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Infant Feeding Guidance
0-2 Years
For health professionals
7th Edition, 2017
Welcome to the new edition of the Infant Feeding Guidance

It’s 20 years since we wrote the first Infant Feeding Guidance 0-2 years for health professionals. It continues to provide clear, concise, evidence based information to health professionals involved in advising parents and carers of infants on all aspects of infant feeding across the county. Copies can be downloaded from our website. You will see two new chapters; choking and lactose intolerance, which I hope you find informative. Current advice specific to the treatment of food allergy, gastro oesophageal reflux disease and feeding the premature infant is included along with current recommendations for diagnosing coeliac disease. The appropriateness of the many infant formulas, milks and drinks are discussed to help you advise your patients to make an informed choice.

I am delighted to present the 7th edition of the guidance to you and hope you continue to find it a valuable resource. I would like to thank Simon Udal (Simon Udal Designs) for the original artwork and to all of you who have sent comments and recommendations for this revised edition. I would welcome any further feedback you may have.

Happy reading!

Dr Penny Barnard, RD, PhD
Advanced Dietitian, Paediatrics
Editor
Introduction

Editorial Team

Penny Barnard, Advanced Dietitian, Paediatrics, Western Sussex Hospitals NHS Foundation Trust

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Disclaimer

The information given in this document is accurate at the time of going to press. The mentioning of a particular product, support group or website does not constitute an endorsement by Western Sussex Hospitals NHS Foundation Trust or Sussex Community NHS Foundation Trust.

The 7th edition is now the recognised guidance. All prior editions should be destroyed. These guidelines will be reviewed in Jan 2019.

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* Sussex Community NHS Foundation Trust

** Western Sussex Hospitals NHS Foundation Trust

Thankyou to Dr Nick Brennan, Dr Mwape Kabole, Dr Stuart Nicholls & Dr Asma Shah, Consultant Paediatricians at Western Sussex Hospitals NHS Foundation Trust for their contribution to the medical review of this guidance.
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1. Breastfeeding

Breastfeeding

Breastfeeding is the healthiest way for a woman to feed her baby and recognises the important health benefits now known to exist for both the mother and her child\(^1,2\).

The Unicef UK Baby Friendly Initiative\(^3\) (BFI) is a ‘best practice’ framework for health services which ensures support is provided to parents to make informed decisions about feeding their babies. Research has shown that mothers giving birth in hospitals where baby friendly policies are implemented are more likely to breastfeed than mothers who give birth in other hospitals\(^4\). Therefore this guidance is based on both BFI\(^3\) and NICE guidance\(^5\).

All mothers have the right to receive clear and impartial information to enable them to make a fully informed choice as to how they feed and care for their baby. Staff will not discriminate against any woman in her chosen method of feeding and will fully support her when she has made a choice. However, it is essential that the health benefits of breastfeeding and the potential health risks of formula feeding are discussed with all women so that they can make informed choices.

It is the aim of the hospital and community to create an environment where more women choose to breastfeed their babies and all women are given sufficient information and support to enable them to do so.

18. References


18. References


1. Breastfeeding

UNICEF Baby Friendly Initiative Standards
Facilities providing maternity services and care for new born infants should:

- Support pregnant women to recognise the importance of breastfeeding and early relationships on the health and wellbeing of their baby.
- Support all mothers and babies to initiate a close relationship and feeding soon after birth.
- Enable mothers to get breastfeeding off to a good start and offer support to continue as long as they wish.
- Support mothers to make informed decisions regarding the introduction of food or fluids other than breast milk.
- Support parents to have a close and loving relationship with their baby.

All babies should be encouraged to be in skin contact with their mother immediately after birth. All babies will be encouraged to feed within the first hour of birth and again around 6 hours after birth or before if the baby is showing feeding cues. Baby should be offered the breast when showing feeding cues (sucking fists, rooting, salivating) regardless of the interval of time since the last feed. Timing the length of each feed should be avoided. Feeding time will depend on the baby's appetite and the rate of milk transfer. Mothers should be taught to recognise signs of good quality feeding; correct attachment, good sucking rhythm & sounds of swallowing. It does not matter whether the baby wants one breast or both at any individual feed, provided the feed on the first breast is finished spontaneously before the other is offered.
1. Breastfeeding

The UNICEF infant feeding assessment guide (see below) can be used to assess feeding. For the complete version of the form see the UNICEF website. Seek help from a midwife, health visitor or breastfeeding specialist if there are concerns about feeding.

How you and your midwife can recognise that your baby is feeding well

<table>
<thead>
<tr>
<th>What to look for/ask about</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your baby:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>has at least 8 - 12 feeds in 24 hours*</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is generally calm and relaxed when feeding and content after most feeds</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>will take deep rhythmic sucks and you will hear swallowing*</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>will generally feed for between 5 and 40 minutes and will come off the breast spontaneously</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>has a normal skin colour and is alert and waking for feeds</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>has not lost more than 10% weight</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your baby’s nappies:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 5-6 heavy, wet nappies in 24 hours*</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 2 dirty nappies in 24 hours, at least £2 coin size, yellow and runny and usually more*</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your breasts:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breasts and nipples are comfortable</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nipples are the same shape at the end of the feed as the start</td>
<td>✓</td>
<td></td>
<td></td>
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</tbody>
</table>

How using a dummy/nipple shield/infant formula can impact on breastfeeding?

Date

Midwife’s initials

Midwife: if any responses not ticked: watch a full breastfeeding, develop a care plan including revisiting positioning and attachment and/or refer for additional support. Consider specialist support if needed.

18. References

38. www.healthystart.nhs.uk.
42. Royal College of Paediatricians & Child Health (2009), www.growthcharts.rcpch.ac.uk.
49. Koletzko S et al. Diagnostic Approach and Management of Cow’s-milk Protein Allergy in Infants and Children. ESPGHAN GI Committee Practical Guidelines. JPGN 2012;55;2;221-229.
18. References


1. Breastfeeding

The WHO state ‘breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. Review of evidence has shown that, on a population basis, exclusive breastfeeding for 6 months is the optimal way of feeding infants. Thereafter infants should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.’

If maternal or baby’s health is compromised further professional advice may be necessary. Where there is a family history of atopy or gluten enteropathy, mothers should still be encouraged to breastfeed (see chapter 9 Food Hypersensitivity). As with all milks, good dental hygiene should be practiced (see chapter 8 Oral Health).

Maternal Nutrition

During lactation, the mother requires some additional calories, protein, vitamins, minerals and fluids. A small increase of a normal balanced diet should satisfy most of their nutritional requirements. Breastfeeding mothers are advised to take a Vitamin D supplement 10µg/day. Very few foods "upset" individual babies. If this is suspected the mother should avoid the "culprit" foods for a few weeks. Strict weight reducing diets should be discouraged.

There is no evidence to suggest that micro-organisms such as listeria are transmitted through breast milk. Therefore, high-risk foods such as pâté and soft cheese are not contra-indicated for the breastfeeding mother.

Adequate fluid intake is essential to establish and maintain lactation. Fluid intake should be increased according to thirst, but around 8-10 cups/day is advised. Alcohol should be kept to a minimum as it passes into breast milk.
1. Breastfeeding

Vitamin Supplementation
The Department of Health recommends that all children aged six months to five years are given vitamin supplements containing vitamins A & C unless they are consuming 500ml or more of infant formula milk. Babies from birth to one year of age who are being breastfed should be given a daily supplement containing 8.5-10µg of vitamin D, see page 28. Infants born preterm may need additional vitamin supplements, see page 83 for further details.

Storing Breast Milk

<table>
<thead>
<tr>
<th>PLACE</th>
<th>TIME</th>
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<tbody>
<tr>
<td>Fridge 0-4°C</td>
<td>Up to 5 days</td>
</tr>
<tr>
<td>Freezer compartment of fridge</td>
<td>Up to 2 weeks</td>
</tr>
<tr>
<td>Freezer at −18°C</td>
<td>Up to 6 months</td>
</tr>
</tbody>
</table>

Frozen milk should be defrosted in the fridge and not re-frozen once thawed.

Special Considerations
- To prevent the transmission of HIV infection during the postpartum period the British HIV Association recommend the complete avoidance of breastfeeding for infants born to HIV-infected mothers, regardless of maternal disease status, viral load or treatment.
- Mothers with type 1 diabetes mellitus and type 2 who are treated on insulin should be encouraged to breastfeed for as long as possible. Insulin may need to be reduced by up to 25% after the birth. Women with type 2 diabetes treated with insulin or Metformin can remain on these while breastfeeding but this should be discussed with the GP. Regular meals should be encouraged and extra carbohydrate may be required to minimise risk of hypoglycaemia (40-50g more starchy foods is required per day whilst breast feeding).

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1. Breastfeeding

Snacks before feeding, particularly before the night-time feed, may be required, however some mothers may prefer to adjust insulin levels instead. Careful monitoring of blood glucose levels will help to determine individual requirements for insulin and carbohydrate. Treatment options when breastfeeding should ideally be discussed before the birth of the baby and a review by the diabetes team encouraged following the birth. Hand expressing colostrum from 36 weeks gestation is encouraged and can be taught on a one-to-one basis by a maternity support worker.

Drugs and Breastfeeding

Almost all drugs are excreted in breast milk but the amount may be too small to be harmful to the baby. When prescribing drugs for a new mother every care should be taken to ensure that she can continue to breastfeed. New-born babies and particularly those born prematurely have immature renal and hepatic function and are therefore more vulnerable to drug accumulation. Babies with G6PD deficiency are at risk of haemolytic anaemia with certain drugs (e.g. dapsone, nalidixic acid and sulphonamides).

Most adverse effects are predictable on the basis of known therapeutic effects of a drug, but idiosyncratic or allergic reactions can occur very occasionally. Maternal use of a drug to which an infant is known to be allergic should be avoided.

Where a drug is to be used in breastfeeding always check drug safety in Thomas Hale’s ‘Medications and Mother’s milk’12. If information is lacking or there are any concerns, further advice must be obtained. GP’s can contact the PCT prescribing support team on 01903 708400 or midwives and hospital staff at St Richard’s Hospital and Worthing Hospital can call 01903 205111 Ext 85471. For other useful resources see page 91.
1. Breastfeeding

Some Drugs to be avoided

This list of drugs to be avoided is by no means complete. If in any doubt about safety in breast feeding, consult with other information sources, the prescribing doctor or pharmacist.

Drugs to be avoided because of high intrinsic toxicity or because serious side effects have been documented:

- Amiodarone
- Antineoplastic agents
- Chloramphenicol
- Dapsone
- Doxepin
- Ergotamine
- Gold salts
- Iodides (including some cough remedies)
- Indomethacin
- Lithium
- Penicillamine
- Oestrogens (high dose)
- Radioisotopes
- Retinoids
- Phenindione
- Pseudoephedrine (preliminary data suggests significant loss in milk production)
- Vitamin A and D (high dose)
- Tetracyclines

17. Useful Resources

BLISS  Tel 0207 3781122/0808 8010322 (parent helpline)  www.bliss.org.uk
Breastfeeding Network  www.breastfeedingnetwork.org.uk
British Dietetic Association  www.bda.uk.com
British Dental Health Foundation  www.dentalhealth.org.uk
Cleft Lip and Palate Association (CLAPA)  www.clapa.com
Coeliac UK  www.coeliac.org.uk
Down’s Syndrome Association  www.downs-syndrome.org.uk
Drugs in Lactation Advisory Service  www.midlandsmedicines.nhs.uk
Healthy Start Scheme  www.healthystart.nhs.uk/
La Leche League  (Great Britain) (Breast feeding help and information) BM 3424, London WC1 6XX
   Tel 0845 1202918 www.laleche.org.uk
Muscular Dystrophy Campaign  www.musculardystrophyuk.org
National Childbirth Trust (NCT)
   Tel 0300 3300700 www.nct.org.uk
SCOPE  www.scope.org.uk
The Vegetarian Society of the United Kingdom,
   Tel 01619 252000/ Fax 0161 9269182  www.vegsoc.org
The Vegan Society, Tel 0121 5231730  www.vegansociety.com
Together for Short Lives  www.togetherforshortlives.org.uk
17. Useful Contacts

Paediatric Dietitians
St Richards Hospital, Chichester, 01243 831734
Worthing Hospital, Worthing, 01903 205111 ext. 84546
Crawley Hospital, Crawley, 01293 600406

Children's Community Nurses
Chichester, 01243 793619 (available Mon-Fri 8am to 5.30pm)

The Children’s Unit
St Richards Hospital, 01243 831444

Blufin Ward
Worthing Hospital, 01903 285135

Paediatric SALTs
Chichester, 01243  831477

West Sussex and Surrey Dental Helpline
0300 1231663

St Richard’s Paediatric Pharmacist
01243 788122 bleep 6452

Worthing Pharmacy Medicines Information
01903 205111 ext. 84840

PCT Prescribing Support Team
01903 708530

Health Improvement Project Manager
Children's Services, 01243 793654

Infant Feeding Specialist Health Visitor
MILK! Infant Feeding Team
01903 858158

1. Breastfeeding

Principles of Drug Treatment

There are a number of principles that should be considered in any situation in which drug therapy is required for the nursing mother:

- Drug therapy must be necessary.
- Suitable alternative drugs should be considered.
- The baby’s exposure should be minimised.
- The state of the baby’s health should be carefully monitored.

Guidelines exist for the use of drugs in breastfeeding mothers:

a) Unnecessary use of drugs in a breastfeeding mother should be avoided.

b) Drugs known to cause serious toxicity in adults should be avoided. (If there is no alternative discontinue breast feeding).

c) For potentially hazardous drugs used in single doses/short courses, maintain milk production by manual expression/use of a pump. Discard all expressed milk.

d) Use dosing regimes that present the minimum amount of drug to the infant:
   - avoid breastfeeding at times when drug levels are highest (usually 1-2 hours after oral administration).
   - use drugs with short elimination half-lives.
   - use the most appropriate route of administration (inhaled for bronchodilators and steroids in asthma).
   - avoid long-acting preparations which make it difficult to time feeds to avoid high drug levels.

e) Infants under 1 year are at most risk of drug effects since they have a reduced capacity for metabolism/excretion.
2. Bottle Feeding

In some situations breastfeeding may not be possible or mothers may choose not to breast feed. If this is the case, infant formula milk is the only nutritionally appropriate alternative. The composition of infant formulas is tightly regulated and must comply with strict criteria set by the European Union. The most recent amended Infant Formula and Follow on Formula (England) Regulations 2007 can be assessed on the IDFA website. Responsive bottle feeding should be encouraged, the principles of which are summarised below. Further information is available on the UNICEF website.

Tips for bottle feeding:

- Offer feeds when baby shows early signals of being hungry.
- If baby is upset, try to soothe before a feed is offered.
- Hold baby close, in a slightly upright position.
- Look into baby’s eyes and talk gently.
- Gently rub the teat above baby’s top lip. This will encourage them to open their mouth and poke their tongue out.
- Place the teat into the front of baby’s mouth allowing it to be drawn in further.
- Allow just enough milk to cover teat and pace the feed to meet baby’s needs, gently removing it if baby appears to want a break.
- Offer frequent breaks throughout the feed sitting baby upright to help bring up her wind.

16. Home Enteral Feeding

Blended Diets

Blended diets, (BD) are home made tube feeds. They are becoming increasingly popular with parents in the UK as an alternative to standard pre-packed sterile commercial feeds. They originate from America where patients have to pay for feed prescriptions.

Whilst there is some evidence that blended diets may aid reflux and possibly the gut ‘microbiome’ (variety of friendly bacteria in the gut). There are concerns that BDs may not provide the full range of macro and micronutrients that the child needs to meet their nutritional requirements for the health, growth and development in comparison to standard commercial tube feeds which are nutritionally complete.

Additionally, as the feeds are not sterile there are microbial/hygiene risks associated with BDs as the feeds are usually frozen and defrosted by the caregiver before use. For these reasons blended diets are not recommended by UK dietitians presently. If you are aware of a child using a home made blended diet tube feed, please liaise with their dietitian so that they can help guide the family regarding its use.
16. Home Enteral Feeding

- A typed feeding plan should be provided for the parents/carers and others looking after the child (e.g. school, respite, hospice, ward, Multi Disciplinary Team).
- Advice on good dental hygiene is important even if the child is not eating

Feeding Equipment

The Paediatric dietitian and Children’s Community Nurses (CCNs) organise the supply of feed and feeding equipment (ancillaries) in the community. Infants are discharged from hospital with 7 days supply of feed.

Each infant is registered with a home delivery service by the paediatric dietitian (with parental consent) to provide a monthly supply of feed & ancillary equipment. GP prescriptions for feed are sent directly to the delivery company. Feeding equipment provided by this service includes – replacement NG tubes, Buttons, Extension Sets, Giving Sets, Feeding Pumps, Feed, 60ml Enteral Feeding Syringes (for boluses), 5ml syringes (for balloon water changes).

NB - Syringes used for medication are provided by the children’s community nurses.

Ongoing Care

Children who are tube fed should be reviewed regularly. Close liaison is maintained with the child’s Paediatrician and others involved in the child’s care. Regular phone contact is maintained with parents/carers between appointments. Please liaise with your paediatric dietitian if you are concerned about a child on Home Enteral Feeding.

2. Bottle Feeding

No one brand of standard infant formula is recommended. A whey based formula should be the first choice. Whey based formulas more closely mimic human milk with their whey: casein ratio. Casein dominant formulas are often labelled as stage 2 or second milks. There is currently no evidence of any benefit of using ‘hungry baby’ or ‘night-time’ formulas. Standard cows milk formulas are made from skimmed milk with fats and other nutrients added.

Additions to Formula Milk

There is continuing research in the formula milk industry to identify ways that formula milks could mimic breast milk more closely. Currently, standard formulas differ in which novel ingredients have been added. They claim to contribute to the normal growth, visual development and modify immunity of the infant\(^\text{14}\). Research supports the addition of long chain polyunsaturated fatty acids (LCPs) and these formulas should be encouraged if bottle feeding\(^\text{15,16}\). Organic formulas do not contain LCPs and often do not contain nucleotides.

Prebiotics are selectively fermented ingredients that facilitate changes in the composition and/or activity of gut flora, which is associated with some benefits. They have been shown to be effective in improving gut flora of bottle fed infants\(^\text{17}\) but due to insufficient data their routine use in infant formula cannot be recommended\(^\text{18}\). The World Allergy Organisation recommend the use of prebiotic supplementation in not-exclusively breastfed infants for the purpose of preventing allergic disease\(^\text{19}\). The administration of currently evaluated probiotic and/or prebiotic-supplemented formula to healthy infants does not raise safety concerns with regard to growth and adverse effects. The safety and clinical effects of one product should not be extrapolated to other products. For details of pre-thickened formulae see Chapter 14, Common Gut problems.
Making up Feeds

Babies should be offered feeds on demand, correctly diluted according to the manufacturer’s instructions. The usual requirements are:

150ml formula/kg body weight/per day divided between 4-8 feeds daily.

- Standard UK infant formula should be made up with one scoop of milk powder to 30ml of water (water added first).
- Bottles should be made up fresh for each feed.
- Boiled, fresh tap water should be used. Boiled water should be cooled to no less than 70°C. An exception to this is when making up Nutramigen Lipil 1 & 2 with LGG. The manufacturers instructions recommend making the feed with boiled, tap water that has been cooled to room temperature.
- Any milk left at the end of a feed should be discarded.
- Water from water filter jugs should not be used, because the bacteria and their toxins produced in the charcoal filter are not necessarily destroyed by boiling.
- Bottled water should only be used to make up feeds if reliable tap water is not available. Boiled, cooled bottled still water with a low mineral content should be advised. Aim for water with a sodium (Na) content less than 200mg/l and a sulphate content less than 250mg/l such as Evian, Highland Spring & Volvic. Alternatively liquid infant milks that are pre-mixed could be used.

Bolus Feeding - Gravity or Feeding Pump

- Feeds are given via a 20ml or 60ml syringe (or mobile pump) throughout the day.
- Flexible – can be given when out and about.
- Mimics meal times.
- Sociable - child can be fed at and join in with family mealtimes.

Continuous Feeding: Pump only

- Variable rate of feeding – more exact than bolus method
- Useful for overnight feeding via button (not suitable via NG tube due to risk of tube being dislodged)

Feeds and Feeding Plans (Feed Regimens)

These should be devised by the Paediatric Dietitian and the parents/carers. Feed plans will be calculated taking account of age and weight appropriate nutritional and fluid needs, any current oral nutritional intake, and medication. This assessment is made in conjunction with the Children’s Community Nurses and Paediatric Speech and Language Therapist where necessary.

- A variety of feeds are available for different age and weight ranges, plus high/normal/low energy needs.
- Consider normal daytime routine and mealtimes.
- Feeds containing fibre may help resolve constipation and reduce need for aperients.
- Feeding plans should be regularly reviewed by a Paediatric Dietitian, parents/carers and child alongside assessment of growth and feed tolerance.
16. Home Enteral Feeding

Feeding Devices

Naso-Gastric (NG) Feeding Tubes

Types of Tubes

- PVC (Poly Vinyl Chloride) tubes - for short term use and need to be changed weekly
- PU (Poly Urethane) ‘Silk’ tubes are more comfortable and are used for longer term feeding. Tubes should be changed at a frequency in line with manufacturer’s guidelines. It is usually done by CCNs or on Children’s Wards.

Use pH 2-9 Test Strips to check NG or NJ tube position. Litmus paper and the ‘whoosh test’ (auscultation) should not be used.

Percutaneous Endoscopic Gastrostomies (PEGs)

- Inserted under a general anaesthetic in children.
- Sit on the abdomen with a tube extending from the stoma.
- Held in place inside the stomach by a plastic disc or flange.
- Sometimes used as a temporary measure to form a tract between the stomach and abdomen, before being replaced at a later date by a button balloon gastrostomy.
- Common PEG Types – Merck Corflo, Fresenius, Freka.

Whichever type of feeding device is used – parents/carers should receive full training by paediatric nurses on the ward before discharge. Once in the community Children’s Community Nurses (CCNs) will continue training, give support and advice.

NB - Syringes used for medication are provided by the children’s community nurses.

2. Bottle Feeding

- Infant formula should not be warmed in a microwave oven once it is in the feeding bottle - this can lead to ‘hot spots’ in the centre of the bottle which may scald the baby. The milk feed will continue to cook and heat after it is removed from the microwave.
- No sugar or solids should be added to bottles, e.g. feeds should not be thickened with baby cereals or rusks, etc. This concentrates the feed, reduces fluid content and can cause dehydration. Adding food to milk in bottles is also known to delay feeding skills and poses a choking hazard.
- Feed thickeners should only be used under medical supervision and only specialised prescribed thickening agents such as Carobel, Thick and Easy or Thixo-D should be used.
- All equipment used to feed the infant under 6 months should be sterilised, e.g. breast pump (see manufacturers details), bottles, teats, spoons, bowls, etc. Salt should not be used to clean teats. After 6 months it is only necessary to sterilise bottles and teats.
3. Choking

Choking

Food is one of the primary causes of choking-related injury and death, especially in children under 3 years. Certain characteristics, including the shape, size and consistency of foods increase their potential to cause choking among children.

High risk foods are those that are cylindrical, airway sized and compressible that could wedge tightly into a child’s hypopharynx and completely occlude the airway creating effective ‘plugs’. They include:

- Sausages and frankfurters
- Hard sweets
- Peanuts and nuts
- Seeds
- Whole grapes
- Raw carrots
- Pieces of apple
- Popcorn
- Chunks of peanut butter
- Marshmallows
- Chewing gum

Children younger than 4 years and children with chewing and swallowing disorders such as neuromuscular disorders, developmental delay or traumatic brain injury are at greater risk of food-related choking. Before the molars erupt children are able to bite off a piece of food with their incisors but are unable to grind it adequately in preparation for swallowing.

16. Home Enteral Feeding

This section provides general advice, and refers to the service at St Richard’s Hospital and Worthing Hospital. For advice regarding individual patients please contact the dietitians at your local hospital.

Some infants and children require top up or total feeding via a Naso Gastric (NG) tube, Naso Jejunal (NJ) tube, gastrostomy ‘Button’ or Percutaneous Endoscopic Gastrostomy (PEG) tube at home to meet their nutritional needs.

Tube feeding may be considered if the infant:

- Has a medical condition which prevents them taking in adequate nutrition orally and/or due to increased nutritional needs, increased losses or special dietary needs.
- Is found to have an unsafe, or immature swallow following an assessment by a paediatric specialist SALT.
- Needs support through the transition to full oral feeds in the otherwise well premature infant.

The multidisciplinary team looking after the infant/child should include a registered paediatric dietitian, Children’s Community Nurses (CCNs), Paediatric Speech & Language Therapist (SALT), Consultant Paediatrician, supported by the Health Visitor/School Nurse and GP. The aim is to provide a cohesive service & minimise attendance at or admissions to hospital.
15. Premature Infants

Weaning the Premature Infant

On discharge all parents should be given appropriate information regarding complementary feeding (e.g. BLISS weaning leaflet). In line with BLISS guidelines it is safe to start weaning the preterm infant from 5 to 8 months uncorrected age from birth and follow normal weaning guidelines as for term infants. Infants should be at least 3 months corrected age to allow for sufficient motor development. Infant formula should continue to 12-18 months corrected age depending on the adequacy of the weaning diet.

3. Choking

Behavioural factors may also affect a child’s risk for choking. High activity levels while eating such as walking or running, talking, laughing, and eating quickly may increase a child’s risk of choking. Child games that involve throwing food in the air and catching it in the mouth such as hard sweets and grapes and stuffing large numbers of marshmallows or other food in the mouth also may increase the risk of choking.
Complementary feeding, previously called weaning, is the process of solid food introduction when milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed along side milk. The World Health Organisation recommends exclusive breastfeeding for the first 6 months of life\textsuperscript{24}. This advice forms the basis for the current Department of Health recommendations\textsuperscript{25} which are:

- Breast milk is the best form of nutrition for infants.
- Exclusive breastfeeding is recommended for the first 6 months (26 weeks) of an infant’s life.
- The addition of complementary foods should preferably be commenced around 6 months of age (26 weeks), but no earlier than 17 weeks.
- Breastfeeding (and/or breast milk substitutes if used) should continue beyond the first 6 months, along with appropriate types and amounts of solid foods.

Complementary feeding should have commenced by 6 months because:

- The amounts of energy, protein, iron, zinc, and Vitamins A and D are particularly likely to be inadequate from milk alone.
- The infant would need to consume too large a volume of milk to supply its nutritional needs.
- The infant needs to be encouraged to develop biting and chewing behavior.
- Infants in which complementary foods are delayed beyond 6 months often find it difficult to accept lumpy foods\textsuperscript{26,27}.

### Vitamins – on the Neonatal Unit and Post Discharge

**Abidec (Multivitamin) - Vitamins A, B, C and D**

Abidec is prescribed for all infants born at 36 weeks gestation or less. Dosage varies depending on the type of milk used. It should be continued post discharge until the baby is weaned onto a full, mixed diet, at 1 year of age. From 1 year of age infants should take a vitamin supplement in line with department of health guidance, see chapter 3.

**Sytron (Iron Supplement)**

Sytron is prescribed for all infants born at 36 weeks gestation or less, who are breastfed or not on a PDNEF. It should be continued until 1 year of age.

**Other supplements**

Fluoride drops are not routinely used on the NNU. Folic acid is used in the treatment of haemolytic anaemia. Infants requiring any additional supplements should be under the supervision of a Consultant Paediatrician and Paediatric Dietitian.
**Babies Being Discharged home from NNU**

Post Discharge Nutrient Enriched Formulae (PDNEF) are prescribable formula which meet the nutritional needs of the preterm infant when discharged. Formulas available include SMA Gold Prem 2 and Nutriprem 2 (Cow & Gate). They contain higher levels of energy, protein & other nutrients than term formulae & negates the need for an iron supplement at discharge. PDNEF can be used for infants born prior to 34 weeks and under 2kg at birth once the baby reaches 2kg, or for a few days before discharge.

PDNEF should be prescribed by the GP until the infant is 6 months corrected age.

**Term formulae**

These contain much lower levels of protein and iron and therefore may only be suitable for well infants with a birth weight >2kg.

**Calorie Supplements**

Calorie supplements e.g. Duocal (SHS) and Maxijul (SHS) are not routinely recommended for preterm infants as protein and other nutrient levels in supplemented milk are inadequate to meet preterm infant needs.

**Other Formula**

In certain circumstances it may be advisable for the preterm infant to be on a specialised formula e.g. an amino acid formula.

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**4. Complementary Feeding**

Breast milk or infant formula remains an important source of nutrition during the first year. The introduction of food is an educational process, its aim being to stimulate the infant's appetite and to encourage a wide variety of foods by offering different colours, textures and flavours.

Parents should be advised that babies go through a learning process from sucking smooth foods, to thicker foods, to chewing family foods. Infants should be supervised during all meal times.

**General rules throughout weaning**

- Foods should be cooked and served without salt.
- Avoid adding sugar to food where possible.
- Due to the risk of Salmonella food poisoning, all eggs should be well cooked until the white and yolk are solid before giving to infants under 1 year. Dishes which contain raw, uncooked or partially cooked egg, e.g. soft boiled egg, should be avoided until 1 year of age.
- Wheat and oat based cereal can be used from 6 months.
- Whole nuts and large seeds should not be given before 5 years of age due to the risk of choking (See Chapter 3, Choking). Nut products, e.g. smooth peanut butter can be given in small amounts.
- Infants with a suspected or proven food allergy will need individual assessment and advice (See Chapter 10, Food Hypersensitivity).
- Babies under 12 months should not consume honey due to risk of Clostridium botulinum.
4. Complementary Feeding

Stage 1 - starting from around 6 months

In the initial stage of weaning the aim is for a baby to get used to the sensation of food that is not free flowing. Foods suitable for weaning in the early stages are of smooth consistency such as:

- baby cereal e.g. rice, sago, maize or cornmeal.
- pureed, freshly cooked rice blended with added liquid to achieve the correct consistency.
- mashed potato blended to a smooth consistency.
- pureed vegetables e.g. carrots, parsnips, swede.
- custard.
- full fat yoghurt (unsweetened).
- stewed pureed fruit e.g. pear and apple.
- pureed meat, fish & poultry.
- pureed lentils, pulses, beans.
- eggs with whites & yolks fully cooked.

It is no longer recommended that infants be introduced to new foods one at a time. Breast or formula milk will continue to provide the majority of the baby's needs at this stage. They will still need a regular breast feed on demand or formula milk equivalent to 568ml or 1 pint per day.

Cow's milk can be used in the preparation of solid foods, such as custards and sauces and in the form of yoghurt (ordinary and baby varieties) and to mix with cereals.

15. Premature Infants

Breast Milk Fortifier (BMF)

This may be used on the NNU when the infant has reached full feed tolerance (150-180ml/kg/day) but is not demonstrating good weight gain. Various fortifiers are available including Nutriprem BMF (Cow & Gate) & SMA BMF.

BMF are not prescribable post discharge. They may be continued on the advice of the Paediatrician or Paediatric Dietitian and would then be provided by the NNU.

Rare occasions when Breast milk is contra-indicated

- Viral Illnesses – e.g. maternal HIV, Cytomegalovirus
- Some maternal medications contraindicate breast-feeding.

Infant Formula Milks

On the Neonatal Unit

If breast milk is unavailable a preterm formula is the next appropriate option for preterm (born under 37 weeks) and low birth weight infants (weighing less than 2000g) and should be continued until the infant reaches 1800-2000g, then switching to a post discharge preterm formula (see overleaf). Growth restricted, well, term (born above 37 weeks) infants with a birth weight above 1.8kg are given term formula in the absence of maternal milk. Preterm formula is designed to meet the increased nutritional needs of the preterm infant, with levels of nutrients following nutritional guidelines for preterm infants. Formulas available include Nutriprem 1 LBW formula (Cow & Gate) and SMA Gold Prem 1. These are not prescribable post discharge.
15. Premature Infants

Which Milk?

Options in order of preference:

- Breast milk – fed from the breast
- Maternal expressed breast milk (MEBM) +/- breast milk Fortifier (BMF)
- Infant formula – appropriate to gestational age and birth weight.

Advantages of Breastfeeding

Breast milk is the optimal feed for all new-borns. The advantages of breast milk extend beyond the neonatal period. It is particularly important for the premature infant who has missed the in-utero period of the last trimester when maternal antibodies cross the placenta. Breast milk potentially reduces the incidence of sepsis in preterm infants and therefore the risk of life threatening conditions such as NEC (Necrotising Entero Colitis). Evidence suggests that the developmental outcome of breastfed premature infants is superior.

Breastfeeding establishes bonding between mother and baby it is an important positive contribution the mother can make to their infant’s care whilst their infant is separated from them on NNU61.

Risks with Breast Milk

Levels of protein, vitamins & minerals may not be sufficiently adequate in breast milk to meet increased requirements to allow infant catch-up growth. On these occasions a Breast Milk Fortifier (BMF) is used.

4. Complementary Feeding

Stage 2 - 7-9 months

The amount and variety of foods including meat, fish, eggs, all cereals and pulses should be increased and the number of "milk" feeds reduced. Food consistency should progress from pureed through to minced and mashed to finely chopped. Family foods can be mashed or blended to a texture containing some soft lumps, vegetables need to be cooked until soft and meat will still need to be coarsely puréed. Babies should be given soft finger foods to help chewing, especially during teething if able to sit independently. Start with bite and dissolve foods and then progress onto bite and easy chew textures.

Suitable finger foods are:

Bread, toast, rice cakes, savoury biscuits, breadsticks, soft peeled raw fruits such as banana and pear, and sticks of vegetables, such as cooked peeled carrots and cooked green beans.

Stage 3 - 10-12 months

By the age of one year, the infant's diet should be mixed, varied and integrated into family meals. They should be encouraged to take lumpy foods of different textures. Three meals per day are suggested, with up to two small snacks in between. Solids should be offered by spoon only until the infant is able to self-feed.

Cooked vegetables need only be chopped and some salad vegetables can be included. Meat may need to be minced or finely chopped. Finger foods are a preliminary to full self-feeding. Examples include small cubes of fruit & vegetables, potato, toast, pasteurised cheese or soft meat such as thinly sliced ham/chicken.

Information leaflets are available to download28,29.
4. Complementary Feeding

Baby Led Weaning

Baby led weaning is defined as the infant taking control of his or her own solid food intake by self-feeding from the start of the weaning process. Instead of pureed food, the baby is given a range of finger foods and eventually will self-feed from a spoon. Different textures of food have been shown to have an impact on food preferences, which can support the idea that children may become less picky eaters.

Principles of baby led weaning are:

- Infants are offered a variety of finger foods at meal time from the age of six months, preferably sitting upright in a high chair.
- Initially soft fruits are offered with meals; harder fruits and vegetables are cooked until soft enough to chew.
- Food is offered in baton shaped pieces or in natural shapes that have a handle (e.g. broccoli) and it is not cut into bite sized pieces as these are difficult for the baby to pick up and handle.
- Food is free of added salt and sugar.
- Initially food may be picked up and played with only and this process should not be hurried.
- It is accepted that many foods may be first rejected but should be offered again.
- Infants decide how much they want to eat and no spoon-fed, puree food top ups are offered at the end of a meal.
- Water is offered with meals, milk feeding is still baby led and may be given at a separate time from meal time.
- Small hard foods such as peanuts should not be offered.

15. Premature Infants

Key factors affecting the nutritional needs of preterm versus term infants:

- Low nutrient stores of fat, glycogen and therefore energy compared to term infant - due to shorter in-utero period for accretion of nutrients.
- Low weight - massive amount of growth required to achieve 'catch up'.
- High risk of perinatal problems, e.g. necrotising enterocolitis (NEC), sepsis, chronic lung disease (CLD), which result in increased energy needs.
- Immature suck-swallow-breath coordination - may be weak/absent.
- Immature GI tract - which limits intake of enteral feeds. Early minimal enteral nutrition as bolus trophic feeds are given - reduces risk of NEG and sepsis.
- Increased losses of electrolytes.
- Immaturity of some metabolic pathways.

Hence the nutritional needs of the preterm infant for energy, protein, fluid, vitamins and minerals are greater than for the term infant.

For this reason if the infant is not breastfed, specialist infant milks and additional vitamins and minerals may be required.
**15. Premature Infants**

### Some Useful Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>Premature</td>
<td>Any infant delivered before 37 weeks completed gestation</td>
</tr>
<tr>
<td>Small for Gestational Age (SGA)</td>
<td>Birth weight &lt;10% for gestational age &amp; sex</td>
</tr>
<tr>
<td>Intra Uterine Growth Retardation (IUGR)</td>
<td>Foetus usually SGA &amp; growth has been restricted</td>
</tr>
<tr>
<td>Symmetrical IUGR</td>
<td>Weight, length &amp; head circumference reduced – difficult to distinguish from SGA</td>
</tr>
<tr>
<td>Unsymmetrical IUGR</td>
<td>Head &amp; sometimes length growth preserved compared to weight</td>
</tr>
<tr>
<td>Low Birth Weight (LBW)</td>
<td>Infants weighing less than 2500g (5.5lb) at birth</td>
</tr>
<tr>
<td>Very Low Birth Weight (VLBW)</td>
<td>Infants weighing less than 1500g (3lb) at birth</td>
</tr>
<tr>
<td>Extremely Low Birth Weight (ELBW)</td>
<td>Infants weighing less than 1000g (2.2lb) at birth</td>
</tr>
</tbody>
</table>

### 4. Complementary Feeding

Limited studies are available regarding the impact and outcome of baby led weaning. Possible positive outcomes are the promotion of healthy food preferences that could be protective of obesity and parents have been shown to be less controlling and more willing to hand control over to the child when introducing solids.

Nutritional adequacy, especially calories, iron, vitamin B₆ & B₁₂, at 6 months are less likely to be supplied in the required quantities by a baby starting on baby led weaning. It may take several months before an infant has been established on a full, nutritionally complete diet.

Finger foods should be encouraged as soon as the baby is ready. This can be alongside pureed foods that improve overall quality of the diet. It should also be emphasised that no one approach will be suitable for all infants with regards to their individual development and readiness. It is important to remain flexible whilst discussing the various options of complementary weaning.

### Other Considerations

Foods given during weaning should be prepared, handled and stored in a hygienic way. Food should be cooked thoroughly and served as soon as possible after cooking.

- Left over food should be stored in a refrigerator or freezer at the correct temperature.
- Food should not be reheated more than once.
- Particular care should be taken if using microwave ovens to avoid hot spots in foods.
4. Complementary Feeding

Vitamins

- All children over one year should consider taking a daily supplement containing 10µg vitamin D especially during autumn and winter.¹⁰
- All babies under one year should be given a daily supplement of 8.5-10µg vitamin D unless they have more than 500mls of infant formula milk.⁹
- All babies over 6 months of age should be given a daily supplement containing vitamin A & C unless they have more than 500mls of fortified formula milk.⁸
- For premature infants see Chapter 15, Premature Infants.

Vitamins A & C should be continued until 5 years of age. Other vitamin preparations or nutritional supplements should not be used unless under medical supervision.

14. Common Gut Problems

Once diagnosed children with coeliac disease should be reviewed annually (BSPGHAN, 2008). The benefits of this include a regular review of nutritional intake, compliance, growth, symptoms and networking with representatives from the food industry and other children with coeliac disease.
14. Common Gut Problems

(v) Coeliac Disease

Coeliac disease is diagnosed by blood test and biopsy. Individuals with coeliac disease produce endomysial antibodies (EMA) and tissue transglutaminase antibodies (tTGA) when gluten is ingested, and these blood tests measure these antibodies.

The IgA TTG and IgA EMA serological tests show high levels of sensitivity and specificity in the diagnostic process for coeliac disease. Serological tests are accurate for both children and adults provided sufficient gluten is eaten in the diet at the time of testing.

Children with a positive blood test and those with negative blood tests but who are suspected to have coeliac disease should be referred to a paediatric gastroenterologist.

For children a biopsy may not be necessary in every case. The British Society of Paediatric Gastroenterology, Hepatology and Nutrition (BSPGHAN) recommend that children with symptoms of coeliac disease whose blood tests show a high level of antibodies (TTG >70) and have a positive genotype (HLA DQ 2 or 8) may not need to have a biopsy to confirm the diagnosis.

The NICE guideline states that serological testing should be offered to children with any of the following signs and symptoms:

- Chronic or intermittent diarrhoea
- Failure to thrive or faltering growth (in children)
- Persistent or unexplained gastrointestinal symptoms including nausea and vomiting
- Prolonged fatigue (“tired all the time”)
- Recurrent abdominal pain, cramping or distension
- Sudden or unexpected weight loss
- Unexplained iron deficiency anaemia, or other unspecified anaemia.

5. Other Infant Formula, Milks and Drinks

Follow-on Formula

Standard follow-on formulas are suitable from six months of age. They are higher in some nutrients including iron. Iron stores laid down before birth are becoming depleted by six months, but a nutritious diet can provide the extra nutrients required so changing to a follow-on formula is not necessary. Growing-up formula milks are also available which are targeted from 10 months to 3 years depending on the manufacturer. These are not necessary for infants on a nutritious diet. Similarly, “Good Night” milks are not advised.

Soya Formula

Soya Infant formula is not advised for infants under 6 months of age. It should not be the first line treatment for cows milk allergy (See Chapter 10, Food Hypersensitivity). It may be the formula of choice for parents wishing their child to follow a vegan diet or where there is a clinical need, e.g. for the treatment of Galactosaemia.

The only soya Infant formula available is Wysoy (SMA Nutrition). Any infant who takes less than 300mls per day should be considered for dietetic referral for nutritional assessment. Good feeding practices should be encouraged at all times to reduce the risk of tooth decay (See Chapter 7, Oral Health).

Goat’s Formula

Goat’s milk formula is available for sale in the UK. It is not suitable for infants with cows milk allergy (See Chapter 10).
**Goat, sheep, soya, coconut, lactofree, oat and nut milks**

Non formula milks such as goat’s, sheep’s, soya, coconut, lactofree, oat and nut milks should not be used in infants under 12 months as a main drink due to their low iron and other nutrients. After one year of age they can be given if pasteurised. Calcium enriched varieties should be encouraged and good dental hygiene is essential. Milks made from goat, sheep, soya, milk and nuts should not be used for the treatment of cow’s milk allergy (See Chapter 10) without the advice from an allergy specialist.

**Rice Milk**

Rice milk is not suitable for children under 4½ years of age due to the inorganic arsenic content.

**Cow’s milk**

Whole pasteurised cow’s milk should not be used as the sole source of nutrition due to its low iron content. It should only be used as a main drink after the age of 1 year. It can be introduced as part of the diet, e.g. yoghurt, milk based sauces and as puddings from 6 months but not as a main drink. From one until five years of age, 568ml (1 pint) of pasteurised cow’s milk per day should be encouraged. This is inclusive of milk used on cereals and that used in custard, yoghurt and sauces.

Semi-skimmed cow’s milk is not suitable as a drink before the age of two years of age but thereafter it may be introduced gradually if:

- The child’s energy and nutrient intake is adequate
- Growth remains satisfactory

**14. Common Gut Problems**

Before advising treatment, make sure, by taking a history, that the infant really is constipated. Parents often become disproportionately anxious about their baby’s bowel habits, and often it is reassurance that is required rather than action since the infants are not truly constipated.

There may also be a behavioural element to the problem in toddlers.

Stools may be small, greenish, pellet-like, hard, difficult to pass and occasionally these may be blood-streaked if a fissure develops. Fissures are painful and may perpetuate the constipation.

If constipation is a problem in young babies, the first step should be to ensure that an adequate fluid intake is being given. Extra drinks of cooled boiled water can be helpful, as can fruit juices such as pure orange juice diluted with water in the dilution of 1:12.

Sugary drinks are not recommended.

Diluted prune juice has also been found to be helpful. Great care should be taken that this is not used routinely in case it gives baby a ‘sweet tooth’.

High-fibre foods can be encouraged in the diet e.g. puréed fruits, vegetables, cereals, beans and pulses. High fibre foods should gradually be increased in the diet. Pure bran is not recommended for children under 2 years.

Movicol Paediatric Plain (Norgine Pharmaceuticals Ltd) could be commenced if dietary change is not effective.
14. Common Gut Problems

**Toddler Diarrhoea**

This poorly understood problem usually presents after six months, often following the introduction of solids. The child shows increased stool frequency or diarrhoea, passing undigested pieces of food.

They are otherwise well and thriving with a normal pattern of growth (see Chapter 7 Growth). This usually resolves by three years but before making such a diagnosis, other more serious causes of chronic diarrhoea must be excluded by a medical practitioner.

A brief dietary history should be taken to establish whether the diet contains excess fibre or inadequate fat, and this should be adjusted accordingly.

(iv) **Constipation**

Normal bowel frequency may vary from several stools per day to 4-5 days between stools.

Infants are not constipated if stools are soft but passed infrequently.

Breast-fed babies are rarely constipated and bottle fed babies who pass stools without excessive straining are unlikely to have serious problems. Contributory factors to bottle fed babies having constipation include:

1. The milk feeds may be over-concentrated or
2. Inadequate fluid is taken.

5. Other Infant Formula, Milks and Drinks

Skimmed milk should only be given after the age of five years. Skimmed and semi-skimmed milk have a lower energy and vitamin A content.

Raw, untreated milk must be boiled. Ordinary pasteurised milk does not need to be boiled.

**Water**

- Tap water from the first tap on the mains supply (usually the cold tap in the kitchen) should be used. Run the tap first if water comes from lead pipes. Seek advice regarding private supplies of water from the environmental health officer.

- Infants under 6 months of age do not normally require drinks in addition to breast or formula milk. If additional fluids are needed boiled and cooled tap water should be offered. After 6 months of age tap water no longer needs to be boiled unless it is being used to make an infant formula.

- Water from water filter jugs should not be used because boiling does not necessarily destroy the bacteria and toxins which can be produced in the charcoal filter.

- Softened water and some bottled waters whose label includes the word "natural mineral water" should not be used due to their higher mineral content and solute loads. Carbonated water is also not suitable.

- If travelling abroad, boiled, cooled bottled still water with a low mineral content should be advised. Aim for water with a sodium (Na) content less than 200mg/l and a sulphate content less than 250mg/l such as Evian, Highland Spring & Volvic. Alternatively ready to use liquid infant milks could be used.
5. Other Infant Formula, Milks and Drinks

Fruit Juice

- Fruit juice is a good source of Vitamin C. However, it also contains sugar and acids. They should not be given to infants under 6 months of age. After 6 months of age, if offered, to lower the risk of dental caries and enamel erosion, it should be well diluted, e.g., 1 part juice to 10 parts water. It should be given sparingly and only at mealtimes. It should never be served in a bottle or a (non-spill) valved feeder cup.

- Drinks formulated specifically for children such as baby juices, squash, flavoured milk, fruit milk, fruit drinks, and fizzy drinks are not suitable for infants. The sugar content can cause dental caries and the acid from fruit can cause enamel erosion.

- Diet and reduced sugar drinks that contain artificial sweeteners are not intended for infants. Frequent consumption of artificially sweetened drinks may result in diarrhoea.

Herbal Drinks and Tea

- All herbal drinks and herbal teas should be discouraged due to their high sugar content and because the pharmacology of these drinks is unknown.

- It is also advised that tea is not given as a main drink for infants and young children. Tannin in tea may interfere with the absorption of iron and other minerals, thereby compromising iron status.

14. Common Gut Problems

Normal Fluid Intake

Feeding should be re-established as soon as possible as withholding milk repeatedly or for prolonged periods can be harmful. Infants and children should not be fasted as they may become nutritionally compromised.

<table>
<thead>
<tr>
<th>Age</th>
<th>Fluid volume / kg / 24 hours</th>
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<tbody>
<tr>
<td>0 - 6 months</td>
<td>150 - 200 ml</td>
</tr>
<tr>
<td>6 - 9 months</td>
<td>120 - 150 ml</td>
</tr>
<tr>
<td>12 months</td>
<td>90 - 100 ml</td>
</tr>
<tr>
<td>2 years</td>
<td>80 - 90 ml</td>
</tr>
</tbody>
</table>

Stool frequency often increases when milk or solids are reintroduced. This does not require a return to fasting oral rehydration solution unless vomiting or dehydration recur. This can be compensated for by offering oral rehydration solution with each loose stool.

Diarrhoea which persists for longer than seven days after gastroenteritis may be caused by transient lactose intolerance (See Chapter 11) or cow’s milk allergy (Chapter 10).
(iii) Diarrhoea

Normal bowel frequency can vary from several stools a day to one every four or five days. Diarrhoea is usually regarded as the passage of four or more watery stools a day but is sometimes indicated by just a change in frequency or consistency. Before advising treatment, confirm the diagnosis by taking a history.

Acute Diarrhoea

Dehydration is uncommon in babies and young children with gastroenteritis. Management aims to prevent and treat dehydration while maintaining adequate nutrition or resuming it as early as possible.

Breastfed infants should continue breastfeeding with an oral rehydration solution given in addition as part of rehydration therapy. Bottle fed infants should stop formula milk for 4-6 hours and replace with oral hydration solution to replace prior and ongoing losses of fluid\textsuperscript{56}.

Oral rehydration solutions are not adequate nutrition and should not be used alone. Sugary drinks e.g. cola should not be used as a substitute for proprietary oral rehydration solutions. Only use commercially prepared oral rehydration solutions e.g. Dioralyte. Oral rehydration solutions should be given in small frequent amounts. When oral rehydration solutions are not immediately available used cooled boiled water.

Bottle fed babies can return straight to full strength feeds if tolerating oral rehydration solution.

Normal/usual diet should be recommenced after rehydration.

6. Healthy Start

Who Qualifies\textsuperscript{38}?

Women who are at least 10 weeks pregnant or have children under 4 years of age in the family and who are:

- Receiving Income Support, or
- Income based Jobseeker’s Allowance, or
- Income-related Employment and Support Allowance, or
- Child Tax Credit run-on
- **AND** has an annual family income of £16,190 or less (2013/14) or
- Under 18 years of age.

What do Healthy Start Beneficiaries Receive?

- Pregnant women and children aged 1-3 years get one voucher a week
- Babies under the age of one get two vouchers a week.

Each voucher is worth around £3.10 and can be spent on cow’s milk, fresh or frozen fruit and vegetables, or infant formula milk in a wide variety of local shops and supermarkets and with milkmen that have registered to take part in the scheme. Every eight weeks, beneficiaries also receive green vitamin coupons which they can swap for Healthy Start vitamins in their local area. The coupons are either for Healthy Start women’s tablets or Healthy Start children’s drops.

Where are Vitamins Available?

Vitamins are available in all Children and Family Centres. To apply use Form HS01 available from the above centres, Health Visitors or call the Healthy Start helpline on 0845 607 6823 or go online to http://www.healthy start.nhs.uk/. 
Accurate and regular measurement of infant growth is an important part of assessing the general health and development of a child. Weight measurement is the principle indicator of good health and nutrition in the child’s first year of life\(^3\).

Potential benefits of growth monitoring include:

- identification of chronic disorders
- reassurance to parents/carers
- monitoring the health of the nation’s children
- supporting future research\(^4\).

All health professionals involved in monitoring infant growth should receive training in measurement technique and interpretation of growth charts\(^4\).

Weight is also used for calculating infant feed volumes.

**Which Scales?**

Only Class III digital portable scales with a weighing pan should be used\(^4\). Weighing scales must be calibrated for accuracy. Ideally serial measurements should be on the same scales.

**How Often Should An Infant’s Growth Be Monitored?**

The Royal College of Paediatricians & Child Health (RCPCH) standards for growth monitoring are as follows\(^4\).

Regurgitation (passive, non forceful vomiting) is common in infants of less than three months who may have a relaxed lower oesophageal sphincter. This is gastro-oesophageal reflux and will settle with time. Parents should be reassured that it is very common and happens to 4 out of 10 infants, healthy children and adults. It can be difficult, however to differentiate between normal episodes of reflux and more serious GORD (Gastro-oesophageal reflux disease). Troublesome vomiting should be evaluated by the GP or Paediatrician. Pathological causes of vomiting e.g. pyloric stenosis may need to be ruled out. Healthcare professionals should look out for ‘red flag’ symptoms, which may indicate that further investigation is necessary. Red flag symptoms include bile-stained vomit; projectile vomiting; blood on stool or vomit; faltering growth; abdominal distention/ chronic diarrhoea; unwell/fever/ altered responsiveness; bulging fontanelle; late onset (after 6 months)

Babies who regurgitate a lot may benefit from thickening the milk with a commercially available thickening agent e.g. Instant Carobel®, Thixo-D® or Thick and Easy®. It can be given as a gel before breast feeds. Pre-thickened formula milks are available, such as Aptamil anti-reflux® or thickening formula such as Enfamil AR® & SMA Staydown®.

If a thickened formula is not successful it should be stopped and a 2 week trial of Alginate therapy, e.g. Infant Gaviscon® trialled.

Milk allergy can be a cause of vomiting. A two week trial period of an extensively hydrolysed formula or amino acid formula could be trialled\(^5\). For further information see chapter 10.
14. Common Gut Problems

Diet

Gripe water containing sugar and water and herbal drinks containing sugar are not recommended.

Colic should not be used as a reason to stop breastfeeding.

There is no specific nutritional advice that can be given for colic as no one specific food has been proven to cause it. Changing an infant's feed is not recommended; in fact changing from a whey to casein based formula may well aggravate the problem. There is some anecdotal evidence that casein-based formula induce constipation and exacerbate ‘colic’.

ii) Vomiting and Regurgitation

Vomiting

All babies vomit occasionally. Vomiting in a baby who does not usually vomit or vomiting associated with weight loss requires medical attention.

Important questions to ask if a baby is vomiting:

- What is the nature of the vomitus? e.g. does it contain blood or bile?
- Is it forceful or regurgitant?
- Is it related to feeds?
- How long after a feed?
- Are feeding volumes appropriate?
- Is the weight gain normal?

7. Growth

Weight

- At birth and during the first week as part of a feeding assessment and thereafter if needed.
- Once feeding is established babies should be weighed at 8, 12, 16 & 32 weeks and at 1 year at the time of routine immunisations.

Infants may be weighed at health visitor led weigh-in clinics more frequently. Care should be taken as measurements too closely together are often misleading and can cause unnecessary anxiety for the parent. As a general rule, they should not be weighed more than every 2 weeks up until 6 months, once every month from 6 months until 1 year and once every 3 months when more than 1 year, unless required by a health professional, e.g. paediatrician or paediatric dietitian.

Length and Head Circumference should be measured:

- If there is a concern about a child’s weight gain, growth or general health.
- If the weight is below the 0.4th centile or above the 99.6th centile.
- If there is rapid weight gain.

Head Circumference should also be measured:

- Around birth.
- At the 6-8 week check.
- If there are concerns about a child’s head growth.
7. Growth

How To Measure Infant Growth

Measurements (weight, supine length and head circumference) should be taken following the standardised instructions on growth charts. Children should have supine lengths taken on a length board or mat until 2 years of age.

Which Chart?

- All babies should be plotted on UK WHO Growth charts.
- Babies born before 32 weeks gestation should be plotted on a UK WHO Neonatal & Infant Close Monitoring (NICM) growth chart.

The UK WHO charts describe optimal rather than average growth and are based on healthy breast fed babies. For more information go to www.growthcharts.rcpch.ac.uk. It is important to acknowledge that breastfed infants grow at a slower rate than bottle fed infants and this is reflected in the charts.

Plotting Infant Growth

For all infants born after 37 weeks completed gestation, plot from the estimated delivery date (EDD). Measurements should be recorded in kg (and imperial measurements if desired) alongside the infant’s age in weeks if under 12 months and calendar months thereafter. Ensure entry is signed and dated, with the location of the weight recorded (e.g. Health Visitor, hospital, ward).

14. Common Gut Problems

An assessment of the baby’s feeding pattern should be undertaken including feeding position, how feeds are made up, possible over feeding, teat size and winding method.

Feeding Pattern

Offering more frequent feeds of a reduced amount, but maintaining the same volume and checking that the infant is well positioned during feeding can be useful.

Drugs

- Only consider trying medical treatments if parents feel unable to cope despite advice and reassurance. The options for medical treatments are:
  - A 1-week trial of simethicone drops (such as Infacol® drops)
  - A 1-week trial of lactase drops (such as Colief® Infant Drops)
- Only continue treatment if there is a response (such as the duration of crying shortens)
- If there is no response to one medical treatment, consider trying another.
- If the baby responds to lactase drops, reassure the parents that this does not necessarily mean that they are lactose intolerant. Lactose intolerance is a rare condition that affects very few babies with infantile colic (see chapter 11).

Dicyclomine hydrochloride (Merbentyl) is contraindicated in infants less than 6 months of age.
14. Common Gut Problems

(i) Infantile Colic

Colic is a common, harmless but distressing complaint of unknown cause which occurs in both breast and bottle fed babies. The term ‘colic’ is sometimes applied to prolonged crying episodes in otherwise healthy babies, particularly in the first 3 months of life.

Colic disappears spontaneously, often without any intervention. NICE guidelines recommend the following advice:

- Reassure the parents that their baby is well, they are not doing something wrong, the baby is not rejecting them, and that colic is a common phase that will pass within a few months.
- Holding the baby through the crying episode may be helpful. However, if there are times when the crying feels intolerable, it is best to put the baby down somewhere safe (such as their cot) and take a few minutes’ ‘time out’.
- Other strategies that may help to soothe a crying infant include:
  - Gentle motion (for example pushing the pram or rocking the crib).
  - ‘White noise’ (for example from a vacuum cleaner, hair dryer, or running water).
  - Bathing the baby in a warm bath.
- Encourage parents to look after their own well-being by:
  - Asking family and friends for support - parents need to be able to take a break
  - Resting when the baby is asleep
  - Meeting other parents with babies of the same age.
- CRY-SIS is a support group for families with excessively crying, sleepless, and demanding children. Their helpline is available every day from 9am to 10pm. Tel: 08451 228 669. The CRY-SIS website (www.cry-sis.org.uk) also contains useful information.

7. Growth

Correcting For Prematurity

It is vital that preterm infants have their growth accurately corrected for prematurity. For infants born at less than 36 weeks 6 days completed gestation, draw a vertical line at the appropriate week in the growth chart and plot measurements from this line. Infants born at or above 37 weeks do not need to be corrected.

How Long Should Growth Be Corrected For?

Infants born at 32-36 weeks 6 days - correct their growth for prematurity until their first birthday.

Infants born at under 32 weeks - correct for prematurity until their 2nd birthday.

For example:

- An infant born at 33 weeks should be corrected by 7 weeks, until 1 year.
- An infant born at 29 weeks should be corrected by 11 weeks until 2 years.
- An infant born at 37 weeks should not be corrected.

Health visitors and health professionals updating the parent held record or hospital growth chart should ensure that the corrected age is clearly marked.
What is Normal Growth and When to Refer On

In the UK, normal birth weight is 3.3-3.5kg in both sexes. Some weight loss (up to 10% birth weight) is expected during the first 5-7 days of life whilst feeding is established\(^{44}\). Birth weight is usually regained by 2 weeks of age. After this, average weight gain is:

- 210g/week for girls & 240g/week for boys from 3 months
- 120g/week for girls & 130g/week for boys from 3-6 months
- 75g/week for girls & 80g/week for boys from 6-9
- 60g/week for girls & 65g/week for boys from 9-12 months

Increase in length during the first year of life is 25cm\(^{43}\).

Weight usually tracks within one centile. Acute illness can lead to weight loss and a fall off the centile but a child’s weight usually returns to its normal centile within 2-3 weeks. Less than 2% of infants will show a sustained drop through 2 or more centile spaces when using the UK WHO charts. It is acceptable for premature infants to track within 2 centiles of their birth weight.

Faltering growth

The decision regarding whether to refer the infant on for further assessment should be made on the basis of the whole clinical picture (in collaboration with the parents/carers) and not the growth chart alone\(^{41}\). Any child with measurements consistently under the 0.4th centile should be assessed in more detail by a consultant paediatrician. It is helpful for a copy of the child's centile chart to be sent with the referral, and to remind the parents/carers to take their child health record along to the consultation.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Food</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100g</td>
<td>Savoury minced beef</td>
<td>1.4</td>
</tr>
<tr>
<td>90g</td>
<td>Roast beef</td>
<td>2.6</td>
</tr>
<tr>
<td>1 (60g)</td>
<td>Beef burger</td>
<td>1.5</td>
</tr>
<tr>
<td>2 (80g)</td>
<td>Sausages</td>
<td>1.0</td>
</tr>
<tr>
<td>80g small breast</td>
<td>Chicken</td>
<td>0.4</td>
</tr>
<tr>
<td>2</td>
<td>Fish fingers</td>
<td>0.4</td>
</tr>
<tr>
<td>46g</td>
<td>Tuna</td>
<td>0.5</td>
</tr>
<tr>
<td>20g/1 tsp</td>
<td>Peanut butter</td>
<td>0.4</td>
</tr>
<tr>
<td>90g</td>
<td>Roast lamb</td>
<td>1.4</td>
</tr>
<tr>
<td>1</td>
<td>Egg</td>
<td>1.0</td>
</tr>
<tr>
<td>1 slice</td>
<td>White bread</td>
<td>0.6</td>
</tr>
<tr>
<td>1 slice</td>
<td>Wholemeal bread</td>
<td>0.9</td>
</tr>
<tr>
<td>25g</td>
<td>Fortified Breakfast cereal</td>
<td>2.0</td>
</tr>
<tr>
<td>2</td>
<td>Ginger biscuits</td>
<td>0.8</td>
</tr>
<tr>
<td>1 tbsp</td>
<td>Lentils (cooked)</td>
<td>1.4</td>
</tr>
<tr>
<td>60g</td>
<td>Quorn</td>
<td>0.4</td>
</tr>
<tr>
<td>small bar</td>
<td>Milk chocolate</td>
<td>0.8</td>
</tr>
<tr>
<td>Handful</td>
<td>Raisins</td>
<td>1.1</td>
</tr>
<tr>
<td>2 spears</td>
<td>Broccoli</td>
<td>0.9</td>
</tr>
<tr>
<td>1 small tin (150g)</td>
<td>Baked beans</td>
<td>2.0</td>
</tr>
<tr>
<td>2</td>
<td>Weetabix</td>
<td>4.8</td>
</tr>
<tr>
<td>4</td>
<td>Dried Apricots</td>
<td>1.1</td>
</tr>
<tr>
<td>50g</td>
<td>Chick peas</td>
<td>0.7</td>
</tr>
<tr>
<td>125g can</td>
<td>Sardines in tomato sauce</td>
<td>3.6</td>
</tr>
<tr>
<td>3 tbsp (40g)</td>
<td>Garden peas</td>
<td>0.6</td>
</tr>
<tr>
<td>1 small</td>
<td>Baked potato + skin</td>
<td>0.7</td>
</tr>
<tr>
<td>1 large slice</td>
<td>Watermelon</td>
<td>0.6</td>
</tr>
<tr>
<td>50g</td>
<td>Red kidney beans</td>
<td>1.3</td>
</tr>
<tr>
<td>1 thin slice (38g)</td>
<td>Corned beef</td>
<td>1.0</td>
</tr>
<tr>
<td>100g</td>
<td>Salmon</td>
<td>0.5</td>
</tr>
</tbody>
</table>
13. Iron Deficiency

Current estimated requirements based on the Department of Health Dietary Reference Values\(^5\) are:

<table>
<thead>
<tr>
<th>Age</th>
<th>Male &amp; Female iron intake mg/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 months</td>
<td>1.7</td>
</tr>
<tr>
<td>4-6 months</td>
<td>4.3</td>
</tr>
<tr>
<td>7-12 months</td>
<td>7.8</td>
</tr>
<tr>
<td>1-3 years</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Meeting Iron Requirements

Both animal (haem) and plant (non-haem) forms of iron exist in the diet. The bioavailability of iron from animal sources is higher than those from plant sources. Vitamin C is helpful in aiding the absorption of non-haem iron whilst the tannin in tea is known to reduce absorption. A detailed diet history will help to identify how best to optimise iron intake and absorption from appropriate sources.

Foods Rich in Iron

The following table provides information on the iron content of specific foods and can be used along with estimated iron requirements to assess whether the child’s diet is likely to be adequate in iron\(^5\).

7. Growth

There are other Faltering Growth patterns that should be recognised when assessing a growth issue:

- Falling off Centile: weight falls 2 or more centiles from the maximum centile achieved between 4-8 weeks of age.
- Height and Weight Centiles Markedly Discrepant: weight persistently more than 2 centiles below height centile.
- Saw Tooth Pattern (Dipping): weight goes up and down, crossing and recrossing centile positions due to illness & family stress. This can also occur if a child is weighed too frequently, see above.
- Family Pattern Discrepant: infants and children that do not achieve a normal or expected rate of growth in comparison to other family members, or when compared to their adult height potential.

Dietetic Management of Faltering Growth

The dietetic management of faltering growth aims to ensure sufficient nutritional intake to support adequate weight gain and growth, and prevent nutritional deficiencies.

Dietetic objectives are:

- To assess if sufficient calories and protein are consumed per kg bodyweight for adequate weight gain and growth and appropriate introduction of complementary foods.
- To provide appropriate advice and support for parents/carers to increase this if nutritional intake is inadequate for nutritional needs.
- To liaise with other health professionals if behavioural issues occur surrounding food, which may impact on nutritional intake.
Obesity

Obesity should be assessed on a BMI centile chart for boys and girls. Adult charts should not be used. The paediatric dietitian at your local hospital will have access to BMI charts for children. Body Mass Index (BMI) is calculated using the following equation:

\[ \text{BMI} = \frac{\text{Wt (kg)}}{\text{Ht}^2 \text{ (m)}} \]

So for an 18 month old child with a weight of 16kg and length 86cm the BMI will be:

\[ \text{BMI} = \frac{16}{0.86 \times 0.86} \]

\[ = 21.6 \text{ kg/m}^2 \]

\[ = 99.6\text{th centile} \]

BMI usually decreases in pre-school children between the ages of 1 and 5 years. The 91st centile for BMI is generally used as a cut off for overweight and the 98th for clinical obesity. All 0-2 year olds with a BMI>98th centile should be referred to a consultant paediatrician and paediatric dietitian. For more information see NICE Clinical Guideline 18945.

Iron Deficiency

Healthy babies born at full gestation have an adequate iron reserve to allow normal growth and function up until around 6 months of age. After this point, iron absorption from external sources, i.e. diet and fluids, becomes essential for maintaining healthy function. Iron is a component of blood cells and several enzymes and has many metabolic functions as well as a key role in carrying oxygen around the body. Iron deficiency anaemia is the most common nutrient deficiency among children in the developed world. The most recent results of the National Diet and Nutrition Survey53 indicate that this is an ongoing problem in both infants and children.

The symptoms of iron deficiency in infants can include:

- Poor growth
- Psychomotor delay and behavioural problems
- Lethargy and tiredness
- Poor appetite
- Breathlessness
- Frequent infections

Those most at risk of developing iron deficiency anaemia include:

- Delayed complementary feeding.
- Pre-term infants
- Fussy eaters
- Children who drink excessive amounts of cow’s milk
- Infants given cow’s milk as a main drink before 12 months of age
- Those following a vegetarian or vegan diet.

Infants have relatively high iron requirements due to the rapid rate of growth. After 6 months of age, iron stores diminish and iron from breast milk is no longer sufficient to meet demand.
12. Fussy / Selective Eaters

Encourage families to work together to deal with the issue so the child is not hearing conflicting messages from different people. They may need to involve other people like grandparents or a childminder, who the child may be with at mealtimes.

Discourage rewards of food when a child eats well. Other reward ideas include taking them to the park or going to see friends.

Families should be encouraged to eat together whenever possible and in a calm, relaxed area without distraction such as toys or television. Children will often learn from parents and siblings and be more inclined to try new foods if they are being eaten by those around them.

Food should not be withheld as a punishment for not eating.

Do not force feed.

Do not offer large portions that are unlikely to be finished or insist on clean plates.

Encourage parents to speak with friends/other parents who are going through or have gone through similar experiences so they know they are not alone.

Perseverance is they key to success! Although things may get worse initially, it is likely to improve once the child gets used to the changes and responds to the positive praise he/she is now receiving.

If the problems start to affect growth and/or development, refer on to the GP or paediatric dietitian for further assessment and advice (See Chapter 7 Growth).

8. Oral Health

Diet

Frequency of sugar is a major factor in the development of dental caries. Foods containing added sugars should be restricted to meal times only.

Many manufactured baby foods have added sugars including familiar first foods. Low sugar does not mean no sugar and often means the product has only a small amount less than the standard product. Encouraging a "sweet tooth" is to be avoided.

Drinks

Drinks containing added sugar contribute towards dental caries and drinks containing fruit or that are carbonated contribute to dental erosion. The most appropriate drinks between meals are milk and water. The risk to teeth from other drinks can be reduced by diluting them, keeping them to meal times and not making them last a long time.

Care should be taken in the choice of spouted drinking cups as valved no-spill designs carry the same risks to teeth as drinking from a bottle. Free flow spouted cups are messier but will encourage the carer to supervise drinking, keep drinking times short and discourage using the drink as a comforter.
8. Oral Health

Oral Hygiene

Plaque starts to form on teeth once they emerge, therefore tooth brushing should commence as soon as the first tooth appears in the mouth. This should be carried out by a parent/carer. When the child is able to hold a toothbrush he/she should be encouraged to practise cleaning the teeth. However, the parent/carer should always complete the tooth brushing for the child. Supervision, assistance and encouragement should continue until the child is about six to eight years old depending on the child’s capability.

Fluoride is not added to the water in West Sussex so it is important that fluoride toothpaste is used regularly. For babies and children up to 3 years it is recommended that a smear of toothpaste containing no less than 1000ppm fluoride is used. For babies and children over 3 years a pea sized amount may be used, once spitting is mastered. The toothpaste should contain 1350-1500ppm fluoride. This should be dispensed by an adult onto a toothbrush with a small head and soft bristles. Children should be encouraged to spit out the bubbles but not to rinse off the residual toothpaste as the fluoride continues to strengthen tooth enamel. Toothpaste should be kept out of reach of young children to prevent them from consuming it.

Teeth should be cleaned once in the morning, either before breakfast or at least half an hour after eating. Bedtime brushing should be after last milk drink from one year old to protect teeth from natural sugars. Water only should be given if the child wakes and is thirsty in the night.

12. Fussy / Selective Eaters

Food refusal/fussy eating is very common in children (especially those under 5) and is a normal part of growing up and showing independence. Most children will go through phases of refusing individual foods or at times complete refusal to eat. However, parents can become anxious and mealtimes can often become a ‘battle’. Reassuring parents that food refusal is usually only short lived and therefore not likely to cause any long term problems is advised.

Encourage a regular eating pattern, i.e. 3 meals plus 2 small snacks. Offer 2 courses at each meal time, e.g. 1 savoury plus 1 sweet. The sweet course is often used as a ‘bargaining tool’ by parents to convince children to eat the savoury part but this should be discouraged.

The meal should be offered and removed without comment if the child refuses to eat it. Do not offer alternatives.

Meal times should be fun. Encourage the use of brightly coloured plates and cups and present food in fun, attractive ways.

Only positive feedback or praise should be given. Ignore the behaviour you do not like and praise the behaviour you do.

Allow at least 1 hour between a snack and next meal and do not offer drinks just before a meal or large volumes of fluid during a meal.

Try not to rush mealtimes, but set a maximum of 30 minutes so it does not drag on for too long.

Tiredness can be a reason for food refusal. Encourage a good meal pattern and sleeps at regular times.
11. Lactose Intolerance

- Secondary lactase deficiency can result from damage to the gastrointestinal mucosa. This can present at any age and symptoms can develop shortly after the primary injury. It can happen in Crohn’s disease, short gut syndrome, cow’s milk protein enteropathy and rotavirus infection. Treatment is to eliminate lactose from the diet (see congenital lactase deficiency) and treat the primary disorder causing the mucosal damage. Infants with secondary lactase deficiency due to rotavirus infection should recover 2-4 weeks after the infection. Toddlers who develop secondary lactase deficiency after their first birthday and are already drinking full fat cow’s milk can use a suitable over the counter milk free substitute, see Chapter 5 on infant formula, milks and drinks.

8. Oral Health

Dental Visits/Fluoride

Parents should be encouraged to register their infants with their family dentist and begin to seek individual advice on prevention of disease by about six months of age. This should include individual advice regarding the use of fluoride supplements and toothpaste.

If a Health Visitor is concerned about a child’s oral health and the family have been unable to register their infant with a dentist then they can be referred to the Special Care Dentistry Service.

The water authorities in West Sussex have advised that there is no fluoride added to the drinking water supply. The fluoride content naturally occurring is too low to help in the prevention of dental caries.

Fluoride supplements should only be used if prescribed by a dentist.

It is important that families moving out of the district are advised to contact the local water authority, family dentist or Community Dental Service before continuing with fluoride supplementation as their new home may be located in a fluoridated area. To find a dentist locally call West Sussex & Surrey Dental Helpline 0300 1231663 or look on NHS Choices.

Medicine

If children need to take medicine, a sugar free preparation should be prescribed if available.
Vegetarian & Vegan Diets

A well balanced, varied vegetarian diet can be nutritionally adequate. There is increasing evidence that people who are vegetarian are less likely to suffer from diseases such as coronary heart disease, cancer, diabetes, obesity and hypertension.

Provided that parents are well informed regarding their child’s nutritional needs and offer their child an adequate, varied diet, a vegetarian & vegan diet can provide all the nutrients needed for a growing infant. This should take extra thought and planning however, to prevent nutritional deficiencies.

<table>
<thead>
<tr>
<th>Foods Excluded</th>
<th>Protein Sources</th>
<th>Nutrient at Risk of Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial vegetarian (semi/demi)</td>
<td>red meat offal, fish, eggs, milk, cheese, lentils, nuts, seeds, yoghurt, Quorn®, Tofu/soya</td>
<td>Iron</td>
</tr>
<tr>
<td>Pescatarian (eat fish but not meat)</td>
<td>red meat offal, poultry gelatine, fish, eggs, lentils, cheese, nuts’, seeds, Tofu/soya, Quorn®</td>
<td>Iron</td>
</tr>
<tr>
<td>Lacto-ovo-vegetarian (most common type of vegetarian)</td>
<td>red meat offal, poultry, fish rennet gelatine, milk, eggs, yogurt, cheese, lentils, nuts’, seeds, beans, Quorn®, Tofu/soya</td>
<td>Iron</td>
</tr>
</tbody>
</table>

Lactose Intolerance

Lactose intolerance is a digestive problem where the body is unable to digest lactose, a type of sugar mainly found in milk and dairy products. Symptoms include flatulence, diarrhoea, bloated stomach and stomach cramps. Lactase is the enzyme responsible for lactose metabolism. People with lactose intolerance do not produce lactase, so lactose stays in the digestive system where it is fermented by bacteria. This leads to the production of various gases that cause the symptoms associated with lactose intolerance. Depending on the underlying reason why the body does not produce enough lactase, lactose intolerance may be temporary or permanent.

- Congenital lactase deficiency is very rare resulting in severe diarrhoea during the first few days of life. Symptoms will resolve when either breast milk or normal cow’s milk formula is stopped and a lactose free formula is given. Low lactose, cow’s milk protein based formula available are SMA LF (SMA Nutrition) & Enfamil O Lac (Mead Johnson) which is available on prescription & Aptamil Lactose free which is not available on prescription. A lactose free diet will be needed when complementary feeding is started.

- Primary adult type lactase deficiency is found in approximately 70% of the world’s population. Levels of lactase are normal during infancy but decline during childhood and adolescence to about 5-10% of levels at birth. This is seen in certain population groups, East and South East Asians, tropical Africans and Native Americans and Australians. In Europeans lactase levels remain high and declining tolerance to lactose with age is not seen.
The Prevention of Infant Developing Allergic Disease

Some infants are at greater risk of developing allergic disease. If they have a parent or sibling with atopy then they are more likely to develop allergic disease. The following are practical dietary prevention strategies for infants at risk of developing allergic disease.

- Mothers should eat a healthy, balanced diet during pregnancy and lactation. Their diet can include all major allergens unless they have a food allergy themselves.
- Ideally breast milk should be the sole source of nutrition until 6 months of age.
- Recommended alternatives to breast milk for those at risk of developing milk allergy are extensively hydrolysed formula milks (see page 55) or partially hydrolysed formula.
- Soya, goat and standard cow’s milk formula or off the shelf cow, goat, sheep, soy or rice milk should not be given.
- Complementary feeding should not commence before the age of 17 weeks.
- From the age of 6 months once complementary feeding has been established with low allergenic weaning foods, higher allergenic foods can be introduced.
- High allergenic food such as wheat, egg and milk should be commenced by adding each food singly starting with a small amount and introducing no more than one allergenic food at a time. By the age of 12 months all major allergens which would normally be suitable for a child of this age should have been introduced.
- Delayed weaning beyond 6 months could adversely affect the normal dietary and developmental milestones essential to establishing a good, varied diet.

### Vegetarian & Vegan Diets

<table>
<thead>
<tr>
<th>Foods Excluded</th>
<th>Protein Sources</th>
<th>Nutrient at Risk of Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lacto Vegetarian (eat dairy products but not eggs)</td>
<td>milk, lentils, yoghurt, Nuts, Cheese, beans, soya/Tofu</td>
<td>Iron, Vitamin D</td>
</tr>
<tr>
<td>Vegan</td>
<td>beans, lentils, Nuts, soya/Tofu</td>
<td>protein, energy, iron, fat-soluble vitamins (A,D,E,K), Riboflavin (B2), Vitamin B12 (Cobalamin), Calcium, Zinc, essential fatty acids</td>
</tr>
<tr>
<td>Raw food Vegan** (more restrictive than vegan)</td>
<td>As above and limited cooked foods – 80% diet is raw plants</td>
<td>500g/day green leafy veg, sweet fruit, high fat plants, nuts, seeds</td>
</tr>
</tbody>
</table>
9. Vegetarian & Vegan Diet

<table>
<thead>
<tr>
<th>Foods Excluded</th>
<th>Protein Sources</th>
<th>Nutrient at Risk of Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruitarian</strong> (Usually only foods which do not kill the plant of origin)</td>
<td>as vegan plus lentils nuts</td>
<td>none - eat only uncooked fermented cereals and seeds</td>
</tr>
<tr>
<td><strong>Macrobiotic</strong> Nutritional content depends on stage of diet - 10 stages of dietary elimination</td>
<td>animal products, fruit and vegetables are gradually removed from the diet until the final goal of consuming only brown rice is achieved, fluids are also severely restricted</td>
<td>none</td>
</tr>
</tbody>
</table>

*Giving whole nuts to children under 5 years is a choking hazard. Instead nuts can be ground down or used as a smooth nut butter.

**Nutritionally inadequate for a child of any age.

To determine what exactly is being excluded from the child’s diet, it is important to check with parents/carers what the child is allowed to eat.
The Vegetarian & Vegan Diet During Pregnancy

The health of the mother and baby is influenced by diet in pregnancy and preconception. Normal nutritional advice applies as for non-vegetarian women; however vegetarians/vegans should concentrate on preventing vitamin B\textsubscript{12} and zinc deficiency and be aware of adequate folate and iron intakes. As a precaution, a vegetarian over the counter nutritional supplement suitable for pregnancy can be advised.

Feeding the Vegetarian & Vegan Infant

Breastfeeding

If the mother does not consume dairy products then a calcium supplement is required to meet increased calcium needs whilst breastfeeding (1250mg Calcium/day). Breastfeeding on demand should be encouraged as for all infants. If the maternal diet is adequate, breast feeding will meet the infants nutritional needs for the first 4-6 months of life. Vegan mothers may require a vitamin B\textsubscript{12} supplement.

Bottle Feeding

Currently, the only standard whey based infant formula available on the market suitable for vegetarians is powdered SMA First Infant Milk. The inclusion of fish oils and/or the use of the animal derived enzyme rennet during the production process makes other infant powdered milks and ready-to-drink formulas unsuitable. There are no infant formula milks suitable for vegans due to the Vitamin D used being sourced from sheep’s wool. Soya formula is not suitable for infants under 6 months of age due to the phytoestrogen content.
Complementary Feeding

Breast milk or infant formula milk provides sufficient nutrition until the infant reaches 6 months of age. Solids should be introduced gradually increasing flavours and textures, see Chapter 4 for more details.

Maximising the calorie content of the diet is important as vegetarian diets can sometimes be very high in fibre (which is filling for the infant, and can limit the absorption of some nutrients) and lower in energy, vitamins and minerals.

Vegetarian diets should include foods which have little or no fibre such as eggs, milk and cheese so as to provide baby with sufficient calories. Semi-skimmed milk should not be introduced before the age of two years and skimmed milk should not be introduced before the age of five years. If dairy products are not consumed then vegetable oils and vegan fat spreads can be used to increase calories.

Pulses provide a valuable source of protein from 6 months; these should be well cooked to destroy naturally occurring toxins which may cause diarrhoea and vomiting. Soya milk can be incorporated into the diet when the infant is over 6 months of age to provide protein. Calcium enriched varieties are encouraged for those on non-dairy containing diets. Tofu and Quorn can be introduced from 7 months. Finely ground nuts and nut butters are a good source of protein and fat and can be included from 6 months of age. If there is a family history of atopy individual advice will be needed. The infant should continue with at least 568ml 1 pint of breast or formula milk/day.
10. Allergic Food Hypersensitivity

- Goat’s infant formula milk and goat’s milk & sheep’s milk is not recommended for the treatment of milk allergy.

- Suitable alternatives to cow’s milk such as oat, nut and coconut milk should only be used as a main drink from the age of 2 years if not sensitized to these allergens.

- Rice milk is not recommended as a drink in children under 4½ years of age.

- Partially hydrolysed infant formula is not recommended for the treatment of cow’s milk allergy.

In some circumstances an amino acid formula may be needed. Examples include Alfamino (SMA Nutrition), Puramino (Mead Johnson), & Neocate LCP (Nutricia). An amino acid formula should be trialled if any of the following apply:

- symptoms persist on an extensively hydrolysed formula
- symptoms of CMA on breast milk and a formula is required
- multiple food allergies
- anaphylaxis to cow’s milk
- Heiner’s syndrome
- Severe eczema
- severe gastrointestinal food allergies.
- Faltering growth

If a diagnosis of cow’s milk allergy is confirmed, the infant should remain on dietary exclusion for around 6 months. Please refer to the MAP Guideline page 57 & 58 for further details.

Reintroduction should be considered by a healthcare professional. Infants who have had symptoms of IgE food allergy or severe eczema should have allergy testing prior to food challenge. If it has been established it is safe to introduce dairy into the diet at home the MAP Milk ladder (see page 59) can be used. Infants with a history of anaphylaxis should only be challenged in hospital under medical supervision. Infants should be reviewed every 6-12 months whilst they remain on dietary intervention.

9. Vegetarian & Vegan Diet

Vitamins

For general advice on vitamin supplementation see page 28. Children following a vegan diet are also encouraged to take a Vitamin B₁₂ (Cobalamin) supplement if they do not have any fortified food products in their diet.

Sources of Nutrients on a Vegetarian & Vegan Diet

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Vegetarian Source</th>
<th>Vegan Source*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>Dairy products, eggs</td>
<td>Pulses, grains, finely ground nuts and seeds (including spreads)</td>
</tr>
<tr>
<td>Iron</td>
<td>Eggs, chocolate Absorption aided by: Vitamin C rich foods eaten at the same meal Absorption limited by: phytates (bran), oxalates (spinach, rhubarb) tannins (tea)</td>
<td>Whole grains, fortified breakfast cereals, wholemeal bread, pulses, dried fruit, finely ground nuts, soya beans, lentils, tofu, green leafy vegetables</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Eggs, fortified yoghurts, dried skimmed milk</td>
<td>Sunlight, fortified soya milk, fortified breakfast Cereals, vegetable oils and margarines, yeast</td>
</tr>
</tbody>
</table>
## 9. Vegetarian & Vegan Diet

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Vegetarian Source</th>
<th>Vegan Source*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential Fatty Acids</td>
<td>Seed oils, wholegrains, finely ground nuts and seeds, soya, margarines, soups, sauces</td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Carrots, red peppers, dark green leafy vegetables, tomatoes, yellow-coloured fruit</td>
<td></td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Dairy products, eggs</td>
<td>Wheat germ, almonds, green leafy vegetables, yeast extract, avocado, soya beans, fortified soya milk, pulses, almond butter or ground almonds, avocados, mushrooms</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt;</td>
<td>Dairy products, eggs</td>
<td>Fortified yeast extract, e.g. Marmite, fortified cereals, fortified soya milk, Tofu</td>
</tr>
<tr>
<td>Calcium</td>
<td>Dairy products</td>
<td>Fortified soya products, seaweed products, finely ground cashew nuts and almonds, sunflower and sesame seeds, fortified bread</td>
</tr>
<tr>
<td>Zinc</td>
<td>Dairy products, eggs</td>
<td>Some soya products, e.g. tempeh and miso, finely ground nuts and seeds, wheat germ, wholegrains, fortified breakfast cereals, seaweed, pulses, Tofu</td>
</tr>
</tbody>
</table>

## 10. Allergic Food Hypersensitivity

### Dietary Intervention

Manipulative dietary investigations should not be undertaken lightly. Infants may be nutritionally at risk due to dietary constraints. A paediatric dietitian should assess the diet in order to ensure long-term nutritional adequacy and the complete removal of allergens. Avoiding allergens not proven to show clinical reactivity should not be encouraged.

Breast milk is the best milk for infants with food allergies. It may be necessary for the mother to change her diet to ensure that the breast milk does not contain the offending allergen. The paediatric dietitian can advise on this.

### Cow’s Milk Allergy

If the infant is being exclusively breast fed then the mother should follow a milk and soya free diet and an assessment made by a Dietitian to ensure an adequate intake of calcium and vitamin D is being consumed. The mother may need a supplement containing 1000mg calcium and 10µg vitamin D.

If breast milk is not available and a milk allergy is suspected then the following options can be advised:

- **Infants 6 months of age and under** - offer an extensively hydrolysed casein based cow’s milk formula. Examples include Nutramigen Lipil 1 with LGG (Mead Johnson) or Similac Alimentum (Abbott)
- **Infants over 6 months of age** - offer an extensively hydrolysed cow’s milk formula. Examples include Nutramigen Lipil 2 with LGG (Mead Johnson) or Similac Alimentum (Abbott)
- **Soya infant formula milk should not be recommended for infants under 6 months of age** and is not the first line treatment for cow’s milk allergy.
Diagnosis of Allergic Food Hypersensitivity

A detailed allergy focused history is crucial in the diagnosis of allergic food hypersensitivity. If a patient history points to an IgE-mediated reaction, tests are available that can detect food-specific IgE antibodies.

**Skin Prick Tests (SPT)** – This test indicates the likelihood of a patient reacting to a particular food depending on the size of the skin reaction. SPT is not suitable for infants with severe eczema, dermographia, a respiratory infection or temperature or unstable asthma. Antihistamines must not be taken before SPT. Chlorphenamine (Piriton) should not be taken for 2 days prior to SPT and Loratidine or Cetirizine for 5 days before SPT testing.

**Specific Immunoglobulin E (sIgE)** – This test measures the concentration of food specific IgE in a patient’s blood. The higher the concentration of IgE the higher the likelihood of reacting to the food protein. Requests for sIgE can be made to the Clinical Chemistry Department at your local hospital. Antihistamine can be taken prior to sIgE tests.

Other tests e.g. cytotoxic food tests, hair and nail tests, pulse testing and sublingual provocative testing have been developed to diagnose allergy. They are not available on the NHS and their reproducibility has been shown to be very poor. "Alternative Practitioners" providing therapy for food intolerance and allergies vary in their training and perceptions. Many of their diagnostic tools would not withstand scientific scrutiny and for these reasons they are not recommended.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Vegetarian Source</th>
<th>Vegan Source*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iodine</td>
<td>Dairy products</td>
<td>Whole grains, seaweeds, vegetables, cereals</td>
</tr>
<tr>
<td>Selenium</td>
<td>Eggs</td>
<td>Cereals, finely ground nuts especially Brazil nuts, seeds</td>
</tr>
</tbody>
</table>

* Foods also suitable for the vegetarian diet.

**Children on a Restrictive Diet - When to be Concerned**

If you have concerns regarding the nutritional adequacy of an infant’s diet or their growth a referral to a registered dietitian should be considered.
9. Vegetarian & Vegan Diet

Useful Resources

- Eating well: vegan infants and under 5s by First Steps Nutrition. Available from their website www.firststepsnutrition.org

  126 page visual guide to weaning the vegan infant and child up to the age of 5 years. It includes meal/finger food ideas, examples of breakfast, snacks, savoury meals and desserts. Suitable for parents.


  2-page summary suitable for parents, focussing on the nutrients required for those following vegetarian/vegan diets and their dietary sources.


10. Allergic Food Hypersensitivity

Food hypersensitivity is defined as an adverse reaction to food.

**Non-Allergic Food Hypersensitivity**

Non-allergic food hypersensitivity is caused by substances in food other than food proteins with no involvement of the immune system. Histamine release, pharmacological effects or enzyme deficiencies may cause such reactions. They can be acute and severe (although rarely life-threatening) and are often difficult to diagnose. Examples include lactose intolerance.

**Allergic Food Hypersensitivity**

Allergic Food Hypersensitivity often referred to as food allergy is a specific reaction resulting from an abnormal immunological response to a food protein. It can develop soon after exposure to the food, be severe and life threatening known as IgE-mediated. It can also develop more slowly known as non-IgE-mediated, e.g. eczema, vomiting, diarrhoea or may even show a mixed pattern.

**Symptoms of Allergic Food Hypersensitivity**

Symptoms are typically present in one or more of 3 organ systems.48

- Gastrointestinal Tract: common symptoms include vomiting, gastro-oesophageal reflux and diarrhoea.
- Respiratory Tract: common symptoms include rhinoconjunctivitis and wheeze.
- Skin: common symptoms include urticaria, eczema and oedema.