Optimal nutrition in critically ill children

Good safety practices required for nutritional therapy

Developed by
The Asia Pacific – Middle East Consensus Working Group on Nutrition Therapy in the Paediatric Critical Care Environment

Supported by
Nestlé Nutrition Institute
Learning objectives

• To understand why safety practices are important, and the potential harm that can result from poor practices

• To know the elements of the safety campaigns, and be able to apply them

• To know the risk factors and contamination points for bacterial contamination and how to avoid them

• To know how to prepare, store and administer EN feeds in a safe manner that minimises chances of incorrect administration and contamination

• To know how to avoid the possibility of enteral tube misconnections

• To know how to administer enteral medication safely
Overview

1. Rationale for good safety practices

2. Campaigns to promote good safety practices

3. Good safety practices when implementing nutritional therapy
   - Ordering and labelling feeds
   - Safe preparation for formula feeds
   - Storage and hang times of feeds
   - Avoiding tube misconnections
   - Administering medication through feeding tubes

4. Test your knowledge
1 Rationale for good safety practice
Why are good safety practices so important?

Poor safety practices and human errors lead to complications from EN/PN, which can result from:

- Bacterial contamination of feeds
- Misconnections in tubing
- Incorrect feeding
- Aspiration
- Drug:nutrient interactions

Good safety practices reduce the possibility of avoidable complications in PICU patients who are receiving nutritional therapy.
Potential contamination points during EN feed preparation and delivery

Order

- Formula, delivery site, administration method, rate

Sterile formula
- in a closed system

Sterile liquid formula

Non-sterile powder formula

Non-sterile additives

Human breast milk

Preparation site

- Pour, reconstitute, mix, transfer to administration container

PICU

- Store or take to patient

Bedside

- Connect container to administration set and to patient

Risk factors for microbiological contamination of feeds

- Environment and manner in which feeds are prepared
- Inadequate hand-washing techniques
- Poor attention to hygiene when handling containers and equipment
- Repeated ‘topping up’ of feed container
- Opening and decanting feeds from source containers, rather than use of ‘closed’ feeding systems
- Excessive hang time

Enteral feeding tube misconnections

**What it is**
Inadvertent connection between enteral feeding system and non-ental system such as an intravenous line, peritoneal dialysis catheter or medical gas tubing

**How it happens**

**Human factors**
- Fatigue, inadequate training
- Inadequate lighting

**Physical and design factors**
- Luer connectors
- Universal port allowing connection of IV spike to enteral closed system container
2 Campaigns to promote good safety practice
Collaborative initiative between Nestlé HealthCare Nutrition and A.S.P.E.N. to promote safe enteral feedings

- First launched at Clinical Nutrition Week (A.S.P.E.N. annual meeting) in New Orleans, USA in Feb 2009

Be A.L.E.R.T. acronym includes five easy steps to assist the nurse in administering enteral feedings more safely at the bedside

Designed to minimise the risk of adverse events that can be associated with serious harm
<table>
<thead>
<tr>
<th>Be A.L.E.R.T. Campaign</th>
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<tr>
<td><strong>A</strong> - Aseptic Technique</td>
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<td><strong>L</strong> - Label Enteral Equipment</td>
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<td><strong>R</strong> - Right Patient, Right Formula, Right Tube</td>
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<td><strong>T</strong> - Trace All Lines and Tubing Back to Patient</td>
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BE ALERT

Aseptic Technique
- For preparation and delivery of enteral formula
- Practice good hand washing technique
- Wear gloves when handling feeding tube
- Avoid touching can tops, container openings, spike and spike port
- * Per facility policy and procedure.

Label Enteral Equipment
- Patient name and room number
- Formula name and rate
- Date and time of initiation
- Nurse initials

Elevate HOB
- ≥30°
- When clinically possible
- May mitigate risk of reflux and aspiration of gastric content

Right Patient
- Match formula and rate to patient’s feeding order
- Verify ENTERAL tubing set connects formula container to feeding tube

Right Formula

Right Tube
- Only enteral-to-enteral connections

Trace All Lines and Tubing Back to Patient
- Avoid misconnections – trace all lines from origin to patient

www.nestlenutrition.com/us
1-800-422-ASK2 (2752)

An A.S.P.E.N safety campaign, supported by Nestlé HealthCare Nutrition.
Aseptic technique

For preparation and delivery of enteral formula

Practice good hand-washing technique

Wear gloves when handling feeding tube (according to facility policy)

Avoid touching can tops, container openings, spike and spike port
Label enteral equipment

- Formula name and rate
- Date and time of initiation
- Nurses’ initials
- Patient name and room number
Be A.L.E.R.T.

Elevate head of bed ≥30°

- When clinically possible
- For at least one hour following feeding administration
- May reduce risk of reflux and aspiration of gastric content
Be A.L.E.R.T.

Right patient, Right formula, Right tube

- Match formula and feeding rate to patient’s feeding order
- Ensure that enteral tubing set connects formula container to feeding tube
Be A.L.E.R.T.

Trace all lines and tubing back to patient

Avoid misconnections: trace all lines from origin to patient

Make sure that only enteral-to-enteral connections are made
PICU-specific campaign: Be R.E.A.D.Y.

BE Practice Safe Enteral Feeding in Kids

R ight patient
- Right product
- Right tube
- Match formula to patient’s feeding order
- To help avoid misconnections trace tubing back to origin
- Label all enteral equipment
- Label human breast milk (HBM) per hospital policy

E arly Start of Enteral Feeding
- Start feedings within the first 24-48 hours in hemodynamically stable patients per protocol
- Bowel sounds or passing of flatus is not required to initiate feeding
- Elevate HOB 30 to 45° during feeding per protocol

A ssure Proper Preparation and Handling
- Prepare formulas using aseptic technique
- Maintain good handwashing practice
- Use sterile, liquid EN formulas (cans, closed system, RTF bottles for infants) over powders, if possible
- Follow guidelines for proper storage of formulas or HBM

D eliver Formula Appropriately
- Advance tube feeding as per protocol
- Identify & prevent avoidable interruptions to EN in critically ill children
- Follow recommended hangtimes based on administration system
- Assess fluid status

Y our Safety Checklist
- Check for appropriate tube placement
- Only enteral to enteral connections
- Use oral syringes for medications administered through a feeding tube
- Consult pediatric pharmacist for meds co-administered with EN
- Use equipment designed to reduce the risk of tubing misconnections
Administering medications with EN

BE A. L. E. R. T.
Practice Safe Enteral Medication Delivery

A. SK the Pharmacist about...
- drug-nutrient interactions
- drug-drug interactions
- adverse drug reactions
- appropriate dosage form
- risk of a drug clogging the tube
- whether location of the feeding tube’s distal end allows safe and adequate drug delivery

W. ATer ONLY
- to dilute medications (including liquid meds)
- to routinely flush the tube
- flush before/after each medication administered using an amount appropriate for the patient’s age and condition
- use water ONLY (no carbonated beverages, juices, coffee, other liquids)

A. dminister medications
- identify if tube location (distal end) allows for safe and adequate drug delivery
- 1 medication at a time – do not mix drugs together
- do not add medication directly to formula
- identify medications that must be separated from formula by ≥30 minutes

R. emember the ‘Rights’
- right patient, drug, time, dose, route (PO = via tube)
- right syringe, drug formulation, dilution, tube and medication port
  Only:
  - oral or enteral syringes
  - immediate-release solid or oral liquid dosage forms

E. stablish evidence-based protocols
- follow your facility’s medication protocols
- establish specific enteral medication protocols based on:
  - National Guidelines
  - Practice Recommendations
  - www.nutritioncare.org/safety
3 Good safety practices when implementing nutritional therapy
Ordering and labelling EN

• Design **standardised order forms** to help prescribers meet the patient’s nutritional needs and to improve order clarity
  – Patient demographics
  – Formula type
  – Delivery site/device
  – Administration method
  – Rate of administration

• A label with these details should be **affixed to all** EN formula **administration containers** (bags, bottles, syringes used in syringe pumps)
Example of EN order form

| Patient Name: ___________________ Medical Record No: ___________ DOB: ___________ |
| Room Number: ___________ Dosing Weight: ___________ |

**FORMULA:** _______________ at concentration: _______________ kcal/30mL

Additional Nutritional Additive: _____________________________________________

Final concentration: _______________ kcal/30mL

Other additives/medications: _____________________________________________

**DELIVERY SITE**

Oro: PO ad lib or ___________ mL

Feeding tube:
- Nasogastric
- Gastrostomy
- Nasojejunal
- Gastrojejunal
- Jejunostomy

**METHOD OF ADMINISTRATION:** [select a method and then a rate]

Method
- Pump-assisted
- Gravity-assisted (30-60 min)
- Bolus (Syringe) (10-20 min)
- Oral

Rate
- Initial ___________ mL/h
- Advance by ___________ mL/h every ___________ hour(s) to goal of ___________ mL/h
- Initial ___________ mL bolus over ___________ min ___________ time(s) daily
- Advance by ___________ mL each day to a goal of ___________ mL feeding over ___________ min ___________ time(s) daily
- Initial ___________ mL bolus over ___________ min ___________ time(s) daily
- Advance by ___________ mL each day to a goal of ___________ mL bolus over ___________ min ___________ time(s) daily
- Offer PO every ___________ minute(s), then give remaining via tube

**OTHER ORDERS** [based on institutional protocol]

(For example)
- Flush the feeding tube with ___________ mL of water every ___________ hour(s)
- Keep head of bed elevated to 30°-45°

**MONITORING** [based on institutional protocol]

(For example)
- Observe for abdominal distension every ___________ hour(s)
- Tube site care and assessment every ___________ hour(s)
- Intake and Output every ___________ hour(s)
- Weigh daily
- Labs:_____________________

**Prescriber:** ___________________  **Date:** ___________  **Time:** ___________
Example of EN labelling

Example of EN labelling


HBM=Human breast milk
Safe preparation of formula feeds

- Wash hands before preparing and handling delivery sets
- Use mask if handler has a cold, sore throat or upper respiratory tract infection
- Use clean technique when handling the feeding system
- Use pre-prepared feeds for enteral feeding
- Formula decanted from a screw cap is preferable to a flip top
- Use cool boiled water to make up formula from powder

Strict application of manufacturers’ reconstitution recommendations, and in particular the use of safe water and the immediate feeding of fresh prepared formula is very important.

Hang times for EN feeds

**Administration sets should be changed every 4 hours for enteral HBM feed, at least every 24 hours for open system EN feeding, and every 24–48 hours for closed systems**

*Follow manufacturer’s instructions*

HBM=Human breast milk

Safety practices to avoid contamination/prevent diarrhoea during EN

1. Do not decant feeds before use
2. Use aseptic technique when handling the feeding system
3. Adhere to hang time limits
4. Administration sets and containers should be discarded every 24 hours

Storage of EN components and feeds

• Immediate feeding of freshly prepared formula is very important

• Formulas should be exposed to room temperature for no more than 4 hours, after which they should be discarded

• Formulas reconstituted in advance should be immediately refrigerated, and discarded within 24 hours if not used

• If HBM is to be used fresh – within 48 hours of expression – the milk can be refrigerated (4°C) in a sterile/aseptic container; otherwise, HBM should be frozen at -20°C

• Store unopened commercially-available liquid EN formulas under controlled (dark, dry, cool) conditions

• Monitor for expiry dates


HBM=Human breast milk
Avoiding enteral feeding tube misconnections

**Education, awareness and human factors**
- Assess practices for potential risks of misconnection
- Package together all parts needed for enteral feeding
- Route tubes and catheters that have different purposes in different directions
- Label or colour-code feeding tubes and connectors
- Train non-clinical staff and visitors not to reconnect lines

**Design changes**
- Choose products that have been redesigned to decrease the risk of enteral tubing misconnections
Giving medication to an EN-fed patient

- **Do not add** medication directly to formula
- **Avoid** enteric-coated and **slow-release formulations**
- **Crush tablets** thoroughly and mix with water; contents of **gelatin capsules** can be dissolved in warm water
- To avoid incompatibilities or tube obstruction, **do not mix** medications intended for enteral administration
- Stop the feed before administering the medicine
- **Flush the tube with water** before, between, and after medication(s), taking patient’s fluid status into account
- Restart the feeding in a timely manner to **minimise EN interruption**

Additional recommendations for good safety practices for EN

- Define a quality control process for EN formula preparation, distribution, storage, handling, and administration
- Maintain written procedures for safe EN formula and HBM preparation and handling
- Maintain a surveillance program for contamination

Module summary

- Good safety practices reduce avoidable complications in PICU patients who are receiving nutritional therapy.

- Collaborative initiatives between Nestlé Nutrition and A.S.P.E.N. have produced campaigns targeted at nurses that promote safe enteral feeding.

- Good safety practices include standardised ordering and labelling of feeds, minimising chances of microbial contamination, safe medication administration, and avoiding tube misconnections.

- The PICU should implement a quality control process with written procedures that cover all aspects of EN preparation and administration.
Test your knowledge
Test your knowledge

1. Which of these listed options are contamination points during EN feed preparation and delivery? (Select all that apply)

A. Pouring HBM into an administration container
B. Transporting sterile formula to the PICU in a closed system
C. Connecting the delivery container to the administration set
D. Ordering the formula from the pharmacy
1. Which of these listed options are contamination points during EN feed preparation and delivery?

• Answer:

  A. Pouring HBM into an administration container
  C. Connecting the delivery container to the administration set

• Both of these steps involve exposure of the formula to air, which can allow microbial contamination to enter the administration set. Extra care must be taken during these steps in feed preparation.
Test your knowledge

2. What is the hang time limit for non-sterile powder formula?

A. 2 hours
B. 4 hours
C. 8 hours
D. 12 hours
E. 24 hours
2. What is the hang time limit for non-sterile powder formula?

- Answer:

  B. 4 hours

The recommended hang time limit for EN formula prepared from non-sterile powder is 4 hours. Adhering to hang-time limits reduces the chances of avoidable complications caused by bacterial growth.
Test your knowledge

3. Which of these techniques are NOT correct when giving medication to an EN-fed patient? (Select all that apply)

A. Flush the feeding tube with water before, during and after giving medication
B. Add medication directly to the EN formula
C. Dissolve contents of gelatin capsules in water before adding
D. Mix all the medications together before adding
3. Which of these techniques are NOT correct when giving medication to an EN-fed patient?

• Answer:
  • C. Add medication directly to the EN formula
  • D. Mix all the medications together before adding

Medication should not be added directly to the EN formula during the feed, but should be mixed with the formula first. Medications should not be mixed together, to avoid the possibility of interactions between them.
4. Reconstituted enteral formulas should not be exposed to room temperature for more than ____ hours, after which they should be discarded.

A. 2 hours
B. 4 hours
C. 8 hours
D. 12 hours
E. 24 hours
4. Reconstituted enteral formulas should not be exposed to room temperature for more than _____ hours, after which they should be discarded.

• Answer:
  
  B. 4 hours

• Formulas reconstituted in advance should be immediately refrigerated, and discarded if exposed to room temperature for more than 4 hours.
Test your knowledge

5. After how long should the administration set for open system EN feeding be discarded?

A. 2 hours
B. 4 hours
C. 8 hours
D. 12 hours
E. 24 hours
5. After how long should the administration set for open system EN feeding be discarded?

• Answer:

E. 24 hours

• Administration sets for enteral feeds should be changed every 24 hours, to prevent avoidable complications caused by bacterial growth.