Department of Health Government of Nunavut	NURSING POLICY, PROCEDURE AND PROTOCOLS		
	Community Health Nursing		
TITLE:		**SECTION:**	**POLICY NUMBER:**
Enteral Nutrition		Clinical Procedures	11-006-00
EFFECTIVE DATE:	**REVIEW DUE:**	**REPLACES NUMBER:**	**NUMBER OF PAGES:**
February 10, 2018	February 2021		22
APPLIES TO:			
Community Health Nurses			

POLICY 1:

Enteral feeding involves the provision of supplemental nutrition via a tube inserted into the gastro-intestinal tract. It is the registered nurses responsibility for the care and maintenance of enteral feeding tubes.

POLICY 2:

Insertion and removal of enteral tubes requires a physician order. Registered nurses are only permitted to insert and remove Nasoenteric (NE) tubes in populations not at high risk for misplacement.

The Percutaneous Endoscopic Gastrostomy tube; Percutaneous Endoscopic Jejunostomy tube; Jejunostomy tube; Genie" Low Profile Gastrostomy Devices and the Tracheo-Esophageal tube shall only be removed by a physician.

POLICY 3:

All NE tubes must have placement verified prior to use.

DEFINITIONS:

Nasoenteric Tubes (NE): Tubes placed into the gastric, duodenal or jejunal portion of the gastrointestinal tract through the oral/nasal orifice.

Percutaneous Endoscopic Gastrostomy Tube (PEG): Tube inserted percutaneously by endoscope into the stomach.

Percutaneous Endoscopic Jejunostomy (PEJ): Tube inserted percutaneously by endoscope into the stomach with a second tube inserted into the jejunum via the gastric tube. The tube allows dual access in to the stomach/jejunum. This tube has the capacity to simultaneously decompress the stomach and administer feeds into the jejunum.

Jejunostomy (JEJ): Tube inserted via a surgical opening of the jejunum.

"Genie" Low Profile Gastrostomy Devices (LPGD`s) commonly called **"buttons":** Designed for permanent feeding and placed into a mature (feeding tube in place for > 6 months) gastrostomy tract. It is anchored in the stomach and protrudes just above the skin. An antireflux valve keeps gastric contents from leaking. A special access adaptor is required to access port.

Tracheo-Esophageal (TE) Tube: The tracheo-esophageal fistula is an opening surgically created from the trachea to the esophagus. The fistula is created in conjunction with a permanent laryngectomy. The long-term purpose of this fistula is to insert a speaking prosthesis once the fistula is well established. This tube is often used for short term feeding post laryngectomy.

Gastric Residual: The amount of residual withdrawn from the stomach to confirm gastric placement and to assess the client's tolerance of feeds. The gastric residual is obtained from tubes inserted in the stomach. Gastric residual is assessed with PEJ tubes using the suction/ gastric port to determine gastric motility.

Tube Irrigation (Flushes): The amount of sterile water required to maintain tube patency. This must not be confused with the amount of water required to ensure nutritional requirements.

Gastric Intolerance: Client inability to tolerate the amount or type of feed being given as evidenced by an increase in gastric residuals, regurgitation or vomiting, or an acutely distended abdomen.

PRINCIPLES:

Removal of enteral feeding tubes requires special competence and certification, except for NE Tubes.

Registered Nurses are not authorized to insert nasoenteric tubes in high risk populations:

Nasocranial surgery or trauma, maxillofacial trauma, pharyngeal surgery or trauma, acute head injury, basal skull fracture, cerebrospinal fluid rhinorrhea, post-op esophageal and gastric surgery, recent radiation therapy to the mediastinal area, or known or suspected partial obstruction in the naso-pharyngeal or oro-pharyngeal areas.

Pulmonary aspiration is a common complication related to tube feedings. Appropriate verification of tube placement reduces the incidence of pulmonary aspiration.

RELATED POLICIES, GUIDELINES AND LEGISLATION:

Procedure 11-006-01 Enteral Nutrition: Nursing Considerations
Procedure 11-006-02 Enteral Nutrition: Care for Feeding Tubes

Perry & Potter (2010):

- Inserting nasogastric or nasoenteric tube for feeding tuber (p.829);
- Verifying Feeding Tube Placement (p. 834)
- Insertion of large bore nasogastric tubes (Levine) for short term enteral feeding (p. 914)
- Irrigating a feeding tube (p. 837)
- Administration of Enteral Feedings via Nasogastric, Gastrostomy and Jejunostomy tubes (p.840)
- Care of a Gastrostomy or Jejunostomy Tube (p. 846)

REFERENCES:

Methany, N. & Steward, B. (2002). Testing Feeding Tube Placement during Continuous Tube Feedings. *Applied Nursing Research 15(*4). Pp 254-258.

Metheny N.A., Titler M., (2001). Assessing placement of feeding tubes, *American Journal of Nursing 101*(15) p.36-45.

Methany, N.; Wehrle, M.; Wiersema, L & Clark, J. (1998) Testing feeding tube Placement: Auscultation vs. pH method. *American Journal of Nursing,* pg-37-43.

Methany, N. (2001). *Enteral Access Management*.

Potter, P.A. & Perry, A.G. (2010). *Clinical Nursing Skills & Techniques*, 7th edition, Mosby: Toronto.

PROCEDURE 11-006-01

Policy 11-006-00: *Enteral Nutrition* relates to the following interventions (refer to Potter & Perry (2010) for detailed procedures):

- Inserting nasogastric or nasoenteric tube for feeding tube (p.829);
- Verifying Feeding Tube Placement (p. 834)
- Insertion of large bore nasogastric tubes (Levine) for short term enteral feeding (p. 914)
- Irrigating a feeding tube (p. 837)
- Administration of Enteral Feedings via Nasogastric, Gastrostomy and Jejunostomy tubes (p.840)
- Care of a Gastrostomy or Jejunostomy Tube (p. 846)

NURSING CONSIDERATIONS:

1. Small-bore nasoenteral tubes create less discomfort and should be considered as first choice. The insertion of a rigid levine tube for feeding purpose is recommended only for very short term, immediate use.

    a. All small-bore nasoenteric tubes (stylet insertion) must be verified with a chest x-ray prior to initial administration of medications or feeding (see Procedure 11-006-02: *Care for Feeding Tubes*.
    b. Air auscultation will **not** be utilized to determine either initial or on-going placement as research has demonstrated that it is unreliable.
    c. Leave stylet (if used) in place until tube position verified by x-ray. Never attempt to reinsert a partially or fully removed stylet while feeding tube is in place. This can cause perforation of the tube and injure the client.

2. Blue food coloring dye is not to be added to enteral feeding solution as untoward client effects may occur.

3. Medication administration guidelines will be followed as per *Nunavut Formulary*, *Compendium of Pharmaceuticals and Specialties,* and Potter & Perry (2010).

    - Nurses will collaborate with Pharmacy in determining the best drug routes and regimes in a client who is receiving enteral feeding.
    - Not all oral medications are safe to give by nasoenteric tubes.

4. Rapid acting insulin (Humalog, Mix 25, or Novo rapid) must be given immediately prior to intermittent (bolus) feed. Rapid acting insulin starts to work within 10-15 minutes and the client could become hypoglycemic if bolus is delayed for 30 minutes.

5. Bolus feeding is not recommended for tubes placed in the jejunum.

6. With small bore feeding tubes, the use of syringes smaller than 50 ml can create pressures in excess of the bursting pressure of the tube, which is approximately 80 psi. Vigorous pressure should not be used during irrigation.

7. Otitis media and sinusitis are possible infectious complications of nasal tube placement. If these complications occur, enteric tube placement must be changed. PEG/PEJ are alternatives.

8. If the PEG falls out, replace with a Foley catheter # 18 or # 20 and notify physician to make arrangements for transportation and PEG replacement. Feeds should be held, as appropriate verification methods cannot be performed in the health centre setting.

Medication Administration:

1. Medications will be administered as per the Nunavut *Formulary,* the Compendium of Pharmaceuticals and Specialties, and physician's orders. The pharmacist should be consulted if the nurse is unsure whether a drug may be administered via Enteral feeding tube.

2. Order of administration of medication consistency will be as follows: liquid, dissolved, and crushed. Approximately 20% of medication is lost through crushing techniques.

3. All medications will be administered in liquid form whenever possible. If liquids unavailable, dissolve medication in syringe and administer. Crush drug only if necessary. Administer one drug at a time whenever feasible with appropriate irrigation in between medications.

4. For PEJ tubes, administer medications through the gastric lumen unless specifically ordered to be given via the jejunal lumen.

PROCEDURE 11-006-02

PROCEDURE 1: INSERTION OF NE TUBE

1. Nurses may insert nasoenteral tubes as outlined in Potter & Perry (2010, p.829), except in clients at risk for misplacement (see Policy 11-006-00: *Enteral Nutrition*).

2. Pediatric considerations:

    a. Premature infant and neonate: Estimate tube length by measuring from the nose or mouth to the earlobe then to the xiphoid process.

    b. Older child: Estimate tube length by either (1) measuring from the nose to the bottom of the earlobe then to the lower end of the xiphoid process or (2) measuring from the nose to the earlobe then to a point midway between the xiphoid process and the umbilicus

    c. Observe for vagal stimulation during insertion of feeding tube in an infant, which results in decreased heart rate.

3. Follow Procedure *Verification of Tube Placement* to verify placement of small bore tube prior to use.

PROCEDURE 2: VERIFICATION OF TUBE PLACEMENT

Nursing Considerations

1. It is possible for the tip of a feeding tube to move into a different location (e.g. from stomach to the intestine) without any external evidence that the tube has moved.

2. The risk for aspiration of regurgitated gastric contents into the respiratory tract increases when the tip of the tube accidentally dislocates upward into the esophagus.

3. Four methods of verification are used:

    i. Chest x-ray verification after initial insertion of small bore tube and for any tube suspected of migration
    ii. pH of aspirated fluid (see Procedure 11-006-03: *pH Testing*) → Do not use as initial method of verification
    iii. Appearance of aspirated fluid (see 11-006-05: *Interpreting Appearance and pH Results of Aspirate*) → Do not use as initial method of verification
    iv. Measurement of the external length of the tube → Do not use as initial method of verification

4. Current evidence-based practice indicates the most reliable method of feeding tube verification is chest radiograph (Rauen and others, 2008, as cited by Potter & Perry, 2010). The other methods are useful after radiological confirmation is determined.

Verification by Chest X-Ray

1. On initial insertion of small bore tubes, X-ray verification is required. PEG, PEJ, JEJ and TE tubes are inserted in the operating room or the GI unit where initial verification has been done.

2. An x-ray may also to be ordered when displacement of the tube is suspected.

3. Routine, on-going verification for all types of tubes will be done using external length measurement, pH and appearance of aspirated fluid.

4. Initiate the order of a chest x-ray (this is a transferred function to the registered nurse, therefore a medical order is not required)

5. Complete and sign the x-ray requisition indicating "chest x-ray" for test required and under clinical indication, nurse will write "Verify correct position of naso enteric tube"

6. Complete all x-ray related documentation as per Policy 08-011-00*: X-Ray Log*.

7. Perform x-ray in accordance with Policy 08-007-00: X-Ray.

8. Document initial x-ray findings in the client health record.

Frequency of Tube Placement Verification

1. After initial insertion and verification, the frequency of ongoing tube placement verification will be:

    a. Immediately prior to each intermittent (bolus) feeding and before medication administration;

    b. Daily and before medication administration in clients with continuous feedings.

    c. If there has been any migration of the tube and the correct placement is in question (for any type of tube), obtain abdominal x-ray for verification.

    d. After episodes of retching or vomiting or severe bouts of coughing.

2. Must wait at least 1 hour after medication administration (by mouth or tube) to verify tube placement, as premature aspiration of contents will remove unabsorbed medication and thus reducing dose delivered to the client.

VERIFICATION OF TUBE PLACEMENT

Equipment

- ✓ 60ml Luer lock catheter tip syringe
- ✓ Stethescope
- ✓ Clean gloves
- ✓ pH indicator strip (scale of 0.0 to 14.0)
- ✓ small medicine cup
- ✓ If client has a Genie LPGD: special access adaptor

PROCEDURE

1. Assess for any signs and symptoms of inadvertent respiratory migration of the feeding tube: coughing, choking or cyanosis.

2. Identify conditions that increase the risk of spontaneous tube dislocation:
    a. Retching or vomiting
    b. Nasotracheal suctioning
    c. Severe bouts of coughing

3. Measure the external mark of the tube from nostril to distal end of catheter hub daily and compare to initial measurement recorded in the client's health record.

4. Review client's medications for any gastric acid inhibitor medications (e.g. cimetidine, ranitidine, etc) or a protein pump inhibitor (e.g. omeprazole). Reduced gastric acid secretion volume and acid content may cause the pH value to be higher and therefore poor indicator for placement.

5. Prepare equipment, perform hand hygiene and put on clean gloves

6. Draw up 30ml of air into a 60ml syringe and attach to the end of the feeding tube. Flush tube with 30ml of air before attempting to aspirate fluid.

7. May need to reposition the client from side to side and/or administer additional boluses of air in order to successfully aspirate fluid.

8. Draw back slowly on syringe (prevents collapse of the tube) to obtain 5 to 10 ml of gastric aspirate. Observe appearance of contents.

9. Gently mix aspirate in syringe. Expel a few drops into a clean medicine cup. Dip the pH strip into the fluid or apply a few drops to the strip to measure the pH. Compare to the colour on the chart, as directed by the manufacturer.

    a. Gastric fluid aspirated from a client who has fasted for at least 4 hours usually has a pH range of 1 to 4.
    b. Fluid aspirated from a tube in the small intestine from a client who has fasted usually has a pH greater than 6.
    c. Client with continuous feedings may have a pH of 5 or greater.
    d. The pH of pleural fluid from the tracheobronchial tree is generally greater than 6.

10. With PEJ tubes, the jejunal tube may migrate upwards into the stomach. To confirm correct placement, aspirate from the jejunal lumen. If the appearance and pH is keeping with gastric content versus jejunal content, stop the infusion, obtain abdominal x-ray and notify physician.

11. Following initial verification by chest x-ray:

    a. The stylet is to be removed and discarded.

    b. If the stylet is difficult to remove, re-instill 5 ml of sterile water to prevent the upward dislodgment of the tube. The stylet is never re-inserted into the tube while in the client.

12. If unsuccessful in aspirating fluid from a tube that was confirmed by x-ray to be in proper position and (1) there are no risk factors for tube dislocation, (2) tube has remained in original taped position, and (3) client is not experiencing respiratory distress, assume tube is correctly placed.

13. When the tube is determined to be properly positioned, irrigate to prevent blockage.

14. Remove gloves and perform hand hygiene.

PROCEDURE 3: IRRIGATING A FEEDING TUBE

Equipment
✓ 60ml Luer lock catheter tip syringe ✓ Water ✓ Towel ✓ Clean gloves ✓ If client has a Genie LPGD: special access adaptor

1. Irrigate only after verification of tube placement is confirmed (see Verification procedures contained within this Procedure)

2. Perform hand hygiene, prepare equipment and apply clean gloves

3. Draw up 30ml of water in a syringe. Do not use irrigation fluids from multidose bottles that are used on other clients. Each client should have individual bottles of solution.

4. Change irrigation bottle every 24 hours.

5. Position client in semi-Fowlers's position.

6. Kink feeding tube while disconnecting it from feeding-bag tubing or while removing plug at end of tube.

7. Insert tip of syringe into end of feeding tube. Release kink and slowly instil irrigating solution.

8. If unable to instil fluid, reposition client on left side and try again. If still unsuccessful, notify physician and discuss alternative interventions.

9. When water has been instilled, remove syringe. Reinstitute tube feeding, or administer medication as ordered. Irrigate before, between and after the final medication.

10. Remove and discard gloves and supplies. Perform hand hygiene.

11. Pediatric Considerations:

    - Irrigation of a tube requires a smaller volume of solution in children: 1 or 2 ml for small tubes to 5 to15 ml (or more) for larger ones.

12. Document amount and type of irrigation used; ease of irrigation; and any related interventions.

Nursing Considerations

1. Maximum hang time for formula is 8 hours.
2. All opened unused cans of formula to be covered, dated, refrigerated and used within 24 hours
3. Do not use IV pumps for administering Enteral feeds. Use only pumps designed for tube feedings.
4. Cold formula causes gastric cramping and discomfort, therefore formula should be at room temperature.
5. Gradual emptying of tube feeding by gravity from feeding bag reduces the risk for abdominal discomfort, vomiting or diarrhea induced by bolus or too-rapid infusion of tube feedings.
6. Gradually advance rate of concentration of tube feeding to prevent diarrhea and gastric intolerance to formula.

Procedure

INITIATION OF ENTERAL FEEDS
Equipment
✓ Disposable feeding bag and tubing ✓ Formula (as ordered by physician) ✓ 30ml (or larger) Luer lock catheter tip syringe ✓ Stethescope ✓ pH indicator strip ✓ Clean gloves ✓ If client has a Genie LPGD: special access adaptor ✓ Equipment for obtaining blood glucose, if ordered.

1. Verify tube placement as per Procedure 11-006-01: *Insertion, Verification & Irrigation of Feeding Tubes.*
2. Refer to Potter & Perry (2010, p. 840) for additional procedure details and the physician's orders for specific feeding instructions.
3. Perform hand hygiene, assemble equipment.
4. Put on gloves if you need to handle the feeding equipment.
5. For intermittent feeding have a syringe ready and be sure formula is at room temperature.
6. Formula (as ordered by physician):
    a. Check expiration date on formula and integrity of container
    b. Have tube feeding formula at room temperature

c. Shake formula container well, and fill feeding container bag with formula. Open roller clamp on tubing, and fill tubing (prime tubing) with formula. Close roller clamp, and cap end of tubing. Hang bag.

7. Place client in high-fowlers position, or elevate head of bed at least 30 degrees. For clients forced to remain supine, place in reverse trendelenburg position.

8. If not already applied, put on gloves.

9. Check gastric residual volume:

    a. Before each feeding for intermittent feedings; or

    b. Every 4-6 hours for continuous feedings.

10. Flush with 30ml of water.

11. Initiate feeding:

    a. Intermittent Feeding:
        i. Pinch proximal end of feeding tube and remove cap.
        ii. Attach end of administration set tubing to end of feeding tube.
        iii. Set rate by adjusting roller clamp on tubing or placing on a feeding pump. Allow bag to empty gradually over 30 to 60 minutes. Label bag with tube-feeding type, strength, and amount. Include date, time and initials.
        iv. Change bag every 24 hours.
    b. Continuous drip method:
        i. Connect distal end of administration set tubing to proximal end of feeding tube as described in step 11a.
        ii. Connect tubing through tube feeding pump, open roller clamp on tubing, set rate on pump and turn on.

12. Following intermittent infusion or at end of continuous infusion, flush feeding tube with 30ml of water. Repeat irrigation as per Procedure 3: *Irrigating a Feeding Tube.*

13. With intermittent infusions, cap or clamp the proximal end of feeding tube.

14. Rinse bag and tubing with warm water whenever feedings are interrupted. Use a new administration set every 24 hours.

15. Dispose of supplies and perform hand hygiene.

PEDIATRIC CONSIDERATIONS:

- Intermittent feeding is preferred in infants because of possible perforation of the stomach, nasal airway obstruction, ulceration and irritation to mucous membranes with continuous feedings.

- When giving intermittent feedings to a small child, administration usually takes 20 to 30 minutes, or as long as it takes to bottle feed the child. Hold the infant and offer a pacifier during the feeding to simulate a more natural bottle-feeding experience.

- Temporary small bore NG tubes are often placed in infants just before each feeding and removed afterwards.

Procedure 5: GASTRIC RESIDUALS (Verification of feeding tolerance)

1. Assess gastric residuals as per Reference Sheet 11-06-05: *Interpreting Appearance and pH Results of Aspirate.*

2. Withdraw gastric fluid from a small-bore tube slowly to prevent collapse of the tube. If no fluid obtained on first attempt, wait 5 minutes and repeat procedure.

3. When initiating the feeding schedule

    a. If gastric residual is > 50% of the amount infused over the last 4 hours and client is asymptomatic (no regurgitation, acutely distended abdomen) re-instil the gastric residual, hold the feeding for 1 hour then verify residual.

    b. Do not progress the client on the feeding schedule until gastric residuals are less than 50% of the amount given in the last 4 hours.

4. Client at maximum feeding rate (continuous or intermittent feeding)
    a. If gastric residual is >200 ml, re-instil the aspirate, hold feeding/bolus for 1 hour then verify residual.

    b. If residual is now >200 ml and the client remains asymptomatic, re-instill for a maximum of 500 ml and notify physician for new orders. Assess need for IV fluids to maintain fluid requirements

5. If client becomes symptomatic (If intolerance develops) with a residual greater than 200 ml for 4 hours, regurgitation or vomiting, and acutely distended abdomen, stop feed and notify physician immediately.

6. Monitor bowel function. If gastric residuals are consistently elevated, discuss need for motility agent with physician.

7. Client with a PEJ tube: The gastric residual should be negligible. There are 2 situations where the gastric residuals may require further action:

    i. **Upward migration** of the jejunal tube into the stomach.

        The pH will be similar to gastric pH (Usually ≤ 6) rather than jejunal pH (Usually ≥ 6). See Reference Sheet 11-06-05: *Interpreting Appearance and pH Results of Aspirate.* If pH jejunal aspirate in gastric pH range, obtain abdominal x-ray and contact the physician for further management regarding tube migration.

ii. **Decreased gastric motility** leading to high gastric residuals

If gastric residual is >200 ml, re-instill the aspirate to a maximum of 500 ml, give PRN motility medication if not contraindicated.

Re-check residual in one hour. Call physician if residual remain > 200ml.

Procedure 6: Care Of PEG / PEJ Insertion Sites

1. Inspect site daily.
2. Keep the insertion site clean and dry.
3. Do not cover with a gauze unless leakage is present.
4. If leakage is present, use a small drain-type dressing to absorb body fluids or moisture.
5. If debris or drainage present, cleanse the PEG/PEJ insertion site with sterile saline until healed (a healed site is one that has no erythema/edema around the tube)
6. When healed, the site can be cleansed with mild soap and water.
7. If saline is not sufficient, crusty residual can be removed with hydrogen peroxide-soaked cotton tip applicators.
8. If signs of infection are present at the insertion site and drainage present:
    a. Culture the insertion site
    b. Notify the physician
    c. Cleanse the site with an aqueous Chlorhexedine solution.
    d. Rotate the PEG/PEJ tube bolster ½ turn daily to prevent pressure ulcers.
    e. Do not use barrier type of cream around insertion site.
9. All single feeding tubes are to have a Y adaptor added for the administration of sterile water and medications. Change Y adapter every 24 hrs with bag change.

DOCUMENTATION

In the client health record, document:

1. Date and time of insertion;
2. Type of tube, size and route of insertion;
3. Measured external length; and
4. Any special care requirements.
5. Results of X-ray verification
6. Verification of tube placement –measurement of external length of tube, consistency, colour, quantity and pH result of gastric/intestinal aspirate
7. Care of nasal and gastrointestinal insertion sites
8. Client response during insertion, removal, and/or any signs & symptoms of intolerance
9. On fluid management record (as required), amount of irrigation instilled, type and amount of feeding formula administered.
10. Amount of gastric residual

CLIENT TEACHING

1. Purpose of tube and reasons for insertion
2. Enteral feeding schedule
3. Importance of notifying the nurse of any abdominal pain, cramps, nausea, vomiting
4. Preparation for home if necessary, teaching will include the following:
    a. Mouth care
    b. Feeding schedule
    c. Medication administration
    d. Care of feeding tube insertion site
    e. Verification of tube placement (daily measurement of tube and pH testing if tube measurement has changed)
    f. Prevention of aspiration
    g. Bowel care: constipation and diarrhea
    h. Care of equipment
    i. If the client is in the community and the PEG tube falls out, instruct client to contact the nurse-on-call immediately.

REFERENCES:

Health Canada (2003). *Safety warning concerning the use of blue food dye in enteral feedings*.

Methany, N. & Steward, B. (2002). Testing Feeding Tube Placement during Continuous Tube Feedings. *Applied Nursing Research 15(*4). Pp 254-258.

Metheny N.A., Titler M., (2001, May). Assessing placement of feeding tubes, AJN 101(15) p.36-45.

Methany, N.; Wehrle, M.; Wiersema, L & Clark, J. (1998) Testing feeding tube Placement: Auscultation vs. pH method. AJN pg-37-43.

Methany, N.; (document distributed, January 21-2001). Enteral Access Management. Postgraduate Course #1.

Potter, P.A. & Perry, A.G. (2010). *Clinical Nursing Skills & Techniques*, 7th edition, Mosby: Toronto.

NURSING CONSIDERATIONS

1. PH testing is not required for PEG tubes.

2. PH testing is required for PEJ tubes to confirm tube location, as there is some risk that the jejunal port has migrated into the stomach. PH testing will be performed on the jejunal port of the PEJ.

3. Several factors such as presence of feeding, acid-inhibiting medications and presence of blood will affect the pH level (Reference Sheet 11-006-06: *Medications Affecting Gastric pH*). Inspection and pH testing of aspirate are reported to be more accurate in confirming correct tube placement than air insertion and gastric auscultation.

4. PH testing will be affected by the location of the tube, the amount of time between feeding, acid–inhibiting medication and other conditions.

5. PH of ≤ 4 usually indicates gastric placement while a pH of ≥ 7 usually indicates either intestinal or respiratory placement (although it may occasionally indicate gastric placement). Visual inspection of the aspirated fluid is to be used in conjunction with pH to help determine tube location. 11-006-05: *Interpreting Appearance and pH Results of Aspirate*.

6. Specimens for pH testing may be obtained immediately after the feeding has been stopped. In cases where the feeding has been stopped for periods of time for medication absorption,(ie Phentyoin) then collect the specimen for pH testing just prior to resuming feedings.

7. If there is concern regarding the placement of the tube or there is discrepancy between pH results and appearance of aspirate, assess need for confirmation of placement by x-ray.

8. Aspiration for pH testing for tube verification must not be confused with aspiration for gastric residuals to determine gastric motility.

FREQUENCY OF PH TESTING

Initial:

Immediately following the initial placement of a large bore tube that is used for enteral feeding, gastric drainage or medication administration.

On-going:

Daily for continuous feeding
Prior to each intermittent (bolus) feeding
PRN if tube migration is suspected

pH Testing
Equipment
✓ 60ml syringe with adaptor ✓ pH indicator strip ✓ Sterile water ✓ Clean gloves ✓ Medicine cup

Procedure:

1. PH testing is done on the following enteral feeding tubes: Small and large-bore nasogastric tubes, small bore nasojenunal tubes, the jejunal port of the PEJ tube, and the TE tube. pH testing is also done on nasogastric drainage tubes to confirm placement

2. For intermittent (bolus) feeding schedule, collect specimen immediately prior to the next scheduled feeding.

3. For continuous feeding schedule, stop the feeding long enough to obtain a sample.

4. Inject 30 cc of air with a 60 cc syringe into the tube to clear tube of fluid.

5. Aspirate 5 cc of fluid. Aspiration of fluid from small bore feeding tubes must be done slowly to prevent collapse of tube.

    a. If no fluid obtained, wait 5 minutes, reposition the client and attempt again.
    b. If unable to obtain aspirate, determine appropriateness of initiating feeding, obtaining x-ray or notifying the physician.

6. Visualize color of aspirate then saturate pH test strip with aspirated fluid and determine pH based on color match on the pH container.

7. Refer to 11-006-05 to confirm tube placement via pH result and appearance of aspirate.

8. Flush tube with 30 cc of sterile water to maintain tube patency.

9. Re-connect tube to feeds / drainage as applicable.

Documentation:

Document the pH result

CLIENT TEACHING:

Educate the client on the purpose of pH testing.

REFERENCES:

Potter, P.A. & Perry, A.G. (2010). *Clinical Nursing Skills & Techniques*, 7th edition; Mosby: Toronto.

Methany, N & Steward, B. (2002). Testing feeding tube placement during continuous tube feedings. *Applied Nursing Research 15*(4). pp 254-258.

Methany N.A., Titler M., (2001, May) . Assessing placement of feeding tubes, *American Journal of Nursing 101*(15) p.36-45.

Methany, N.; Wehrle, M.; Wiersema, L & Clark, J. (1998). Testing feeding tube Placement: Auscultation vs. pH method. *American Journal of Nursing,* pg-37-43.

Methany, N, (2001) *Enteral Access management*.

Approved by: 11 FEB 2011 **Chief Nursing Officer** **Date**	Effective Date: April 1, 2011
February 11, 2011 **Deputy Minister of Health and Social Services** **Date**	

REFERENCE SHEET 11-006-04

Table 1: Frequency of Tube Placement Verification and Gastric Residual

FREQUENCY OF TUBE PLACEMENT VERIFICATION				FREQUENCY OF GASTRIC RESIDUAL
Type of tube	**X-ray**	**pH Testing**	**Tube Measurement**	**(Feeding Tolerance)**
Naso-gastric	Small-bore: on insertion and if migration suspected	➢ Continuous feed: daily ➢ Prior to intermittent feeds	Initially and daily	➢ Initiation of feeding: Q 4h for first 48hrs ➢ Continuous feed: BID ➢ Prior to intermittent feeds
Naso-jejunal	Small-bore: on insertion and if migration suspected	Daily to determine upward migration of tube	Initially and daily	Not applicable
PEG	Not routinely ordered	Not required	Initially and daily	➢ Initiation of feeds: Q4h for first 48hrs ➢ Continuous feed: BID ➢ Prior to Intermittent feedings
PEJ	If migration is suspected (formula aspirated via the jejunal port)	Daily (obtain fluid from jejunal port)	Initially and daily	➢ Check gastric port to determine presence of excess gastric secretions (Presence of gastric secretions may indicate tube migration)
JEJ	Physician may order gastrograffin test to check for leakage (not currently available in health centres)	Not required as tube cannot migrate	Initially and daily	Not applicable
GENIE / LPGD	Not routinely done	Not required with a well established track. Daily for continuous and intermittent (bolus) feeds if new track	N/A	Not applicable with an established track If new track: ➢ Initiation of feed: Q4h for first 48hrs ➢ Continuous feed: BID ➢ Prior to Intermittent feed
TE	If migration suspected	Daily	Initially and daily	➢ Initiation of feed: Q4h for first 48hrs ➢ Continuous feed: BID ➢ Prior to Intermittent feed

Table 2: Appearance and pH Results of Gastrointestinal Fluid Aspirate

Aspirate	Ph result	Appearance of aspirate
Gastric contents: ➢ Fasting ➢ 4 hr post feeding ➢ no acid-inhibiting medications	Usually ≤ 5	➢ Grassy green ➢ If blood is present - brownish sediments ➢ Clear & colorless (often shred of off-white to tan mucous)
Gastric contents: ➢ < 4 hr fasting ➢ acid inhibiting medications	Usually ≤ 6 ➢ Residual formula will ↑ pH ➢ Acid inhibiting medication will ↑ pH	➢ Grassy green, brownish, or tannish with traces of recently ingested materials. ➢ If continuous feedings, may look like formula (curdled)
Intestinal contents	Usually ≥ 6	➢ Light to dark yellow golden color or brownish green. ➢ Fluid is clearer than gastric fluid.
Respiratory contents	Usually ≥ 6 Aspirated stomach content will ↓ pH	Tracheobronchial – off white to tan

Note: If discrepancy between pH results and appearance of aspirate, assess need for confirmation of placement by x-ray.

Table 3: Medications That Increase Gastric pH

Classification	Medications	Duration of Effect on pH
Antacids	calcium carbonate, aluminum hydroxide, magnesium hydroxide, magaldrate	Onset: Immediate Duration: 1 hr (if fasting) **OR** 1-3 hours when taken after meals
H2 blockers	Cimetidine, Rantidine, famotidine, nizatidine	Onset: 15 min (I.V.), 60 min (po) Duration: 8-12 hrs
Proton pump inhibitors	Omeprazole, lansoprazole, pantoprazole	Onset:1-3 hrs Duration: 2-7 days after drug Discontinued
Proton pump inhibitors	Misoprostol	Onset: 60-90 min Duration: 3 hrs
Anticholinergic agents	Scopolamine, hyoscyamine, glycopyrrolate, dicyclomine	Onset: 90 min Duration: 4 hr
Antiviral drug	Videx (didanosine + antacid)	Same effect as antacids