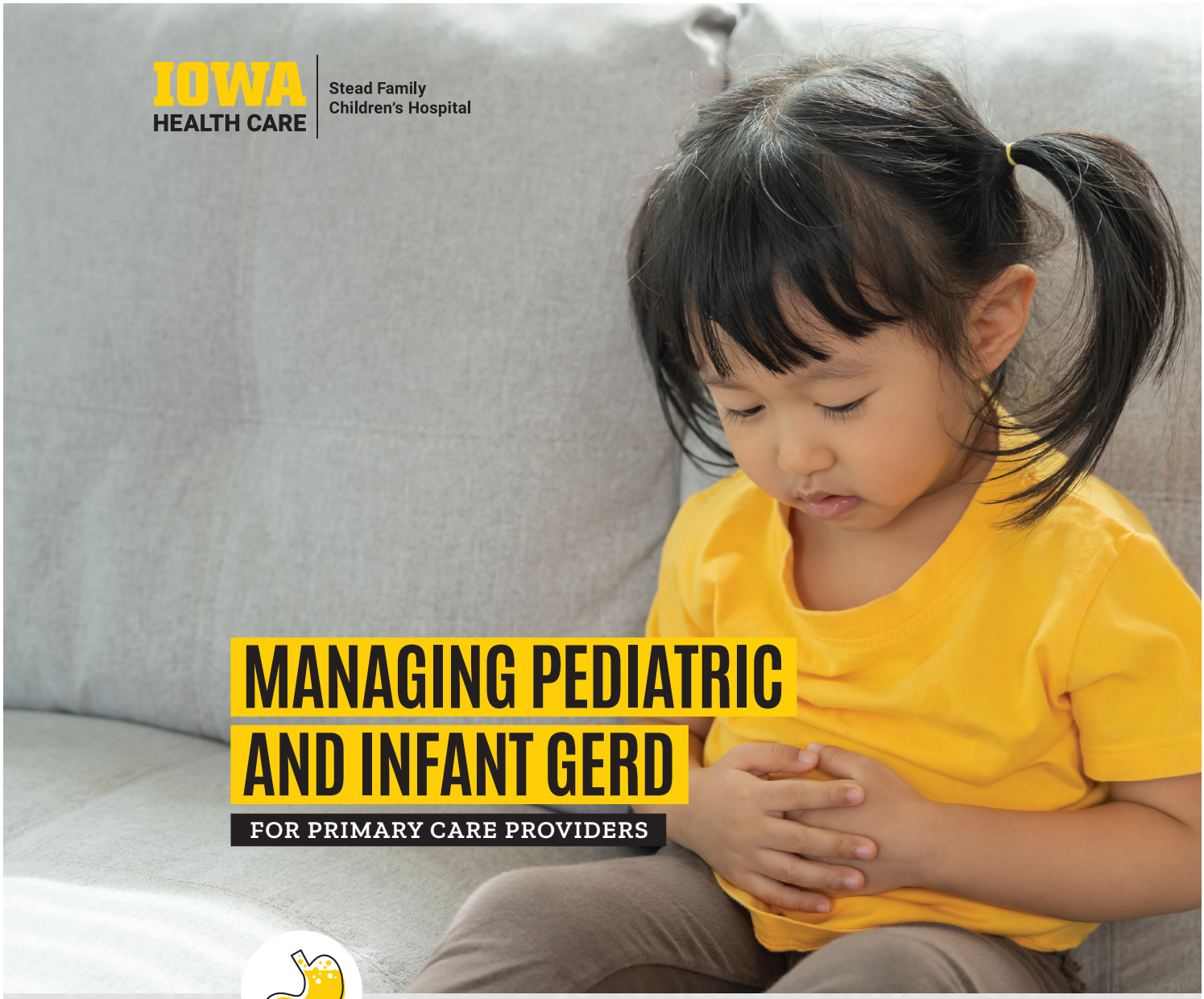
IOWA HEALTH CARE | Stead Family Children's Hospital



MANAGING PEDIATRIC AND INFANT GERD

FOR PRIMARY CARE PROVIDERS

Gastroesophageal reflux (GER) is a common occurrence in infants. It happens due to several physiological factors such as a liquid diet, frequent lying down, a short esophagus, and a poorly compliant stomach. In these cases, GER is considered benign and usually resolves on its own. Therefore, treatment is generally not necessary or effective for physiologic reflux in infants.

Gastroesophageal reflux disease (GERD) refers to reflux that leads to troublesome symptoms or complications

Common symptoms of GERD in infants and children

	Infants	Children (Older than 2 years)
General symptoms	• Discomfort/irritability (if excessive irritability and pain are they only symptoms it's unlikely to be GERD) • Feeding refusal • Failure to thrive • Dystonic neck posturing (Sandifer syndrome)	• Heartburn • Abdominal (usually epigastric) or chest pain • Nausea • Feeding avoidance
Gastrointestinal	• Recurrent regurgitation • Hematemesis • Dysphagia/odynophagia	• Regurgitation • Vomiting • Dysphagia/odynophagia
Airway/respiratory	• Wheezing • Stridor • Cough • Hoarseness	• Chronic cough • Asthma-like symptoms • Recurrent pneumonia • Hoarseness
Signs	• Anemia • Esophagitis • Esophageal stricture • Aspiration pneumonia	• Dental erosion • Anemia • Esophagitis • Barrett's esophagus • Esophageal stricture • Aspiration pneumonia

Diagnosing GERD in infants and children

For most infants and children, a thorough medical history is sufficient to diagnose GERD. Routine diagnostic testing is not necessary unless there are concerns of features or suspicion of anatomical abnormalities such as:

Pyloric stenosis. Order a pyloric ultrasound.

Intestinal malrotation or hiatal hernia. Consider an upper gastrointestinal (GI) series.

Esophageal stricture. Consider an upper GI series.

For children, a short course of proton pump inhibitor (PPI) may be used diagnostically. Improvement in symptoms during the trial can support a diagnosis of GERD.

Red flag symptoms that suggest conditions other than GERD

Frequent spitting up is common—seen in about 50% of four-month-olds—and is usually not a cause for concern unless accompanied by poor weight gain, feeding refusal, and other red flag symptoms.

The following table outlines red flag symptoms and signs that may suggest conditions other than GERD. These findings warrant further evaluation and may indicate more serious underlying disorders.

Category	Sign/Symptom	Possible Concern
General	Weight loss, lethargy, fever	May indicate a variety of conditions, including systemic infections
	Excessive irritability or pain	If this is the only indication, it is most likely something other than GERD
	Dysuria	May suggest urinary tract infection
	Regurgitation/vomiting starting after 6 months or persisting beyond 12–18 months	Late onset as well as symptoms increasing or persisting after infancy, based on natural course of the disease, may indicate something other than GERD
Neurological	Bulging fontanel or rapidly increasing head circumference	May suggest raised intracranial pressure (e.g., meningitis, tumor, hydrocephalus)
	Seizures	Requires further neurological evaluation
	Macrocephaly or microcephaly	Requires further neurological evaluation
Gastrointestinal	Persistent forceful vomiting (in infants <2 months)	Suggestive of hypertrophic pyloric stenosis
	Nocturnal vomiting	May indicate increased intracranial pressure
	Bilious vomiting	Possible intestinal obstruction (e.g., Hirschsprung disease, intestinal atresia, or mid-gut volvulus or intussusception)
	Hematemesis	May indicate serious upper GI bleeding, possibly from GERD-associated from acid-peptic disease (especially with non-steroidal anti-inflammatory drugs), Mallory-Weiss tear (associated with vomiting), or reflux-esophagitis
	Chronic diarrhea or rectal bleeding	Could suggest food protein-induced gastroenteropathy (more likely in infants with eczema or family history of atopic disease), bacterial gastroenteritis, IBD, as well as acute surgical conditions.
	Abdominal distention	Indicative of obstruction, dysmotility, or anatomic abnormalities

Alternative underlying diseases with GERD-like symptoms

Category	Associated Conditions
Gastrointestinal obstruction	Pyloric stenosis Malrotation with volvulus Intussusception Hirschsprung disease Antral/duodenal web Foreign body Incarcerated hernia Superior mesenteric artery (SMA) syndrome
Other gastrointestinal disorders	Achalasia Gastroparesis Gastroenteritis Peptic ulcer Eosinophilic esophagitis Food allergy/intolerance Inflammatory bowel disease
Neurologic	Hydrocephalus Subdural hematoma Intracranial hemorrhage Intracranial mass
Infectious	Sepsis/meningitis Urinary tract infection Upper/lower airway infection Otitis media Hepatitis
Metabolic/endocrine	Congenital adrenal gland hyperplasia/adrenal crisis Galactosemia Hereditary fructose intolerance Urea cycle defects Amino and organic acidemias Fatty acid oxidation disorders Metabolic acidosis
Toxic	Lead poisoning Other toxins
Cardiac	Heart failure Vascular ring Autoimmune dysfunction
Others	Pediatric condition falsification (PCF)/factitious disorder by proxy (FDP) Child neglect or abuse Self-induced vomiting Cyclic vomiting syndrome Rumination syndrome
Renal	Obstructive uropathy Renal insufficiency

Treatment of GERD in infants and children

Infants will often outgrow GERD as they continue to develop. Children with GERD will likely benefit from lifestyle changes and medication.

For infants

First line approach

- Avoid overfeeding.
- Be careful about feeding position and avoid pressure on the abdomen after feeding.
- Consider thickening feeds (one teaspoon to one tablespoon cereal per ounce of formula or use a commercial thickener such as GelMix).

Second line approach

Try a two-to-four-week trial of extensively hydrolyzed formula (such as Nutramigen or Alimentum) or amino acid-based formula (such as Neocate or Elecare). If there is no improvement, go back to the standard formula.

Third line approach

Refer to a pediatric gastroenterologist. If referral is not possible, you may consider a PPI trial, However, most studies do not show efficacy in infants with GERD.

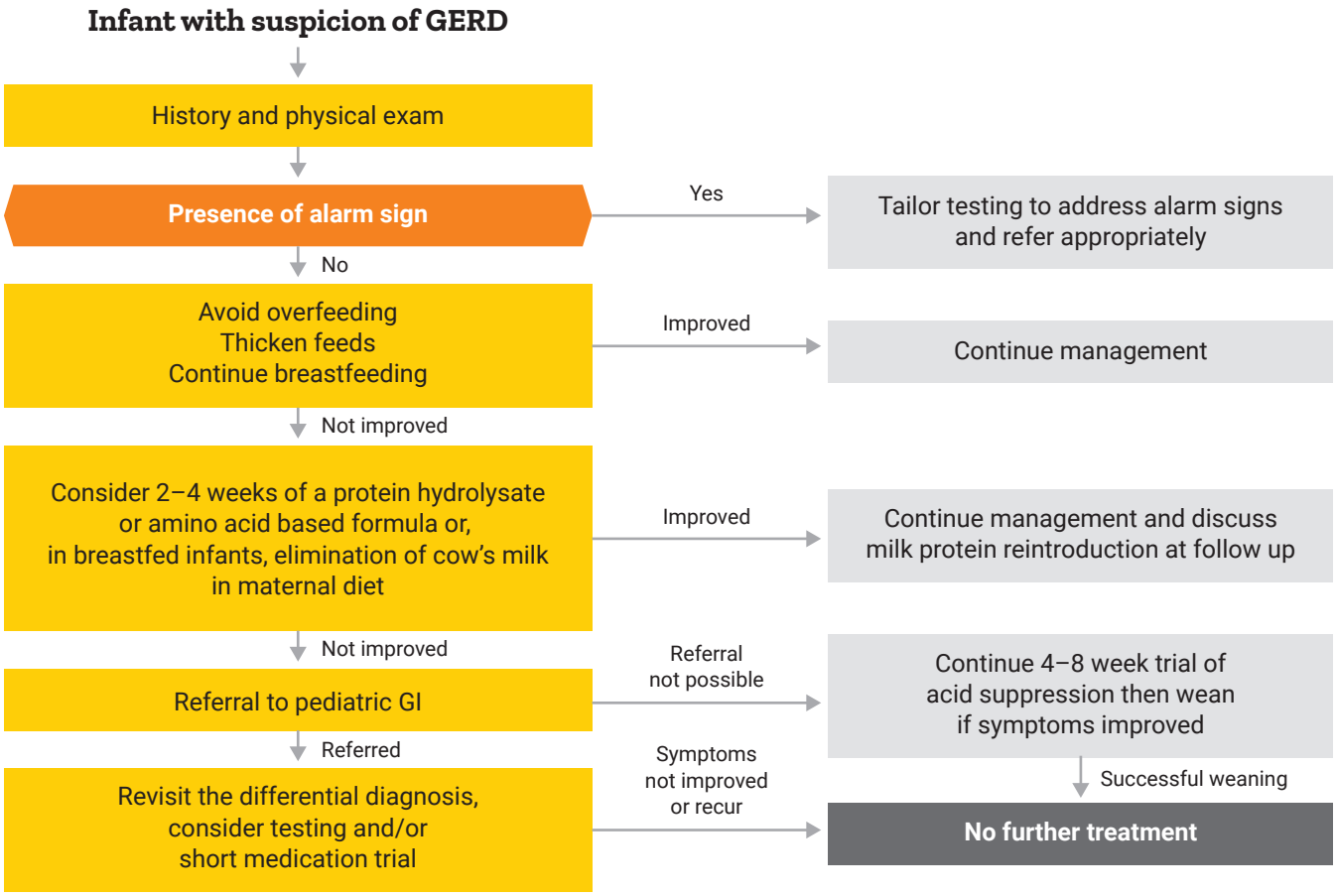


Figure from Rosen, R, Vandenplas Y, Singendonk M, et al. Pediatric Gastroeesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. JPGN 2018:66: 516-554

Treatment of GERD in infants and children *(Continued)*

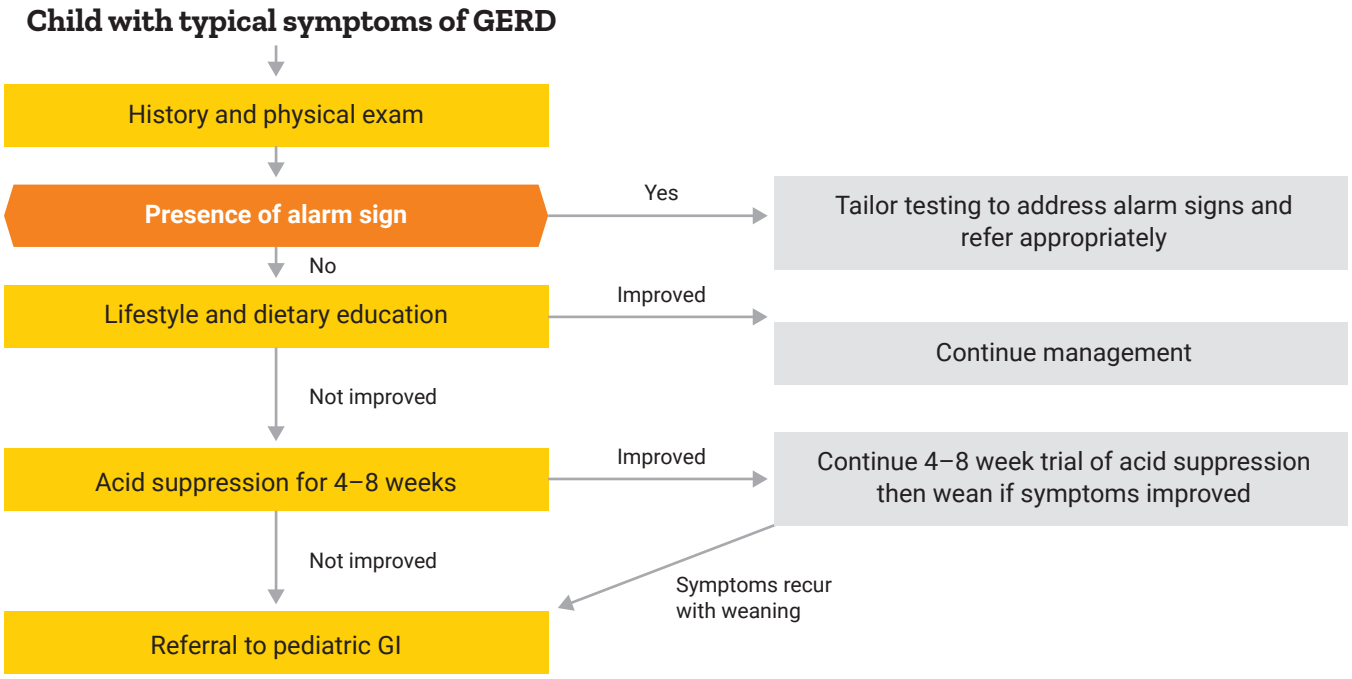
For children

Lifestyle modifications

- Avoid food triggers, such as caffeine, tomatoes, citrus, fried/high fat foods, spicy foods, carbonation, and chocolate.
- Maintain a healthy weight.
- If nocturnal symptoms are present, avoid eating one hour before bed and consider elevating the head of the bed.
- Don't eat right before exercising.
- Don't smoke.

Medical therapy

- For infrequent reflux (<3 times per week), consider over the counter antacids, such as calcium carbonate or magnesium hydroxide.
- For more frequent symptoms, a trial of PPI is recommended for at least two weeks.



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Proton pump inhibitor dosing for infants and children

Drug	Recommended dosing	Maximum dosage (adult)	Formulation
Omeprazole	1–4 mg/kg/d	40 mg	Capsules (10, 20, 40 mg)–can be opened and sprinkled onto soft food Oral suspension (Konvomep 2 mg/ml) – difficult to get insurance coverage
Lansoprazole	1–3 mg/kg/d	30 mg	Capsules (15, 30 mg)–can be opened and sprinkled onto soft food Oral disintegrating tablet (15, 30 mg) Suspension 3 mg/ml
Esomeprazole	0.7–3.3 mg/kg/d	40 mg	Capsules (20 mg, 40 mg)–can be opened and sprinkled onto soft food Granules for suspension (2.5, 5, 10, 20 mg)
Pantoprazole	1–2 mg/kg/d	40 mg	Tablet (20, 40 mg) Oral powder packet (40 mg)

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When to consult with pediatric gastroenterology

Infants

- Symptoms start after 6 months of age and do not response to therapy
- Symptoms persist beyond 1 year of age
- Persistent hoarseness, cough, or other signs of airway problems are present associated with typical GERD symptoms
- Diagnosis is not clear and differentiation from other conditions is needed
- Symptoms recur after discontinuation of proton pump inhibitor

Children

- Treatment with medication fails
- Persistent hoarseness, cough, or other signs of airway problems are present associated with typical GERD symptoms
- Diagnosis is not clear and differentiation from other conditions is needed
- Symptoms recur after discontinuation of proton pump inhibitor
- When GERD persists and there is a strong family history of esophageal disorders
- Patient has red flag symptoms