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Key Issues

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- [Blind Pediatric NG Tube Placement Patient Safety Alert](#)

Patient Safety Alert

#### Action Needed

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

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.

Target Audiences

- Pediatric Clinicians
- Nutritionists
- Nurses/nursing Leaders
- Quality and Safety Leaders

- Home Health Clinicians
- Hospital Leaders

### High-risk Patients

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.

### Incidence and Research

More than 1 million enteral intubations occur annually, according to *The Journal of Parenteral and Enteral Nutrition* (January, 2011).

The most common method of insertion of nasogastric (NG) tubes is blind passage.

Researchers found 1.3 to 2.4 percent of NG tubes were malpositioned and 28 percent of those resulted in respiratory complications (pneumonia, pneumothorax), in a study of more than 2,000 feeding tube insertions, Sorokin et al. (2006). “Malpositioned” was defined as placement external to the gastrointestinal tract.

Other studies reported NG tube misplacements in children between 20.9 and 43.5 percent (Ellett et al. 2005).

It is difficult to verify NG tube placement errors in children because of differing definitions across studies, observed Farrington et al. (2009). Additionally, poor reporting of tube misplacement has prevented the adoption of protocols to prevent such errors (Metheny 2007).

### Additional NG Tube Safety Alerts

The United Kingdom’s National Patient Safety Agency (NPSA) issued a Patient Safety Alert, “Reducing the harm caused by misplaced nasogastric feeding tubes,” in 2011 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.

### Related Links

- [A Call to Action: The Development of Enteral Access Safety Teams](#) (Nutrition in Clinical Practice; May 7, 2014)

- [Nasogastric Tube Placement and Verification in Children: Review of the Current Literature](#) (Nutrition in Clinical Practice; April 15, 2014)
- [Nasogastric Tube Placement and Verification in Children: Review of the Current Literature](#) (Critical Care Nurse; April 15, 2014)

**Questions**

Contact [Kate Conrad](#), vice president, (913) 981-4118 or [Barbara Weis](#), project specialist, (913) 981-4117.

Supporting Literature of Methods Studied

Literature Recommendations	References
<b>Radiographic Methods</b>	
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)
<b>Measuring Feeding Tube Insertion Length Methods</b>	
Measuring Feeding Tube Length: Use of age-related height-based (ARHB) (calculated using	Cincinnati Children’s Hospital Medical Center Best Evidence Statement (2011)  Ellett et al. (2011)

<p>prediction equation tables) and nose-ear-mid-umbilicus (NEMU).</p> <ul style="list-style-type: none"> <li>• 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).</li> <li>• For children &gt;2 weeks, age-related height-based (ARHB) methods and NEMU are more accurate than NEX.</li> </ul>	
<p>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.</p>	<p>Ellett et al. (2011)</p>
<p>Measuring Feeding Tube Length*: Mark tube exit.</p>	<p>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)</p>
<p><b>Other Methods</b></p>	
<p>Gastric pH testing*</p> <p>Gastric pH &gt;5 validate NG placement using another method.</p> <p>Gastric pH varies by pediatric population and situation.</p>	<p>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)</p>

	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.

#### Tags

- [Patient Safety](#),
- [Intubation and Extubation](#),
- [Surgery and Anesthesia Safety](#)

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#### Related Resources

##### Announcement or News

[Participate in Patient Safety Initiatives to Qualify for Contracts with Exchange Plans](#) May 19, 2016

##### Presentation or Recording

[Mastering the PSO Ladder: Is Your PSES Policy Enough?](#) April 10, 2015

##### Contact

1. [Kate Conrad](#)(913) 981-4118

##### Patient Safety Alerts

Child Health PSO Patient Safety Action Alerts provide immediate notification of patient safety concerns for most pediatric health care providers.

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## Quality Award



Find out which project won the Pediatric Quality Award, and discover quality initiatives you can replicate in your hospital.

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