



The Northern Neonatal Network
An Operational Delivery Network
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Guideline for Vitamins, Iron & Breast Milk Fortifier

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Northern Neonatal Network guideline

Guideline for Vitamins, Iron and Breast Milk Fortifier

Purpose

This document offers guidance to healthcare professionals, predominantly staff on NICUs (Neonatal Intensive Care Units) and SCBUs (Special Care Baby Units) for the administration and use of vitamin and iron supplements and also breast milk fortifier in neonates. It is based on extensive references and research and is recommended for use across all Network Units as a means of standardising best practice care.

Audit points

1. All babies born at <34 weeks gestation receive multivitamins after full feeds established
2. Babies with birthweight <2kg and on breast milk receive iron supplements on discharge from the neonatal unit.

Summary

1. Start all babies <34 weeks on multivitamins (e.g. Dalivit) when full feeds tolerated
2. Encourage breast milk fortifier (BMF) in infants <1500g if not on formula
3. BMF does not contain iron: iron is necessary for adequate growth and should be started by about 2-4 weeks of age unless recently transfused (last 7 days)
4. Infants who are primarily breast milk fed on discharge need additional iron, Vitamin K and Vitamin D (as part of multivitamins such as Dalivit or ABIDEC)

Background

Infants born prematurely have lower stores and higher requirements for vitamins than those born at term as the third trimester is a time of rapid nutrient accretion, and formation of bone and vitamin stores. A number of vitamins have been studied in preterm infants but the only vitamin where more is needed in routine clinical practice is probably Vitamin D.¹⁻⁴

The needs of most preterm infants will be met by the use of a Breast Milk Fortifier (BMF) or a preterm formula combined with a multi-vitamin preparation e.g. Dalivit, ABIDEC etc.. Iron is essential for growth and brain development. In the first 2 weeks iron stores are sufficient, but thereafter additional iron is required. This is provided in preterm formula but is not available in BMF. Theoretical risks of iron supplementation have not been substantiated in clinical trials and most authorities

consider that supplemental iron be provided by 2-4 weeks of postnatal age. Blood transfusions provide additional iron so any baby who has had a blood transfusion in the preceding 1-2 weeks is unlikely to need additional supplemental oral iron.⁵⁻¹¹ Oral iron does not need stopping after blood transfusion if it was already being given.

Whilst EBM is the best milk for preterm babies it will not meet the protein and energy needs of babies <1500g. Babies may still gain weight without additional BMF, but they are unlikely to receive enough protein for optimal lean mass accretion. When a baby has tolerated 150-175ml/kg/day of EBM for 1-2 days it is probably sensible to start BMF. For some babies at high risk of NEC clinicians may wish to wait a few more days to maximise the benefit of human milk before introducing other foods. It is worth noting that many units start BMF when 100ml/kg/day is tolerated.

Method

Feeding supplements and Vitamins on Discharge – Preterm Babies

At discharge encourage continued breast feeding

1. Continue (or start) supplemental iron (Sytron), oral Vitamin K and a multivitamin preparation containing Vitamin D (e.g. ABIDEC, Dalivit etc.).
2. Provide Vitamin K until the Neokay bottle runs out.
3. Continue Sytron and multivitamins until the infant receives an alternative source of iron and Vitamin D i.e. formula or weaning foods
4. Recommend continued provision of extra vitamin D throughout infancy. This is usually provided as a multivitamin such as Healthy Start Vitamin Drops
5. There are no data to support the routine use of BMF after discharge. Providing BMF after discharge may interfere with breast feeding success and no products are recommended for this purpose. There may be occasional circumstances where BMF use at home is appropriate but only if sanctioned by a neonatal consultant and/or nutrition team.
6. Sodium or phosphate supplements are not routinely needed after discharge, but occasional babies (e.g. high dose diuretics, stomas etc.) may benefit.

Vitamins for term babies

Breast fed term babies (35 weeks and above):

- Provide Vitamin K (Neokay) – see separate guidance.
- **All mothers** especially those at high risk of vitamin D insufficiency e.g. certain ethnic groups with limited sun exposure, dark skinned **should be encouraged to take vitamin supplements themselves.**
- Mothers who are at high risk (and especially those known to be Vitamin D deficient) should give their breast fed baby additional Vitamin D. Currently these are not prescribed routinely except where specific medical needs exist.

We recommend Healthy Start Children's vitamin drops throughout infancy.

www.healthystart.nhs.uk/food-and-health-tips/vitamins/

Formula fed term infants

- Do not need additional vitamin K or vitamin D on discharge but should follow standard advice from UK Health Department (see below)

“UK Health Departments recommend that all babies aged from six months onwards should be given a supplement that contains vitamins A, C and D, such as Healthy Start vitamin drops, unless they are drinking 500ml (about a pint) of infant formula a day (infant formula has vitamins added to it). You can continue to give young children a supplement containing vitamins A, C and D until they are five years old, as this will help to make sure that they are getting enough of these vitamins. This is especially important when they are learning to eat a variety of foods and if they are fussy eaters.”

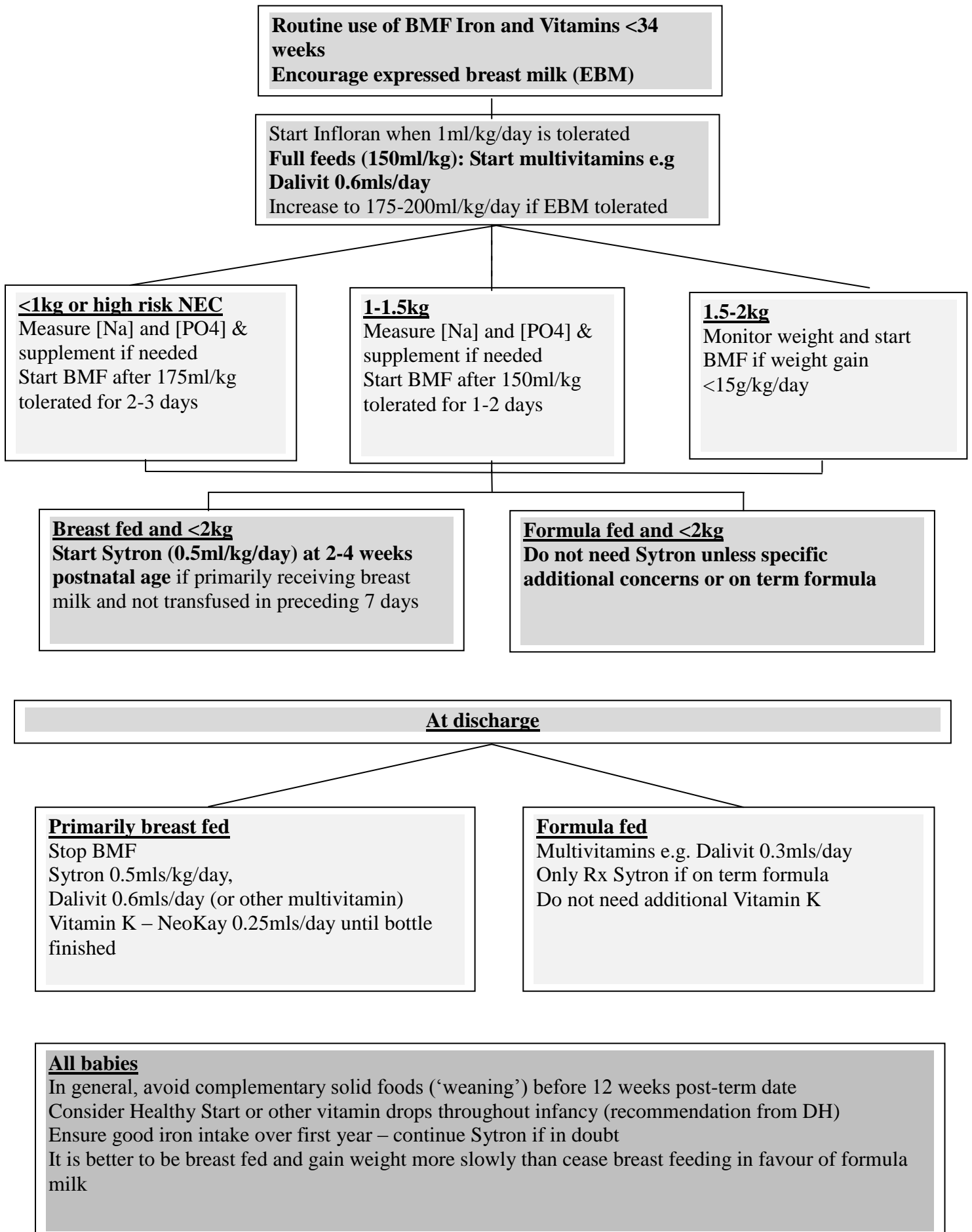
Individualising Iron supplementation & measurement of serum ferritin.

Iron is necessary to support brain growth as well as red cells. Even very preterm babies have sufficient iron stores for the first 2 weeks, but after this will need additional iron. TPN has very low levels of iron. Formula fed babies generally do not need additional iron unless the iron content of the formula is inadequate. Blood transfusions provide babies with additional iron stores, so supplemental iron will often not be needed in the first week or two after a blood transfusion. Serum ferritin (not serum iron) gives an indication of iron stores - but is also an acute phase reactant. It is **not** necessary to measure ferritin before starting routine use in breast fed babies who have not been transfused, but levels may guide practice where the need is less clear. If serum ferritin <35-50ug/L then iron supplements may need increasing (increase by 50% in first instance). If serum ferritin >300ug/L then there is either an acute inflammatory response or iron stores are replete and iron supplementation can be temporarily discontinued. It is not necessary to measure ferritin or haemoglobin levels in routine practice after hospital discharge.

Sodium and Phosphate

Checking electrolytes and providing supplements are covered in the NNS guideline 'Enteral nutrition' and further information is available from the Neonatal Formulary. However, a brief review is included here. Most preterm babies need approximately 5mmol/kg/day of sodium, more if on diuretics. Term formula (including pepti-junior) will only provide ~2mmol/day when fed at 150mls/kg. It is sensible to add Sodium 3mmol/kg/day to most babies <32 weeks gestation once full feeds are tolerated even if the last serum [Na] was 'normal' e.g. >135mmol/L. Preterm babies receiving EBM will become phosphate deplete if they do not receive supplements. Measure [PO₄] as soon as full feeds are tolerated and provide supplements if the level is <1.5-1.7mmol/L. BMF contains additional Na and PO₄ and many babies established on EBM+BMF will not require additional supplements. Be guided by blood tests but remember that serum levels may not accurately reflect total body stores i.e. babies can be Na deplete but still maintain a near normal [Na] level. Almost all babies with

intestinal stomas will need additional sodium. Urinary [Na] levels reflect body stores: a level <10-20mmol/L suggests Na depletion. Urinary levels may be difficult to interpret where diuretics are prescribed.



Information for parents and General Practitioners on hospital discharge

It is helpful to include a recommendation in the discharge letter so parents and GPs understand the rationale for supplements and whether repeat prescriptions are needed. A form of words is included below – this can be ‘pasted’ or copied into the discharge letter and/or adapted depending on specific needs for any baby still receiving breast milk:

We strongly encourage continued breast milk feeding after discharge for all infants especially those who were born preterm. However, preterm babies may benefit from additional supplements.

***IRON:** breast milk has low levels of iron. Preterm infants (but not term infants) will benefit from additional iron (e.g. Sytron 1-2.5mls/day) until they have an alternative dietary source e.g. they are receiving more than 50% formula milk, or are on appropriate amounts of solids.*

***VITAMIN K:** this helps normal blood clotting. We give an injection of Vitamin K to preterm infants when they are first admitted to SCBU. Because breast milk has quite low levels, these babies might benefit from an extra dose for a few weeks. We give NEOKAY oral drops once a day until the bottle runs out (usually after a few weeks). Babies do NOT need more vitamin K after the first few weeks at home.*

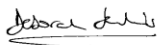
***VITAMIN D:** this helps strengthen bones and muscles. Most Vitamin D comes from sunlight exposure of the skin. National recommendations are for ALL infants to receive extra Vitamin D. We recommend continued administration of a multivitamin drop. Initially on discharge we continue the same vitamins they received in hospital (e.g. Dalivit or Abidec), but this can be changed e.g. to Sure Start Children’s Vitamin drops. Some families qualify for free vitamins. Multivitamins do not contain Vitamin K (see above).*

***STARTING SOLIDS:** we recommend supporting breast milk feeding until the infant is 6 months post due date (Term + 6 months) although we recognise this is not always possible or easy. There is no clear evidence about when it is best to start solids in infants who were born preterm, and individual advice is available from the neonatal or nursing teams. Generally, we recommend waiting until the infant is about 12 weeks after their due date, but some infants may be ready sooner, and many will be fine without solids until they are 4-6 months after their due date.*

***POST-DISCHARGE ENRICHED FORMULA:** these formula (e.g. NutriPrem2) contain extra nutrients and may be beneficial for some preterm infants who are not primarily breast milk fed on discharge. We start these prior to discharge and generally recommend them until the infants are receiving solids (e.g. at least 2 solid meals per day) or until the infant is around 6 months post-due dates.*

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