

CHILD HEALTH PATIENT SAFETY ORGANIZATION

Patient Safety Action Alert

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A Patient Experienced a SERIOUS SAFETY EVENT

Take Action to Reduce Risk of Similar Harm

Event: Blind Pediatric NG Tube Placements – Continue to Cause Harm

Child Health PSO identified an immediate need for pediatric providers to consider the risks associated with blind NG Tube placement and recommendations to prevent harm as this is the most common method of insertion of nasogastric (NG) tubes is blind passage. In 2011, the United Kingdom's National Patient Safety Agency (NPSA) issued a Patient Safety Alert, *Reducing the harm caused by misplaced nasogastric feeding tubes*, as a result of patient deaths and patient harm due to misplaced feeding tubes. The NPSA also issued an alert specific to neonates providing recommendations and guidance for this vulnerable population. Other organizations, such as the American Association of Critical Care Nurses (AACN) and the American Society for Parenteral and Enteral Nutrition (ASPEN), have recognized the complications resulting from NG tube misplacement and have implemented practice alerts and best practices based on evidence.

Incidence: The Journal of Parenteral and Enteral Nutrition (January, 2011) reported more than 1 million enteral intubations occur annually. In studying over 2,000 feeding tube insertions, Sorokin et al. (2006) determined 1.3 to 2.4 percent of NG tubes were malpositioned and 28 percent of those resulted in respiratory complications (pneumonia, pneumothorax). Malpositioned was defined in the study as placement external to the gastrointestinal tract. NG tube misplacements in children have been reported to be between 20.9 percent and 43.5 percent (Ellett et al. 2005). Farrington et al. (2009) reported the prevalence of NG tube placement errors in children is difficult to verify because of differing definitions across studies. Additionally, poor reporting of tube misplacement has prevented the adoption of protocols to prevent such errors (Metheny 2007).

Known Complications: NG tube placement can lead to complications such as esophageal perforation, bronchopulmonary intubation, pneumothorax, hydrothorax, empyema, and pneumonia. In addition, intracranial placement may occur in patients with facial fracture or facial trauma.

Problem: Evidence and clinical practice with pediatric NG Tube placement is inconsistent (see summary, page 2, e.g., radiographic methods) and misplacement is under reported. Pediatric patients at highest risk for incorrect tube placement include neonates, any children with neurologic impairment, or who are obtunded, sedated, unconscious, and/or critically ill, and those with reduced gag reflex or static encephalopathy.

Who should be concerned: Pediatric clinicians, nutritionists, nurses, nursing leaders, quality and safety leaders, home health clinicians, and hospital leaders.

Has a patient experienced an event at your organization that could happen in another hospital?

- Child Health PSO members submit event details into the [Child Health PSO portal](#).
- Contact Child Health PSO Staff to share risks, issues to assess, and mitigation strategies with member hospitals.
- Forty children's hospitals are actively engaged with Child Health PSO. We currently are enrolling new members.

ACTION NEEDED

1. **Immediately Discontinue**
 - Insertion of an air bolus with auscultation over the abdomen to assess/verify NG tube placement
2. **Consider Discontinuing**
 - Nose-ear-xiphoid (NEX) as a predictor of NG tube insertion-length
3. **Consider x-ray verification when indicated (e.g. high-risk situations, difficult placement, when other non-radiologic methods are not confirmatory)**
4. **Review the attached ECRI Hotline Response: Nasogastric Tube Misplacement and Complications in Pediatrics**
 - Evaluate your NG Tube Placement practices against industry standards
5. **Participate in national initiatives to develop and implement reliable, best practices to prevent NG tube related complications (2013 ASPEN Summit in process)**
6. **Participate in collaborative opportunities with vendors for adoption of new verification technologies**

Contact Us

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This Alert is approved for general distribution to improve pediatric safety and reduce patient harm. This Alert meets the standards of non-identification in accordance with 3.212 of the Patient Safety Quality Improvement Act (PSQIA) and is a permissible disclosure by Child Health PSO.

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SUPPORTING LITERATURE OF METHODS STUDIED

Literature Recommendations	References
RADIOGRAPHIC METHODS	
X-ray verification is recommended to confirm placement prior to initiation of feedings/medication administration.	Pediatric Nursing, Farrington et al. (2009) American Journal of Critical Care, Bourgault (2009) American Association of Critical-Care Nurses Practice Alert (2009) Ellett et al. (2011)
Radiologic verification in pediatric patients at high risk for aspiration or when non-radiologic methods are not feasible, or results are unclear.	Cincinnati Children's Hospital Medical Center Best Evidence Statement (2011)
MEASURING FEEDING TUBE INSERTION LENGTH METHODS	
Measuring Feeding Tube Length: Use of age-related height-based (ARHB) (calculated using prediction equation tables) and nose-ear-mid-umbilicus (NEMU). <ul style="list-style-type: none"> For neonates, patients with short stature, or if unable to obtain an accurate height, use of prediction equation tables is recommended (There is new data that suggests NEX should not be used). For children >2 weeks, age-related height-based (ARHB) methods and NEMU are more accurate than NEX. 	Cincinnati Children's Hospital Medical Center Best Evidence Statement (2011) Ellett et al. (2011)
Measuring Feeding Tube Length: Use of nose-ear-xiphoid (NEX) in neonates should no longer be used to estimate the distance to insert NG/OG tubes.	Ellett et al. (2011)
Measuring Feeding Tube Length*: Mark tube exit.	Pediatric Nursing, Farrington et al. (2009) Cincinnati Children's Hospital Medical Center Best Evidence Statement (2011) American Association of Critical-Care Nurses Practice Alert (2009)
OTHER METHODS	
Gastric pH testing* Gastric pH >5 validate NG placement using another method. Gastric pH varies by pediatric population and situation.	Farrington et al. (2009) Cincinnati Children's Hospital Medical Center Best Evidence Statement (2011) Gilbertson et al. (2011) Stock et al. (2008) Longo et al. Journal of Pediatric Nursing (2011) American Association of Critical-Care Nurses Practice Alert (2009)
Observe visual characteristics of aspirate*.	Pediatric Nursing, Farrington et al. (2009) American Association of Critical-Care Nurses Practice Alert (2009)
Auscultation of air insufflated through the feeding tube.	The reliability of this method was not supported by the literature

* Some studies recommended several methods of verification be performed to predict tube location.