum of care and implement strategies that affect the broad determinants that will improve breastfeeding outcomes.
The Code	WHO	Compliance with the International Code of Marketing of Breastmilk Substitutes.
	Canada	Compliance with the International Code of Marketing of Breastmilk Substitutes.

Appendix D

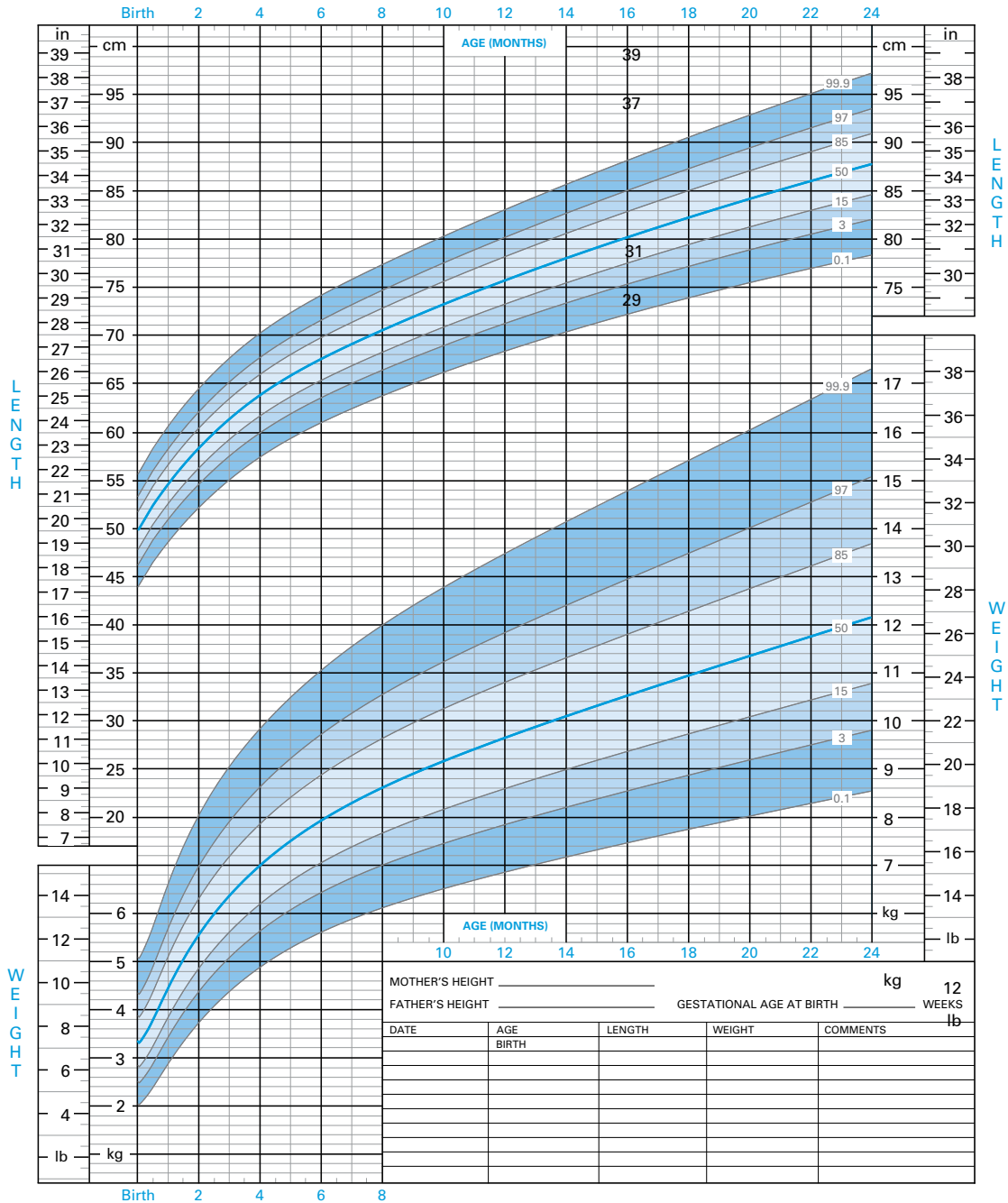
WHO GROWTH CHARTS FOR CANADA

BOYS

BIRTH TO 24 MONTHS: BOYS
Length-for-age and Weight-for-age percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.
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www.dietitians.ca/growthcharts

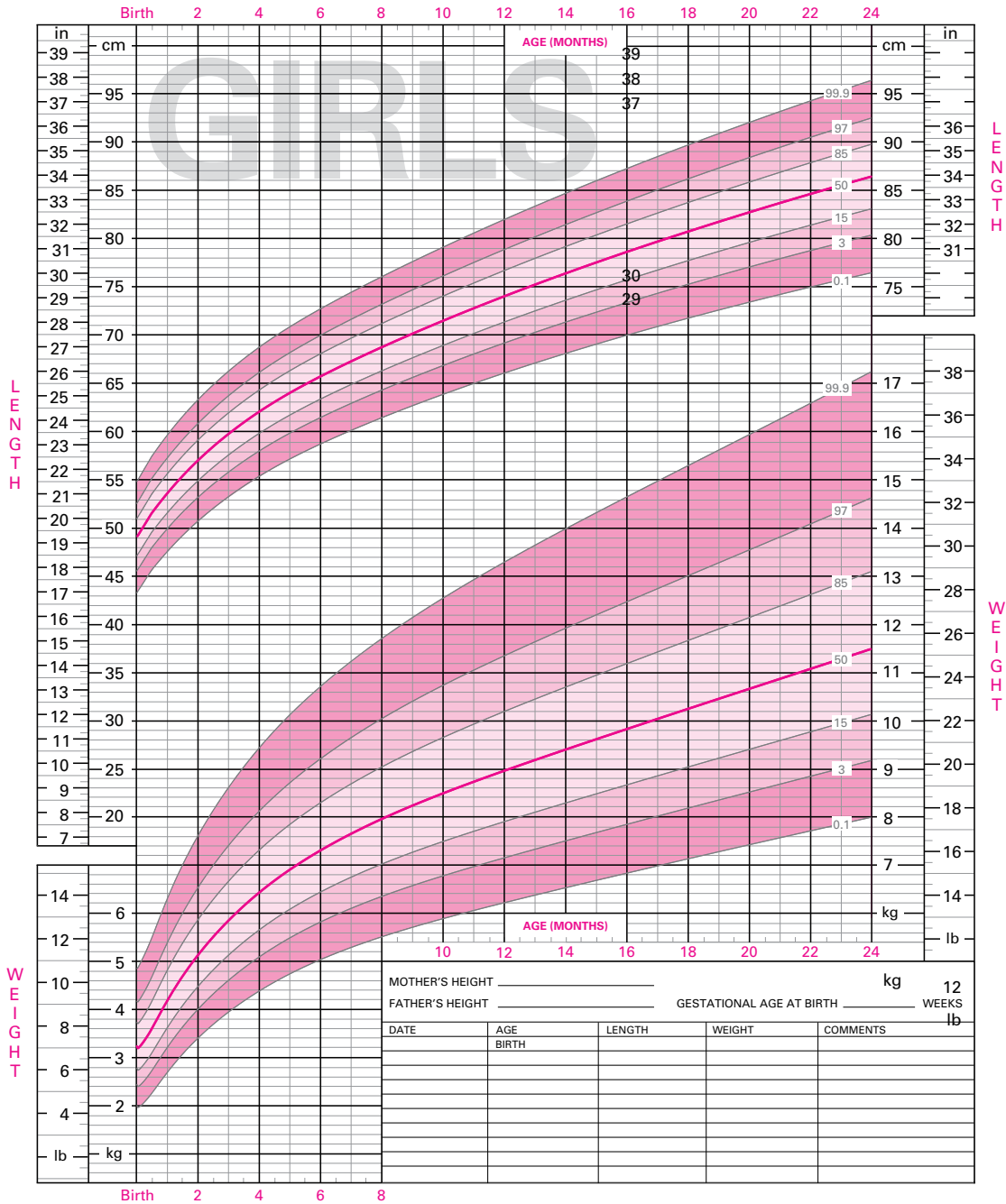
Appendix E

WHO GROWTH CHARTS FOR CANADA

GIRLS

BIRTH TO 24 MONTHS: GIRLS
Length-for-age and Weight-for-age percentiles

NAME: _____
DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.
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