

Child Health Patient Safety Organization

Patient Safety Action Alert



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Pediatric NG Tube Placement Confirmation

Fundamental Issue

Approximately 1.2 million nasogastric tubes (NGTs) are placed in the United States annually, with the rate increasing by 7% each year.¹ Because clinicians cannot see the tube as it is pushed through the nostril into the stomach, they cannot confirm the final placement of the tube's tip. That can lead to NGT misplacement, which can result in harm and, in rare cases, death.

In 2018, the American Society for Parenteral and Enteral Nutrition (ASPEN) released evidence-based guidelines for New Opportunities of Verification of Nasogastric Tube Location (NOVEL).² Though the guidelines recommend against solely using gastric auscultation or gastric fluid visualization to confirm NGT misplacement, this practice continues to occur. Radiographic confirmation is still deemed the most effective practice, but generally pediatric patients do not get an X-ray after each placement.²⁻³ In patients without high-risk conditions, pH testing of gastric contents, electromagnetic imaging, ultrasound, and capnography can be used for confirmation (See Figure 1).⁴

Risk of Harm

Since rates of occurrence are not consistently tracked, all clinicians need to consider the risks of placing nasogastric tubes. A 2025 systematic review of published case studies revealed that patients harmed by a misplaced NGT experienced displacement into the respiratory tract (52%), brain, cardiovascular system, and bladder.⁵ Depending on where the displacement occurs, risk of injury can include esophageal perforation, pneumothorax, hydrothorax, empyema, pneumonia, gastric perforation, and peritonitis. While NGT insertion in the presence of facial or cranial trauma is contraindicated, instances do still occur. If the patient is crying during NGT placement, the epiglottis is open more often than usual, increasing the risk for placement into the trachea. Patients at the highest risk for incorrect tube placement include neonates; those with neurologic impairment, reduced gag reflex, or static encephalopathy; and those who are obtunded, sedated, unconscious, or critically ill.

Additionally, using an X-ray to verify placement brings additional risks.

Pediatric Considerations

Because the body size of pediatric patients can vary greatly, the length of the inserted NGT will also vary between patients. For children under two weeks old, place NGTs using the Age-Related Height-Based (ARHB) table (see Table 1).⁶ For children older than two weeks, use the nose-ear-mid umbilicus (NEMU) method.⁴

What can I do with this alert?

- Forward to the recommended target audiences for evaluation.
- Include in your daily safety brief.
- Create a loop-closing process for evaluating risks and strategies to decrease risk of repeat harm.
- Let us know what is working and what additional information you need.

Target Audiences

- Ambulatory care
- Clinical educators
- Nursing staff
- Emergency/urgent care
- Home health clinicians
- Medical leaders
- Nursing leaders
- Nutritionists
- Parents of patients with NGTs
- Quality and Safety leaders

Contact Us

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Recommended Actions

1. Place NGTs using the Age-Related Height Based (ARHB) table (see Table 1) or the nose-ear-mid umbilicus (NEMU) method to identify insertion length.^{4,6} Discontinue the use of auscultation and the nose-ear-xiphoid prediction method to verify NGT placement.
2. Use the smallest bore tube possible to meet the indication for placement.
3. Align institutional practices to NOVEL recommendations (See Figure 1).²
4. Use X-ray confirmation for high-risk conditions such as the presence of endotracheal tubes, decreased gag or cough reflexes, decreased level of consciousness, sedation or paralytics, and gastric aspirate pH >5.5. In the absence of high-risk conditions, NGT placement can be confirmed with a gastric aspirate pH ≤5.5.
5. Clearly state in X-ray orders that the reason for request is to confirm the position of the NGT for feeding or medication administration.⁷
6. Continue to confirm NGT placement through provider-to-provider handoff, marking the tube at the nostril, and documenting it in the EHR and any radiology reports.
7. Maintain the competency and proficiency of the nurses placing NGTs through education and reinforcement of evidenced-based standards.⁸

Resources

- ASPEN's [NOVEL Project Resources](#)
- [Nutrition in the Critically Ill Child Training Module](#)

References

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FIGURE 1
ASPEN's NOVEL Practice Guidelines for NGT Confirmation

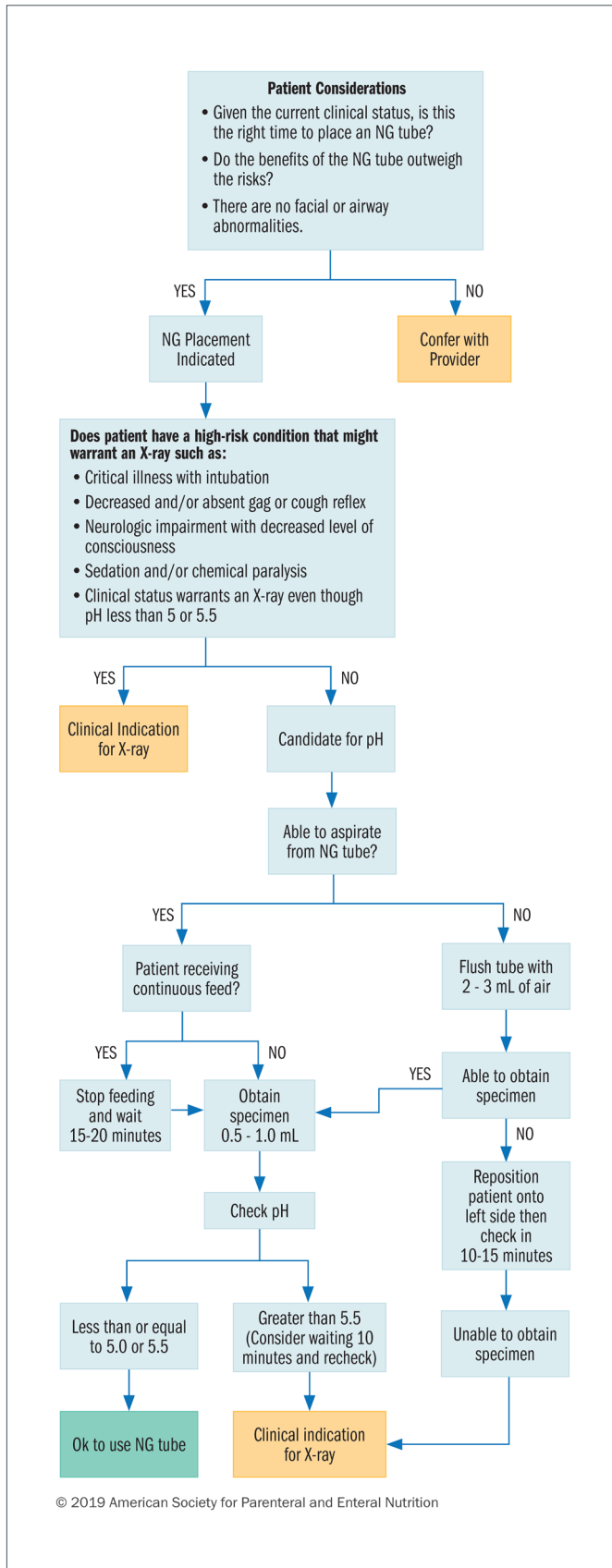


TABLE 1

Age-related height-based (ARHB) prediction equations for gastric tube placement

(Beckstrand et al., 2007)

Route	Age group (months)	Predicted internal distance to the body of the stomach*
Oral	Age ≤ 28	$9.1 \text{ cm} + 0.183 (\text{height cm}) + 6 \text{ cm} + 1.5 \text{ cm} = 16.6 \text{ cm} + 0.183 (\text{height cm})$ (1)
	28 < age ≤ 100	$9.1 \text{ cm} + 0.183 (\text{height cm}) + 8 \text{ cm} + 3 \text{ cm} = 20.1 \text{ cm} + 0.183 (\text{height cm})$ (2)
	100 < age ≤ 121	$4.5 \text{ cm} + 0.218 (\text{height cm}) + 7.5 \text{ cm} + 5 \text{ cm} = 17.0 \text{ cm} + 0.218 (\text{height cm})$ (3)
	Age > 121	$4.5 \text{ cm} + 0.218 (\text{height cm}) + 9 \text{ cm} + 5 \text{ cm} = 18.5 \text{ cm} + 0.218 (\text{height cm})$ (4)
Nasal	Age ≤ 28	$10.1 \text{ cm} + 0.197 (\text{height cm}) + 6 \text{ cm} + 1.5 \text{ cm} = 17.6 \text{ cm} + 0.197 (\text{height cm})$ (5)
	28 < age ≤ 100	$10.1 \text{ cm} + 0.197 (\text{height cm}) + 8 \text{ cm} + 3 \text{ cm} = 21.1 \text{ cm} + 0.197 (\text{height cm})$ (6)
	100 < age ≤ 121	$4.5 \text{ cm} + (2.7 \text{ cm}) + 0.218 (\text{height cm}) + 6.5 \text{ cm} + 5 \text{ cm} = 18.7 \text{ cm} + 0.218 (\text{height cm})$ (7)†
	Age > 121	$4.5 \text{ cm} + (2.7 \text{ cm}) + 0.218 (\text{height cm}) + 9 \text{ cm} + 5 \text{ cm} = 21.2 \text{ cm} + 0.218 (\text{height cm})$ (8)†

*Regression of oesophageal length (EL) on height + maximum deviation above the lower oesophageal sphincter and additional age-specific adjustments + 'ideal' pore interval width.

†Uses the endoscopic oral EL equations estimated in (3) and (4) plus 2.7 cm, respectively, as the base equations.