

## Nasogastric Feeding Tubes: Insertion, Verification, Removal

### Table of Contents

---

- [Critical Points](#)
- [Supplies](#)
- [Procedure](#)
  - [Preparing for NG Tube Insertion](#)
  - [NG Tube Insertion](#)
  - [Initial Verification: pH](#)
  - [Initial Verification: Radiographic](#)
  - [Ongoing Verification](#)
  - [Removal of the Nasogastric Tube](#)
  - [Documentation](#)
- [Troubleshooting](#)
- [References](#)
- [Appendix A: NG Decision Tree: Verification for Initial Placement](#)
- [Appendix B: NG Decision Tree: Ongoing Verification](#)
- [Appendix C: Obtaining an Aspirate](#)
- [Appendix D: NG Tube Securing](#)
- [Appendix E: NG Strip Images](#)
- [Appendix F: ENFit® Transitional Adaptors](#)
- [Appendix G: Clog Zapper](#)
- [Appendix H: Feeding Tube Sizes and Options](#)

### Critical Points

---

1. Verification of gastric placement is performed prior to any use of an NG tube. Verification is determined by x-ray or pH of the aspirate depending on patient population risk factors for misplacement.
2. Auscultation is not a method of NG tube placement verification. It is a step in the placement process.
3. If a patient experiences sudden onset or persistent respiratory distress during or after NG tube insertion, immediately remove the tube and contact provider before attempting replacement.
4. In any patient with a recent history of oral, nasal, facial, tracheal, esophageal, or gastric surgery or trauma DO NOT insert, manipulate, or reinsert an NG tube. Contact provider for assistance.
5. NG tube insertion, re-insertion, or manipulation may be contraindicated in select patients. A provider must place the NG tube or be present during the NG tube placement in patients with the following conditions:
  - a. Esophageal varices
  - b. Esophageal or gastric bleeding, known gastric perforation
  - c. Nasal abnormalities
  - d. Recent nasal/facial trauma or surgery
  - e. Recent basal skull fracture
  - f. Recent surgical procedures such as:
    - i. Cleft lip or palate repair
    - ii. Tracheal, esophageal or gastric surgery

**Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)**

- iii. Alveolar bone graft
  - iv. Pharyngoplasty
  - v. Nasal revision
  - vi. Transphenoidal surgery
  - vii. Midface advancement nares
6. The standards for enteral feeding small bore connectors as recommended by the FDA and Joint Commission to prevent tubing misconnections and wrong route delivery of fluids, nutrition formula, and medication, are observed. ENFit® connections are used. See Appendix C: ENFit® Transitional Adaptors for connections, drawing up liquid medications, and cleaning the ends of an ENFit feeding tube.
  7. Clog Zapper is a natural enzyme that assist with dissolving a clog in a NG/NJ feeding tube if clog is organic material such as a feeding. If the clog is due to medication(s), clog zapper will not dissolve it, so replace tube and ensure adequate flushing as per flush recommendations. Clog Zapper is not to be used on any altered tube, i.e., feeding tube inserted in J tube arm of a G-Tube. Clog Zapper should not be used with force and if tube visually bulges stop intervention as it may lead to dissection of the tube.
  8. Tube replacement is generally recommended every 30 days. Tubes may be used for a longer period and should be reviewed each week after 30 days of dwell by the primary provider team and unit CNS/APN. Document review/plan of use as comment in LDA.
  9. Report damaged or dissected tube(s) & save product and package if possible.
  10. See [Nasogastric Nasoenteric Feeding Tubes Care and Maintenance Procedure](#)

**Supplies**

---

- Nasogastric tube (size as appropriate for size of patient and purpose). See [Appendix H](#) for feeding tube sizes/options.
  - Neonate/Infant 6-8 French
  - Child/Young Adult 6-10 French
  - Adult 8-12 French
- 3M Cavilon No Sting Barrier Film
- Coloplast for use as a skin barrier
- 3M Medipore H tape or cloth adhesive tape (½ inch or narrower)
- Tegaderm
- Scissors
- Clean gloves
- Water to activate existing lubricant on external tip and lumen
- Cup of water and straw for older children, when appropriate
- Pacifier for infants
- Permanent marker
- Suction system, available and functional
- pH strips (*PMM 45345*) – DO NOT use Gastroccult

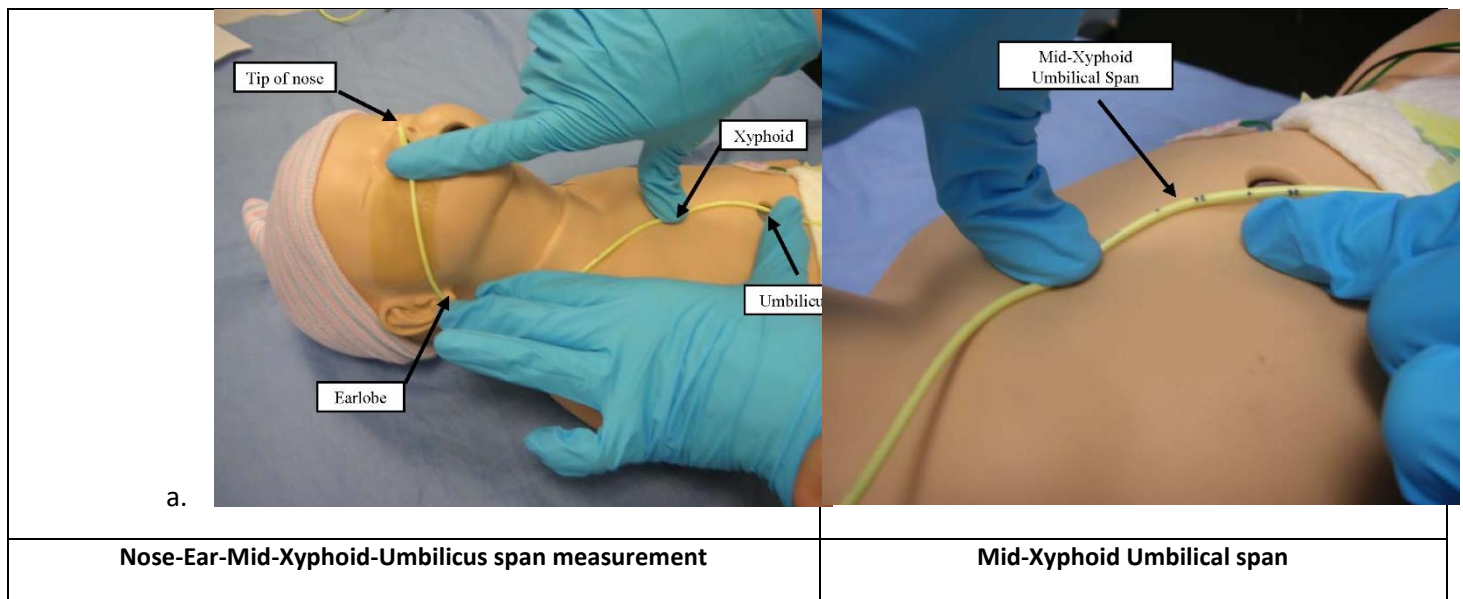
**Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)**Procedure

---

**PREPARING FOR NG TUBE INSERTION**

1. Obtain and review provider order for placement of an NG enteral feeding tube.
2. Explain procedure to parents and child (as appropriate for age/condition) including rationale for NG tube placement. Ensure all questions have been answered.
3. Contact Child Life for procedural support as appropriate.
4. It is recommended the patient is NPO 30 minutes prior to tube insertion, or re-insertion, to decrease the likelihood of vomiting and aspiration. In urgent events, or if there is a potential for hypoglycemia or dehydration, consult provider regarding need for immediate insertion/reinsertion.
5. Gather supplies.
6. Perform hand hygiene and don clean gloves.
7. Select nares for insertion. As age appropriate, evaluate patency by occluding each nares. If tube is being replaced, select opposite nares, if patent.
8. Apply Cavilon to upper lip and cheek of selected nares. Cut skin barrier and apply to patient's cheek. Prepare tape. Cut Tegaderm to size.
9. Position patient as appropriate.
  - a. Supine with head of bed elevated 30-45° as condition permits.
  - b. A small child or infant may need to be held for placement.
10. Determine depth of tube insertion by using the Nose-Ear-Mid-Xiphoid-Umbilicus (NEMU) span method: measure from tip of nose to inferior attachment of ear or earlobe, to mid-point between xiphoid process and umbilicus. (See [Figure 1.](#))
  - a. Note external cm marking at nose as goal depth of insertion.
  - b. Do not mark tube with a permanent marker until there is verification of NG tube placement.
11. Stylet use is optional and may be necessary for successful insertion in some patients.
  - a. Instill 10 mL of water into stylet connector to activate internal lubricant and aid removal of stylet.
  - b. If not using stylet remove at this time.
12. For pre-lubricated tubes, activate lubricant by submersing tip of NG tube in water for 5 seconds.
  - a. If tube does not have pre-lubricated coating, lubricate end of tube sparingly with water-soluble lubricant prior to insertion. (See package insert to confirm type of lubricant.)

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)



**Figure 1.**

### NG TUBE INSERTION

1. For comfort and safety:
  - a. If developmentally appropriate, and patient is not NPO for clinical reasons other than NG placement, give child a cup of water with instructions to sip on straw and swallow during tube passage.
    - i. Ask patient to tip head forward to facilitate passage of tube.
    - ii. If appropriate, pre-arrange a signal (e.g., raising their hand) to indicate child feels he or she is about to gag or cough. You may pause advancing the tube.
  - b. Infant may be consoled by non-nutritive sucking on a pacifier during insertion.
2. To insert: gently but steadily thread tube through selected nares, aiming posterior and parallel to nasal septum. Advance to previously noted mark.
3. Auscultate for audible “swoosh” over epigastric area as a possible indicator of tube tip location. If no “swoosh” is heard, reposition NG tube and auscultate again. Auscultation is not a verification method.
4. If resistance is met consider one or more of the following:
  - a. Reposition the angle of insertion
  - b. Reposition patient’s head
  - c. Use alternate nares
  - d. Use smaller diameter tube
5. If patient experiences persistent respiratory distress or a sudden onset of severe respiratory distress during or after insertion, immediately remove NG tube.
6. If tube placement is unsuccessful, notify ordering provider.
7. Secure tube to face and ensure tube is not placing pressure on any part of the nares. See [Appendix D](#)
8. Remove gloves and perform hand hygiene.
9. Document in medical record:

**Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)**

- a. Time of NG tube insertion
- b. French size of NG tube
- c. Insertion depth (cm marking at the nares, or mouth)
- d. How patient tolerated procedure
- e. Any problems associated with insertion procedure
- f. Method for placement verification (radiographic or pH)
- g. Clinician who placed NG tube
- h. Comfort measures used

**INITIAL VERIFICATION: PH**

- **NOTE:** For difficulty obtaining aspirate see [Appendix C](#)
1. Patients who require pH verification include:
    - a. All acute care and ICN patients who do not meet high risk x-ray criteria (see [Initial Verification: Radiographic](#) section).
  2. Gastric placement must be verified before tube is used to instill fluid, feeds, or medication.
  3. To verify correct placement, obtain sample of aspirate for pH testing.
  4. If pH result is 5 or less, tube is considered to be in the stomach and can be used.
  5. If pH result is greater than 5, obtain order for chest/abdominal x-ray to verify placement. See [Initial Verification: Radiographic](#) section
  6. After verification of correct NG tube placement, for all patients clearly identify exit point at nares with a permanent marker. Exit point mark must remain visible at all times.
  7. Document exit cm NG tube marking in medical record.

**INITIAL VERIFICATION: RADIOGRAPHIC (X-RAY)**

1. Patients who require radiographic verification include:
  - a. All critical care patients in CICU and PICU
  - b. All transitional care patients in CTCU and TCUP
  - c. Patients with gastric aspirate pH results greater than 5
  - d. Pediatric patients in Emergency Department
  - e. Pediatric patients in PACU and OR
  - f. Patients in whom the medical team requests x-ray verification
2. Gastric placement must be verified by provider before tube is used to instill fluid, feeds, or medication.
3. If NG tube is in the airway, and patient is not in distress, notify provider and make a plan for removal. Removal of a tube in the airway may result in pneumothorax and respiratory insufficiency.
4. Provider must provide a written order, following x-ray verification of gastric placement, stating "OK to use NG tube".
5. After verification of correct NG tube placement, clearly identify exit point at nares with a permanent marker. Exit point mark must remain visible at all times.

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### ONGOING VERIFICATION

1. RN will verify tube placement by confirming black exit mark and/or cm marking visible at nares:
  - a. At beginning of each nursing shift.
  - b. Before instilling, fluid, feeds, or medication.
2. pH re-verification of placement is required when:
  - a. Mark is not visible at nares or cm marking has changed from previous documentation and tube must be pushed in or pulled out to return the mark to nares.
  - b. Patient has severe vomiting.
  - c. Patient is admitted with existing NG tube and no x-ray is obtained on admission.
    - **NOTE:** For difficulty obtaining aspirate see: [Appendix C](#)
3. Radiographic re-verification of placement is required and x-ray must be ordered by provider when:
  - a. pH is greater than 5
  - b. Patient's condition changes acutely, even if mark is visible at nares. These symptoms may include:
    - i. Coughing or cyanosis (aspiration is suspected)
    - ii. Signs of acute respiratory distress
    - iii. Any changes in patient's color, behavior, cry, or voice
    - iv. Decreased oxygen saturation (only when patient monitored by pulse oximetry)
4. When x-ray is obtained for placement verification, provider must verify tube is in the stomach on x-ray. Once verified, a provider order is required prior to use stating "OK to use NG tube".

### REMOVAL OF THE NASOGASTRIC TUBE

1. Obtain and review provider order for NG tube removal.
2. Inform patient and family of procedure.
3. Perform hand hygiene and don clean gloves.
4. If applicable, turn off continuous feeding.
5. Remove tape and skin barrier using adhesive remover if necessary.
6. Pull tube out of nose in a steady motion. If resistance is met during removal: stop, secure tube, and notify provider.
7. Inspect and document catheter integrity measuring from black mark to end of tube when able to read cm markings and if not able to read cm markings carefully exam end of tube to rule out dissection. Immediately notify provider if concern for discrepancy, save tube and complete IR.
8. Document tube removal and any associated complication in medical record.

### DOCUMENTATION

1. Document:
  - a. Patient's tolerance of procedure.
  - b. Size of tube and centimeter marking at insertion site (nares or mouth.)

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

- c. Method of tube verification.
- d. Insertion depth once a shift.

### TROUBLESHOOTING

Problem	Action
Difficulty obtaining aspirate for Ph	<ul style="list-style-type: none"> <li>• If unable to obtain aspirate from NG tube consider one or more of the following:               <ul style="list-style-type: none"> <li>○ Use smaller syringe (smaller syringe will generally result in less pressure generated during aspiration)</li> <li>○ Reposition patient to his/her side</li> <li>○ Instill 1-3 mL air and re-attempt aspiration.</li> </ul> </li> <li>• If unable to instill air and unable to obtain aspirate, patient will require radiographic verification of NG tube placement. Obtain provider order.</li> </ul>
Unclogging	<ul style="list-style-type: none"> <li>• Notify provider if tube is clogged.</li> <li>• Use Clog Zapper to unclog feeding tubes. This system works by loosening, breaking down, and dislodging organic matter of feeding clogs.               <ul style="list-style-type: none"> <li>○ Does not require provider order. Obtain from Materiel Services. See instructions <a href="#">Appendix G: Clog Zapper</a>.</li> <li>○ <b>Note:</b> For patients 4 or less kg, flush tube with volume of tube plus 1 mL. Do not use 6 mL.</li> </ul> </li> <li>• Feeding tubes which cannot be de-clogged must be replaced.</li> <li>• Do not use clog zapper on altered tubes, see critical points.</li> <li>• Do not use clog zapper if visual bulging is seen with intervention</li> </ul>

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

Difficulty disconnecting tube due to milk in moat or stickiness

- Due to the complex design of the ENFit Connector, cleaning and removal of nutritional formula may be more difficult and risk of contamination could increase. Conventional cleaning methods (cottons balls, cotton swabs, wipes) may be ineffective.
- Do NOT over tighten the ENFit cap as it can get stuck and make it difficult to open
- Leave a little air bubble at the tip if the feeding syringe to prevent spillage of milk/formula into the moat
- The EnClean Brush removes formula, cleans the internal threads of the ENFit Connector, clean the moat daily and as needed





## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### References

Level of Evidence (FAME <sup>®</sup> )	Level*	Reference
	E4	AACN Practice Alert. (2009). Verification of feeding tube placement (blindly inserted). <a href="http://www.aacn.org/wd/practice/docs/practicealerts/verification-feeding-tube-placement.pdf?menu=aboutus">http://www.aacn.org/wd/practice/docs/practicealerts/verification-feeding-tube-placement.pdf?menu=aboutus</a>
	E4	Boeykens, K., Steeman, E., & Duysburgh, I. (2014). Reliability of pH measurement and the auscultatory method to confirm the position of a nasogastric tube. <i>International journal of nursing studies</i> , 51(11), 1427–1433. <a href="https://doi.org/10.1016/j.ijnurstu.2014.03.004">https://doi.org/10.1016/j.ijnurstu.2014.03.004</a>
	E4	Boullata, J. I., Carrera, A. L., Harvey, L., Escuro, A. A., Hudson, L., Mays, A., McGinnis, C., Wessel, J. J., Bajpai, S., Beebe, M. L., Kinn, T. J., Klang, M. G., Lord, L., Martin, K., Pompeii-Wolfe, C., Sullivan, J., Wood, A., Malone, A., Guenter, P., & ASPEN Safe Practices for Enteral Nutrition Therapy Task Force, American Society for Parenteral and Enteral Nutrition (2017). ASPEN Safe Practices for Enteral Nutrition Therapy [Formula: see text]. <i>JPEN. Journal of parenteral and enteral nutrition</i> , 41(1), 15–103. <a href="https://doi.org/10.1177/0148607116673053">https://doi.org/10.1177/0148607116673053</a>
	E4	Conway, D.B. (2008). Orogastric/nasogastric tube: insertion and removal. In J.T. Verger & R.M. Lebet (Eds). <i>AACN Procedure Manual for Pediatric Acute and Critical Care</i> , pp. 1328-1333.
	E4	Cirgin Ellett, M. L., Cohen, M. D., Perkins, S. M., Smith, C. E., Lane, K. A., & Austin, J. K. (2011). Predicting the insertion length for gastric tube placement in neonates. <i>Journal of obstetric, gynecologic, and neonatal nursing : JOGNN</i> , 40(4), 412–421. <a href="https://doi.org/10.1111/j.1552-6909.2011.01255.x">https://doi.org/10.1111/j.1552-6909.2011.01255.x</a>
	E4	Farrington, M., Lang, S., Cullen, L., & Stewart, S. (2009). Nasogastric tube placement verification in pediatric and neonatal patients. <i>Pediatric nursing</i> , 35(1), 17–24.
	E4	Gilbertson, H. R., Rogers, E. J., & Ukoumunne, O. C. (2011). Determination of a practical pH cutoff level for reliable confirmation of nasogastric tube placement. <i>JPEN. Journal of parenteral and enteral nutrition</i> , 35(4), 540–544. <a href="https://doi.org/10.1177/0148607110383285">https://doi.org/10.1177/0148607110383285</a>
	E4	Gordon, M.D. (2011). Best Evidence: Nasogastric Tube Placement Verification, <i>Journal of Pediatric Nursing</i> , 26, 373-376.
	E4	Irving, S. Y., Lyman, B., Northington, L., Bartlett, J. A., Kemper, C., & Novel Project Work Group (2014). Nasogastric tube placement and verification in children: review of the current literature. <i>Critical care nurse</i> , 34(3), 67–78. <a href="https://doi.org/10.4037/ccn2014606">https://doi.org/10.4037/ccn2014606</a>
	E4	Lyman, B., Kemper, C., Northington, L., Yaworski, J. A., Wilder, K., Moore, C., Duesing, L. A., & Irving, S. (2016). Use of Temporary Enteral Access Devices in Hospitalized Neonatal and Pediatric Patients in the United States. <i>JPEN. Journal of parenteral and enteral nutrition</i> , 40(4), 574–580. <a href="https://doi.org/10.1177/0148607114567712">https://doi.org/10.1177/0148607114567712</a>
E4	National Association of Children’s Hospital and Related Institutions. (2012). Child Health Patient Safety Organization Patient Safety Action Alert, Blind Pediatric NG tube Placements Continue to Cause Harm. <a href="https://www.childrenshospitals.org/quality-and-performance/patient-safety/alerts/2012/blind-pediatric-ng-tube-placements">https://www.childrenshospitals.org/quality-and-performance/patient-safety/alerts/2012/blind-pediatric-ng-tube-placements</a>	
E4	AHRQ National Guideline Clearinghouse. (2011). Best evidence statement (BEST). Confirmation of nasogastric tube placement in pediatric patients. 2 <a href="https://www.guideline.gov/content.aspx?id=35117&amp;search=nasogastric">https://www.guideline.gov/content.aspx?id=35117&amp;search=nasogastric</a>	

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

	E4	Peter, S. & Gill, F. (2008). Development of a clinical practice guideline for testing nasogastric tube placement. <i>The Authors Journal Complication</i> , 14(1), 3-11.

### Procedure History

---

Author:	Barbara Bratton, RN, MS; Lori Fineman, RN, MS
Originated:	03/04
Resources:	UCSF Children’s Hospital CNSs/APNs
Reviewed:	7/10 Approved by: UCSF Children’s Hospital Safety Committee; UCSF Patient Safety Committee
Reviewed / Revised:	8/07 Lori Fineman, RN, MS, CNS; Barbara Bratton, RN, MS; Steve Kloman, RN, MS 11/10 Lori Fineman, RN, MS, CNS; Barbara Bratton, RN, MS 2/14 Shelley Diane, RN, MS, CNS 3/16 Shelley Diane, RN, MS, CNS; Barbara Bratton, RN, MS; Lisa Tsang, RN, MN; Sue Peloquin, RN, MS, NP; Barbette Murphy, RN, MS, CPNP 6/16 Susan Peloquin, RN, MS, NP (only: verification Sections III/IV & Appendix A) 10/16 Barbette Murphy, RN, MSN, CPNP (only: Section IV.A) 7/18 Barbette Murphy, RN, MSN, CPNP 2/22 Shelley Diane, RN, MSN, CNS; Jeannie Chan, RN, MSN, CNS

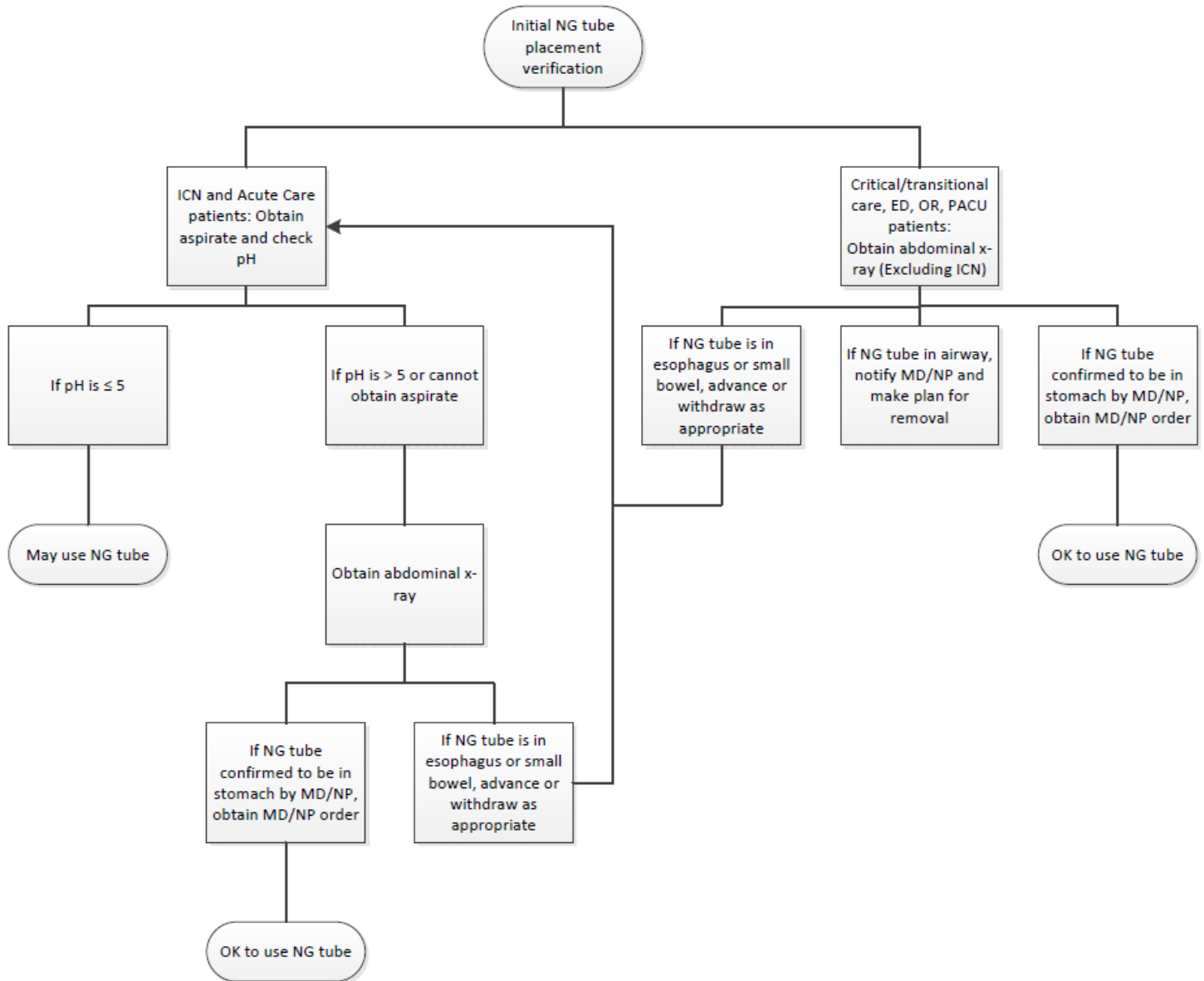
This document is intended for use by the UCSF Medical Center. No representations or warranties are made for outside use.

Not for outside reproduction or publication without permission.

Inquiries to the Center for Nursing Excellence and Innovation at [CenterforNursingExcellenceandInnovation@ucsf.edu](mailto:CenterforNursingExcellenceandInnovation@ucsf.edu)

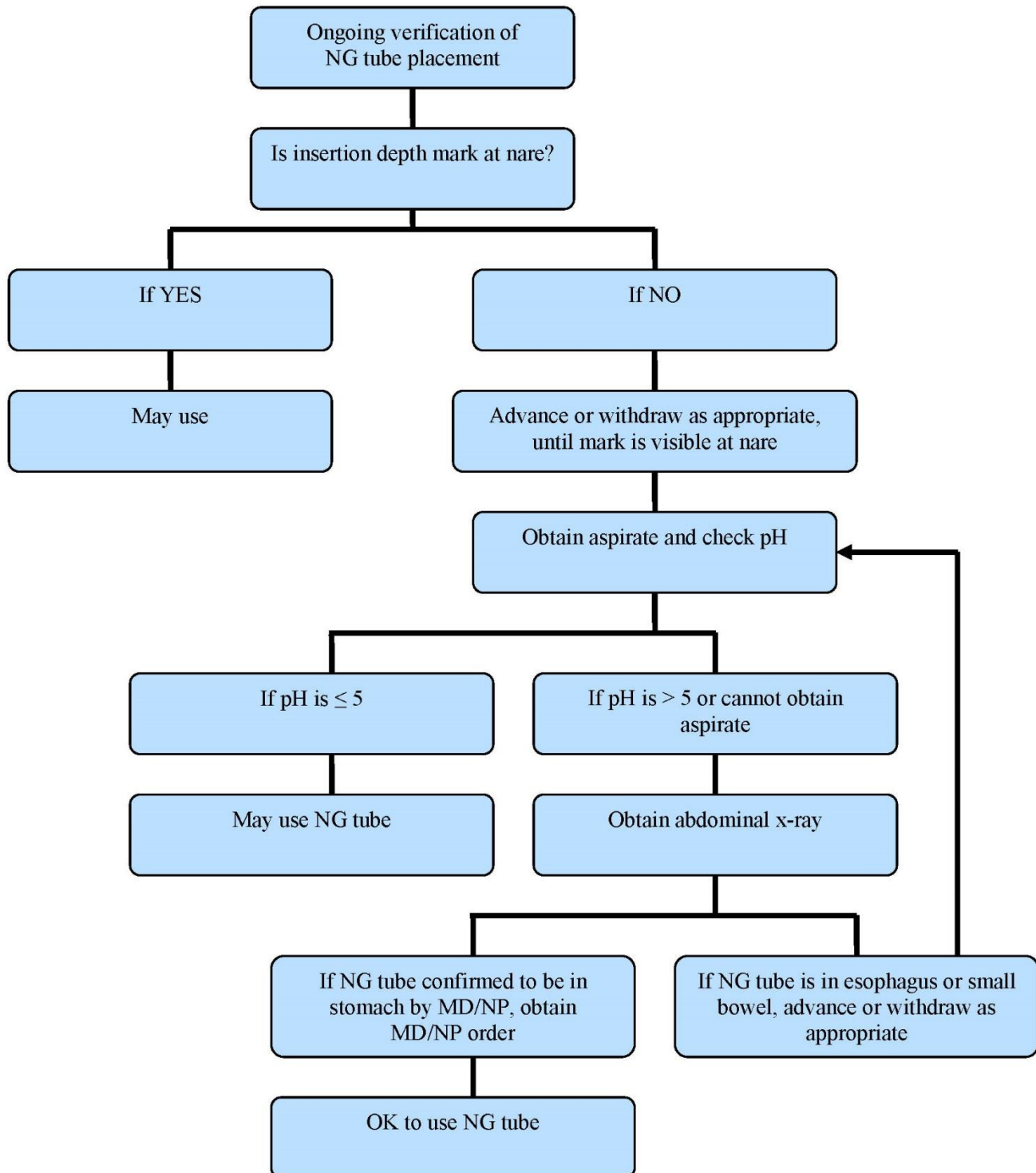
## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix A: NG DECISION TREE: VERIFICATION FOR INITIAL PLACEMENT



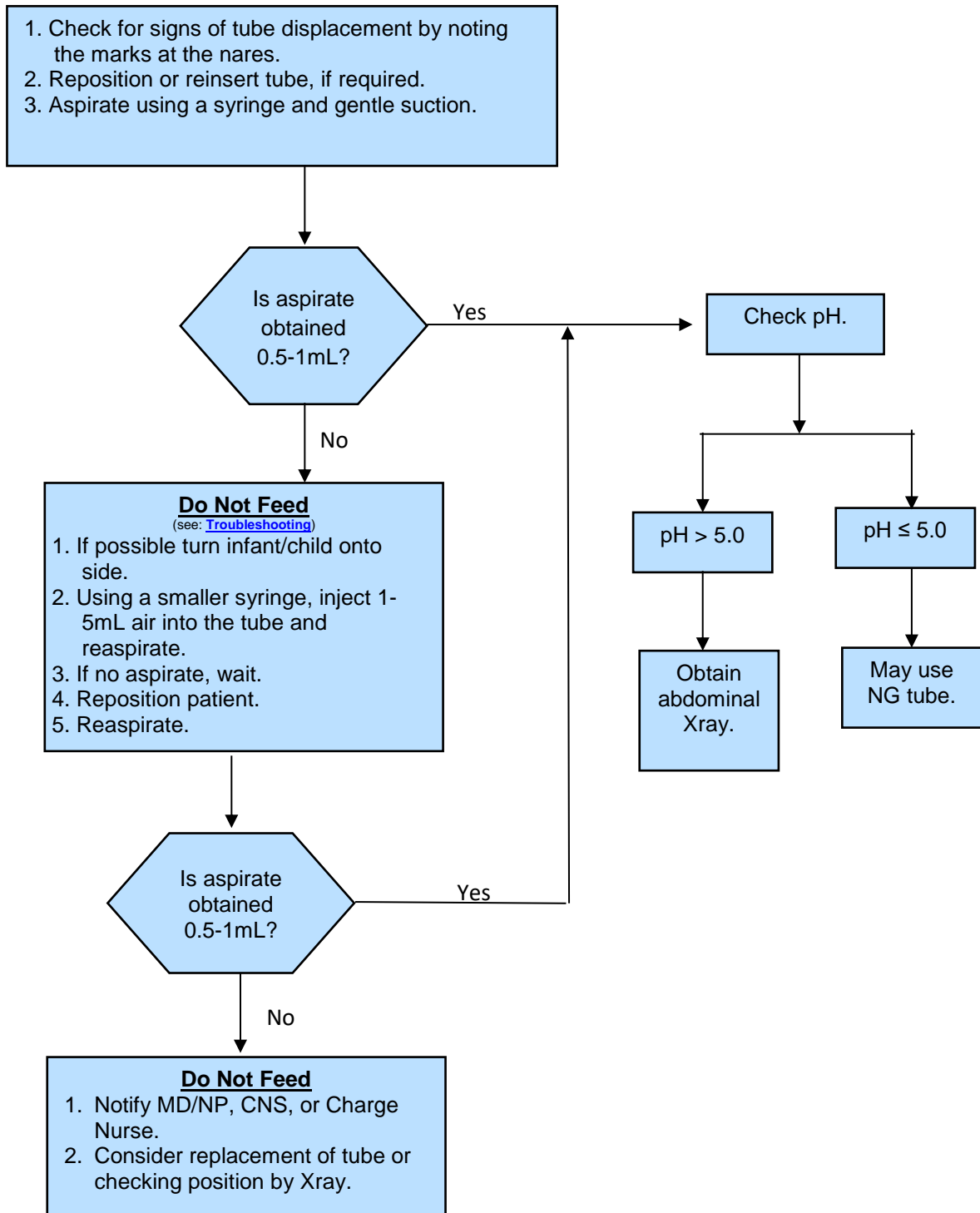
## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix B: NG DECISION TREE: ONGOING VERIFICATION



## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix C: OBTAINING AN ASPIRATE



## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix D: NG TUBE SECURING

**Cavilon Application #1**



**Skin Barrier Application #2**



**NG Tube Insertion #3**



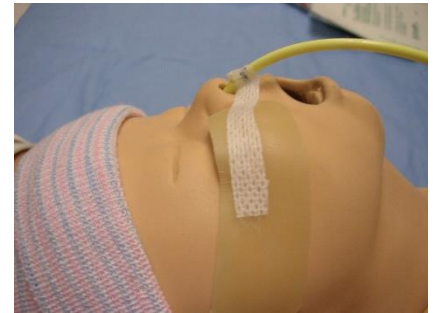
**Tape Application #4**



**Pinch Tape Application #5**



**Completed Taping #6**



**Cavilon Over Tape #7**



**Film Dressing Application #8**



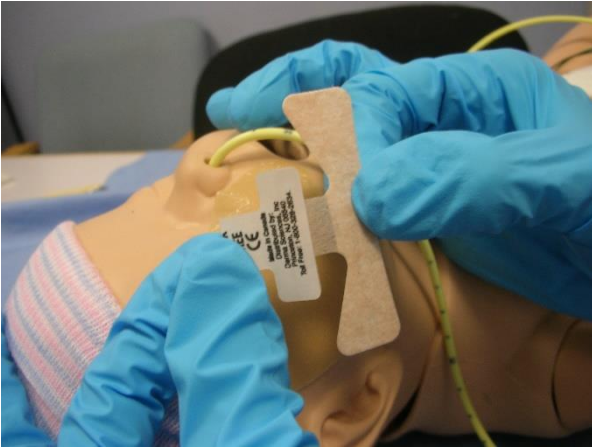
**Mark at Nares #9**



## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix E: NG STRIP IMAGES

---



**NG strip #1**



**NG strip small end to side of nose #2**









**Wrap wide end of NG strip around tube #3**



**Mark at Nares #4**

## Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)

### Appendix F: ENFit® Transitional Adaptors Available from Materiel Services

PMM	Transitional Adaptors
104004	<p>ENFit® Syringe to Med-Port in Standard Y-Port</p>  <p>Order# – TRN101</p>
360806	<p>Oral and Luer Lock/ Slip Tip Syringes to ENFit® Feed Set</p>  <p>Order# – TRN201</p>
801079	<p>Standard Feed Bag to ENFit® Feed Set Standard</p>  <p>Order# – TRN203</p>
112266	<p>Standard Catheter Tip Syringe to ENFit® Feed Set</p>  <p>Order# – TRN202</p>
201843	<p>Enfit Syringe to Standard Med or Y-Port use EnFit Stepped to draw up liquid medication</p> 
66595	<p>Single-Use brush for cleaning of the internal threads of the ENFit end</p>  <p>The Single-Use Brush</p>



**Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)**

## Appendix G: CLOG ZAPPER

Clog Zapper is a natural enzyme that assist with dissolving a clog in a NG/NJ feeding tube if clog is organic material such as a feeding. If the clog is due to medication(s), clog zapper will not dissolve it, so replace tube and ensure adequate flushing as per flush recommendations. Clog Zapper is not to be used on any altered tube, i.e., Feeding tube inserted in J tube arm of a G-Tube. Clog Zapper should not be used with force and if tube visually bulges stop intervention as it may lead to dissection of the tube.

Only use sterile or bottled water when directions say "water". Instructions are included in the clog zapper package.

Instructional video: Clog Zapper Video



**Nasogastric Feeding Tubes: Insertion, Verification, Removal (*continued*)**

**Appendix H: FEEDING TUBE SIZES AND OPTIONS**

---

<b>NeoMed NeoConnect</b>		
<b>Tube Size and Length</b>	<b>PMM</b>	<b>Manufacturer #</b>
5fr x 40cm	737036	FTS5.0P-NC
5Fr x 60cm	582880	FTM5.0P-NC
6.5Fr x 40cm	601014	FTS6.5P-NC
6.5Fr x 60cm	512304	FTM6.5P-NC
6.5Fr x 90cm	594180	FTL6.5P-NC
8Fr x 60cm	658136	FTM8.0P-NC
8Fr x 90cm	270497	FTL8.0P-NC

<b>Corflo Non-Weighted Tubes</b>		
<b>Tube Size and Length</b>	<b>PMM</b>	<b>Manufacturer #</b>
6Fr x 36in	228832	40-9366
8Fr x 43in	88842	40-9438
10Fr x 43 in	124157	40-9431
*12Fr x 43 in *Weighted	435334	40-7432