

## Infant feeding

The World Health Organization (WHO) strongly recommends exclusive breastfeeding for the first six months of life, with other foods introduced at six months, alongside continuing to breastfeed for up to two years, or more.<sup>[1]</sup> Similarly, the UK's Scientific Advisory Commission on Nutrition (SACN) recommends exclusive breastfeeding for 6 months, with continued breastfeeding for at least the first year of life.<sup>[2]</sup> Breastfeeding has an important role in addressing health inequality.<sup>[3]</sup>

### Incidence of breastfeeding<sup>[4]</sup>

In the UK, in 2010 81% of mothers initiated breastfeeding at birth (an increase from 76% in 2005). These are the most recent UK-wide figures that are available, as the Infant Feeding Survey was discontinued after this. 17% of women remained exclusively breastfeeding at three months, falling to 1% exclusively breastfeeding at six months. 55% of women continued partially or fully breastfeeding at six weeks, and 34% at six months. Infant feeding surveys may over-estimate the frequency of breastfeeding, as older mothers from less deprived areas (who are more likely to breastfeed) are more likely to respond to the surveys.<sup>[5]</sup>

More recent data are available from Scotland. In 2018/19, 65% of babies had been breastfed for at least some time after birth. 43% of babies were breastfed at 6-8 weeks of age, an increase from 36% in 2002/03.<sup>[5]</sup>

In the 2010 Infant Feeding Survey, mothers were more likely to breastfeed if they:

- Were from a minority ethnic group (97% for Chinese or other ethnic group, 96% for black and 95% for Asian).
- Worked in managerial and professional occupations (90%).

- Lived in England compared to Scotland, Wales and Northern Ireland (which has the lowest breastfeeding rate).
- Were aged over 30 (rates are 87% compared to 58% in mothers aged under 20).
- Were first-time mothers.
- Left full-time education when they were over 18 years of age (91%).

Breastfeeding mothers were more likely to stop breastfeeding within two weeks if they have not been breastfed themselves or if their friends mainly formula fed their babies.

## Social benefits of breastfeeding

Breast milk is free and available without preparation. There is no need to buy a steriliser, bottles or formula milk. It does not need to be pre-warmed.

## Social detractions of breastfeeding

Breastfeeding in public can be socially taboo. There is a joint initiative from the United Nations Children's Fund (UNICEF) and the WHO to increase public awareness and encourage certain environments to be more welcoming to breastfeeding mothers – eg, surgery waiting rooms and restaurants.<sup>[6]</sup>

## Medical advantages of breastfeeding<sup>[7]</sup>

### Child

- Immunity/infection protection: there is overwhelming evidence that infants who are breastfed have lower rates of [otitis media](#) and [lower respiratory tract infections](#) as well as fewer episodes of [gastroenteritis](#), with a consequent reduction in hospitalisations for these conditions.
- There is a protective effect of breastfeeding on more severe eczema. However, there is no evidence that exclusive breastfeeding for four months or longer actually protects against eczema.<sup>[8]</sup>
- Breastfeeding may be protective against childhood asthma, but this may be due to confounding factors.

- **Sudden infant death syndrome (SIDS)**: a meta-analysis of six high-quality studies has shown that ever having been breastfed is associated with a 36% reduction in SIDS.
- **Intelligence**: studies have shown that breastfeeding has a positive effect on the child's general intelligence, even when controlled for confounding factors such as maternal intelligence and home stimulation.
- **Obesity**: breastfeeding appears to be protective against subsequent overweight and obesity.
- **Diabetes**: breastfeeding confers protection from future type 2 diabetes and possibly also from type 1 diabetes.

## Mother

- **Breast cancer**: for every 12-month increase in breastfeeding over a woman's lifetime, there is an associated 4.3% reduction in invasive breast cancer.
- **Diabetes**: breastfeeding reduces the chances of developing type 2 diabetes by about one third.
- **Ovarian cancer**: longer periods of breastfeeding are associated with a reduction in ovarian cancer of about 18%.
- **Breastfeeding** has also been suggested to reduce the incidence of metabolic syndrome and cardiovascular disease but the evidence is not conclusive.
- **Contraception**: the lactation amenorrhoea method can be recommended to mothers if:<sup>[9]</sup>
  - The child is up to 6 months old.
  - The mother is amenorrhoeic.
  - The child is exclusively breastfed.

## Medical disadvantages of breastfeeding

There are, in general, no medical disadvantages to breastfeeding, except in the vertical transmission of human immunodeficiency virus (HIV).

## Vitamin D<sup>[10]</sup>

- Breast milk is low in vitamin D. Vitamin D supplements are recommended for all pregnant women and for breastfeeding women.
- The British Dietetic Association recommends that all infants from birth to one year of age who are exclusively or partially breastfed be given a daily supplement of 8.5–10mcg of vitamin D.<sup>[11]</sup>
- The advice is particularly important for those mothers and their babies at high risk of [vitamin D deficiency](#) (including those who have limited skin exposure to sunlight, or who are of South Asian, African, Caribbean or Middle Eastern descent, or who are obese). In the UK there is inadequate sunlight for skin synthesis of vitamin D from mid-October to early April.
- Vitamin supplements which contain vitamin D are available free in the UK for pregnant women and families who are on a low income, through a government scheme called 'Healthy Start'.
- Breastfeeding mothers should have appropriate nutritional advice, including advice on vitamin D supplementation, to ensure that their breast milk provides good nutrition for their babies.

## Transmission of HIV

An HIV-infected mother can pass the infection to her infant during pregnancy and delivery and through breastfeeding. Antiretroviral (ARV) drug interventions, either to the mother or to the HIV-exposed infant, reduce the risk of transmission of HIV through breastfeeding. Together, breastfeeding and ARV interventions have the potential to improve infants' survival chances significantly while remaining HIV-uninfected.<sup>[12]</sup> The WHO recommends that when HIV-infected mothers breastfeed, they should receive ARVs and follow WHO guidance for breastfeeding and complementary feeding.<sup>[13]</sup> This advice, however, is targeted at low- and middle-income countries, where there is a high risk of infant mortality from infectious diseases (which breastfeeding can reduce), and formula feeding may not be safe or affordable.

By contrast, the British HIV Association's guidelines instead recommend that, in the UK and other high-income countries, women with HIV should be advised to use formula milk only, as there is an ongoing risk of HIV exposure after birth.

However, they acknowledge that women who are virologically suppressed on combined antiretrovirals with good adherence should be supported to breastfeed if they want to, but that they should be made aware of a low risk of HIV transmission and the need for additional monitoring for both mother and baby.<sup>[14]</sup>

## Hepatitis B and hepatitis C

- Breastfeeding is not a risk factor for mother-to-child transmission of [hepatitis B virus \(HBV\)](#) provided the infant has received appropriate HBV immunoprophylaxis. HBV-infected mothers should be encouraged to breastfeed their infants.<sup>[15]</sup>
- Although the [hepatitis C virus \(HCV\)](#) can be found in maternal milk, breastfeeding is not contra-indicated.<sup>[16]</sup>

## Other infections

- Certain bacterial infections in the mother may be transmitted through breast milk; temporarily stopping breastfeeding may be appropriate for a limited time: 24 hours for *Neisseria gonorrhoeae*, *Haemophilus influenzae*, group B streptococci and staphylococci, and longer for others – for example, *Borrelia burgdorferi*, *Treponema pallidum*, and *Mycobacterium tuberculosis*.
- Most anti-tuberculosis drugs appear to be safe for use with breastfeeding.
- In certain situations, prophylactic therapy may be advisable for the infant – eg, *T. pallidum*, *M. tuberculosis* and *H. influenzae*.
- Decisions about stopping breast milk because of infection should balance the potential risk with the huge benefits of breastfeeding.

## Problems<sup>[17]</sup> <sup>[18]</sup> <sup>[19]</sup>

### Cracked/sore nipples

Nipple soreness is very common during the first weeks of breastfeeding. Some breastfeeding mothers describe nipple soreness as a pinching, itching, or burning sensation. It may be caused by:

- Improper position of the baby: altering feeding positions may help to reduce soreness, providing good attachment is maintained.

- Improper feeding techniques: nipple soreness may be caused by incomplete suction release at the end of baby's feeding. Gently inserting a finger into the side of the mouth to break the suction may help.
- Improper nipple care: excessively dry (or excessively moist) skin can cause nipple soreness. Moisture can be caused by bras made of synthetic fabrics. Ointments containing lanolin may be helpful. Olive oil and expressed milk may also be effective for soothing uncomfortable nipples. Regardless of treatment, for most women, initial nipple pain reduces to mild levels after 7-10 days postpartum. [20]

Both mother and baby learn breastfeeding skills with time; attachment and positioning usually improve over days and weeks.

### **Milk blisters (milk blebs)**

- These are caused by a blocked nipple pore; skin grows over a milk duct, causing a trapped buildup of milk behind it. This causes a painful yellow or white 'bleb' on the nipple.
- These last for days to weeks until the overlying skin causing the blockage comes away.
- Applying heat can help; removing the skin of the blister may also release the pressure, such as by scraping gently with a fingernail, rubbing a warm, damp towel on the area, or inserting a sterile needle at the edge of the blister.

### **Blocked duct and breast engorgement**

- These are caused by poor drainage of the breast. The breasts feel swollen, hard and painful. There may be redness or systemic symptoms. The nipples cannot protrude to allow the baby to 'latch on', and feeding becomes difficult.
- Common causes are: pressure on the breast (from, for example, a poorly fitting bra or a seatbelt) and prolonged gaps between feeds.

- Advise the mother to nurse eight times or more in 24 hours, for at least 15 minutes for each feed, to prevent engorgement. To relieve it, express milk manually or with a pump. Alternate warm showers followed by cold compresses may help to relieve the discomfort. Gently massaging any lumps towards the nipple during feeding can help drainage.
- If engorgement persists, mastitis may develop and milk or milk products can get into the bloodstream, leading to flu-like symptoms similar to those of incompatible blood transfusion.

## Nipple eczema

- Nipples can become irritated by contact with allergens, including food particles after the baby has started weaning.
- Avoiding triggers and precipitants can help, such as avoiding harsh soaps and shampoos, breastfeeding before feeding the baby solids, and rinsing nipples after a feed.
- Mild or moderate topical corticosteroids can be used if conservative measures fail.
- Consider [Paget's disease of the breast](#) for unilateral nipple eczema that does not respond to treatment.

## Mastitis/abscess

Mastitis (inflammation of the breast) occurs in 20% of breastfeeding women; nipple damage, over-supply of milk, use of nipple shields and nipple carriage of *Staphylococcus aureus* increase the risk of mastitis.<sup>[21]</sup> It may be infectious or non-infectious and is part of a continuum from blocked duct or engorgement to mastitis to breast abscess.

Mastitis causes breast pain, usually unilateral and affecting a defined segment of the breast. Systemic symptoms of infection may be present eg fever.

- An infectious cause is more likely in the presence of a cracked nipple. If infectious, [puerperal mastitis](#) and abscesses are usually caused by *S. aureus*. The infection takes place in the parenchymal (fatty) tissue of the breast and causes swelling which pushes on the milk ducts. This results in pain and swelling.

- Breastfeeding should continue if possible during treatment; effective milk removal is important for treating mastitis.
- Treatment may include antibiotics – eg, flucloxacillin – if symptoms haven't resolved within 24 hours. An abscess may require aspiration or incision and drainage.<sup>[22]</sup>

## **Nipple vasospasm**

- Nipple vasospasm is an under-diagnosed cause of nipple pain.
- Vasospasm causes severe throbbing pain and blanching of the nipple.
- Poor attachment and positioning may cause vasospasm, alongside trauma such as nipple-biting.
- Attachment and positioning should therefore be assessed and corrected if needed.
- **Raynaud's phenomenon** can affect the nipples. Management is similar to that of Raynaud's phenomenon elsewhere, ie avoiding cold, breastfeeding in warm environments, and avoiding precipitants (smoking and caffeine). Nifedipine can be used for recalcitrant cases,<sup>[23]</sup> although this is off-licence, and specialist discussion or referral may be prudent before prescribing.<sup>[18]</sup>

## **Thrush and breastfeeding/ductal candidiasis<sup>[24]</sup>**

- The diagnosis of candidal infections of the breast is controversial. It is thought to be the cause of deep radiating breast pain and burning nipple pain in the absence of any signs of mastitis and with pain out of proportion to any nipple damage present. Diagnosis relies on subjective signs and symptoms.
- Nipple vasospasm may be mistaken for breast thrush.
- Treatment of the surface of the nipple and the baby's mouth, and occasionally oral treatment for the mother (when necessary to treat deep breast pain), should be considered if no other cause is obvious, especially if it follows antibiotic treatment of either the mother or the infant.



- Miconazole gel is commonly used for thrush of the nipple and oral thrush in the baby. Miconazole gel is unlicensed for use under the age of 4 months, and there have been reports of choking in infants due to the thick gel obstructing the airway.
  - Miconazole gel should therefore be applied to the nipples **after** a feed; apply before breastfeeding is a choking hazard.
  - In infants, it should be carefully applied to the mouth in subdivided doses with a clean finger, avoiding the back of the throat. It should **not** be given off a teaspoon, or with a syringe.

**NB:** commonly used dosing schedules and further information can be obtained from The Breastfeeding Network (see references below).

### **Insufficient milk/hungry baby**

- Not producing enough milk is the most common reason women give for giving up breastfeeding. However, usually there is adequate milk but the woman may lack confidence in her ability to maintain her milk supply. She may not be aware that her breasts will soften as feeding becomes established, and that it is perfectly normal for some breastfed babies to feed as often as 10 times per day.
- Frequent feedings, offering both breasts at each feed, adequate rest, good nutrition and adequate fluid intake, can help maintain a good milk supply. Expressing after feeds will increase milk supply.
- Positioning and attachment should be assessed.
- Checking weight and growth will determine whether the baby is taking enough milk. If the child's growth is faltering or they show signs of dehydration, urgent paediatric advice should be sought.
- Assessment by a skilled lactation specialist should be offered, to provide information on optimal positioning and assessment, skin-to-skin contact, effective ways of expressing breastmilk, and feeding frequency.<sup>[18]</sup>

- Galactogogues (such as domperidone) are sometimes used to increase milk production. Their use is controversial and there is no clear UK national guidelines on when they should be offered. Generally, they should only be used in exceptional circumstances. [25]
- Use of galactogogues for improving milk supply in breastfeeding is off-label.
- Domperidone is the most commonly-used medication, as it has the best side-effect profile and minimal passage into breast milk compared to other galactogogues.
- However, the MHRA issued a safety alert for domperidone in 2014, highlighting a small increased risk of QTc prolongation, *torsades de pointes*, and sudden cardiac death. [26] This was particularly evident in people aged 60 or older, people taking daily oral doses of more than 30 mg, and people taking other QT-prolonging medications.
- The applicability of this warning to galactogogue use has been questioned, as there is no direct evidence for cardiac side-effects when used in lactating mothers. [27]
- A 2021 systematic review and meta-analysis found that domperidone produced a significant increase in milk supply for mothers of preterm infants, without significant side-effects. However, there were insufficient data to comment on its efficacy and safety in the mothers of term infants. [28]
- Any decision to prescribe a galactogogue must be carefully considered and justified by the prescriber, especially given that the responsibility for unlicensed prescribing falls on the individual clinician.

## Establishing breastfeeding

The WHO recommends:

- Breastfeeding should begin within an hour of birth.
- Breastfeeding should be 'on demand', as often as the child wants day and night.

- Bottles or pacifiers should be avoided if possible (although evidence is lacking that it has a negative effect on prevalence or duration of breastfeeding).<sup>[29]</sup>

Mothers need to be given support, confidence and encouragement for successful breastfeeding, including immediate breastfeeding support at delivery, even if that is by caesarean section.<sup>[30]</sup> <sup>[31]</sup> Proactive telephone care delivered by a dedicated feeding team has shown promise as a cost-effective intervention for improving breastfeeding outcomes.<sup>[32]</sup>

A pathway and standards guide has been produced which reflects the WHO/UNICEF best practice for hospital and community healthcare settings. This is a guide for all healthcare professionals who are involved with the care of women who are breastfeeding and the UNICEF Baby Friendly accreditation is the first ever national intervention to have a positive effect on breastfeeding rates in the UK.

Reducing barriers for mothers to breastfeed at work, by providing breaks and breastfeeding rooms, are low-cost interventions that employers can make; they reduce absenteeism and improve workforce performance, commitment and retention. Such initiatives have been shown to increase breastfeeding rates by 25%.<sup>[30]</sup>

## Preterm infant

- Well infants aged >34 weeks are usually able to co-ordinate sucking, swallowing and breathing. They can usually establish breastfeeding or bottle-feeding.
- Extremely preterm babies, or those expected to have a prolonged stay in neonatal intensive care, may require total [parenteral nutrition](#).
- Preterm human breast milk, compared with artificial formula milk, may not provide sufficient nutrition for preterm or low birth-weight infants and may need fortification.<sup>[33]</sup>
- Multinutrient fortifiers can be added to human milk.
- Many mothers of preterm infants struggle to achieve a full milk production for many reasons, the mechanisms of which are still unclear. Strategies to enhance milk volume include early, frequent simultaneous expression of milk combined with breast massage and a reduction of stress.<sup>[34]</sup>

## Breastfeeding after augmentation

Mothers who have had surgery may have problems providing adequate milk, especially where babies are preterm. The success rate of breastfeeding has been shown to decrease by approximately 25% in young women with hypoplastic breasts following augmentation mammoplasty compared with similar women who had not had surgery; furthermore, the need to supplement breastfeeding increases by 19%.<sup>[35]</sup>

## Formula feeding

Infant formula is the only alternative to breast milk. It is available ready-made in cartons or as powder to be made up as directed.

Cow's milk is not suitable until a baby is 1 year old, because it contains too much salt and protein but insufficient iron. Cow's milk infant formulas are the alternative to breast milk and should be given until the baby is at least 1 year old. Follow-on milks can be given from the age of 6 months, although this is not usually necessary.

- Hydrolysed protein infant formulas can be prescribed if the baby has an allergy to cow's milk.
- Soya-based infant formulas can also be used; however, babies who are allergic to cow's milk may also be allergic to soya.
- Goat's milk infant formulas are approved for use in Europe but the proteins are similar to cow's milk so it unlikely to be helpful in cow's milk protein allergy.<sup>[36]</sup>

## Introducing solids/weaning

Weaning is the process of expanding the diet to include foods and drinks other than breast milk or infant formula. The timing of the introduction of solid food to an infant's diet is important for nutritional and developmental reasons.

There is some debate regarding the recommendations for the optimal time of weaning infants.<sup>[37]</sup>

The WHO recommendations state that exclusive breastfeeding for six months confers several benefits on the infant and the mother and complementary (solid) foods should be introduced at 6 months of age (26 weeks), while the mother continues to breastfeed. In the UK the Department of Health (DH) guidelines recommend the introduction of solid food 'at around six months'.<sup>[38]</sup>

A 2012 Cochrane review summarised that although infants should still be managed individually so that insufficient growth or other adverse outcomes are not ignored and appropriate interventions are provided, the available evidence demonstrates no apparent risks in recommending, as a general policy, exclusive breastfeeding for the first six months of life in both developing and developed country settings.<sup>[39]</sup> However, the EFSA's panel on dietetic products, nutrition and allergies has concluded that for infants across the EU, complementary foods may be introduced safely between four to six months, and six months of exclusive breastfeeding may not always provide sufficient nutrition for optimal growth and development.<sup>[40]</sup>

The British Dietetic Association and European Society for Paediatric Gastroenterology, Hepatology and Nutrition recommend that:<sup>[11]</sup> <sup>[41]</sup>

- Exclusive breastfeeding from birth, until the introduction of solid foods, is the optimal way to feed young infants.
- Breastfeeding should continue throughout complementary feeding, ideally until 1 year of age.
- The introduction of solid food should commence 'at around 6 months of age'. However, as individual development of babies varies widely, some may be ready for solid food before, or after, this time.
- Solid food should not be given before 17 weeks of age, and should not be delayed beyond 6 months.
- Potentially allergenic foods (eg, eggs, peanuts, dairy, fish, and wheat) should **not** be excluded or delayed, unless the child develops a reaction to them; early introduction of potentially allergenic foods may reduce the subsequent risk of developing food allergy.
- Gluten may be introduced between 4 and 12 months of age. Consumption of large quantities of gluten should be avoided during the first few weeks after gluten introduction and also during infancy.

- In preterm infants, complimentary feeding should begin according to the baby's cues, but not before four months after the expected date of delivery. Preterm infants with chronic health issues require special consideration and advice should be sought from the dietician and medical team caring for them.

There is little evidence of harm associated with the introduction of complimentary foods between the ages of 4 and 6 months, although also little evidence of benefit either from introducing complimentary foods before 6 months. Introduction of complimentary foods before 4 months may be associated with a greater risk of food allergy and overweight and obesity later in life. <sup>[41]</sup>

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## Further reading

- [The Breastfeeding Network](#)
- [GP Infant Feeding Network](#)

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Authored by:	Peer Reviewed by: Dr Rachel Hudson, MRCP	
Originally Published: 20/11/2023	Next review date: 24/05/2023	Document ID: doc_2313

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