

**THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK**

**Neonatal Orogastric and Nasogastric Tube Guideline**

Approved by/on	Thames Valley & Wessex Neonatal ODN Governance Group (21 <sup>st</sup> March 2024)
Date of publication	March 2024
Last reviewed	New guideline
Review date (Max 3 years)	March 2027
Lead authors	Joanne Hemmings, Advanced Neonatal Nurse Practitioner, UHS Lisa Leppard, Lead Care Coordinator, TVW Neonatal ODN
Distribution	Thames Valley and Wessex Neonatal Clinical Forums Thames Valley and Wessex Neonatal Network website Thames Valley and Wessex Neonatal Network e-bulletin
Related documents / References	<p>British Association for Parenteral and Enteral Nutrition (2016) ENFit Phase 2: ISO 80369-3: IMPORTANT UPDATE – ENFit Implementation. Available at: <a href="https://www.bapen.org.uk/nutrition-support/enteral-nutrition/enfit">https://www.bapen.org.uk/nutrition-support/enteral-nutrition/enfit</a> [Accessed 25th November 2021]</p> <p>British Association for Parenteral and Enteral Nutrition (2020) A position paper on nasogastric tube safety. Available at: <a href="https://www.bapen.org.uk/pdfs/ngsig/a-position-paper-on-nasogastric-tube-safety.pdf">https://www.bapen.org.uk/pdfs/ngsig/a-position-paper-on-nasogastric-tube-safety.pdf</a> [Accessed 21st February 2021]</p> <p>Cirgin Ellett, M., Cohen, M., Perkins, S., Smith, C., Lane, K. and Austin, J. (2011) Predicting the insertion length for gastric tube placement in neonates. Available at: <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3140585/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3140585/</a> [Accessed 21<sup>st</sup> February 2021]</p> <p>Clifford, P., Heimall, L., Brittingham, L. and Davis, K. (2015) Following the evidence: Enteral tube placement and verification in neonates and young children. The Journal of Perinatal and Neonatal Nursing, 29(2), pp149-161</p> <p>Dias, F., Emidio, S., Lopes, M., Shimo, A., Beck, A. and Carmona, E. (2017) Procedures for measuring and verifying gastric tube placement in newborns: an integrative review. Available at: <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5511002/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5511002/</a> [Accessed 25/11/2021]</p> <p>Freeman, D., Saxton, V. and Holberton, J. (2012) A weight-based formula for the estimation of gastric tube insertion length in newborns. Advances in Neonatal Care, 12(3), pp179-182</p>

Government (2020) Guidance: CE Marking. Available at: <https://www.gov.uk/guidance/ce-marking> [Accessed 20th December 2021]

Greenleaf, A. (2017) 'Chapter 40: Gastric and Transpyloric Tubes' in MacDonald, M., Ramasethu, J. and Rais-Bahrami, K. (eds.) *Atlas of Procedure in Neonatology*, 5<sup>th</sup> Edition, Wolters Kluwer Health, Lippincott Williams and Wilkins pp278-284.

Healthcare Safety Investigation Branch (2020) Placement of nasogastric tubes: Independent report by the Healthcare Safety Investigation Branch 2019/006. Available from: [https://hsib-kqcco125-media.s3.amazonaws.com/assets/documents/HSIB\\_Placement\\_of\\_nasogastric\\_tubes\\_Report\\_V07.pdf](https://hsib-kqcco125-media.s3.amazonaws.com/assets/documents/HSIB_Placement_of_nasogastric_tubes_Report_V07.pdf) [Accessed November 2021]

Kato, Y., Hirata, K., Oshima, Y. and Wada, K. (2019) Weight-based estimation of insertion length of the nasogastric tube in extremely low birth-weight infants. *Advances in Neonatal Care*, 20(2), ppE31-E34.

Kemper, C., Haney, B., Oschman, A., Lyman, B., Parker, L. and Brandon, D. (2019) Acidity of enteral feeding tube aspirate in neonates: do pH values meet the cut off for predicting gastric placement? Available at: <https://pubmed.ncbi.nlm.nih.gov/30720480/> [Accessed 25<sup>th</sup> August 2021]

Medicina (2019) ENFit: Medicina nasogastric feeding tubes. Available from: <https://medicina.co.uk/wp-content/uploads/2020/01/ENFITNGMKT003.pdf> [Accessed November 2021]

Meert, K., Caverly, M., Kelm, L. and Methany, N. (2015) The pH of feeding tube aspirates from critically ill infants. *American Journal of Critical Care*, 24(5), ppe72-e77.

Nguyen, s., Fang, A., Saxton, V. and Holberton, J. (2016) Accuracy of a weight-based formula for neonatal gastric tube insertion length. *Advances in Neonatal Care*, 16(2), pp158-161

NHS Improvements (2016) Resource Set: Initial placement checks for nasogastric and orogastric tubes. Available at: [https://improvement.nhs.uk/documents/193/Resource\\_set\\_-\\_Initial\\_placement\\_checks\\_for\\_NG\\_tubes\\_1.pdf](https://improvement.nhs.uk/documents/193/Resource_set_-_Initial_placement_checks_for_NG_tubes_1.pdf) [Accessed 21st February 2021]

NHS Improvements (2018a) Never events policy and framework. Available at: [https://improvement.nhs.uk/documents/2265/Revised\\_Never\\_Events\\_policy\\_and\\_framework\\_FINAL.pdf](https://improvement.nhs.uk/documents/2265/Revised_Never_Events_policy_and_framework_FINAL.pdf) [Accessed 21st February 2021]

NHS Improvement (2018b) Never Events List 2018. Available at: [https://improvement.nhs.uk/documents/2266/Never\\_Events\\_list\\_2018\\_FINAL\\_v\\_5.pdf](https://improvement.nhs.uk/documents/2266/Never_Events_list_2018_FINAL_v_5.pdf) [Accessed 21st February 2021]

NMC (2018) Part 2: Standards for student supervision and assessment. Available at: <https://www.nmc.org.uk/globalassets/sitedocuments/standards-of->

[proficiency/standards-for-student-supervision-and-assessment/student-supervision-assessment.pdf](#) [Accessed 25th November 2021]

National Patient Safety Agency (2005a) *Patient Safety Alert*: Reducing the harm caused by misplaced naso and orogastric feeding tubes in babies under the care of neonatal units. August:09

<https://webarchive.nationalarchives.gov.uk/20171030131002/http://www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=59798&p=4> [Accessed 25<sup>th</sup> November 2021]

National Patient Safety Agency (2005b) How to confirm the correct position of naso and orogastric feeding tubes in babies under the care of neonatal units. Available at:

<https://webarchive.nationalarchives.gov.uk/20171030131002/http://www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=59798&p=4> [Accessed 25<sup>th</sup> November 2021]

National Patient Safety Agency (2011a) Patient Safety Alert  
NPSA/2011/PSA002 Reducing the harm caused by misplaced nasogastric feeding tubes in adults, children and infants

<https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=101559> [Accessed 3<sup>rd</sup> June 2021]

National Patient Safety Agency (2011b) Patient Safety Alert  
NPSA/2011/PSA002 Reducing the harm caused by misplaced nasogastric feeding tubes in adults, children and infants: Supporting information. Available at:

[https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAttachment.aspx?Attachment\\_id=101342](https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAttachment.aspx?Attachment_id=101342) [Accessed 4<sup>th</sup> August 2021]

National Patient Safety Agency (2012) Rapid Response Report  
NPSA/2012/RRR001

Harm from flushing of nasogastric tubes before confirmation of placement. Available at:

<https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=101753> [Accessed 25<sup>th</sup> November 2021]

National Patient Safety Agency (2016) Patient safety alert. Nasogastric tube misplacement: continuing risk of death and severe harm. Available at:

<https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=102504> [Accessed 25<sup>th</sup> November 2021]

Parker, L., Withers, J. and Talaga, E. (2018) Comparison of neonatal nursing practices for determining feeding tube insertion length and verifying gastric placement with current best evidence. *Advances in Neonatal Care*, 18(4), pp307-317

	<p>Spence, K. and Connolly, A. (2020) 'Chapter 17: Nutrition and feeding in the neonatal unit', in Boxwell, G., Petty, J. and Kaiser L., <i>Neonatal Intensive Care Nursing</i>, Routledge: Taylor Francis Group, London, pp437-463</p> <p>Watson, J and McGuire, W (2013) Nasal versus oral route for placing feeding tubes in preterm or low birth weight infants (Review). Available at: <a href="https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003952.pub3/e/pdf/full">https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003952.pub3/e/pdf/full</a> [Accessed 21st February 2021]</p> <p>WoSPGHaN (2012) Enteral tube feeding information pack for healthcare professionals. Available at: <a href="https://www.wospghan.scot.nhs.uk/Info%20leaflets/Final%20ETF%20Info%20for%20staff.pdf">https://www.wospghan.scot.nhs.uk/Info%20leaflets/Final%20ETF%20Info%20for%20staff.pdf</a> [Accessed 25<sup>th</sup> November 2021]</p>
Implications of race, equality & other diversity duties for this document	This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.

**Version Control:**

Version	Date	Details	Author(s)	Comments
V1	March 2024	New guideline	JH / LL	Ratified March 2024.
<b>Review Date:</b>	<b>March 2027</b>			

# Neonatal Orogastric and Nasogastric Tube Guideline

## Contents

1.0 Aim of Guideline.....	6
2.0 Scope of Guidelines.....	6
3.0 Definitions and abbreviations.....	7
4.0 Background information.....	8
5.0 Guideline framework.....	10
5.1 Procedure for insertion.....	11
5.2 Using the Gastric tube.....	18
5.3 Troubleshooting the gastric tube.....	22
5.4 Infection prevention and gastric tube changes.....	22
5.5 Reporting of incidents.....	23
5.6 Parent/Carer and tube feeding.....	23
6.0 Appendices.....	25
Appendix 1: Flow Chart for Use of Gastric Tube.....	25
Appendix 2: How to Test the pH.....	26
Appendix 3: How to Administer a Bolus Feed.....	27
Appendix 4: How to remove a Gastric tube.....	28

## 1.0 Aim of Guideline

The aims of this guideline are:

1. To promote a clear, consistent, and evidenced based approach to the insertion, care and management of gastric tubes
2. To promote the safety and well-being of all patients who require a gastric tube.
3. To provide a framework for parent led tube feeding in neonatal units across the Thames Valley & Wessex Neonatal ODN

## 2.0 Scope of Guidelines

This guideline is for use by **all healthcare professionals** (HCP) working on a **Neonatal Unit**, who look after a **baby with or requiring a gastric tube**. Staff must be deemed competent in providing skills associated with gastric tube passage and care (NPSA 2011b) and they must be **signed off within their competency documents by a registered nurse** before they can provide unsupervised care. Staff who are not signed off as competent must be supervised by a competent NNU HCP who will ultimately take responsibility for the passage and/or use of the gastric tube.

Student nurses are expected to be involved in all the aspects of care regarding gastric tubes. The role of a student nurse is to learn how to competently and safely perform gastric tube insertion, and the subsequent care and management of the patient through practice supervision. Students can be supervised by any competent NNU HCP but any final sign off must be by a competent registered nurse (NMC 2018) (Consult local policies)

Parents should be always supervised whilst tube feeding their baby until they are assessed by a competent NNU HCP and signed off as competent using the "Tube Feeding Your Baby on the Neonatal Unit: Parent/Carer Learning Pack" available on the ODN website. Each parent/carer should have their own competency document and they should be encouraged to seek assistance if they struggle to obtain adequate aspirate or are unsure of the task at hand.

On occasions it may be appropriate for a baby to be discharged into the community whilst continuing to receive gastric tube feeding. In such circumstances the parent/carer for the patient should receive specific training on the use of gastric tubes and their competence confirmed prior to discharge. Local policy to apply for this.

### Trans-anastomotic tubes (TAT)

Trans-anastomotic tubes (TAT) are inserted by the surgical team during surgery through an anastomosed section of the gastrointestinal tract. These tubes require special consideration and are not within the scope of this policy, however, Section 5.2 is relevant to TAT's placed within the stomach.

Remember:

- **NEVER** remove a TAT without being asked to do so by a member of the surgical team.
- **NEVER** repass a TAT if it falls out, contact the surgical team

The guideline applies to all neonates who are born in neonatal units and maternity units covered by Thames Valley & Wessex Neonatal ODN. This includes the following hospitals:

Thames Valley		
Trust	Hospital	Designation
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford	NICU
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury	LNU
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough	LNU
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital	LNU
Royal Berkshire NHS Foundation Trust	- Reading	LNU

Wessex		
TRUST	Hospital	Designation
University Hospital Southampton NHS Foundation Trust	- Princess Anne Hospital	NICU
Portsmouth Hospitals University NHS Trust	- Queen Alexandra Hospital	NICU
University Hospitals Dorset NHS Foundation Trust	- Poole Hospital	LNU
Salisbury NHS Foundation Trust	- Salisbury District Hospital	LNU
Hampshire Hospitals NHS Foundation Trust	- Basingstoke and North Hampshire Hospital	SCU (Temporary designation)
Hampshire Hospitals NHS Foundation Trust	- Royal Hampshire County Hospital, Winchester	SCU (Temporary designation)
Dorset County Hospital NHS Foundation Trust	- Dorset County Hospital, Dorchester	SCU
Isle of Wight NHS Trust	- St Mary's Hospital	SCU
University Hospitals Sussex NHS Foundation Trust	- St Richard's Hospital, Chichester	SCU

### 3.0 Definitions and abbreviations

#### Definitions

- **CE Marking:** shows that the manufacturer has checked the product conforms to European Union health and safety requirements and is compliant with legislation (Government 2020)
- **ENFit:** the global enteral feeding device connector design that complies with the new International Standard (ISO 80369-3) (BAPEN 2016)
- **Free drainage:** Leaving the orogastric or nasogastric tube end open with a collection bag attached and placed below the level of the stomach.
- **Full aspirate:** aspirating the entire contents of the stomach.
- **Gastric decompression:** use of gastric tube to relieve the stomach of gas or secretions that may otherwise build up and result in a compromised baby, usually by leaving an elevated open syringe on the end of the gastric tube.
- **Gastric tube:** Gastric tube is the umbrella term that will be used to cover both an Orogastric Tube or a Nasogastric tube.
- **Neonate:** a baby up to 44 weeks corrected gestational age
- **Open:** Leaving the gastric tube connected to a 10ml syringe and positioned above the baby
- **pH paper:** an indicator strip that shows the level of acidity.



- **Spigotted:** free drainage bag or syringe can be removed, and the stopper replaced on the gastric tube.

### Abbreviations

- **ABC:** Apnoea, bradycardia, colour change (desaturation)
- **BAPEN:** British Association of Parenteral and Enteral Nutrition
- **BNFc:** British National Formulary for Children
- **CPAP:** Continuous positive airway pressure
- **GI:** Gastrointestinal
- **GT:** Gastric tube
- **HCP:** Health care professional
- **HF:** High flow
- **HSIB:** Healthcare Safety Investigations Branch
- **H2:** Histamine 2 receptor
- **Kg:** Kilograms
- **OGT:** Orogastric tube
- **MBM:** Mother's breast milk
- **MV:** MetaVision
- **NEMU:** Nose, ear, mid-umbilicus
- **NEX:** Nose, ear, xiphisternum
- **NGT:** Nasogastric tube
- **NHS:** National Health Service
- **NMC:** Nursing and Midwifery Council
- **NNU:** Neonatal Unit
- **NPSA:** National Patient Safety Agency
- **TAT:** Transanastamotic tube
- **WBF:** Weight-based formula

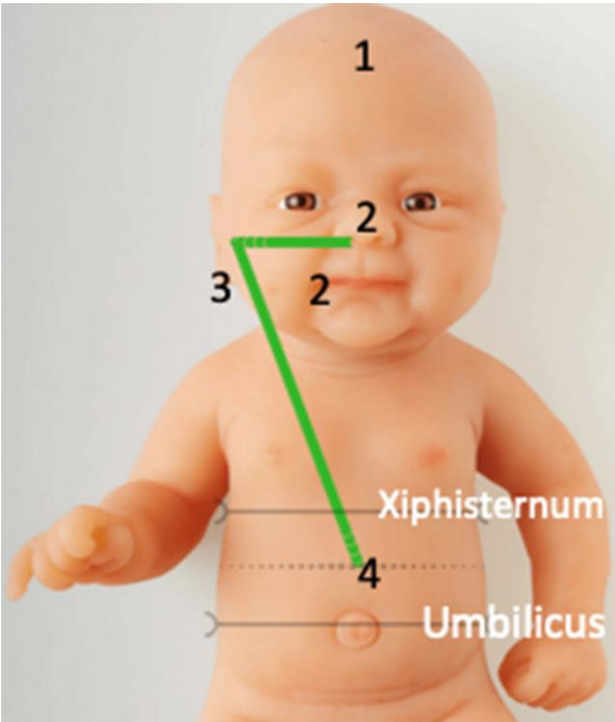
## 4.0 Background information

Nasogastric tubes (NGT) and Orogastric tubes (OGT) are an integral part of care for many neonates admitted to the Neonatal Unit (NNU). They have more than one function in the neonatal population, such as gastric decompressions, gastric aspirate monitoring for feed tolerance and providing nutrition. The passage of a gastric tube is a blind procedure (NHS Improvement 2016), meaning that once the tube has passed into the mouth or nose, we cannot visually direct the tube into the correct position nor can we visually confirm the exact placement of the tube when in use. There is a small risk that gastric tubes can be misplaced during insertion or can migrate out of the stomach at a later stage. Therefore, the need to follow a clinical procedure to confirm the position of the tube on insertion or prior to use is essential.

It is well established that the incorrect placement of a gastric tube can lead to life threatening complication such as aspiration pneumonia and a number of Patient Safety Alerts have been published previously by the National Patient Safety Agency (NPSA, 2005a, 2011a and 2016), due to incidences where gastric tube position has not been appropriately assessed before use, resulting in the administration of fluids or medication into the lungs or pleural cavity. These incidences show that risk to patient safety persists, with misinterpretation of x-rays by medical staff who have not received the required competency-based training as the most common type of error, with other errors including nursing staff and pH testing, unapproved placement checks and communication failures (NPSA 2011a). This guideline outlines the procedures to ensure safe placement of NGT/OGT in neonates and reflects the NPSA guidance (2011b, 2016).



If there is a situation where gastric tube position cannot be confirmed either by pH testing of aspirate or position of gastric tube on x-ray, then the gastric tube **MUST NOT** be used (NPSA 2011a)

	<p><b>Nose – Ear – Mid-Umbilicus (NEMU)</b></p> <ol style="list-style-type: none"><li>1. Head in neutral position</li><li>2. Tip of nose OR corner of mouth</li><li>3. Ear lobe</li><li>4. Midpoint between xiphisternum and umbilicus</li></ol>
	<p><b>Weight Based Formula (WBF)</b></p> <p><b>Orogastric tube:</b> OGT length = <math>[3 \times \text{weight (kg)}] + 12\text{cm}</math></p> <p><b>Nasogastric tube:</b> NGT length = <math>[3 \times \text{weight (kg)}] + 13\text{cm}</math></p>

## **Procedure for the Insertion of a Gastric Tube in a Neonate**

### Step 1.

Identify need for gastric tube insertion

### Step 2.

Explain need for tube to parents and obtain verbal consent

### Step 3.

Identify the most appropriate route for the gastric tube

### Step 4.

Gather equipment required

### Step 5.

Clean hands as per trust policy

### Step 6.

Prepare equipment

### Step 7.

Measure the length using NEMU and check with WBF

### Step 8.

Ensure baby comfortable in midline supine position

### Step 9.

Insert gastric tube, observing for signs of distress

### Step 10.

Check pH of aspirate – 5.5 or below

### Step 11.

Ensure baby is comfortable and settled post procedure

### Step 12.

Dispose of waste and clean hands

### Step 13.

Clearly document procedure

Note: Each step is individually discussed within the body of the guideline

## What is a gastric tube?

A gastric tube is a fine bore, polyurethane tube that is either passed through the mouth (orogastric tube, OGT) or through the nasal cavity (nasogastric tube, NGT), into the back of the throat, down through the oesophagus through the lower oesophageal sphincter and into the stomach.

## 5.1 Procedure for insertion

This section provides further details and supporting literature for the flow chart “Procedure for the Insertion of a Gastric Tube in a Neonate” in section 4.0.

### **Step 1. Identify the need for gastric tube insertion and appropriateness of timing.**

#### **Indications for a gastric tube**

There are many different reasons why gastric tubes are used in the neonatal population:

Table 1: GT Indications	Indication	Further Information
	Gastric decompression (See Section 5.2)	<ul style="list-style-type: none"> <li>• Any neonate who is requiring respiratory support (except low flow or incubator oxygen) should have a gastric tube in-situ. This helps to facilitate gastric decompression which can result in respiratory compromise. It also enables the aspiration of gastric contents in the event of a suspected aspiration.</li> <li>• Any neonate with a surgical condition resulting in increased gastric aspirates i.e., gastroschisis, full or partial bowel obstruction (atresia, webbing, imperforate anus, ileus etc)</li> </ul>
	Assessment of gastric contents	<ul style="list-style-type: none"> <li>• In the preterm neonate and sick term or surgical neonate, it is often required that gastric residuals are assessed to ascertain whether feeds are being tolerated and if they can be increased.</li> <li>• Any surgical neonate with an obstruction should have a gastric tube on free drainage</li> </ul>
	Establishing feeds	<ul style="list-style-type: none"> <li>• Preterm infants who are not able to coordinate suck, swallow, breathing patterns.</li> <li>• Any infants with an unsafe suck/swallow reflex</li> <li>• Faltering growth</li> </ul>
	Administration of medications	<ul style="list-style-type: none"> <li>• Upper gastrointestinal (GI) contrast</li> </ul>
	Exclusion of congenital anomalies	<ul style="list-style-type: none"> <li>• Oesophageal atresia</li> <li>• Choanal atresia</li> </ul>
	Any baby who requires a chest x-ray for respiratory distress	<ul style="list-style-type: none"> <li>• To facilitate a differential diagnosis (NPSA 2005b)</li> </ul>

## Contraindications to gastric tubes

There is an increased risk of causing trauma or gastric tube misplacement if:

Table 2: GT Contraindications	Indication	Further Information
	Known anatomical deformity	<ul style="list-style-type: none"> <li>• Cleft lip/palate</li> <li>• Tracheoesophageal fistula</li> <li>• Oesophageal atresia</li> <li>• Choanal atresia</li> </ul>
	Evidence of trauma	<ul style="list-style-type: none"> <li>• Oesophageal perforation</li> <li>• Gastric perforation</li> </ul>
	The neonate has recently undergone surgery	<ul style="list-style-type: none"> <li>• Oesophageal atresia repair</li> <li>• Tracheoesophageal fistula repair</li> <li>• Duodenal atresia repair</li> </ul>
	The neonate has a tracheostomy	

Contraindications do not rule out the use of a gastric tube, but you should discuss with the medical team and consider appropriateness of passing a gastric tube.

## Complications associated with gastric tube use.

The use of a gastric tubes is routine practice on neonatal units, but awareness is needed of the potential complication associated with their use. (Greenleaf 2017):

- Nasal obstruction
- Irritation/necrosis of nasal mucosa
- Perforation at any point along the track of insertion, including trachea or lung.
- Displacement after insertion
- Infection
- Breaking of the tube
- Grooved palate
- Misplacement (See Table 3)

Table 3: Consequences of Misplaced GT	Gastric Tube Tip	Consequence of Misplacement
	Oesophagus/Lower oesophageal sphincter	Gastroesophageal reflux Aspiration ABC - Apnoea, Bradycardia, Colour change (desaturation)
	Small Intestine	GI disturbances
	Respiratory tract	Aspiration pneumonia Atelectasis Pleural effusion Death
	General consequences	Inadequate GI decompression GI distension Respiratory compromise Vomiting Discomfort

(Parker et al 2018)

## **Step 2. Explain need for gastric tube to parents and obtain verbal consent.**

There will be some instances where it is considered to be in the baby's best interests to pass a gastric tube, for example in the event of a resuscitation or stabilisation for gastric decompression. However, there will also be scenarios where a gastric tube is not an urgent procedure, and it should be discussed with the parents prior to the procedure and verbal informed consent obtained.

It is useful to explain to parents that it is not uncommon for gastric tubes to become dislodged, needing replacement gaining consent for the gastric tube to be replaced without having to gain verbal consent each time. All conversations should be clearly documented in the relevant section of the patient notes.

## **Step 3. Identify the most appropriate route for the gastric tube.**

Orogastric Tube:

- If baby is on non-invasive ventilation i.e., CPAP (continuous positive airway pressure) or high-flow (HF) the most appropriate route to use is the orogastric route especially in the smaller neonate.
- If there are signs of respiratory distress
- If there is evidence of nasal trauma
- May be more suitable if there are facial deformities.
- Choanal atresia
- More prone to displacement, local irritation, and vagal stimulation (Watson and McGuire 2013)

Nasogastric Tube:

- If OGT is not indicated
- May cause or worsen respiratory compromise (Watson and McGuire 2013)
- If the baby is well established on HF and the use of an NGT will not occlude more than 50% of their nose, then they can be considered for an NGT.
- May be considered for babies who are on long term non-invasive ventilation, but this is not routine.
- Remember to alternate each nostril when an NGT is changed to reduce risk of sores, irritation, or necrosis.
- Easier to secure and less likely to be displaced (Spence and Connolly 2020)

## **Step 4. Gather Equipment Required**

- Clean tray for equipment
- Non-sterile gloves and apron
- Mouth and eye protection should be available.
- Correct sized gastric tube.
- Hydrocolloid dressing or skin preparation.
- Securing tape
- Scissors
- 10ml enteral syringe
- pH paper and comparison chart

Other things to consider:

- An assistant
- Mothers expressed milk/Sucrose.
- Free drainage bag

Resuscitation equipment should be available and in working order.

### What type of gastric tube

Gastric tubes on the NNU are a temporary intervention until feeding can be established and for this reason, we use short term polyurethane feeding tubes which are radiopaque throughout their whole length and have visible external marking (making them NPSA compliant, 2011a). Medicina (2019) identify a link between long term gastric tube use and chest infection in preterm infants, advising that tubes are changed every 7 days.

Gastric tubes used should be ENFit compatible to reduce the risk of disconnection or misconnection (ENFit is not compatible with intravenous devices), thus improving patient safety. The tubes come in several different lengths, and you should use the shortest length available to minimise the risk of the tube becoming wrapped around the baby's neck or a limb.

We do not routinely use long term tubes as gastric tubes, only as trans-anastomotic or jejunal tubes which are both outside the scope of this guideline.

### What size gastric tube

There are a range of different sized gastric tubes available on the NNU. Table 4 provides a weight-based guide to gastric tube size selection. Babies who are either less than 500grams or less than 26 weeks should have a size 4 gastric tube due to their physical size or the fragility of their tissues. If a baby has a surgical concern, they should have their gastric tube upsized to the next sized tube available. It is worth considering that if this upsized gastric tube is placed nasally this may be too big and cause obstruction or trauma so you may need to switch to the oral route.

<b>Table 4: GT Size</b>	<b>Weight (grams)</b>	<b>Gastric Tube Size (fr)</b>	<b>Surgical Babies</b>
	<500 <b>OR</b> <26 weeks	4	5
	500-1500	5	6
	>1500	6	8

### Skin care

It is well evidenced that the more premature a baby is, the more immature and fragile the skin. Use of a hydrocolloid dressing (i.e., Comfeel or Duoderm) or a skin preparation (i.e., Derma-s or Cavilon) should be applied to a preterm baby's skin as a barrier before tape is used to secure a gastric tube. It is not uncommon for hydrocolloid dressings to become unstuck, and you can cleanse and dry the skin prior to application. In term infants it is acceptable to stick the tape directly to the skin. Whichever method of sticking you choose, it is essential to remember that any tapes applied to the skin should be removed using an adhesive remover such as Appeel, to ensure the skin is not damaged.

### **Prepare environment.**

As well as preparing your equipment you should prepare the environment. You need to have the baby on a solid, stable, and non-mobile surface. You should consider adjusting the height of the incubator/overhead etc so that access to the baby is improved. You should have a good light source so that you can provide close observation of the baby during the procedure, i.e., observing for change in colour, vomiting etc.

### **Step 5. Clean Hands as per trust policy**

Although the stomach is not a sterile environment, it is essential to ensure that the transmission of any potential pathogens is reduced by adhering to the trusts hand hygiene policy. Hands should be decontaminated before, during and after patient contact using:

- Liquid/foam soap if hands are visibly soiled or potentially contaminated with bodily fluids.
- Alcohol gel can be used in place of liquid/foam soap if hands are visibly clean.

### **Step 6. Prepare equipment.**

All equipment should be ready and easily accessible during the procedure, consider.

- Removing any unnecessary packaging
- Cutting tape to required size.
- Remove pH strip from tube.
- Placing a 10ml syringe on end of gastric tube (loosen the syringe plunger before use)

### **Step 7. Measure the length of insertion.**

Looking back through the literature it was identified back as far as 1978 (Ziemer and Carroll cited Cirgin Ellett et al 2011), that the nose-ear-xiphisternum (NEX) method of measurement was inaccurate, leading to a high percentage of gastric tubes being too high. Despite ongoing evidence, we have continued to use the NEX method on the NNU and this guideline is part of the role out of a change in clinical practice to the nose-ear-mid umbilicus (NEMU) method.

#### **How to Measure**

1. Ensure that the baby is comfortable in **midline supine position**. A second person can assist with containment holding and providing non-nutritive sucking to ensure the baby remains calm.
2. Measure from the **corner of the mouth** or the **tip of the nose**
3. To the **bottom of the earlobe**
4. To the observed **midpoint between the xiphisternum and the umbilicus**



	<b>NEMU</b>
	<p><b>Orogastric tube:</b> corner of the mouth → bottom of ear lobe → midpoint between xiphisternum and umbilicus</p> <p><b>Nasogastric tube:</b> tip of the nose → bottom of ear lobe → midpoint between xiphisternum and umbilicus</p>
	<b>WBF</b>
	<p><b>Orogastric tube:</b> OGT length = <math>[3 \times \text{weight (kg)}] + 12\text{cm}</math></p> <p><b>Nasogastric tube:</b> NGT length = <math>[3 \times \text{weight (kg)}] + 13\text{cm}</math></p>

Once the NEMU method measurement has been undertaken you should use the weight-based formula (WBF) to check the length measured (see above). This formula was proposed by Freeman et al (2012) with a follow-up study by Nguyen et al (2016) and demonstrated that the incorporation of a WBF as a check to the morphological measures, improves correct placement. This finding was also supported by Kato et al (2019).

For babies <1kg round the measurement up to the nearest half centimetre, those over >1kg round to the nearest centimetre. **The longest length obtained, when comparing NEMU with WBF, should be used as the desired distance for insertion.** For example: baby <1 kg, NEMU measurement 14cm, WBF 14.2cm – insert to 14.5cm. Or baby >1kg, NEMU measurement 19cm, WBF 19.7cm – insert to 20cm.

**Step 8. Ensure baby comfortable.**

Gastric tube insertion is not a comfortable procedure for the baby so you should take measures to make sure the procedure is as comfortable as possible. Consider:

- Containment holding if parent or assistant available.
- Swaddling if no assistant available – do not swaddle before you have taken the NEMU measurement.
- Mother’s breast milk (MBM) or Sucrose pre-procedure – can be combined with non-nutritive sucking.

**Step 9. Insert the gastric tube.**

Orogastric Tube:

1. Hold the head steady.
2. Ensure the tongue is down.
3. Insert the tip of the tube into the centre of the mouth.
4. Gently insert the tube to the desired length

### Nasogastric Tube:

1. Hold the head steady.
2. Insert the tip of the tube into the chosen nostril.
3. Direct the tube towards the occiput (back of the head)
  - If resistance felt in the nasopharyngeal area, withdraw 1-2cm and change the angle at which you are trying to insert (i.e., direct tip a little higher or lower)
  - If ongoing obstruction/resistance withdraw the tube and either use the other nostril or ask for senior help
4. Gently insert the tube to the desired length

### Key points to remember.

- You should never need to use force to pass a gastric tube.
- If you feel resistance, withdraw slightly, and try again.
- If resistance is still felt, then withdraw the tube and ask for some senior support.
- You should not have multiple attempts.

It is not uncommon for babies to cough, gag or have a drop in heart rate during insertion of a gastric tube (Clifford et al 2015). Additional signs that the procedure is not being tolerated include ABC's, onset of respiratory distress, vomiting and bleeding. If any of these signs occur and there is no quick spontaneous recovery (Clifford et al 2015), you should withdraw the tube, provide support as required, and await full recovery before attempting to pass the tube again when appropriate and safe.

If, when you remove an unsuccessfully passed tube there is blood on the tip of the tube, this should be clearly documented as a nursing or medical note.

If the health professional gets any resistance to pass the gastric tube beyond the oropharynx, this is indicative of oesophageal atresia and appropriate care should be prioritised.

If the health professional is not able to pass a nasogastric tube beyond the nares, this is indicative of Choanal atresia and appropriate care should be prioritised.

### **Step 10. Aspirate and check the pH.**

Aspirating the gastric tube should ideally be done before it is secured in place with tape in case any adjustments are needed. Whilst holding the position of the tube in place, slowly and gently withdraw the plunger on the 10ml enteral syringe to draw gastric contents through the gastric tube into the syringe. When gastric secretions have been obtained, kink the gastric tube, remove the syringe, and place the cap on the gastric tube. Place enough of the aspirate on the pH strip, ensuring all the test patches are covered with secretions. Then hold the strip near to the test pot to confirm the pH of the contents. Once you have confirmed a pH of 5.5 or less, secure the gastric tube in place with tape, ensuring that the measurement markers are visible for future confirmation of tube position, see Section 5.2 for further evidence and supporting literature on pH measurement.

**Note:** NOTHING should be introduced down the gastric tube before gastric position is confirmed (NPSA 2012).

**For further information on position confirmation see Section 5.2.**

### **Step 11. Ensure baby settled post procedure.**

Once the procedure is complete and the gastric tube is secure the baby should be returned to a comfortable position and comforted to settle.

### **Step 12. Dispose of waste and clean hands as per trust policies**

All waste should be disposed of as per the trust policy and your hands should be decontaminated.

### **Step 13. Clearly document procedure.**

In paper notes or electronically, follow local guidance on this.

- Date and time of procedure
- Gastric tube size
- Length by NEMU and WBF
- Length inserted to
- Route used OGT / NGT (which nostril)
- pH
- Aspirate obtained: liquid (volume, colour), air (volume)
- Tolerance of procedure or complications
- Sign and print your name

## **5.2 Using the Gastric tube.**

Gastric tubes should only be used by healthcare professionals or parents who are signed off as competent (NPSA 2011b). Those who are not signed off must be supervised by a competent NNU HCP.

Confirmation of gastric tube placement should occur upon placement and EVERYTIME it is used (NPSA 2005b) to ensure the tip has not migrated into or near to the respiratory tract and to prevent harm (NPSA 2016). Appendix 1 provides a flow chart to support decision making for gastric tube use. Examples of when to check:

- At point of insertion
- Prior to administration or feed or medicine
- 3-4 hourly in babies who are “nil by mouth”.
- After every syringe change in babies who are being fed by continuous feed (NPSA 2005b)
- If there is any episode of coughing, retching, or vomiting during a feed.
- Any evidence of tube displacement (NPSA 2005b)

What should you check before using the gastric tube:

1. pH of aspirate
2. Length at point of insertion and security of tape (can be used as a supportive measure but does not rule out internal displacement, Dias et al 2017)
3. Colour and type of aspirate

Whilst the length and colour/type of aspirate are not to be used as a sole method for assessing gastric tube position, they can be used in combination with pH to help make an informed decision on gastric tube position (Clifford et al 2015). Parker et al (2018) identify that movement of as little as 0.5cm can account for 5-10% of the actual required insertion length.

You should NEVER use the following methods to check gastric tube position:

- Litmus paper
- Administration of air whilst auscultating over the gastric region - “whoosh” test
- Absence of respiratory distress
- Aspirate appearance

### **pH Measurement**

The first line of testing for all gastric tubes is to measure the pH of the fluid obtained on aspiration using pH paper that is CE marked and manufactured for the testing of human gastric aspirate (NPSA 2011a). Appendix 2 provides guidance on how to test the pH with some pointers for troubleshooting.

NPSA (2011b) and NHS improvements (2016) advise that a pH of 1- 5.5 is the “safe range”. There are some studies that have suggested using a lower pH range, however, there is no consistent research to guide the best cut off to exclude respiratory tract placement (HSIB 2020) and as BAPEN (2020) explain, using a lower pH does not confirm gastric placement just acid presence where the tip of the tube is sited. There is evidence available to support tracheal secretions having a pH of 6 or above (Meert et al 2015) so any pH that is not obviously 5.5 or less should be rechecked. Every pH obtained or failure to obtain should be documented.

You must always check the pH strip against the colour code chart on the side of the test pot (NPSA 2005b). If you have difficulty distinguishing between colours the pH should be verified by a second person.

There are several limitations of pH testing including:

- Gestational age and postnatal age
- Difficulty in obtaining aspirate in babies who are fed small volumes or not fed.
- Being fed frequently or on continuous feeds
- Small volumes of aspirate
- Dilution of gastric acid by feed
- Alteration of pH by medications
  - proton pump inhibitors: Omeprazole, Lansoprazole
  - H2 antagonists: Ranitidine
  - Antacids: Gaviscon
- Interpretation error which may be influenced by environmental factors such as poor lighting.

(Kemper et al 2019 and NPSA 2005b)

### **X-ray Confirmation**

If gastric aspirate is not obtainable and you cannot check the pH, or the pH is 6 or higher, the second line of testing is to obtain an x-ray, but this is not routine procedure (NHS Improvements 2016). Although the dose of radiation from an x-ray is minimal, you need to consider the potential for cumulative effect (Clifford et al 2015). Other considerations include increased handling (more relevant in the extremely preterm baby) and loss of feed time, especially in babies who are fully fed.

If an x-ray is required, this only provides confirmation of tip position at the time of the x-ray. The interpretation should be carried out by an adequately trained HCP and clearly documented on the insertion record (NPSA 2011b), clearly stating that the tube is safe to use (at point of x-ray). The NPSA (2011a) identified 4 key questions that should be met prior to using a gastric tube:

1. Does the tube path follow the oesophagus/avoid the contours of the bronchi?
2. Does the tube clearly bisect the carina or the bronchi?

3. Does it cross the diaphragm in the midline?
4. Is the tip clearly visible below the left hemi-diaphragm?

Xray confirmation must be documented in the notes either in paper notes or electronically. Please follow local guidance on this.

The limitations of x-ray include:

- Risk of misinterpretation
- Exposure to radiation
- Temperature control, especially in preterm or growth restricted babies
- Omitting feeds whilst awaiting x-ray

The NPSA (2011b) identify that there will be some occasions when pH confirmation of gastric tube placement is difficult and daily x-rays are not safe. In these situations, it may be reasonable, so long as the initial placement of the tube was appropriately confirmed (pH or x-ray) and there is no reason to suggest the gastric tube has been dislodged (no vomiting, coughing, retching and no unexplained respiratory symptoms) to carry out an external assessment of the gastric tube to ensure that the length of insertion remains the same and that the securing tape has not moved. This should be a discussion with the senior nursing team and consultant and clearly documented within the patient notes.

### **Methods of Feeding via Gastric Tube**

The most common method of gastric tube feeding on the NNU is by gravity/bolus feed using an open syringe with the plunger removed (see Appendix 3). The syringe should always be held by the HCP or parent/carer and never hung, so that if any complications arise the feed can be paused or stopped immediately. Gravity feeding minimises feeds being given too fast or by using excessive force, as would occur if plunger feeds were administered. Full feeds typically take between 10-20 minutes and babies who are bolus fed tend to tolerate feeds better and gain weight quicker (Spence and Connolly 2020). However, gravity feeds may result in back flow into the syringe if baby becomes upset/cries – pause the feed and settle the baby and then continue the feed.

Occasionally, the decision may be made to switch a baby to continuous feeds via gastric tube (i.e., if a baby is frequently vomiting due to poor tolerance of larger volumes, gastroesophageal reflux and at increased risk of aspiration). There is some evidence that those who are continuously fed take longer to reach full feeds (Spence and Connolly 2020). Feeds are administered at a set hourly rate, usually for 24 hours per day until tolerance is established when there may then be a re-trial of bolus feeds or the decision to give the feeds over a shorter duration to allow a pause/break in feeding. The decision to feed continuously or change continuous feeds is usually made by a consultant. The gastric tube position, including pH and length should be checked with every feed change and clearly documented.

### **Administration of medication**

Gastric tubes can also be used to administer enteral medication. Ideally you should use liquid medication to minimise the risk of blocking the fine bore tube (WoSPGHaN 2015). If a medication is not available in liquid form discuss suitable administration with pharmacist, consider if the medication is suitable for crushing and administering in the stomach or if absorption usually takes place further along the GI tract. Medications should be checked and administered in accordance with the prescription, neonatal formulary (or BNFC) and your medications competency document.

It is not routine practice to flush gastric tubes with water on the NNU due to small volumes of feed. It is normal practice to give medication and then to give the feed to clear the medication from the tube. However, omeprazole should be given at the end of a feed.

## Documentation

There should be clear documentation every time the gastric tube is used (NPSA 2005b).

## Safety

Some key safety themes have been discussed throughout the body of this guideline. These themes are discussed below alongside some additional considerations:

- ENFit
  - the NPSA (2011) set out some clear criteria for gastric tubes and feeding systems and subsequently the ENFit system was designed resulting in a dedicated enteral feeding system that is incompatible with intravenous connections to reduce the risk of incorrect administration.
  - Medicina gastric tubes are smooth, radiopaque throughout the whole length and have visible centimetre markings (Medicina 2019) making them NPSA compliant (Check local products being used)
  - A tube without external markings is not safe to use unless the position has been confirmed by x-ray and a marking has been placed external on the tube (the only instances where this may happen is a baby who has had surgery but this is very uncommon and should not be encouraged)
- Gastric tube size
  - Neonates are obligate nasal breathers so using oral route if any signs of respiratory distress.
  - Use of larger size in babies with surgical pathology to ensure adequate decompression.
  - Awareness of fragility of all tissues in extremely premature babies or those with genetic conditions that may predispose to perforation.
- Aspirate

If a baby is NBM and has repeated episodes of no aspirate, this need to be escalated to the medical team.
- pH paper
  - must be CE marked and manufactured for human gastric aspirate testing use.
  - Is the first line for confirming gastric tube placement.
- Lighting
  - there is an increased risk of misinterpretation of pH in poor/low lighting levels.
  - there is a chance that vomiting may be missed.
- Risk of strangulation/entanglement (NPSA 2012, cited WoSPGHaN 2012)
  - minimise the risk by using the shortest length of tube possible.
  - checking external tube placement when not in use
  - position pumps at head of bed when on pump feeds so line not running the length of the baby.
- Pressure on aspiration of gastric tube
  - Use of a 10ml syringe or bigger to minimise the pressure generated (negative or positive) on aspiration which can result in gastric mucosa being damaged as a result of being sucked into the gastric tube.
  - High positive pressures generated through using smaller syringes may result in damaged or rupture of the gastric tube.
- Observing during feed
  - Watching the length of the tube
  - Monitoring for vomiting
  - Monitoring for ABC's
  - Stopping feed if any concerns
- End of feed
  - Ensure stopper securely replaced to prevent leakage of gastric contents.
  - Clearly documenting in patient notes



## Gastric Decompression

Babies who are admitted to the NNU with a “surgical abdomen” should have a larger size gastric tube to allow for some element of gastric decompression. The size selected should be largest size appropriate for their size/anatomy (see table in Section 5.1: Step 4). Be aware that extremely preterm babies are at a higher risk of perforation at any point along the tract of insertion due to anatomy size and fragility of tissues.

**If a baby returns from theatre with a funnel shaped tube in-situ, this should be replaced with an ENFit compatible tube at the earliest opportunity, unless it is clearly documented that the tube should not be removed (i.e., if it is a TAT). The tube should be clearly labelled and an ENFit adaptor used.**

Aspiration timings:

- **Surgical: These babies should also have their gastric tube fully aspirated (all gastric contents and air) at regular time periods usually set by the surgeon to allow for decompression. If not documented the standard is for a minimum of every three hours, however, in a post op baby they should be aspirated 1 hourly for the first 24 hours to ensure the tube does not become blocked.**
- Medical: it is standard practice to fully aspirate the gastric tube every 3-4 hours whether or not the baby is feeding

There are different types of free drainage used on the NNU:

- Surgical: The gastric tube should be connected to a drainage bag and placed below the level of the stomach
- Respiratory: The gastric tube should be connected to a 10ml open syringe and positioned above the baby, i.e., through the hole at the top of the incubator, or ‘tree if baby being nurse in an open cot.

**If the surgical team ask for the gastric tube to be spigotted, this means that the drainage bag can be removed, and the stopper replaced on the gastric tube.**

It is normal practice to replace gastric content losses ml for ml with 0.9% Sodium Chloride with 0.2% Potassium Chloride usually over a 6-hour period. The decision to replace losses will be led by the surgical team or surgical guidelines.

## 5.3 Troubleshooting the gastric tube.

Appendix 1 provides a flow chart to support decision making for gastric tube use and can be used to troubleshoot when not able to obtain an aspirate or can obtain an aspirate, but the pH is 6 or above.

## 5.4 Infection prevention and gastric tube changes

Hand hygiene should be maintained as per trust policy when inserting or using a gastric tube. Alongside good hand hygiene, you should handle the key parts as little as possible in order to reduce the risk of microbial contamination (as identified in the Food Hygiene Policy).

- Medicina gastric tubes can be used for up to 90 days, however, in small babies who are ventilated, Medicina (2019) advise that gastric tubes are changed every 7 days to avoid chest infections. In order to reduce the risk of missing a gastric tube that is due a change we will continue to adhere to the 7-day rule for all babies on the NNU. This will also ensure that as a baby grows the gastric tube is inserted to the correct length for their current weight. Appendix 4 provides guidance for removal of gastric tubes. (Check local products being used)



**Babies who are being discharged home should have the date of insertion documented in their notes/discharge letters alongside a second date of when the 90 days change date would be.**

The gastric tubes are single use, meaning that when they become dislodged, they should be discarded and a new tube should be placed. They should not be reused under any circumstance (as per the Single Use Equipment Policy).

	<b>Equipment</b>	<b>Usage marking</b>	<b>When to change</b>
<b>Table 5: Changing Equipment</b>	Syringe	Single Use	Change every feed OR every time you aspirate
			Syringes for gastric decompression syringes should be changed every 4 hours
	Bottle	Single Use	Must be changed every 4 hours or more
	ENFit extension set (150cm) “Whirly” or “Giving set”	Single Use	Must be changed every 24 hours
	FloCare Infinity pack set	Single Use	Must be changed every 24 hours
	FloCare universal adapter cross design	Single Use	Must be changed every 24 hours
	ENFit Enteral Drainage bags	Single patient use	Must be changed every 24 hours

## 5.5 Reporting of incidents

NHS Improvements (2018a) define never events as “serious incidents that are wholly preventable” because there is guidance and/or safety recommendations that should have been implemented by healthcare providers.

Misplaced gastric tubes do not routinely count as a never event. NHS Improvements (2016) suggest that it is not usually the passage of a gastric tube into the respiratory tract that causes the pain or harm but the administration of fluid/feeds or medications. Intrapulmonary placement, pneumothorax or pleural placement only become a “never event” if fluid/feed or medications are administered down the tube (NHS Improvements 2018b). This event must be reported both locally by completing an electronic incident report where it will trigger discussion and investigation with the patient safety team and to the National Reporting and Learning System (NRLS). However, if fluid/feeds or medications are not administered and the misplacement is identified it is not classed as a never event.

Intra-oesophageal placement with or without administration does not count as a never event but can predispose to pneumonia. Oesophageal perforation or hypopharyngeal perforation do not count as a never event but should be recorded via the normal electronic incident reporting pathway for ongoing monitoring.

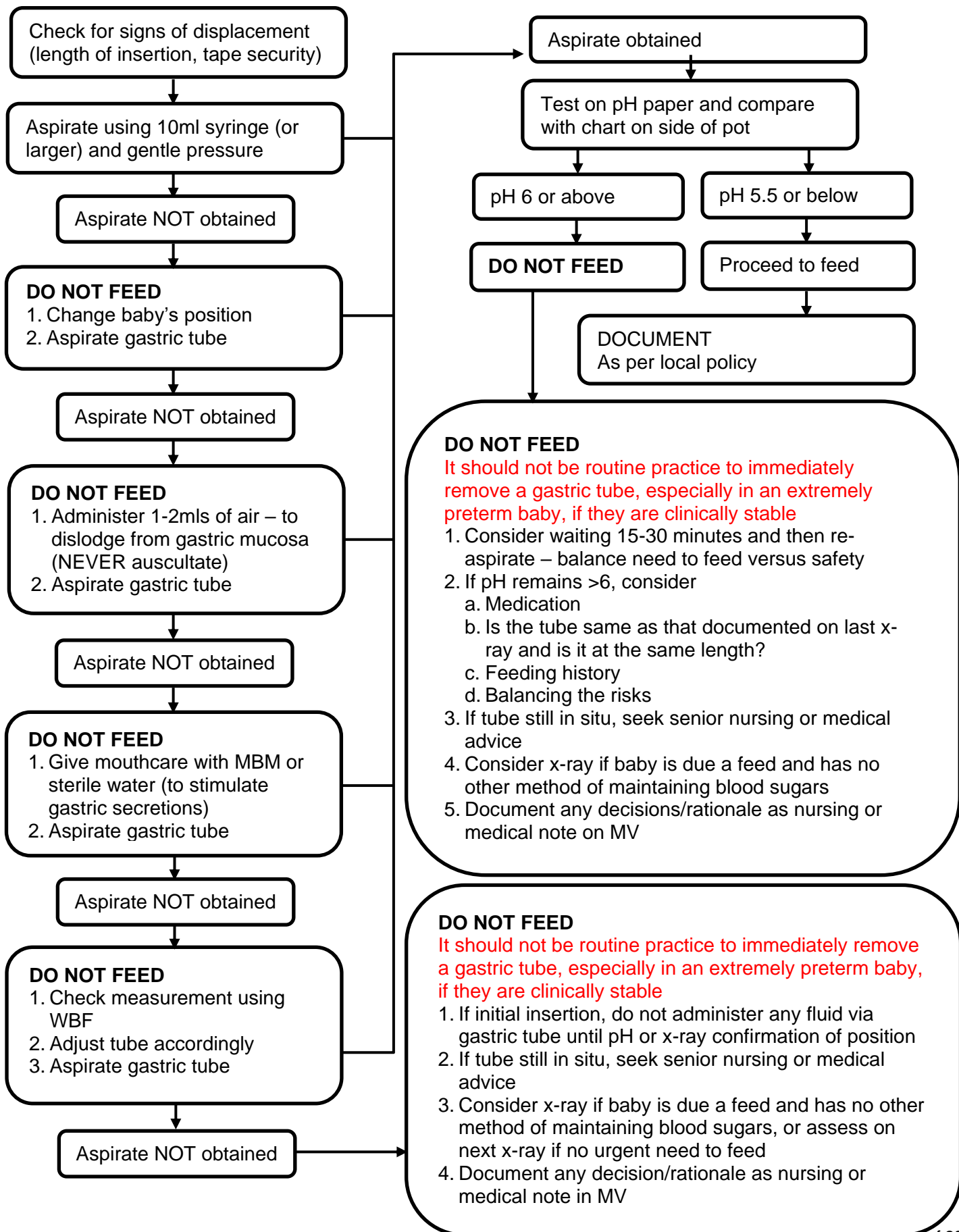
## 5.6 Parent/Carer and tube feeding

When the baby is tolerating small volumes of feeds, we should be actively involving the parents and teaching them how to safely feed their baby following the same advice provided by this guideline. The ODN “Tube feeding your baby on the Neonatal Unit: parent/carers learning pack” is available to give to the parents (a copy per parent) and they should work through before being allowed to carry out a gastric tube feeding unsupervised.

Support for parents when home tube feeding will be provided by some local outreach/paediatric community teams. Please see local policy on this

## 6.0 Appendices

### Appendix 1: Flow Chart for Use of Gastric Tube



## Appendix 2: How to Test the pH.

	What to Do	Additional Information
1	Collect required equipment	10ml Syringe, pH strip and test pot, non-sterile gloves
2	Clean hands as per policy and apply gloves	To reduce the transfer of microbial contamination
3	Kink gastric tube at end, remove cap and attach 10ml syringe	It can help to loosen the syringe plunger before attaching
4	Gently withdraw the plunger to obtain a small amount of gastric contents	<0.5mls required for testing; full aspirates should be obtained every 3-4 hours to assess feeds tolerance
5	Kink gastric tube, remove syringe and replace cap	To prevent loss of gastric contents
6	Place aspirate onto pH strip, ensuring all patches are covered	It takes 10-15 seconds for the number to stabilise
7	Compare pH strip against chart on side of container	To correctly assess pH
8	A pH of 5.5 or below is considered to be in the “safe range”	As per NPSA 2011b and NHS Improvements 2016
9	Kink tube, remove cap, replace aspirate >1ml before proceeding to feed OR Discard aspirate and replace cap, or replace syringe/bile bag	To minimise loss of nutrition and enzymes  Depending on individual need
10	Document as per local policy	Legal requirement

## Appendix 3: How to Administer a Bolus Feed

	What to Do	Additional Information
1	Identify that feed is due	Check "Doses & Tasks" tab
2	Prepare the feed	As per Milk Kitchen Operational Policy
3	Collect equipment	
4	Clean hands as per trust policy and apply gloves	As per Hand Hygiene Policy
5	Test pH	As per Appendix 2
6	<p>Syringe</p> <ul style="list-style-type: none"> <li>- Kink tube and remove cap</li> <li>- Remove stopper from syringe and withdraw plunger as far as able without fully removing</li> <li>- Connect syringe to tube and hold above the patient (not more than 10cm)</li> <li>- Remove plunger and give gentle plunge to start feed flowing and then remove plunger</li> </ul> <p>Bottle</p> <ul style="list-style-type: none"> <li>- Kink tube and remove cap</li> <li>- Remove plunger from syringe and attach to gastric tube</li> <li>- Pour milk into syringe</li> <li>- Unkink tube and give a gentle push with plunger</li> <li>- Top syringe up until all milk administered</li> </ul>	<p>If feed stops you can give it another gentle push with plunger</p> <p>The feed should flow in slowly by gravity; if flowing too fast, lower the syringe; if flowing too slow, raise the syringe</p> <p>Avoid letting syringe run dry and thus administering air</p> <p>If baby has an A/B/C, pause the feed by kinking the tube, you can restart the feed once they have recovered</p> <p>If the baby vomits during a feed, you should stop the feed by kinking the gastric tube, replacing the plunger, and disconnecting the syringe. You should then retest the pH before recommencing the feed</p>
7	Once feed complete, drain as much feed from the tube as possible, kink the tube, remove the syringe, and replace the cap	It is not routine practice to flush gastric tubes with water on the NNU
8	Ensure baby is settled post feed	
9	Discard of waste and clean hands as per trust policy	As per trust policy
10	Document as per local policy	NMC requirement

## Appendix 4: How to remove a Gastric tube

### What to Do

1	Identify that gastric tube requires removal: <ul style="list-style-type: none"><li>• No longer required for nutritional support or gastric decompression</li><li>• Due a change</li><li>• Dislodged by baby</li></ul>
2	The stopper should be attached when removing a gastric tube. If it is not possible to replace the stopper, kink the gastric tube prior to removal to minimise the risk of contents emptying into the pharynx (Greenleaf 2017)
3	Use Appeel if able to remove and sticky tape from the skin (may not be appropriate in an emergency)
4	Gently pull the gastric tube out until the tip is visualised
5	Ensure the baby is settled post procedure
6	Discard of waste as per trust policy
7	Clean hands as per trust policy