# ENTERAL FEEDING TUBES AND THE ADMINISTRATION OF ENTERAL NUTRITION

## PRACTICE GUIDELINE ©

## DOCUMENT SUMMARY/KEY POINTS

- Gastrostomy Care is not included in this document. At CHW, refer to Gastrostomy Management Procedure.
- Feeding tube placement and removal must be the decision of the treating Physician and documentation of this decision is to be completed in the clinical record.
- All registered nurses placing Nasogastric, Transpyloric (Nasojejunal) and Orogastric tubes require training and a demonstration of safety and competence.
- Nasogastric and Orogastric tubes must have placement checked with every insertion or intervention or if on continuous feeds every 6 hours when flushed. Position should also be reconfirmed if the patient experiences episodes of vomiting or coughing.
- Tube placement, using pH indicator strips, is confirmed with a pH reading less than or equal to 5.
- If there are any concerns about correct feeding tube placement, DO NOT USE FEEDING TUBE. An x-ray must be attended to determine position of tube and reviewed and confirmed by medical officer.
- Syringes equal to or greater than 20mLs should be used to aspirate any naso/orogastric tube.
- Oral/ Enteral syringes should be used to administer medication or flushes.
- Transpyloric tube (TPT)/Nasojejunal tube (NJT) insertion is requested by the medical officer and placement is always confirmed via radiology. All TPT feeds must be delivered continuously via a pump. Transpyloric tubes must be flushed with sterile water





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| **Team Leader:** | CNC | **Area/Dept**: Gastroenterology |

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every 4- 6 hours.

- Transpyloric tubes (TPT) can be placed at the bedside in all ward areas by any registered nurse who has proven competence with nasogastric tube insertion.
- See Section 1.1, for children with bulbar palsy, absent gag reflex, oesophageal varices, suspected base of skull fracture or mucositis.
- All enteral feeding sets and feeding bags must be discarded and a new one is to be used in accordance with each sites current policy.

# CHANGE SUMMARY

- Medical decision making algorithm
- Surgical referral for a gastrostomy should be considered in patients requiring a NGT for longer than 12 weeks.
- Consultant medical staff to identify the need for Transpyloric tubeTPT/ placement versus nasogastric tube placement, and suitability of patient for bedside placement of TPT
- Measurement of NG tube length changed to reflect evidence – measure to mid-way between xiphoid process and umbilicus.
- Guidelines on continuous NG feeds at home
- Reference to Salem Sump nasogastric tubes (CHW) have been removed from this document as their use is no longer relevant
- Children on tube feeds requiring proton pump inhibitors PPIs, require a liquid or dissolvable form.
- Clear instruction on Nasogastric and TPplacement, now in Appendix 2
- Inclusion of dietetic and formula information as Appendix 4
- Discharge checklist now in Appendix 5

# READ ACKNOWLEDGEMENT

- All clinical staff who are responsible for decision making regarding the insertion, use and management of nasogastric or transplyorictubes
- The following staff are required to read and acknowledge they understand the contents of this document:
  - All Nursing staff working in clinical areas
  - All Medical staff working in clinical areas
  - All Dietetic staff
  - All Speech Pathology staff

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

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# 1 Introduction

Children who have feeding difficulties can be safely fed via a tube. Tubes can be placed temporarily via the nasogastric, orogastric, or transplyoric routes or more permanently via a gastrostomy or jejunostomy. The route of administration of enteral feeding will depend on the child's current clinical condition, prognosis and ability to tolerate feeds. Feeds can be delivered by gravity bolus or continuous/intermittent infusion using an enteral feeding pump. An individualised feeding plan must be developed and managed in conjunction with the multidisciplinary team. Feeding regimes are individualised to meet the needs of the child and their family/carers and the chosen route of administration.[1]

The insertion of feeding tubes is not without risk[2] and the recognition of displacement or misplaced tubes is essential to ensuring the infant/child's safety. Therefore only experienced nursing or medical staff should manage feeding tubes.

***Related information***

- Parenteral Nutrition Practice Guideline
- Gastrostomy Practice Guideline and Gastrostomy Homecare Guideline
- Re-feeding Practice Guideline
- Hand Hygiene Policy
- Standard Aseptic Technique Procedure

## 1.1 Contraindications for Enteral Feeding

Enteral Feeding *may* be contraindicated if there is:

- Complete bowel obstruction
- Intractable vomiting/diarrhoea (*Consider consultation with Gastroenterology)*
- Inaccessibility to the gut e.g. oesophageal atresia
- Unrepaired tracheo-oesophageal fistula (TOF)

Prior to insertion the treating team Consultant is responsible for the appropriate assessment of :

- Post gastro-oesophageal surgery (e.g. TOF).
- Diagnosed or suspected oesophageal varices or any other significant oral, bronchial or oesophageal abnormality (e.g. stricture or atresia).
- The risk of extending the brain injury[3,4] in children with suspected or confirmed base of skull fractures. In these cases orogastric tubes should always be used.
- The use of orogastric tubes vs nasogastric tubes for long term oral feeding ability of the child or neonate.[5] Management of diagnosed or suspected mucositis in Oncology patients.

Post insertion:

- Infants and children who have either bulbar palsy, absent or limited gag reflex, significant head trauma, decreased level of consciousness, should be X-Rayed to confirm tube placement after initial insertion. This decision lies with the senior clinician caring for the patient

## 1.2 Considerations

### *1.2.1 Medical Implications and Decision Making*

The treating team is responsible to ensure documentation is in the clinical notes of all discussions with the family (including choice of tube and implications and family impact of continuous feeds), consent, management plans and discharge plan.

***Refeeding Syndrome***

Refeeding Syndrome is the term used to describe the potentially fatal shifts in fluids and electrolytes which may occur when a child who has recently lost weight or had a prolonged period of starvation commences aggressive nutritional support (whether enterally or parenterally).[6]

Restarting enteral or parenteral feeding provides a glucose load leading to insulin secretion and can precipitate electrolyte imbalance, especially hypophosphatemia, hypomagnesaemia and hypokalaemia. These metabolic disturbances can cause cardiac arrhythmias, seizures, amongst other life-threatening complications.

For more information please refer to the refeeding syndrome guideline.

Enteral nutrition may be started at lower volumes in patients with significant refeeding syndrome risk (please seek medical team or dietitian advice). Supplementation of thiamine and water-soluble vitamins may be necessary prior to commencing feeding. In addition to baseline and initial daily PN blood monitoring, the patients with significant refeeding syndrome risk should have bloods checked every 12 hours or more frequently depending on the severity of the electrolyte derangement, and BGL should be checked 4 – 6 hourly initially.

Refer to Appendix 1 for Decision Algorithm and other considerations.

### *1.2.2 Nursing Implications*

Most tubes are inserted without incident, however when an incident occurs it can have catastrophic outcomes[7]. Managers and educators in all clinical areas have a responsibility to ensure all nursing staff caring for children with feeding tubes are familiar with the process of aseptic (clean) technique, insertion, ongoing management and practice good hand hygiene.

There is no formal competency but inexperienced staff require supervision until they can demonstrate safe practice and are signed off as competent by the relevant clinical nurse educator. They should be able to;

- Demonstrate how to accurately measure the feeding tube prior to insertion
- Provide a safe and secure environment when inserting the feeding tube
- Demonstrate how to insert the feeding tube
- Demonstrate how to ensure the feeding tube is in the correct position
- Demonstrate what to do if the tube is unable to be aspirated or position checked

- Has completed a relevant education package.
- Understands the patients' developmental stage and responds appropriately.

Once the clinician/RN demonstrates the appropriate clinical knowledge, the following principles apply:

- Standard precautions and single patient use practices apply. The RN should utilise the manufacturers' product information specific to the nasogastric tube to ensure the tube is inserted in accordance with the manufacturers' recommendations.
- Only registered nurses and medical staff can initially insert nasogastric/orogastric and transpyloric/nasojejunal tubes (unless the parent has previously undergone training)
- Assess whether the infant/child is significantly compromised (see Section 1.1)
- Monitor for signs of re-feeding syndrome in severely malnourished patients.
- Tube placement is assessed prior to access by aspirating fluid and testing with pH indicator strips. Confirmation of placement occurs when **universal indicator is less than or equal to 5.**
- Only Syringes equal to or greater than 20mLs should be used to aspirate any naso/orogastric tube or dislodge any possible blockages to reduce the risk of mucosal damage and tube rupture.
- Air insufflation and auscultation with a stethoscope is NOT to be undertaken to confirm tube placement under any circumstances. There is little difference in auscultation sounds between tube placement in the stomach or in the airways[1, 88-15,] .
- Radiographical confirmation remains the gold standard but is not always practical or indicated[1, 9].
    - **However when a patient is compromised then x-ray is essential.**
    - *Opportunistic x-rays are recommended*; that is if a child/infant is to have an x-ray for any other clinical reason it is recommended inserting the feeding tube prior to the radiological intervention and confirm placement at the same time.

### *1.2.3 Dietetic Considerations*

- Refer to Appendix 4 for details.

## 1.3 Transpyloric tubes

Refer to Appendix 3 for insertion details of transpyloric tubes.

Transpyloric tubes (TPT) are sometimes known as jejunal or duodenal tubes.

TPTfeeds are usually administered for children who are unable to tolerate gastric feeds. This may be due to conditions such as poor gastric emptying, significant gastro-oesophageal reflux, or obstruction to the duodenum (e.g. superior mesenteric artery syndrome (SMA) duodenal web or extrinsic compression of the stomach and duodenum).

Both weighted and non-weighted tubes are used across the Network.

Refer to Section 1.2.1 Medical Considerations and Appendix 1 for Decision Algorithm.

If longer term TPT feeding is being considered, the appropriate resources must be available in the family's local area for tube replacement: TPT can only be placed safely in a limited number of Hospitals in NSW, therefore those living in rural and remote NSW may not be suitable candidates.

At SCHN, placement of tubes can be done in any clinical area including Fluoroscopy, wards, Emergency and ICU once a medical request is documented within the clinical record.

**TPT position can only be confirmed by either X-Ray or Fluoroscopy**.

Where possible, insert the TPT **within routine Radiology hours**. Prior to insertion, notify Fluoroscopy of the intention to insert the TPT giving them advance notice they will be required to confirm tube placement.

**Note:** Prior to inserting a TPT out of hours please have the RMO contact the Radiology Consultant on-call.

***Risks***

- Patients receiving feeds via TPT are at risk of developing Dumping Syndrome, Refer to Section 3.3 Minimising Potential Risks in Enteral Feeding.

# 2 Insertion and Care of Enteral Feeding Tubes

***Nasogastric Tube Insertion - Refer to Appendix 2***

***Transpyloric Tube Insertion - Refer to Appendix 3***

# 3 Management of Tube Feeds

Nasogastric feeds should be given as bolus feeds delivered by gravity in less than 20 minutes where tolerated (to mimic normal feeding patterns), unless otherwise indicated. If children do not tolerate a gravity bolus feed, it can be given via a pump over a longer time period. Enteral feeding pumps also provide continuous enteral feeds to infants and children at prescribed rates.

Feeds should be administered at room temperature; cold feeds can cause diarrhoea and lower the body temperature. If feeds need to be warmed to room temperature they should be placed in a container/bath of warm water only: do not warm feeds in a microwave oven as it can decrease the micronutrient content, denature proteins in feeds and unevenly warm the feed (placing the child at risk of burns).

## 3.1 Considerations

- TPT feeds must always be given continuously.
- Supervision by a trained carer is required at all times. Patients receiving continuous feeds should be closely observed for disconnection of the feed line and possible aspiration if the tube becomes displaced and administration of the feed continues.

- The volume decanted into a feeding bag or container should not exceed a four hour supply of feed.
- The physical area where the feed is decanted must be clean and free of contamination.
- Refer to local procedures for feeding bag hanging times.
- Enteral feeding pumps must be secured to appropriate poles when in transit.
- Ensure feeding tube is tested for placement prior to any feed or use and every 6 hours if on continuous feeds or after episodes of vomiting or coughing.
- Regular flushing has been reported to increase the life and patency of feeding tubes. All tubes must be flushed with water[16, 17] (sterile water for infants less than 12 months of age)using a 20mL or larger syringe every 4-6 hours (minimum) or after every intervention. Regular flushing is also recommended for continuous feeds to reduce the intraluminal build-up of product. If fluid restriction is not a consideration, the volume should be at least 3 times the minimum flush volume (i.e. between 2mL for Fr 6 sized tube up to 6mls for Fr 12 sized tube).
- In the hospital setting use a single use syringe for each intervention (flush etc.)[18].
- A designated “oral” or “enteral” syringe should be used to reduce the risks of inadvertent administration of oral medication into an intravenous line.
- Document the ongoing management of the tube in the clinical notes contemporaneously every shift (with each use).
- Secure feeding tubes appropriately. Change tapes to skin regularly, assessing skin integrity each time. Document in the patient notes.
- Check the nares regularly to ensure skin integrity – try to alternate nares with any re-insertion of the tube.
- A new sterile NG tube must be used with each re-insertion in hospital. Weighted and non-weighted tubes are used across the Network.
- Ensure appropriate discharge planning undertaken and utilise checklist. Refer to Section 4 and Appendix 5 for details.

Children on tube feeds requiring proton pump inhibitors (PPIs), for acid suppression, require a liquid or dissolvable form, supplied from pharmacy.

## 3.2 Microbiological Contamination

Enteral feeds are not only a source of nutrition but also a healthy environment for the multiplication of micro-organisms, the impact of which is far greater for children or infants in hospital[19]. A microbiological contaminant will multiply to a clinically significant number at temperatures of 30 - 37°C.[20]

To counteract this, hygiene practices must include strict hand washing when decanting the feed, following recommendations on feed hanging times and ensuring the ambient environmental temperature remains less than 30°C. Infection Control and patient safety are paramount in the delivery of enteral feeds and must be maintained at all times.

Feeds supplied from the Formula Room must be refrigerated as soon as possible after delivery, particularly those which have been stored in refrigeration or previously decanted. Unopened "ready to feed" products (e.g. liquid formulas) can be stored on clean shelves.

## 3.3 Minimising Potential Risks in Enteral Feeding

| Potential problem | Possible causes | Action |
|---|---|---|
| **Accidental tube placement or dislodgement** | Incorrect position of tube<br>Tube pulled out or caught<br>Excessive force<br>Severe vomiting or coughing | • Ensure the tube is secured appropriately at all times. See Appendix 2<br>• **If frequent tube dislodgement, consider alternative feeding route** |
| **Tube blockage** | Infrequent flushing of tube<br>Medications not crushed properly<br>Medications and formula incompatible<br>Feeding tube kinked | • 4-6 hourly flushing with water before/after every feed and medication (sterile water for under 12 months age or TPT)<br>• Ensure feeds are not thickened<br>• Discuss medication formulations with medical team/pharmacy<br>• Check tube for kinks<br>• Use gentle push-pull action with 50mL syringe containing warm water (sterile water if under 12 months)<br>• Gently massage tube between your fingers |
| **Nausea/vomiting** (aspiration risk) | Feed administered too quickly<br>Not in correct position during/after feed<br>Formula too cold<br>Gastro oesophageal reflux<br>Constipation | • Cease administration of feed<br>• During feed, ensure the patient is in semi-upright position of at least 30 degrees<br>• Patient should try to maintain position following feed for 30 mins<br>• Ensure formula at room temperature |
| **'Dumping syndrome' (TPT –only)** [24, 25, 26] | Rapid passage of carbohydrate into the small intestine, i.e. bolus feeding [24, 25, 26] | • Only give feeds continuously via TPTFeeds should be assessed for individual tolerance, however, feeds with an osmolality <300mOsm/kg are generally better tolerated as they are iso-osmolar<br>• Assess patient for epigastric pain, diarrhoea, sweating, and possible hypovolaemia. Hypoglycaemia is usually a late sign. |
| **Diarrhoea** | Medication side effect<br>Formula given too quickly<br>Formula too cold<br>Contaminated formula | • Check with medical team/pharmacy re: medication side effects<br>• Discuss formula and infusion rate with Dietitian<br>• Allow formula to reach room temperature before use<br>• Ensure hygienic preparation and storage of formula/feeding equipment |

# 4 Discharge Planning

Discharge planning should commence prior to tube insertion. A Discharge Planning Checklist and further information on arranging consumables and formula is in Appendix 5.

Discharge home on continuous nasogastric feeds (if clinically indicated) carries increased risks including increased risk of aspiration as parents are unable to closely monitor and supervise overnight feeding in the home environment whilst sleeping. Enteral feeding pumps do not have an in-built alarm to alert a parent/carer to a displaced tube. Significant at risk groups include infants and those without a gag reflex who cannot alert a parent/carer to any disturbance or change in feed delivery or tube displacement.

Where the Consultant Medical Officer requests continuous overnight NG feeds for discharge; the associated risks of having a child at home on continuous feeds delivered by a feeding pump should be discussed with the family by appropriate medical staff. Medical staff are responsible to document in the clinical record a reflection of the discussion and consent of the parents/carers.

***Other Considerations***

- Patients on continuous overnight feeds are at risk of suppressed appetite and reduced oral intake which may delay transition to full oral feeding.
- Parents do not have to learn to insert a feeding tube prior to discharge; this can be discussed when and if the parent is ready to do so.
- Patients are regularly discharged home with enteral feeding tubes in place. There must be the opportunity to discuss with parents/carers and assess their capacity to care for their child at home[21]. Parents/carers may feel uncomfortable about taking a child home with a feeding tube; however parents will develop greater confidence when supported by experienced nursing staff to provide the relevant instruction and education[22].
- Parents/carers will need to demonstrate their competence in caring for the feeding tube prior to discharge. Homecare Guidelines offer a checklist which can be used to determine competence and readiness for discharge.
- Some childcare facilities may have restrictions around enrolling children requiring tube feeds due to lack or trained staff and facilities or experience in managing chronic and complex children. This may be important to discuss with families when considering long term feeding tube use.
- A management plan for ongoing care of the feeding tube must be available. The feeding plan will be provided by the Dietitian and discussed and agreed with the family. In some circumstances local service may not be able to offer appropriate support to families therefore it is critical to ensure a plan is in place for families in the event of accidental dislodgement of feeding tube and to ensure ongoing supplies are provided. This may require a referral to a Feeding Clinic or Feeding Service so that tube weaning can be instituted at the appropriate time.

***Parent/Carer Information***

- Ensure the appropriate Homecare Guideline is provided to the parent/carer:
- Insertion and Care of a Feeding Tube at Home

Kids on HEN Factsheets

Kids on HEN factsheets on a number of topics are available on the SCHN intranet

Fact sheets | The Sydney Children's Hospitals Network

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# Appendix 1: Medical Considerations & Decision making

Nasogastric tubes (NG) and transpyloric tubes, although commonly used within the paediatric setting, may have significant risks attached to their use, particularly in homecare. Decision making should include:

- Ensure all avenues regarding nutritional support are considered such as specialised nursing support for breastfeeding or the Dietitian referral.
- The Dietitian can:
  - provide a full nutritional assessment identifying caloric intake compared to requirements and strategies to optimise nutrition.
  - make an assessment for the indications of enteral feeding and consult on maximising nutrition, including formula choice.
  - assist in identifying if tube feeding is the most beneficial and/or appropriate way to meet the child's needs.
- Assessment by a speech pathologist of the child's oral, motor and swallowing function should occur if there is concern.
- Consider how long the child has not been receiving adequate nutrition and determine whether they are at risk of refeeding syndrome (see earlier section on Refeeding).
- Medical staff to discuss implications of tube management with the parents and obtain their consent for tube insertion.
- Document plan in the clinical notes stating the reason for initial placement of the feeding tube, the expected length of time the feeding tube is required and a plan for ongoing review and eventual removal of the feeding tube. If the patient is going to require nutritional intervention for longer than 12 weeks, a gastrostomy should be considered.

***Figure 1: Improving Suboptimal Nutrition: A decision making algorithm***

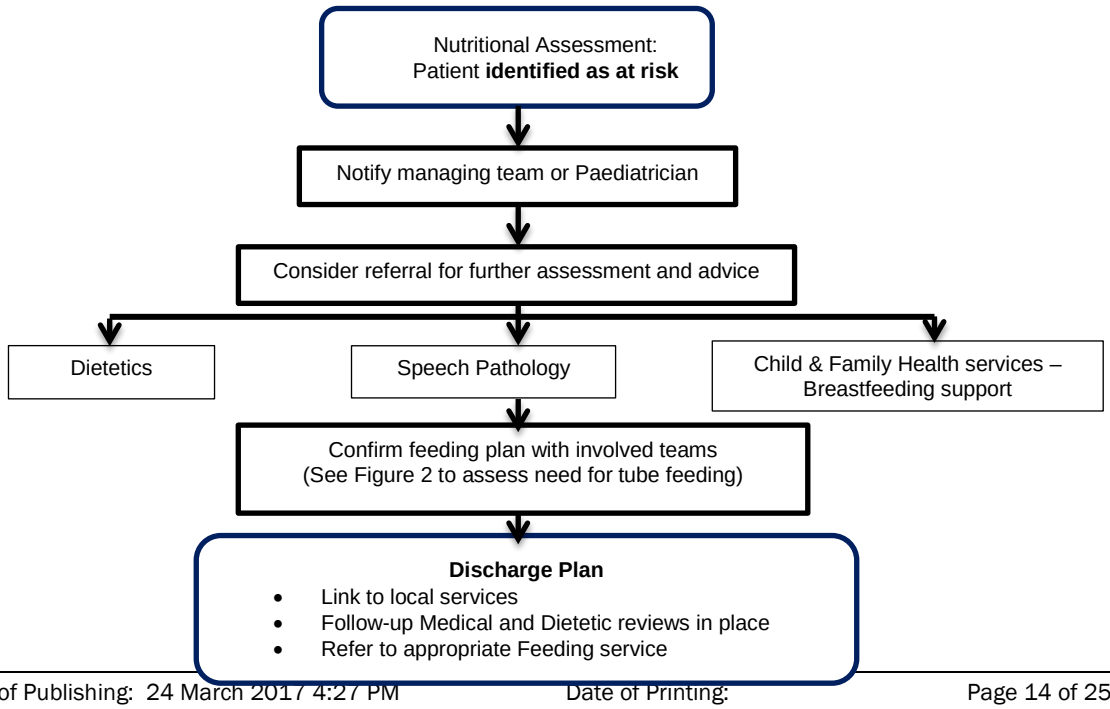
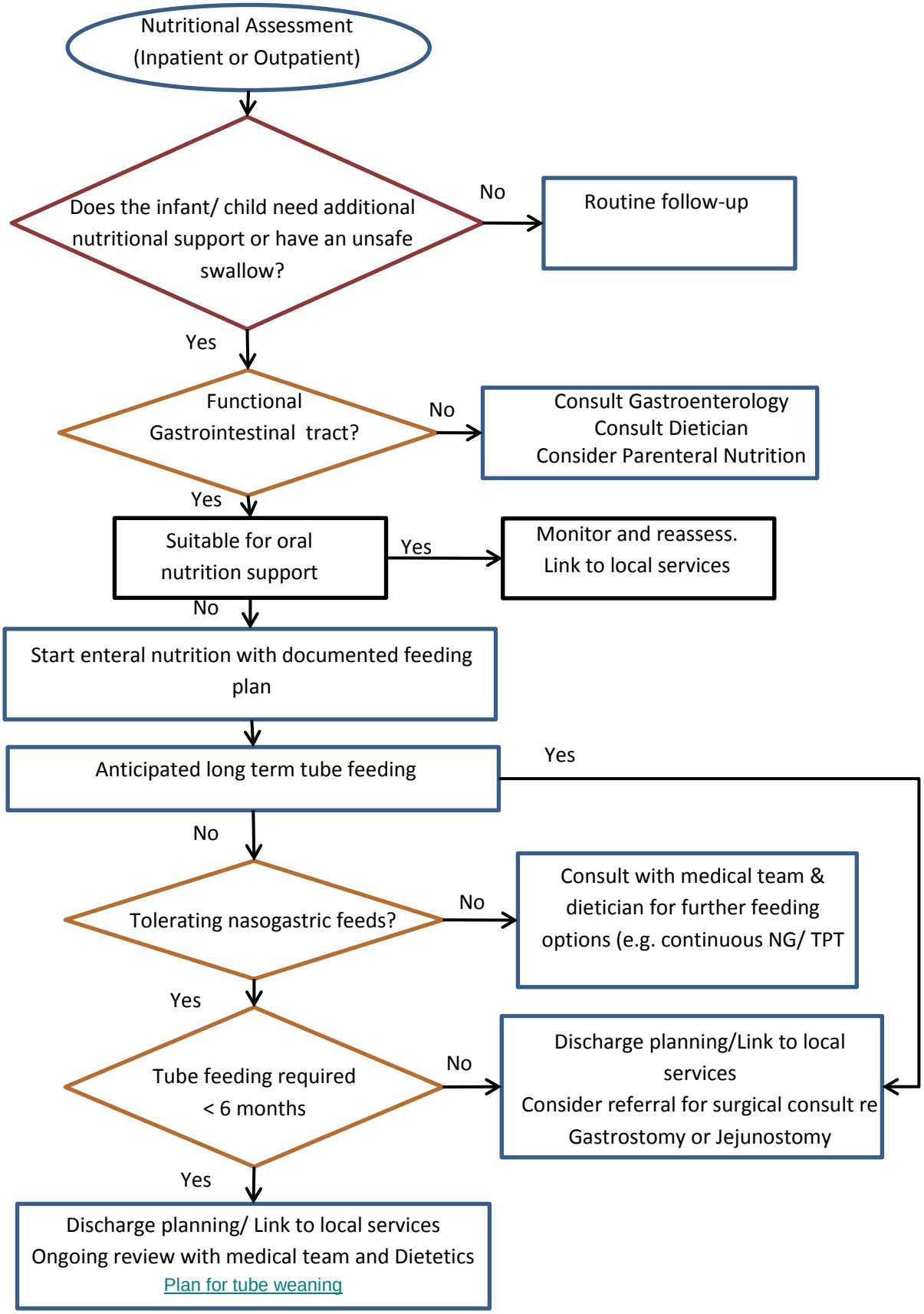


***Figure 2: Assessing need for Tube Feeding: A decision making algorithm for Medical***




*Adapted from: ESPGHAN Committee, Practical Approach to Paediatric Enteral Nutrition: A comment by the ESPGHAN Committee on Nutrition, JPGN, Vol 51 No 1 July 2010 pp 110-122*

# Appendix 2: Insertion of Nasogastric Tubes

***Selecting the appropriate type and size of naso/orogastric tube***

| Age | Feeding Tube Size |
|---|---|
| Newborn | 6 FG |
| Infants & Children less than 5yrs | 8 FG |
| Children greater than 5yrs | 8-10 FG |

*Table adapted from NSWKIDS & Families: Insertion & Confirmation of Correct Placement of Nasogastric and Orogastric Tubes, Procedural Guideline, 1st Edition*

**Note:**

- Feeds should be stopped for 2 hours prior to insertion to prevent vomiting.
- Special consideration to tube size selection should be given to children with developmental or physical delay, and very small for age as a smaller tube may be indicated.
- Soft pliable (polyurethane) small bore tubes (6 – 12 FR) are used for longer term feeding (greater than 30 days). Long-term Polyurethane tubes may be left in place for up to 3 months but regular review of the tube condition is required.
- Polyvinyl tubes are used for short term feeding, and should be used according to manufacturers instructions. Polyvinyl tubes must be replaced at least every 7 days; this is because the plastic hardens in gastric acid, increasing the risk of ulcerations[23].

***Equipment Required for Insertion of tube***

- Appropriate type and size tube
- Personal Protective Equipment
- Sterile water
- 20mL syringe
- pH indicator strip
- Skin protective dressing i.e. Comfeel®
- Securing tapes
- Lubricant
- Scissors

## Procedure for Insertion of tube

1. Explain procedure to parents and patient. Obtain consent. Consider involvement of Child Life Therapist and age appropriate position and holding for the procedure.
2. For difficult or non-cooperative patients, consider using anti-anxiolytic measures such as Nitrous Oxide or local anaesthetic sprays when inserting tubes.
3. Wash hands as per Hand Hygiene Policy
4. Gather and prepare equipment required for tube insertion.
    i. Pre-cut tapes and protective dressing.
    ii. Open syringe packaging and ensure pH indicator strips are ready to use
5. Measure the tube (see picture below) and document the measurement in patient notes.
    i. **Nasogastric Tube**
    Measure from the tip of the nose to the earlobe and down to midway between the end of the breastbone (xiphoid process) and the umbilicus
    ii. **Orogastric Tube**
    Measure from the edge of the mouth to the earlobe and down to midway between the end of the breastbone (xiphoid process) and the umbilicus

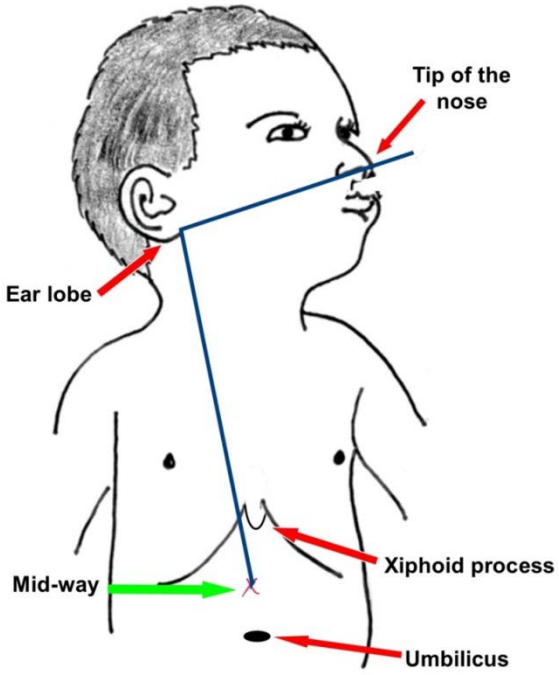



**Figure 3**

6. Wash hands as per Hand Hygiene Policy and don PPE.
7. Lubricate the tube with water soluble lubricant. If using a long-term tube prime the tube with sterile water (allows guide wire to be easily removed) and dip the end of the tube in sterile water to activate the lubricant.
8. Gently insert the tube into the nare (nasogastric) or side of the mouth (orogastric tube) and arch it over and downwards into the throat. Encourage the child to swallow if possible to assist with ease of tube insertion.
9. Continue inserting the tube until the measured appropriate length is reached.
10. If *resistance is felt* during the insertion, *do not force* the tube; pull the tube out slightly and attempt to reinsert.

**11.** The tube should be removed if the child becomes persistently distressed, chokes, turns blue or continues to cough. Settle the child and attempt to reinsert the tube.

**12.** Using a 20mL syringe, obtain an aspirate to check the tube position. Disperse some aspirate on to the pH indicator strips. If pH is less than or equal to 5, the tube position is confirmed.

> **DO NOT** use other potentially dangerous techniques for confirming tube placement such as gas insufflation/auscultation, secretion colour and litmus paper.

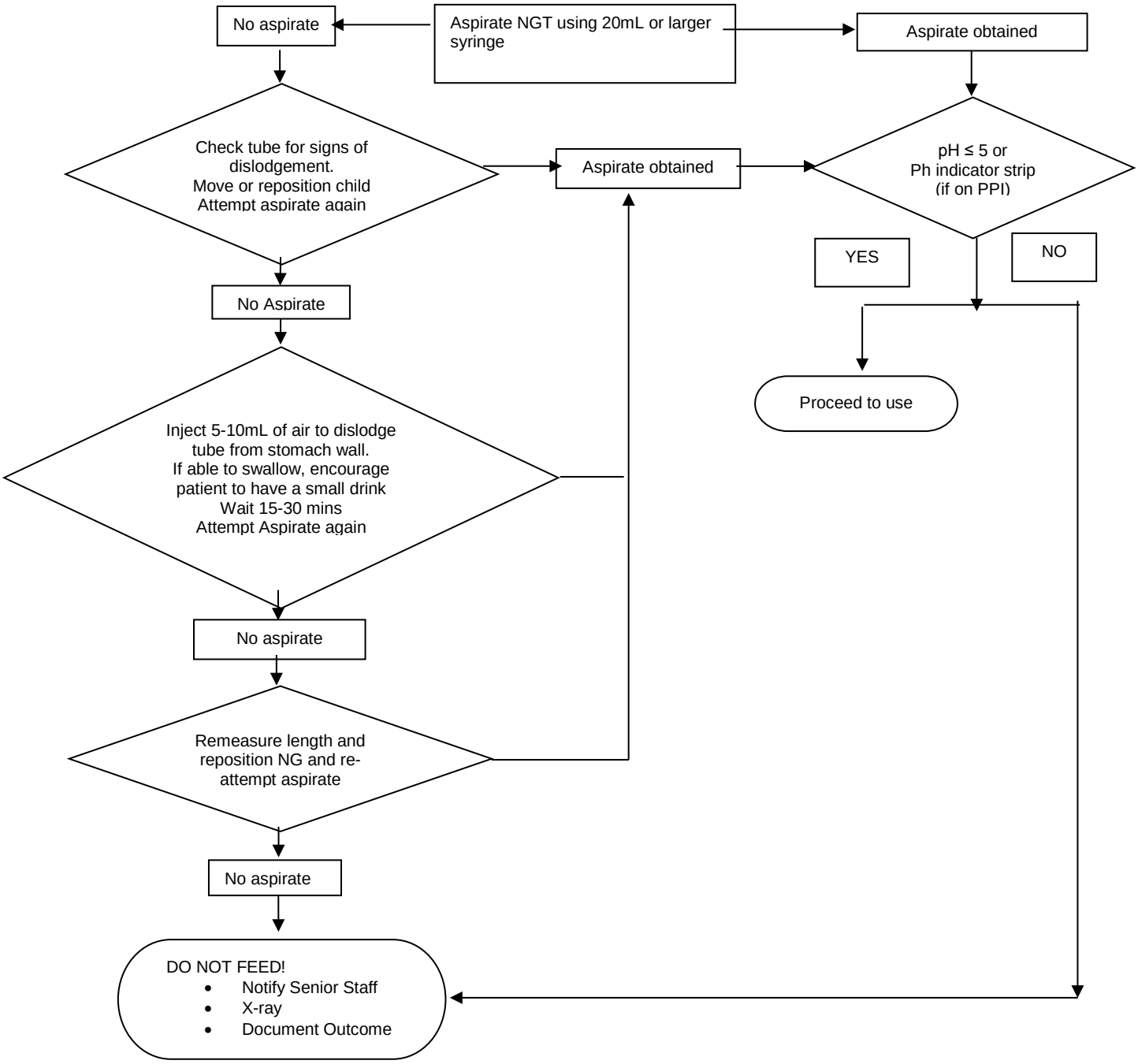
**1.** If aspirate is unable to be obtained once the tube is placed in the stomach refer to algorithm. (See Algorithm 3)

**2.** Remove the guide wire and secure the tube using appropriate tapes.

**3.** Document in the clinical notes: tube type; size; measurement at the nare or mouth; confirmation of tube placement; number of attempts of insertion; and any complications during the procedure.

**4.** Mark the exit point on the feeding tube with permanent marker.

# Algorithm 3: Assessing Nasogastric Tube Placement



# Appendix 3: Placement of Transpyloric tube

Measure as for routine nasogastric tube insertion using the long term feeding tube (polyurethane). *Do not use the PVC* (short term) feeding tubes for transplyoric placement as these need to be replaced weekly.

***Insertion of Transpyloric (nasojejunal) tube***

- Feeds should be stopped at least 2 hours prior to insertion to aid stomach motility and prevent vomiting.
- Prepare the tube as for nasogastric tube insertion – insert as per nasogastric tube, remove guidewire and test for gastric placement as per nasogastric tube guidelines.
- Once confirmed – advance the tube another 5cm (without the guidewire), Tape securely.
- Place the infant/child on their right side for 30 minutes – this aids the peristaltic passage of the tube tip allowing it to pass into the intestine. Do NOT reinsert the guidewire under any circumstances as there is a risk of perforation.
- Document procedure in the clinical record, marking exit position of the tube and length at which the tube has been inserted using the markings on the tube e.g. 50 cm
- Notify Fluoroscopy of tube placement and transfer to Radiology Department for further management and confirmation.

**Further advancement of the tube will occur in Radiology Department as required.**

# Appendix 4: Dietetic Considerations

**The dietitian should be contacted for advice regarding any of the following:**

- Fluid requirements
- Energy requirements
- Macro and micro nutrient requirements
- Gut function
- Physical and medical condition
- Age and stage of development
- Activity level
- Nutritional status and, if relevant, duration of non-feeding, i.e. post-operatively
- Route of delivery
- Home situation (if planning long term feeding regimens)
- Feed choice
- Oral intake
- Continuous/bolus/cyclic delivery or a combination of these methods
- Duration of nutrition support
- Hygiene

***Points to Consider When Choosing and/or Manipulating Formula***

**Osmolality**

- Isotonic feeds are better tolerated than hyperosmolar feeds, i.e. ≤ 300 Osm/kg. Osmolality of >600 Osm/kg is generally not well tolerated and should not be used for TPT/NJT feeds.
- Consider osmolality when increasing strength of formulas or adding carbohydrate (glucose polymers) to feeds.
- Necrotising enterocolitis is a risk in neonates on concentrated feeds.

**Lactose-Free**

- Lactase is the enzyme that is most sensitive to gut injury and last to recover in sick children. Lactose intolerance may result from gut damage and is usually short-term.
- There is a high incidence of lactose intolerance within some populations, especially non-Caucasians. Most nutritionally complete formulae for children and adults contain very low or negligible levels of lactose. Lactose free or soy formulae are available, however soy formula is not usually recommended in infants under 6 months. It should be noted that breast milk contains lactose.

**Nutritionally Complete Feeds**

- Formulas that are intended to be the sole source of nutrition are nutritionally complete i.e. meet the child's RDI's for macro and micronutrients if sufficient volumes are given.

In some cases, supplementation may be necessary particularly of Ca, Na, B vitamins, Fe and trace elements.

**Protein Content**

- It is important to consider the protein content of formula. When using concentrated formulas, avoid exceeding the daily recommendations for protein. May need to dilute or concentrate feeds to meet requirements, especially in infants.
- Aim to meet protein RDI and not exceed by 4g/kg actual body weight (approx. 300-400% of RDI).
- Aim to meet nitrogen: protein ratio of 1:150
- Aim for a protein: energy ratio of 9-11% for catch-up growth in babies.
- Usually older children will have approximately 15-20% energy from protein in an average diet.

**Fibre (To manage ongoing constipation)**

- Ensure adequate fluid provision
- Adding fibre to feeds should be used with caution in children < 2 years and is contraindicated in fluid restricted patients.
- Where practical for the family choose a fibre containing feed or add appropriate fibre.
- If constipation does not improve, please discuss further management with treating team.

**Semi-Elemental/Elemental**

- Special feeds may be required if children have malabsorption, impaired digestive capacity or a confirmed milk or soy allergy. These may include protein hydrolysate or amino acid formulas.

**Fluid restricted/Hypermetabolic**

- May require concentrating or fortifying EBM, infant formula or adult feeds. This increases the osmolality of the feed and tolerance needs to be established gradually.

**Cow's Milk or Soy Milk**

- Not recommended for tube feeding as it is not nutritionally complete. Cow's milk has a high protein content and lacks particular vitamins and minerals and also has a very low iron content.

**Blenderised feeds**

- Currently not recommended due to:
  - Difficulties in producing an appropriate texture to be given via feeding tube (i.e. risk of blockage)
  - Difficulties in providing adequate nutrition in a reasonable feed volume
  - Increased bacterial load with associated risk of food poisoning
  - Difficulties in assessing nutritional adequacy of recipes

# Appendix 5: Discharge Planning Information

### *Equipment and Consumables*

A one month supply of consumables should be organised prior to discharge. This should be arranged by either ward nursing staff or appropriate specialist CNC. These should include:

- **All enteral feeding patients**:
  - Appropriate sized oral syringes
  - Feeding bags (if on pump feeds)
  - Securing tapes and skin protective dressing
  - Complete a Request for Supplies form and provide to the family at time of discharge for purchase of ongoing supplies from the Appliance and Equipment Centre.
- **Nasogastric/orogastric tube fed patients** also require:
  - pH indicator strips
  - spare nasogastric tube (appropriate type and size)
  - lubricant
- If pump feeding is required, a Kangaroo pump needs to be arranged with the Appliance Centre. (24hr notice is preferred).
  - Complete an Equipment Centre Loan form and provide to the family prior to collection. The family are required to pay a refundable deposit and a three month hire fee at time of collection. Contact Equipment Centre for current pricing.

### *EnableNSW*

- EnableNSW provides aids, equipment and consumable items for people living with disability or chronic health conditions.
- In most circumstances patients with nasogastric/orogastric tubes are not eligible for EnableNSW support as it is usually considered to be a short-term feeding option. Exceptions include TPT/NJT feeding and patients that are unable to progress to surgical gastrostomy.
- EnableNSW prescriptions must be completed by an eligible prescriber.

### *Formula Supply*

- Formula supply for home is organised by the Dietitian. There is no facility for supply by the hospital.
- Families are registered by the Dietitian with the Home Enteral Nutrition Service (HENS).
- If a patient is on a prescription formula (authority script), this needs to be provided by the medical team prior to discharge.
- If a patient is known to a Dietitian at a different facility, they should be given a short HENS registration only (e.g. 3 months) and encouraged to follow up with their local Dietitian for ongoing registration and reviews.
- Plans for follow-up and monitoring of growth and nutrition with a Dietitian (either locally or at SCHN should be organised or recommended at or prior to discharge.

## Discharge Planning Checklist

The following checklist may be printed and used as a reminder when considering discharge of a patient requiring enteral feeds – tick the box as the item is completed [✓].

Patients Name: _____ Date Completed: _____

MRN: _____

Completed by: _____

| Assessment | Yes | No | Action |
|---|---|---|---|
| Has the infant/child/young person had a full nutritional assessment by a Dietitian? | | | |
| Have the family and/or carer's been educated on care of the enteral feeding tube? | | | |
| Do the family and/or carer feel confident and comfortable with managing tube feeds at home? | | | |
| Tube replacement plan in place? | | | |
| Have the family and/or carer had feeds organised for discharge including ongoing supply by a dietitian including HEN registration? | | | |
| Have the family and/or carer had equipment organised for discharge by a nurse? | | | |
| Have the family and/or carer been given information on how to identify tube placement and what to do if they are unable to confirm tube placement? | | | |
| Have the family and/or carer been given a copy of relevantguidelines or Factsheets? | | | |
| Do the family and/or carers know who and how to contact if they require assistance or information? | | | |
| Is the parent/carer entitled an assistance package (EnableNSW/NDIS) and has a form been completed by an appropriate clinician. | | | |
| Have follow-up appointments been made? | | | |
| There must be a documented plan in the clinical record stating the reason for initial placement of the feeding tube, the expected length of time the feeding tube is required and a plan for ongoing review | | | |

# Appendix 6: Definition of Terms

**Dumping Syndrome**[25,26,27]

- Results from a rapid passage of carbohydrate into the small intestine, this will result in peripheral and splanchnic vasodilation, which leads to epigastric pain, diarrhoea, sweatiness and may result in relative hypovolaemia

**Enteral Feeding**[27]

- Enteral nutrition is defined as the delivery of nutrition support into the gastrointestinal tract (GIT) and can include oral nutrition support and enteral tube feeding.[1]

**Enteral Feeding Pump**

- An electronic device licensed to deliver fluid via the enteral route not to be used for intravenous fluid administration.

**Small-bore feeding tube**

- Any tube which is less than 12 French Gauge in diameter.[5]

**Nasogastric Tube**

- A flexible tube passed through the nose and into the stomach

**Orogastric Tube**

- A flexible tube passed through the mouth and into the stomach

**Transpyloric (naso-jejunal) tube**

- A Transpyloric (naso-jejunal) tube is a nasogastric tube which is placed through the pylorus into the duodenum or jejunum[28]. The term refers to placement of the tube not to type of tube as any long term feeding tube can be used.

**Gastrostomy**

- Surgical formation of an opening into the stomach (stoma) for the delivery of enteral feeding.

**Gastro-jejunal Tube**

- Transgastric tube inserted by interventional radiology into the jejunum via the gastrostomy stoma to allow for the delivery of nutrition and medications via the stomach or directly into the jejunum[7].

**Jejunostomy**

- A surgical operation to create an opening (stoma) into the jejunum (a part of the small intestine)[29]

**Long Term (enteral feeding)**

- Expected to require tube feeding for greater than 6 months.

**Long Term Feeding Tube**

- A nasogastric or orogastric tube made of materials which allow their use for greater than 7 days; e.g. polyurethane tubes (with or without stylet - weighted or unweighted).

**Short Term Feeding Tube**

- A nasogastric or orogastric tube made of plastic (PVC) which can only be left in place for no longer than 7 days.

**pH Paper/Indicator Strips**

- Universal indicator consists of a mixture of indicators such that there is a continuous colour change from about pH 2 to pH 10. Universal indicator paper is simple paper that has been impregnated with universal indicator[7].