

Local Guideline



John Hunter
Children's Hospital
CHILDREN, YOUNG PEOPLE AND FAMILIES



Health
Hunter New England
Local Health District

Enteral Feeding in NICU

Sites where Local Guideline applies	Neonatal Intensive Care Unit/Special Care Unit JHCH
This Local Guideline applies to:	
1. Adults	No
2. Children up to 16 years	No
3. Neonates – less than 29 days	Yes
	Approval gained from the Children Young People and Families Network on 28 th August 2018
Target audience	All NICU clinicians caring for infants in NICU & SCN
Description	Provides guidance for clinicians to support enteral feeding using different techniques
National Standard	Standard 6 Clinical Handover

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Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:	
	<ul style="list-style-type: none"> • HNELHD PD2013_043:PCP 31 Medication Safety in HNE Health • NSW Health Policy Directive PD2017_013 Infection Prevention & Control Policy • NSW Health Policy Directive PD2017_032 Clinical Procedure Safety
Prerequisites (if required)	N/A
Local Guideline note	This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s require mandatory compliance . If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients' health record.
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PURPOSE AND RISKS

This local clinical procedure has been developed to provide instruction to the health clinician and to ensure that the risks of harm to the infant associated with enteral feeds are prevented, identified and managed.

The risks are:

- *Aspiration of milk*
- *Poor weight gain*
- *Skin damage*

The risks are minimised by:

- *Clinicians having knowledge of insertion of a gastric tube and importance of correct securement*
- *Clinicians seeking assistance if the therapy is outside their scope of practice*
- *Following the instructions set out in the clinical procedure*
- *Recognition of the common clinical signs of the risks of aspiration of milk*
- *Awareness of the normal growth parameters of infant to identify abnormal growth*

Risk Category: *Clinical Care & Patient Safety*

GLOSSARY

Acronym or Term	Definition
NG/OG	Nasogastric/Orogastric
MOM	Mother's Own Milk
PDHM	Pasteurised Donor Human Milk

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Outcomes

The goal of nutrition is to achieve as near to normal weight gain and growth as possible, keeping in mind that preterm infants in an extra uterine environment will not have the growth rates of a foetus at the same gestation due to factors such as water loss, energy expenditure and medical intervention. (Pereira-da-Silva and Virella, 2014)

It is difficult to deliver adequate calories with parenteral nutrition, so the aim should be to introduce enteral milk feeds as early as a baby can safely tolerate them.

The calorie requirement of a preterm infant averages at about 120 kcal/kg/day but this will vary between individual babies with some needing considerably more than this. The target weight gain when an infant is on full enteral feeds is between 10 and 25 grams/kg/day with an average of around 15g/kg/day. Weight gains in excess of 25g/kg/day should raise concerns about fluid retention.

Delivery of enteral nutrition via gastric tube or gastrostomy tube is indicated when oral intake is inadequate or not able to sustain adequate growth and development of the infant.

Breastfeeding is endorsed by NSW Health as the most beneficial method of feeding infants for the immediate as well as long term health outcomes of the infant and mother. When a sick or preterm infant is >32 weeks and has attained cardio-respiratory stability the introduction and establishment of sucking feeds may be commenced. When feeding is commenced consideration of the mother's expectations and plans should be recognised and documented.

What milk?

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Mother's own breast milk is the preferred feed. Pasteurised Donor Human Milk (PDHM) or "ready to use" formula may be used when infants are not receiving breast milk.

All preterm infants are to ideally receive breastmilk, preferably in the order in which it was expressed. This ensures that all infants receive the nutritional and immunological benefits of colostrum and early milk. For most infants, this milk will have been frozen.

Where mother's own milk is unavailable, PDHM may be considered as an alternative for infants <32 weeks gestation.

When should feeds be initiated?

Early trophic feeds maintain gut integrity and are encouraged for all infants, especially when EBM or PDHM is available. If unable to grade up feeds, consider bonus trophic feeds of **10-20 mL/kg/day**.

Alert! - For infants <32 weeks gestation, trophic feeds may be delayed for up to 24-48 hours if EBM or PDHM is unavailable in consultation with the Neonatologist.

How quickly should feeds be increased?

Observational studies have suggested that rapid advancement of feeds is more important than when feeds are started as a risk factor for NEC. However, the randomised trial of Rayyis et al showed no difference in NEC rate between trial arms with rapid or slow feed increases (9% vs. 13%).

Irrespective of this, several studies have shown that NEC rates in a unit are greatly reduced if a standardised feeding regimen is followed for all infants by all clinicians involved (reference).

In babies receiving total fluid volume via enteral feeding:

As a guide, feeds should be increased as shown:

- Day 1- 60 mls/kg
- Day 2- 80 mls/kg
- Day 3- 100 mls/kg
- Day 4- 120 mls/kg
- Day 5- 140 mls/kg
- Day 6- 160 mls/kg
- Day 7- and beyond – as per MO's order

This is a guide only and the final decision on feed volumes for each infant will be made by the medical officer taking into consideration the infant's clinical need.

Alert! – Special Considerations

- Once an infant is tolerating 80ml/kg/day, IV medication orders are changed to oral.
- Once an infant is tolerating 120ml/kg/day of feeds, consideration should be given to removal of all vascular devices. If vascular devices are not removed, the reasons must be documented in the patient record.
- Once an infant is tolerating 120ml/kg/day of feeds, appropriate fortification (HMF/preterm formula) should be commenced.

Generally, enteral fluid volumes >10-20 mL/kg/day are included in *the total fluid intake for the day*. When attempting to determine how best to advance a preterm infant to full enteral nutrition, there is very limited data to support any one method as optimal. The following suggested guidelines reflect current practice.

Suggested Guidelines for advancing Enteral Feed volumes (Cloherty, Eichenwald, Hansen & Stark, 2012)

Birth weight (g)	Initial rate (mL/kg/day)	Volume increase (mL/kg every 12 hours)
< 1,000 grams	10	10
1,001 to 1,250 grams	10-20	10
1,251 to 1,500 grams	20-30	10-15
1,501 to 1,800 grams	30	15
1,801 to 2500 grams	30-40	15-20

- The initial feed volume should be administered for at least 24 hours prior to advancement.
- The guidelines should be individualised based on infant's clinical status / history of illness.
- Once feed volume has reached approx. 80mL/kg/day, infants weighing >1,250 grams should be considered for feeding intervals of every 2 hours
- Feeding volumes may be advanced more rapidly than above guidelines once > 100 mL/kg/day is established, for infants weighing >1,500 grams.
- The recommended volume goal for feeding is 140-160mL/kg/day. These guidelines do not apply to infants capable of *demand* feedings.

Gastric Residuals

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Gastric residuals, defined as a full tube aspiration every 6 hours, offer no correlation to enteral nutrition outcomes and assume that this measurement is valid and reliable. It is known that when an infant is placed supine or left lateral, gastric residuals are increased, and when an infant is placed prone or right lateral, gastric residuals are decreased. It is also known that larger bore gastric tubes will aspirate 2-3 times more than smaller tubes. (Seattle Children's Hospital Research Foundation, 2016)

Further, aspiration is not a valid indicator of gastric content volume (Parker et al, 2015) and may cause damage to the mucosa (Kumar et al, 2017) Given that the gastric tube may be situated next to the mucosal wall, the risk of damage with several aspirations per day is high.

Evidence also suggests that routine gastric residual aspiration may delay attainment of full feeds by up to 6 days. (Torazza et al, 2014) Such delays can be associated with adverse neurodevelopmental outcomes in premature infants.

By attaining full feeds more rapidly, the number of central line days is also reduced, potentially reducing the risk of infection. (Morton et al, 2017)

Alert! - Gastric residuals

- **Performing 6 hourly full gastric residual aspiration is no longer recommended as routine practice.**
- **Where there are other clinical signs or symptoms of feed intolerance or GI surgery considerations, gastric residuals should be attended to PRN.**
- **Aspiration of air from OGT of infant on CPAP should continue.**

Signs of Feed Intolerance[top](#)**Bilious Aspirate**

Bile can be a sign of a poorly positioned feeding tube, an ileus or obstruction and therefore should be investigated. However, green-coloured aspirates are not associated with any increase in NEC in the absence of any other clinical manifestation. (Mihatsch et al, 2002) For bile vomiting, feeds may be stopped for 24 hours and should this worsen, there may be investigation for infection required. The decision whether the feeds should be *ceased OR continued but not upgraded* will be at the discretion of the MO.

Vomiting

Vomiting may be the result of an over distended stomach, poorly positioned feeding tube, reflux, or may be more sinister – infection, obstruction or other disorders and significant vomiting should always prompt a clinical review.

Abdominal distension

Distension with or without visible loops can be due to poor gastric motility, ileus, constipation or 'gas'. If the abdomen remains soft and/or non-tender it may resolve with prone positioning. A tense abdomen with or without visible loops of bowel is abnormal and requires investigation for obstruction, infection or NEC.

Feed intolerance management

Deciding whether feeds should be continued, reduced or stopped is at the discretion of the MO. Feeds are usually stopped if there is significant vomiting and/or abdominal distension, abdominal tenderness or discoloration and/or blood in the stools. Investigations should be carried out and an re-assessment on enteral feeds made after 24 hours. Feeds can generally be restarted when the infant has stabilised and has had a 12-24-hour absence of any significant clinical signs of feed intolerance and after consultation with the medical officer.

How do I increase feeds?[top](#)

When increasing total fluid requirement, the feeds should be graded in increments according to size and gestation of the infant, as well as level of tolerance.

How do I grade feeds from hourly to 2nd hourly, 2nd hourly to 3rd hourly etc?

When grading up the time between each feed, the feeds should be immediately graded in increments according to the size and gestation of the infant.

What do I do when the order is to grade up in TFR AND feed spacing?

Firstly, grade up the TFR, and then attend to the spacing of the feed times. That way, the neonate will have the TFR as is ordered before adjusting the feed times.

What do I do when I have to grade up feeds and reduce IV therapy?

Work out the TFR, and check that the IV is set accordingly. Introduce gastric or oral feeds as ordered –eg hourly or second hourly – and then reduce your IV by the amount of feed you have given. The amount may vary depending on the infant's clinical condition. Every 6 hours, or as directed by medical officer, continue to grade up feeds and reduce IV, until on full oral feeds and the IV can be ceased.

How do I grade from tube feeds to sucking feeds?

The decision to commence sucking feeds (breast or bottle) will be made by the MO according to gestation, and clinical condition. Sucking feeds will be started at intervals such as once or twice daily and then the infant's sucking ability and completion of feeding will be reassessed. Increasing sucking feeds thereafter will be as the infant is able.

Sucking feeds on respiratory support?

As per NICU protocol, individual infants may be able to breastfeed or bottle-feed when on HHHFNC with temporary reduction of gas flow rates to 2L/min after consultation with the MO.

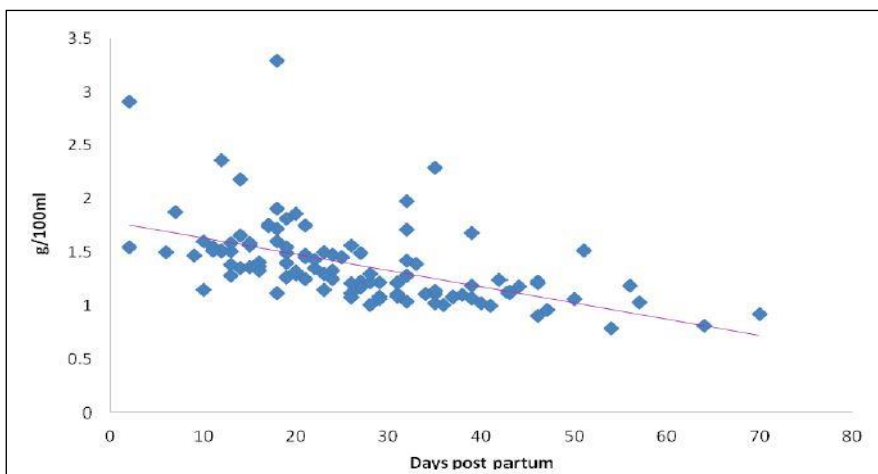
Hypoglycaemia[top](#)

Refer to: [Clinical Guideline on Management of Hypoglycaemia JHCH_NICU_16.01](#).

Fortifying Feeds[top](#)

While human milk is the preferred feed for all infants, preterm infants may need it to be fortified for optimal growth and development. This is because the protein content of EBM decreases as the days post-partum increase – see below.

Once an infant is tolerating 120ml/kg/day of feeds, appropriate fortification (HMF/preterm formula) should be commenced.



Protein concentration of EBM in g/100ml according to time post-partum (Reid, 2014)

Commercial fortifiers are predominantly a protein and mineral supplement, typically containing additional calories, electrolytes and vitamins.

NICU JHCH has elected to use FM85® human milk fortifier. This is a 100% partially hydrolysed, cow’s milk derived whey protein. Standard preparation is one sachet to 25ml EBM or PDHM and is stable in milk for no more than 4 hours

The decision to cease fortifier is made when any of the following points are reached:

- 36 weeks corrected gestation
- Adequate and appropriate weight gain

Those infants who need ongoing calorie supplementation at discharge will be managed by the dietician and may be transitioned onto a more appropriate product for home use.

Enteral feeding methods

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There are 3 methods of enteral feeding commonly used in this NICU:

Tube feeding	Breastfeeding	Bottle feeding
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Tube feeding

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Orogastric (OG) and nasogastric (NG) tubes are frequently used for the management of infants who require nutritional support, decompression of the gastrointestinal tract (GIT), diagnosis and assessment and/ or medication administration.

Oro-gastric or nasogastric tube?

OG tubes are to be used for infants:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Requiring respiratory support i.e. CPAP, ventilation or nasal cannula oxygen; • Showing any signs of respiratory distress; | <ul style="list-style-type: none"> • Choanal atresia • Cleft lip and palate; and, • ELBW (Infants <1000g at birth) |
|---|--|

NG tubes can be used for all other infants.

What size tube?

<p>Size 8FG feeding tubes are to be used for infants:</p> <ul style="list-style-type: none"> • receiving respiratory support • requiring gut decompression • nil by mouth 	<p>Size 6FG feeding tubes are to be used for infants:</p> <ul style="list-style-type: none"> • requiring no respiratory support.
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The benefits of using smaller feeding tubes, particularly nasogastric tubes, include decreased nasal inflammation, throat irritation, pressure necrosis, pulmonary compromise, and interference with gastro-oesophageal sphincter function (Premji, 2005).

Transpyloric tubes

Occasionally, infants will require the insertion of a transpyloric tube – e.g. duodenal atresia & post-operative, severe reflux or poor weight gain. Transpyloric tubes are inserted by a Medical Officer or Nurse Practitioner.

Complications of Enteral Tubes

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- Aspiration
- Difficulty with tube placement
- Perforation of the gut
- Malabsorption

Alert! - Please note – Trans-pyloric feeding may induce symptoms of malabsorption because the stomach is not able to aid in digestion e.g. frequent bowel motion, slow weight gain, necrotising enterocolitis. Consider where each medication is absorbed prior to administration (i.e. stomach or small intestines).

Indwelling or intermittent tube?

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OG or NG feeding tubes can be left in indwelling or inserted for each feed with removal upon completion of the feed. An indwelling gastric feeding tube is generally recommended. There is some evidence, however, that indicates indwelling gastric tubes are a source of bacterial colonization (Petersen et al, 2016). Unit recommendation is to change the enteral tubes on bath days if not required sooner.

Use indwelling gastric tubes for infants:

- Requiring gastric decompression eg: CPAP
- On continuous feeds
- On hourly or two hourly feeds
- Indwelling NG tubes can be used for infants on three hourly feeds when establishing sucking feeds and no respiratory compromise is present.

Intermittent gastric tubes can be used for infants:

- Requiring CPAP who are 'fighting' the OGT (see CPAP CPG)
- On three hourly feeds via OG tube or NG tube;
- Requiring only occasional tube feeds.

Refer to Appendix A for tube insertion technique

Continuous feeds

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Infants in NICU who require long-term continuous enteral feeding to achieve optimal nutrition for growth and development will require the use of a pump for feed delivery (see Appendix C).

The use of continuous feeds can preclude the infant from the opportunity to practice sucking and swallowing or to experience normal hunger and satiation cycles. Infants can demonstrate aversion to oral feeds such as averting the head, tongue thrust, gagging and vomiting. Infants at risk of oral feeding aversion should be provided with regular oral stimulation based on the infant's developmental age. Providing opportunities for non-nutritive sucking on a pacifier during continuous tube feeding may encourage the use of oral musculature.

Checking tube position using pH strips?

Only the following tests are recommended to confirm gastric tube placement in appropriate position:

- pH indicator strip of pH 5.5 or below within 10-15 seconds;
- X-ray – although x-ray is the gold standard to confirm tube placement it is not routinely used due to cost and radiation exposure. However gastric tube position should always be noted if the infant is being x-rayed for other reasons. (NHS NPSA Patient Safety Alert 05).

Alert! - The following is not recommended as a method to confirm gastric tube placement:

- The 'Woosh' test i.e. injecting air down gastric tube and listening is not to be used as a method of confirming position, however it can be used to dislodge the exit-port of the feeding tube from the gastric mucosa. (NHS NPSA Patient Safety Alert 05).

Consider the possible factors that may contribute to a high gastric pH (pH6 or above):

- The presence of amniotic fluid in an infant less than 48 hours old;
- Infants on continuous, hourly or second hourly feeds;
- Medications to reduce or alter stomach acid; e.g. Ranitidine, Omeprazole
- Presence of medication or milk left in feeding tube; or blood-stained aspirate.
- Some infants with none of the above will consistently have pH values of 6 or above.

Senior medical advice should be sought and documented on possible actions.

Suck Feeding Readiness

To orally feed, infants must be able to sustain awake behaviour, coordinate sucking, swallowing and breathing, and maintain cardiorespiratory stability for the time required to ingest a caloric volume adequate for growth. Suck feed readiness is determined by the healthcare team looking after the infant once the infant is > 32 weeks corrected gestational age (cGA) and cardiorespiratory stability has been achieved.

It may be helpful to examine the pre-feed behaviours displayed by the infant to determine readiness for sucking feeding. Signs of readiness to suck may include:

- Sucking on a feeding tube or pacifier
- Rooting reflex
- Swallowing own saliva
- Fist in mouth
- "Fighting" gavage feed

It may also be helpful to perform a full readiness assessment using a tool such as the Preterm Oral Feeding Readiness Assessment Scale (POFRAS, 2007 cited by Fujinaga Cl. et.al 2013) prior to completing routine cares to help determine absolute readiness. Such an individualised assessment has also been suggested as the best way to promote consistency in identifying readiness to feed (Cochrane, 2012)

Preterm Oral Feeding Readiness Assessment Scale 2007

Score	Cues
1	Drowsy, alert or fussy prior to care. Rooting and/or hands to mouth/takes pacifier. Good tone
2	Drowsy or alert once handled. Some rooting or takes pacifier. Adequate tone
3	Briefly alert with care. No hunger behaviours. No change in tone.
4	Sleeping throughout care. No hunger cues. No change in tone.
5	Needs increased O2 with care. Apnoea and/or bradycardia and/or tachypnoea over baseline with care.

(Pofras, 2007 cited in Fujinaga et al ,2013)

The score may be recorded prior to each feed to provide documentation as to the infant's overall behavioural readiness for sucking feeds. The cumulative scores may show progress and indicate an appropriate time to commence sucking feeds, or when to increase the number of sucking feeds per day.

Breastfeeding

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Benefits

Breastfeeding has a range of established benefits for both mothers and infants. These benefits include effects on infant and maternal health as well as mother-infant bonding.

Establishing Breastfeeding – see Appendix D

Mothers of both term and preterm infants need support and advice to successfully establish breastfeeding.

The process of successfully establishing breastfeeding is more complex in the case of preterm or LBW infants. The psychological challenge of establishing breastfeeding given the extra stress and difficulties of having a preterm infant cannot be overestimated.

Mothers of preterm babies need to be supported and encouraged to breastfeed, as well as educated about the importance of breastfeeding as well as the reality that establishment of breastfeeding is a complex and sometimes difficult process.

It has been suggested that skin-to-skin contact has a range of benefits for infants, both on establishing breastfeeding and other physiological outcomes. “Kangaroo care” may assist establishment of breastfeeding in several different ways. As the NHMRC guidelines state — *Close mother–child contact immediately after birth helps to establish lactation, and frequent suckling or feeding on demand helps to maintain it.*

Demand or Schedule Feeding?

Infants aged ≥ 35 weeks who meet the criteria for sucking feeds should usually be demand-fed, if the mother agrees, with consideration given to the infant's blood sugar, sucking ability and weight gain.

Infants aged < 35 weeks will not necessarily display hunger cues and should therefore be schedule-fed. Demand feeding may be considered for infants in this age group who meet the criteria for sucking feeds, display hunger cues, and are otherwise stable and well.

An interval should be set after which an infant will be fed if they have not demonstrated hunger cues. This interval should not usually be more than 5 hours in infants and considered for babies receiving > 4 suck feeds without need for tube top up and/or term infants getting ready for discharge aged < 36 weeks, . Longer intervals may be set for older infants.

Rate of introduction and advancement of breastfeeds?

No research evidence has been identified which determines the most effective protocol for introducing or advancing breastfeeds. Consensus is that infants < 35 weeks who demonstrate feeding cues may be offered a sucking feed in partnership with the treating team. These infants often have less well-developed sucking skills, and so their progress should be monitored and their success assessed after each feed. An infant who is scheduled to receive a tube feed and is displaying feeding cues, should be offered a breastfeed in preference to the tube feed if the mother is available.

Advancement of breastfeeding

In an infant being introduced to breastfeeding, the need for additional feed to be provided as a 'top-up' after a breastfeed should be decided in consultation with the mother, on the basis of the infant's weight record, gestation and the success of the feed. For premature infants, the Premature Infant Breastfeeding Behaviour Scale (PIBBS) (appendix D) may be useful in determining the success.

Supplementary or 'top-up' feeding methods

Mothers who wish to exclusively breastfeed

If the mother is aiming to fully breastfeed her infant, but is unable to be present for all feeds, then a decision needs to be made about what method of supplementary feeding will be used. Potential feeding methods include bottle, or tube feeding. Infants being introduced to breastfeeds whose mothers wish to exclusively breastfeed should have any supplementary feeds provided by **tube**.

Mothers who do not wish to exclusively breastfeed

If the mother is not aiming to exclusively breastfeed her infant, and her infant is having some breastfeeds, it may be appropriate to replace remaining tube feeds with bottle feeds with the mother's permission. There is some concern that using bottle feeds as an adjunct to breastfeeding may reduce the likelihood of maintaining even partial breastfeeding, however no evidence has

been found to support this. If the mother wishes to primarily (but not exclusively) breastfeed her infant, bottle feeds should not be introduced until breastfeeding is well established and the infant is >35 weeks old.

Breastfeeding tools - Nipple Shield

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Due to physiologic immaturities, the premature infant has difficulty in generating adequate suction pressures required for successful breastfeeding. Baseline sucking pressures throughout a breastfeed are normally -50 to -60 mm Hg (during pauses) in term infants. These are significantly less in preterm infants and may not develop fully until approximately term, corrected age.

Although positioning techniques can help compensate for the relative weight of the head and the immature suction pressures, many premature infants demonstrate greater milk transfer (18.4 ml vs. 3.9 ml) when feeding with an ultra-thin nipple shield. Various studies have shown the benefits of using a nipple shield including sustained better weight gain and significant maternal satisfaction from its use.

Nipple shields can be used in a variety of different situations and for varying medical conditions (as well as prematurity) and these should be discussed with a Lactation Consultant prior to use to ensure that a nipple shield is the most appropriate solution for each individual mother.

Fitting a shield



Once the decision to initiate use of a shield has been made, each mother needs education and support to help them use the shield for the first few times. The shield should be placed over the breast so that the nipple fits into the nipple chamber of the shield. Position the shield so that the cut-out area is over the part of the breast where the baby's nose will be. Sterile water can be used to help the shield stay against the mother's skin.

Bottle feeding – Initiation – see Appendix D

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- The parents should be aware and have given verbal consent for the infant to be bottle-fed and this should be documented in the notes. Parents are required also to give written consent for PDHM, and artificial feed, to be given to the infant-document appropriately
- Consideration of bottle feed times to suit the parent's availability in the nursery enables them to be actively involved in their infant's care. Feeding is an excellent way to involve parents in their infant's care.
- The infant will usually be around 34 weeks and have readiness for oral feeds assessed by neonatologist and the clinical team before commencing bottle feeds. An infant <34 weeks gestation has a decreased ability to co-ordinate the breathe/suck/swallow process and may put the infant at risk of aspiration.

Interventions to facilitate bottle feeding success

1. Kangaroo care before bottle feeding may increase alertness and transition to quieter states
2. Non-nutritive sucking prior to a bottle feed can increase alertness during a feed by calming the infant
3. Swaddling the infant, with hands towards the midline and exposed
4. Teat – it is important to select the appropriate teat to suit the infant –
The teat needs to fit the size and shape of the mouth. Smaller babies may need a small or short teat to decrease the risk of gagging and refusal.

Vitamin and Mineral Supplementation

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Pentavite

Infants born <35 weeks gestation or <2kg on full feeds require *Pentavite* until 6 months corrected to help meet their requirement for micronutrients. Commence at 14 days.

Ferrous Sulphate: All preterm infants <1.8kg, term infants 1800g-2500g and ex-preterm infants not tolerating feeds of 180mL/kg/day with iron containing fortifier or formula require an iron supplement as determined by the MO. These infants will be on on full unfortified feeds (\pm breastfeeds) and to continue on Ferrous Sulphate until 6 months corrected. Commence at 14 days.

NOTE: Iron supplements are NOT required for infants receiving fortified EBM

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APPENDICES:

- Appendix A. Tube insertion & feeding procedure
- Appendix B. Preparing to feed with a gastric tube
- Appendix C. Continuous Feed Pumps Breastfeeding Procedure
- Appendix D. Breastfeeding Procedure
- Appendix E. Bottle feeding procedure

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Staff Preparation

It is mandatory for staff to follow relevant: “Five moments of hand hygiene”, infection control, moving safely/safe manual handling, documentation practices and to use HAIDET for patient/carer communication: **H**and hygiene **A**cknowledge, **I**ntroduce, **D**uration, **E**xplanation, **T**hank you or closing comment.

Implementation, monitoring compliance and audit

1. Approved clinical guideline will be uploaded to the PPG and communication of updated ‘Enteral Feeding in NICU’ clinical guideline to NICU staff will be via email and message on the HUB.
2. All new grad staff will complete the ‘NICU insertion of a gastric tube competency Assessment Tool’ and recorded on HETI
3. Incident investigations associated with this Guideline and Procedure will include a review of process.
4. The Guideline and Procedure will be amended in line with the recommendations.
5. The person or leadership team who has approved the Guideline and Procedure is responsible for ensuring timely and effective review of the Guideline and Procedure.
6. Evaluation will include a review of the most current evidence as well as a consideration of the experience of Neonatal staff at JHCH in the implementation of the Guideline and Procedure.

Feedback

Any feedback on this document should be sent to the Contact Officer listed on the front page.

Appendix A. - Tube insertion procedure

- Always measure the length of the tube needed for insertion.
- In infants having NG or OG tubes inserted there is only low quality evidence to evaluate which method of tube placement is most accurate (Turner, 2006).
- The length of the inserted tube should be equal to the distance from the bridge of the nose to the earlobe, and earlobe to a point halfway between the xyphoid process (the lower tip of the sternum) and the umbilicus (Anderson, Wood, Keller & Hay, 2006; NRP, 2006).
- Note the cm mark at this point on the tube. Indwelling gastric tube should be taped securely to face leaving cm mark visible. Measurement should be recorded on observation chart at time of insertion and thereafter confirmed and recorded every shift.

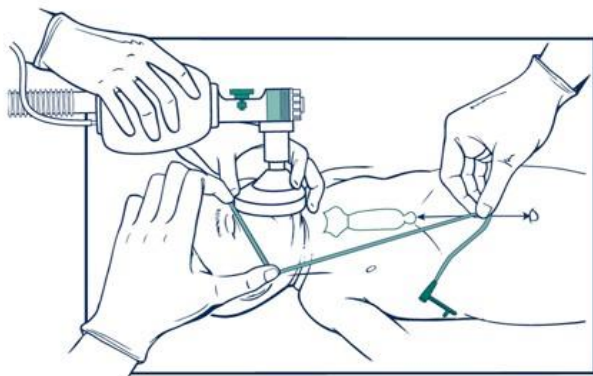


Fig 1: Measurement for placement of OG tube (NRP, 2006).

- Indwelling gastric tubes can be secured to the Neobar® if the infant is ventilated.
- Change short-term PVC feeding tubes every bath day i.e. every 48 hours.
- Occasionally an infant will have a long-term silastic feeding tube inserted-these should be changed every 4 weeks.
- Indwelling gastric tubes may be left insitu longer if specifically requested by the surgical team.

Examples of taping for NGT or OGT.



O/G
elastoplast- cut
H shape and
secure



N/G -trouser
leg with
elastoplast

Appendix B - Preparing to feed with a gastric tube

[top](#)

Equipment:

- Appropriate size feeding tube, with green enteral feed label including infant's MRN to assist with the checking and administration of feeds. The sticker should be checked against ID bands by 2 RN'S prior to placing on gastric tube.
- Appropriate size syringe for method of feeding
- Appropriate feed – checked by 2 RN's and signed if EBM is being used.

Procedure:

- Identify infant
- Check fluid chart for type, frequency, volume of feed required and administration route/method. Calculate milk volume according to current weight and mls/kg/day.
- Check observation chart for route/method, time and tolerance to last feed.
- **Check expressed breast milk with 2 RN's at the bedside and check the label on the NG/OG tube to confirm the identity.**
- Warm the milk using bedside milk warmer.
- Review measurement of tube against recording on observation chart
- Ensure tube is taped securely
- If initially unable to check position by aspirate, inject 0.5-1ml air and repeat aspirate.
- Observe infant colour, H/R and RR during the procedure: cease if cyanosis, bradycardia or vomiting occurs. Observe infant receiving feed at all times during the feed.
- Record feed, method, and pH aspirate on infant's observation chart.
- All indwelling gastric tubes are changed on bath days.

Parental Support

- Feeding is an excellent way to involve parents in their infant's care;
- During tube feeds parents can be encouraged to hold their infant and / or to support a pacifier to encourage non-nutritive sucking.
- Holding the feeding tube remains the responsibility of the nurse administering the feed, however, parents may hold the syringe of milk.
- The bedside nurse should provide education and explanation of feeding practices to parents.

Appendix C – Continuous Feeds/Pumps

[top](#)


The *Kangaroo Pump* should be set up as per instructions located on right hand side of pump. The pump requires 15 ml to prime the tubing –for this reason, only larger volumes of continuous feeds are put through the *Kangaroo pump*. No more than 2 hrs volume of EBM / formula should be placed in the plastic volume bag. Dial up required hourly rate and set volume to be infused over 2 hrs. Ice brick is not required for use in NICU.

after each bag change.



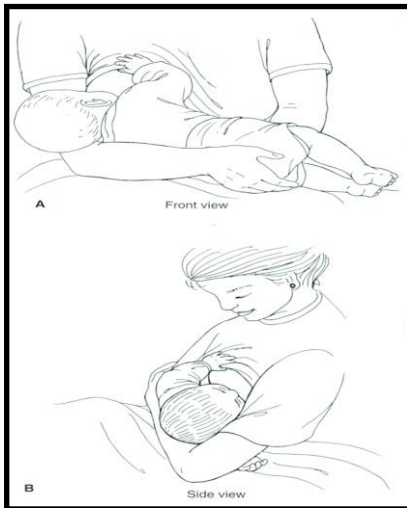
The *NeoThrive* enteral pump is orange in colour to eliminate any potential cross-use between common IV pumps, ensuring safe delivery of enteral fluids. This pump is generally used for smaller volumes delivered continuously, as it only requires 1 ml to prime.

Appendix D - Breastfeeding Procedure

Skin-to-skin contact and kangaroo care have been suggested as methods of supporting establishment of breastfeeding in preterm infants. It may be useful to begin the breastfeed with skin-to-skin contact.

When being breast-fed, the infant should be held unwrapped in a side-lying position, close to the mother's chest. In a —chest-to-chest, chin-to-breast arrangement, the infant's neck will be slightly extended.

There are a variety of positions that can be used –



Cradle or Madonna hold

The infant lies across the mother's forearm on the side that the mother will be using for feeding. The head is resting near the crook of the elbow. The mother holds the infant's buttocks with her hand. The infant's lower arm can be placed around the mother's back or tucked down along next to his body. The infant's legs are wrapped her waist. She supports her breast with her free hand. When the infant seeks the breast with the widest open mouth, she scoops the infant up to the breast using the supporting arm.



Cross Cradle Hold

The infant lies across the forearm of the opposite arm from the breast being used for the feed. The mother's fingers are around the neck supporting the head.

The cross cradle hold should be slightly lower than the nipple. One of the infant's arms is around the mother's body against her rib cage and the other above the breast. The breast is supported with the hand on the same side.

Football Hold

The mother sits upright with a pillow at her side on which to support the infant, who lies turned toward her, flexed and tucked close to her body, feet facing backward. It may be necessary to adjust pillows at the mother's back to make room for the infant's lower body. The infant's arms can be placed across his chest or around the breast. With the mother's arm on the outside of the

infant, she supports the head and neck in her hand and brings them to the breast.

When an infant has successfully attached, the following signs are evident -

- their chin touches the breast
- nose is not blocked
- mouth is wide open
- cheeks are round and full
- lips are splayed out
- tongue is forward over the lower gum
- mouth covers much of the areola particularly on the 'chin side'.

Assessing attachment can be difficult. Where clinicians are unsure, they should check with an experienced clinician.

Assessing effectiveness of sucking

Preterm infants may not always suck with adequate strength or coordination to receive enough milk during a breastfeed. Effective sucking is characterised by a rhythmic alternation of suction and expression/compression (with visible working of jaw muscles) with swallowing and breathing for a period of several minutes. This pattern of sucking and ability to maintain sucking without fatigue may develop over time as the infant has more experience in breastfeeding.

Assessing effectiveness of sucking can be difficult and it is agreed that where clinicians were unsure they should check with an experienced clinician. A tool such as the PIBBS – the Premature Infant Breastfeeding Behaviour Scale – can be helpful in making a formal assessment of each feed attempt. (see below)

During early breastfeeding attempts, little milk is likely to be transferred and the emphasis should be on supporting mothers and infants to have a positive experience as these oral feeding opportunities are important in establishing breastfeeding.

The Preterm Infant Breastfeeding Behaviour Scale (PIBBS) 1999

Scale Item	Maturational Step	Score
Rooting	Did not root	0
	Showed some rooting behaviour	1
	Showed obvious rooting behavior	2
Areolar Grasp	None, only mouth touched nipple	0
	Part of nipple	1
	Whole nipple, not areola	2
	Whole nipple, some of areola	3
Latch	Did not latch at all	0
	Latched on for ≤ 5 min	1
	Latched on for 6-10 min	2
	Latched on for ≥ 11-15 min	3
Sucking	No sucking or licking	0
	Licking & tasting, but no suck	1
	Single sucks, occasional short bursts (2-9 sucks)	2
	Repeated short sucking bursts (≥ 10 sucks)	3
	Repeated (≥ 2) long sucking bursts	4
Longest sucking burst	1-5 consecutive sucks	1
	6-10 consecutive sucks	2
	11-15 consecutive sucks	3
	16-20 consecutive sucks	4
	21-25 consecutive sucks	5
	≥ 26-30 consecutive sucks	6
Swallowing	Swallowing not noticed	0
	Occasional swallowing noticed	1
	Repeated swallowing noticed	2
	Total Score	

Studies have demonstrated that the PIBBS, when used by trained lactation specialists, is a reliable instrument for evaluating preterm infants' breastfeeding behaviours, although may not accurately predict the *volume* of milk intake consumed by the preterm infant.

The PIBBS can identify specific BF problems as it assesses the feed from start to finish. Reliability of the tool has been measured as good between health professionals.

Designed for **premature** infants & neonates in hospital settings, the PIBBS may not be useful once the infant has been discharged.

Appendix E - Bottle feeding procedure

- If giving expressed breast milk please refer to “Dispensing and Checking Expressed Breast Milk Prior to Feed” CPG (5-5.2.13) Ensure the infant is correctly identified, and the EBM / artificial feed are ordered by the MO on the fluid chart. Draw up milk by syringe, and empty into a sterile bottle. A suitable sterile cap and teat is used and the bottle is then placed in the infant’s bedside warmer.
- If the infant requires oral medications these should be administered with a small amount of milk in a teat prior to the feed. **Never** add medications to a bottle of expressed breast milk or artificial feed as it is difficult to ensure the correct dose has been given.
- If giving EBM, universal precautions must be observed throughout. Gloves and PPE are required.
- Some infants require extra calories or thickening agents added to milk. Note: this may thicken the milk significantly and increase the workload of sucking required.
- Sit in a comfortable quiet position away from distractions holding infant in the crook of the arm, or cradling the head while resting on your lap – see pic below. Place a bib under the infants chin.



- Make eye contact with infant and “talk” with the infant as you stimulate the corner of the mouth with the teat to stimulate the rooting reflex and to let the infant know you are about to start the feed.
- As the infant opens his/her mouth in response to the stimulation, gently introduce the teat over the top of the tongue, ensuring bottle is inverted sufficiently to keep teat full of milk and not air.
- Observe start time of feed- length of feeding time should be determined by frequency of feeds and should not exceed 45 minutes.
- Observe that the teat is far enough in the infant’s mouth to be able to grasp with the tongue and suck.
- Observe that the infant is ‘comfortable’ during feed, and maintaining vital signs within normal limits. Discontinue feed and rest infant if distressed or not coping at any time. Stress behaviors, such as changes in RR or HR, decreased oxygen saturation, colour change, gagging, choking, vomiting, or fatigue are cues to pause for a rest period or end the feed. If the infant becomes apnoeic / bradycardic and desaturates, steps for active resuscitation need to be considered.
- Observe infant for excessive ‘spilling’ of feed, which indicates infant is not managing flow and may need a ‘slower’ teat, if a slower teat does not improve ‘spilling’, check again that infants suck – swallow sequence is effective.



- Give infant opportunity to ‘burp’ or expel ingested air approximately half way through the feed or if tiring. Sit the infant up straight and lift the chin to ‘the sniffing’ position. Hold this position for a minute or two.

- Change arms - move baby into your other arm during feed – this stimulates the infant's eyesight and ability to focus
- Do not force infant to complete feed volume. Measure the residual and if volume remaining is greater than 1/4 of feed, consult with MO to determine if remainder needs to be given by gastric tube. Document volumes taken by bottle/gastric tube on the baby's observation chart. If the baby is repeatedly not taking a full feed, consultation with the medical staff is required- have available weight charts and observation charts for viewing.
- Advise parents of infants being bottle fed to never "prop feed" – SIDS risk may be likely if the infant is unsupervised.
- Speech Pathology services are available for all infants that are having difficulty bottle feeding. A referral is required from a Neonatologist.