



# Gastroesophageal Reflux Disease (GERD)

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*When your child needs a hospital, everything matters.*

Prescribing for Gastroesophageal Reflux Disease

Prescribing medications to treat Gastroesophageal Reflux Disease (GERD) or symptoms of heartburn has become increasingly common and there is an array of options available. To address the chronic use and varying costs of these medications, Partners For Kids, in collaboration with Nationwide Children’s Division of Pediatric Gastroenterology, have created this tool.

1. As shown in the algorithms below, treatment of a child with GERD begins with lifestyle and dietary modifications before medications are initiated.

a. Avoid overfeeding

b. Avoid laying child horizontally for 20-30 min after feeding

c. Perform frequent burping during feed

d. If the child remains symptomatic despite the lifestyle modification listed above, thickening feeds would be another suggested method to improve symptoms<sup>4</sup>. There are many options for thickeners. Counsel family to watch labels for thickeners with soy protein as the infant may be intolerant.

– *Formula-fed infants*: Infant cereal is recommended and is much more affordable than other commercial thickeners.

– *Breast-fed infants*: Amylase in breast milk can break-down cereal and reduce efficacy as a thickener, therefore commercial thickeners with carob bean gum (e.g. GelMix™) or xanthum gum (e.g. SimplyThick™) are recommended instead. These thickeners are only recommended for patients ≥1 year old.

e. Another potential approach to GERD management is eliminating cow’s milk from the maternal diet or using protein hydrolysate/amino acid-based formulas.

– *Breast-fed infants*: Elimination of cow’s milk from the maternal diet has been shown to be effective in patients that have GERD symptoms associated with an allergy to cow’s milk protein. A 2-4 week trial of elimination is recommended prior to initiating acid-reducing medications.

– *Formula-fed Infants*: Hydrolyzing formula breaks down proteins into smaller fragments, making the milk proteins less allergenic. Protein hydrolysate formulas are preferred over amino acid based formulas for most formula fed infants. A 2-4 week trial of protein hydrolysate formula is recommended prior to initiating acid-reducing medications.
2. Medications should only be used for treatment of typical symptoms in children with GERD.

a. Medications are not recommended for:

– Crying/distress in infants without presence of other signs/symptoms

– Visible regurgitation without presence of other signs/symptoms

– Extra-esophageal symptoms only

b. Generally, antacids/alginates are not recommended for chronic treatment for GERD in infants and children.

c. Decision between Histamine-2 Receptor Antagonist (H2RA) therapy and Proton Pump Inhibitor (PPI) therapy should be based upon:

– Ease and ability to administer medication (see Table 1 for available dosage formulations)

– Cost/insurance coverage

– Availability, as not all pharmacies compound PPI products

d. In general, evidence in adults supports superiority of PPI over H2RA therapy; however, there is a lack of research in children.
- ALGORITHM 1. Management of the symptomatic infant.<sup>1</sup>
- ```
graph TD
    A[Infant with suspicion of GERD] --> B[History and physical exam]
    B --> C{Presence of alarm sign}
    C -- YES --> D[Tailor testing to address alarm signs and refer appropriately]
    C -- NO --> E[Avoid overfeeding<br/>Thicken feeds<br/>Continue breastfeeding]
    E -- IMPROVED --> F[Continue management]
    E -- NOT IMPROVED --> G[Consider 2-4 weeks of protein hydrolysate or amino acid based formula or, in breastfed infants, elimination of cow's milk in maternal diet]
    G -- IMPROVED --> H[Continue management and discuss milk protein reintroduction at follow up]
    G -- NOT IMPROVED --> I[Referral to pediatric gastroenterologist]
    I -- REFERRAL --> J[Revisit the differential diagnoses, consider testing and/or short medication trial]
    I -- REFERRAL NOT POSSIBLE --> K[Consider 4-8 week trial of acid suppression then wean if symptoms improved]
    K -- SYMPTOMS NOT IMPROVED OR RECUR --> J
    K -- SUCCESSFUL WEANING --> L[No further treatment]
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- ALGORITHM 2. Management of reflux symptoms in the older child.<sup>1</sup>
- ```
graph TD
    A[Child with typical symptoms of GERD] --> B[History and physical exam]
    B --> C{Presence of alarm sign}
    C -- YES --> D[Tailor testing to address alarm signs and refer appropriately]
    C -- NO --> E[Lifestyle and dietary education]
    E -- IMPROVED --> F[Continue management]
    E -- NOT IMPROVED --> G[Acid suppression for 4–8 weeks]
    G -- IMPROVED --> H[Continue for a total/ of 4–8 weeks and then attempt wean]
    G -- NOT IMPROVED --> I[Referral to pediatric gastroenterologist]
    H -- SYMPTOMS RECUR WITH WEANING --> I
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3. Things to consider when prescribing PPI therapy:

a. If a patient can take solid dosage forms, consider omeprazole (Prilosec®) and lansoprazole (Prevacid®) capsules first line. These capsules can be opened and sprinkled on soft foods

b. If a liquid/dissolvable formulation is required, try compounded omeprazole suspension before lansoprazole orally-disintegrating tablets (Prevacid® SoluTab®).

c. Chronic acid suppression can minimize the effectiveness of any medication that requires acid for absorption. These medications include: antifungals (ketoconazole, voriconazole, itraconazole), atazanavir, calcium, and iron salts.

d. In 2012, the FDA issued a Safety Alert that PPIs may be associated with an increased risk of Clostridium Difficile Associated Diarrhea (CDAD). The FDA recommends using the lowest dose and shortest duration of PPI therapy possible and advising patients to seek medical attention if they develop symptoms of CDAD (abdominal pain, fever, and watery stools).<sup>2</sup>

e. Adult studies have shown that use of PPIs increases risk of fractures, dementia, myocardial infarction, and renal disease.

f. Not enough research is available on long term effects of these medications in pediatric patients taking acid suppression medications. However, some reports have shown increased risk of infections (necrotizing enterocolitis, community-acquired pneumonia, upper respiratory tract infections, sepsis, and urinary tract infections) in this patient population.<sup>3</sup>

TABLE 1. Available Dosage Formulations

Histamine-2 Receptor Antagonist (H2RA)				
Drug	Formulation	Strength	Dosing	Max Dose
Famotidine (Pepcid®)	Suspension	40 mg/5 mL	1 mg/kg/day divided twice daily	40 mg/day
	Tablet	10 mg, 20 mg, 40 mg		
Proton Pump Inhibitors (PPI)				
Drug	Formulation	Strength	Dosing	Max Dose
Omeprazole (Prilosec®)	Suspension	2 mg/mL	1 - 4 mg/kg/day given once daily	40 mg/day
	Capsule	10 mg, 20 mg, 40 mg		
Lansoprazole (Prevacid®)	Suspension	3 mg/mL	1 - 2 mg/kg/day given once daily	30 mg/day
	Capsule	15 mg, 30 mg		
	Orally-disintegrating tablet	15 mg, 30 mg		
Pantoprazole (Protonix®)	Packet for oral suspension	40 mg	1 - 2 mg/kg/day given once daily	40 mg/day
	Tablet	20 mg, 40 mg		

<sup>1</sup> Rosen R, et al. Pediatric Gastroesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. JPN 2018;66: 516-554.

<sup>2</sup> Freedberg DE, Lamoué-Smith ES, Lightdale JR, et. al. 2015. Use of acid suppression medication is associated with risk for C. difficile infection in infants and children: a population-based study. Clinical Infectious Diseases, civ432.

<sup>3</sup> Canani RB, Cirillo P, Rogger P et. al. Therapy with gastric acidity inhibitors increases the risk of acute gastroenteritis and community acquired pneumonia in children. Pediatrics 2006; 117(5), pp.e817-e820.

<sup>4</sup> Duncan DR, Larson K, Rosen RL. Clinical Aspects of Thickeners for Pediatric Gastroesophageal Reflux and Oropharyngeal Dysphagia. Curr Gastroenterol Rep. 2019 May 16;21(7):30.

## Referrals and Consultations

Online: [NationwideChildrens.org](https://www.nationwidechildrens.org)

Phone: (614) 722-6600 or (877) 722-6220 | Fax: (614) 722-4000

Physician Direct Connect Line for 24-hour urgent physician consultations:

(614) 355-0221 or (877) 355-0221

Pharmacy Consultations/Assistance: [PFKPharmacy@NationwideChildrens.org](mailto:PFKPharmacy@NationwideChildrens.org)



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