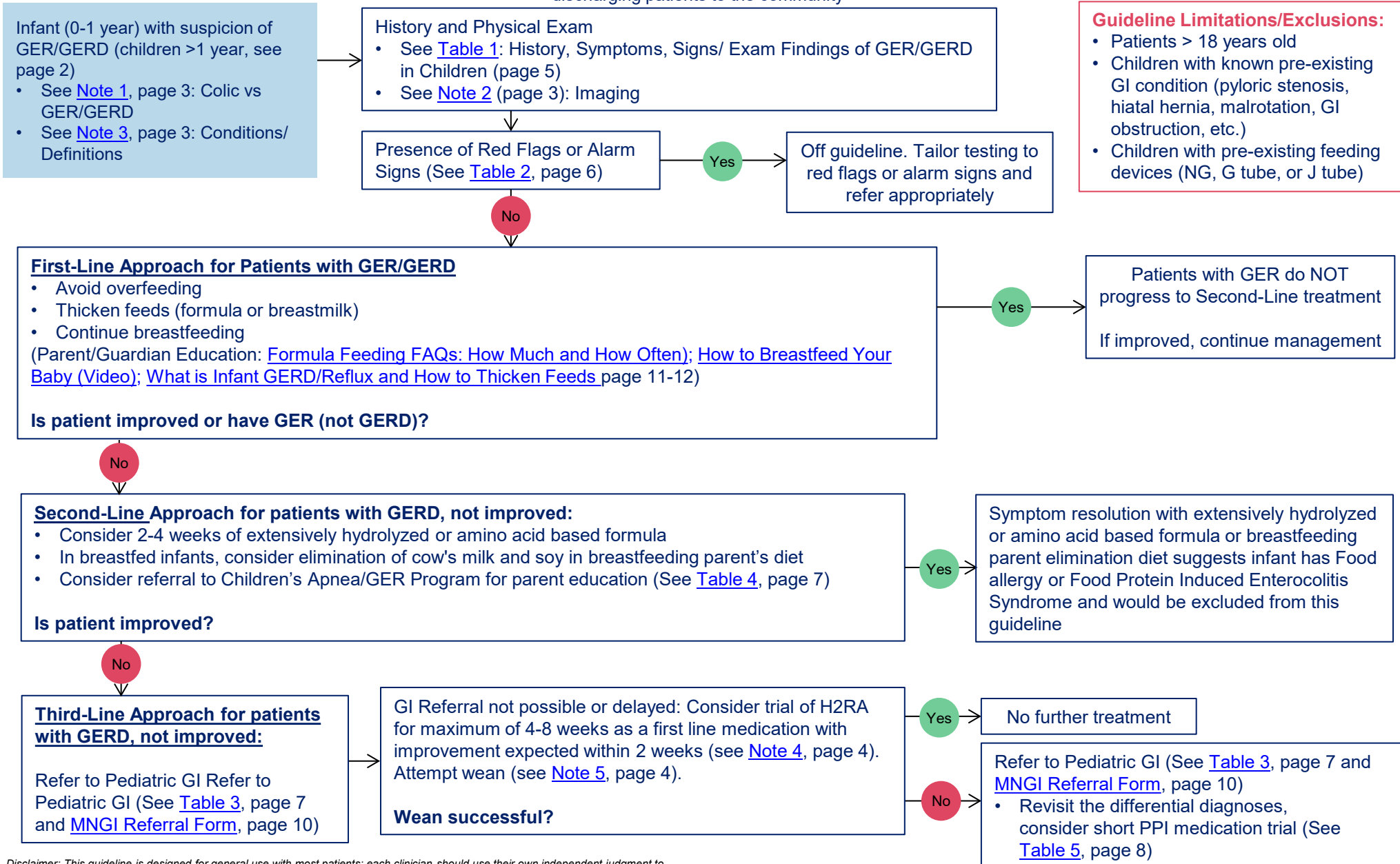


Aim: To decrease variation in management of GER/GERD in Primary Care and improve outcomes; to serve as a resource for inpatient clinicians' care of GER/GERD and discharging patients to the community



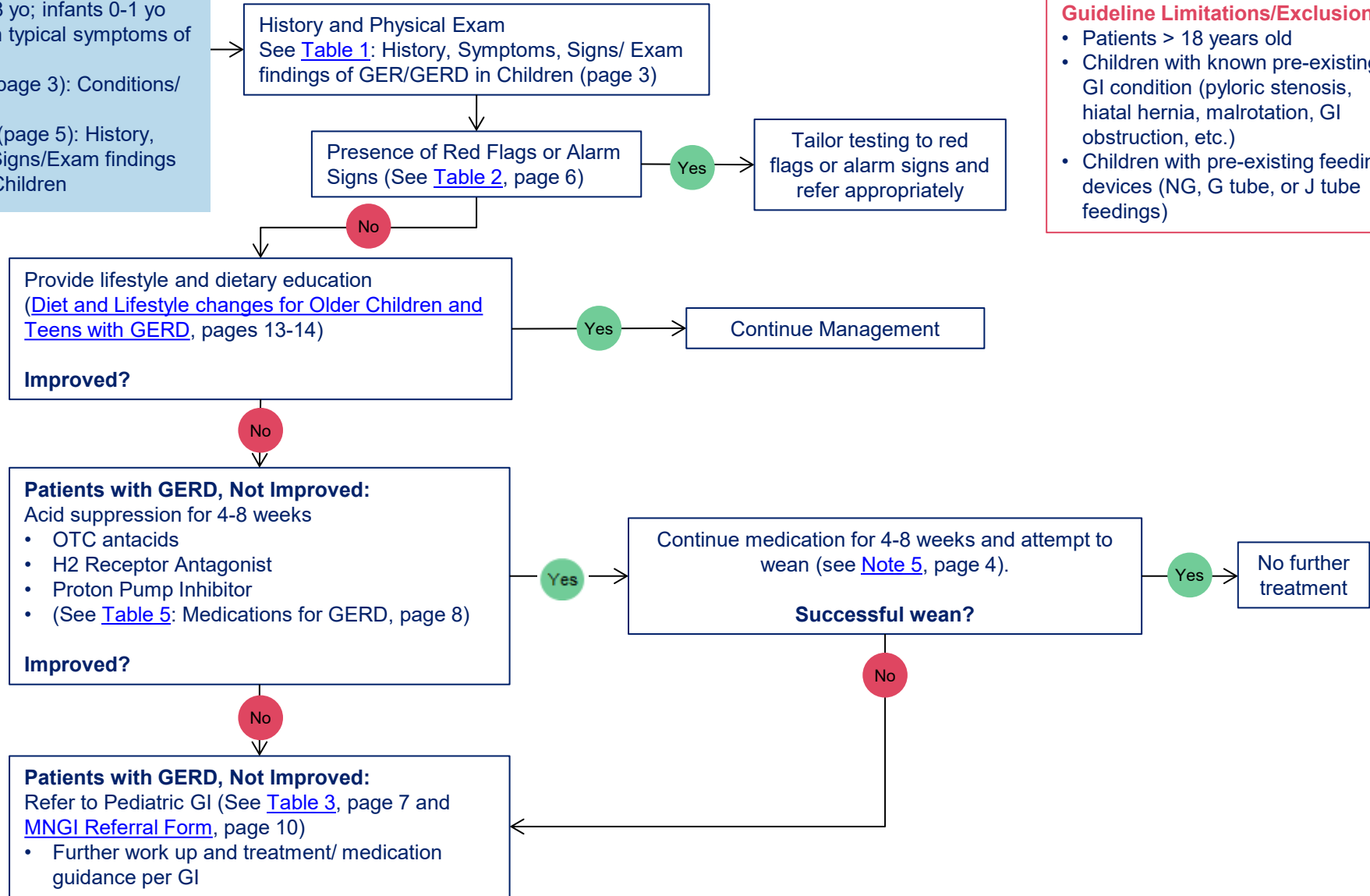
Guideline Limitations/Exclusions:

- Patients > 18 years old
- Children with known pre-existing GI condition (pyloric stenosis, hiatal hernia, malrotation, GI obstruction, etc.)
- Children with pre-existing feeding devices (NG, G tube, or J tube)

Aim: To decrease variation in management of GER/GERD in Primary Care and improve outcomes; to serve as a resource for inpatient clinicians' care of GER/GERD and discharging patients to the community

Child (ages 1-18 yo; infants 0-1 yo see page 1) with typical symptoms of GER/GERD

- See [Note 3](#) (page 3): Conditions/ Definitions
- See [Table 1](#) (page 5): History, Symptoms, Signs/Exam findings of GERD in Children



Guideline Limitations/Exclusions:

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Note 1: Colic vs GER/GERD

- Colic is most common cause of “fussiness” in infants from 2 weeks to 4 months
- Difficult to differentiate presentation of fussiness, arching, crying, with or without spit up in otherwise thriving infants
- Families/Caregivers may pressure clinicians to start anti-reflux therapies or pursue diagnostic testing because of perceived severity of symptoms
- Absent warning signs, diagnostic testing and/or therapies including acid suppression are NOT needed if there is no impact of the symptoms on feeding or growth

Resource: [National Center on Shaken Baby Syndrome - PURPLE Crying \(dontshake.org\)](https://www.dontshake.org/)

Parent/Guardian Education: [Colic](#) (English and Spanish available)

Note 2: Imaging

- There is no “gold standard” diagnostic tool for GERD; diagnosis of GERD in infants is based primarily on clinical suspicion.
- If suspicious of pyloric stenosis in infants < 3 mos, consider Abdominal Ultrasound.

Note 3: Conditions/Definitions

Gastroesophageal Reflux (GER): the passage of gastric contents into the esophagus with or without regurgitation and vomiting.

- Common - affects 40% or more of infants
- Begins before 8 weeks of age, peaks about 4 months and resolves by 1 year in most cases
- Does not cause crying and irritability in infants
- Rarely requires evaluation
- *Can be managed with parental education, support and anticipatory guidance*

Gastroesophageal Reflux Disease (GERD): when GER leads to troublesome symptoms and/or complications such as esophagitis or stricturing.

- In clinical practice it may be difficult to differentiate GER from GERD in children, particularly preverbal infants and toddlers. Reported symptoms of GERD may occur in all babies (with or without GERD) making definitive diagnosis challenging.
- Symptoms may include refusal to feed, pronounced irritability with feeding, aspiration, slow weight gain, chronic cough or wheeze, hematemesis

Refractory GERD: GERD not responding to optimal treatment after 8 weeks

Optimal Therapy: Maximum pharmacologic and/or non-pharmacologic therapy based on the available health-care facilities

Aim: To decrease variation in management of GER/GERD in Primary Care and improve outcomes; to serve as a resource for inpatient clinicians' care of GER/GERD and discharging patients to the community

Note 4: Pharmacologic Treatment in Infants. See [Table 5](#) page 8 for dosing.

- Histamine-2 Receptor Antagonists (H2RA) recommended for 1st line pharmacologic treatment in **infants** because:
 - H2RA does not require compounding
 - H2RA is easier to administer, does not taste as bad, does not require refrigeration
 - Acid suppressing medications, particularly PPIs have been associated with adverse side effects:
 - Alteration of the intestinal microbiome affecting the immune system
 - Increase risk of infections including serious infections of respiratory, gastrointestinal, urinary tracts and sepsis
 - Necrotizing Enterocolitis
 - Increased later risk of fractures
 - Increase later risk of allergies and auto immune disease such as inflammatory bowel disease
 - Micronutrient deficiencies
- H2RA must be weight adjusted if used longer than 4 weeks.
- If H2RA trial fails, follow up on referral to Pediatric GI.
- Proton Pump Inhibitor (PPI) use in infants should be reserved for documented esophagitis, preferably after consultation with a Pediatric Gastroenterologist. If consultation cannot be arranged, consider trial of PPI, improvement expected by 2-4 weeks. PPIs should be stopped after 4-8 weeks due to risk of complications.
- Studies have failed to demonstrate the efficacy of treating infants with medication for reflux symptoms without endoscopically proven esophagitis. Providers should consider medication only after all other options have been attempted without benefit and carefully weigh potential risks and benefits of medication.
- Goal for medication therapy is to use the lowest dose of medication for the shortest time possible.

Note 5: Weaning GERD Medications

- Weaning of H2RA:
 - Wean dose by 50% (or decrease from twice daily to once daily dosing) for 5 days;
 - Discontinue treatment.
- Weaning of PPI:
 - Wean dose by 50% (or decrease from twice daily to once daily) for 7 days;
 - Wean dose by 50% again for 7 days;
 - If patient is taking capsules, weaning by 50% may include transitioning from once daily to every other day dosing
 - Discontinue treatment

Aim: To decrease variation in management of GER/GERD in Primary Care and improve outcomes; to serve as a resource for inpatient clinicians' care of GER/GERD and discharging patients to the community

Table 1: History, Symptoms, Signs/Exam findings of GER/GERD in Children

	History	Symptoms	Signs/Exam
General	<ul style="list-style-type: none"> • Age of onset • Physiologic GER seldom starts before 1 week or after 6 months of age • Feeding and dietary history • Growth Trajectory • Family medical history 	<ul style="list-style-type: none"> • Discomfort/irritability • Excess irritability/pain unlikely to be GERD • Failure to Thrive • Feeding refusal • Dystonic neck posturing (Sandifer syndrome) 	<ul style="list-style-type: none"> • Dental erosion • Anemia
Gastrointestinal	<ul style="list-style-type: none"> • Pattern of regurgitation/spitting/vomiting <ul style="list-style-type: none"> ○ Immediately post prandial ○ Long after feedings/meals ○ Nocturnal ○ Digested vs. undigested 	<ul style="list-style-type: none"> • Recurrent regurgitation with/or without vomiting in the older child • Heartburn/chest pain • Epigastric pain • Hematemesis • Dysphagia/odynophagia 	<ul style="list-style-type: none"> • Esophagitis • Esophageal stricture • Barrett esophagus
Other	<ul style="list-style-type: none"> • Possible environmental triggers • Family psychosocial history - • Second-hand tobacco smoke exposure • Prior pharmacological and dietary interventions • Presence of warning signs 	<p>Airway</p> <ul style="list-style-type: none"> • Wheezing • Stridor • Cough • Hoarseness 	<p>Airway</p> <ul style="list-style-type: none"> • Apnea spells • Asthma • Recurrent pneumonia due to aspiration • Recurrent otitis media

Aim: To decrease variation in management of GER/GERD in Primary Care and improve outcomes; to serve as a resource for inpatient clinicians' care of GER/GERD and discharging patients to the community

Table 2: Red Flags/Alarm Signs may include:

	System: Symptoms/Signs	Possible Diagnostic Implications	Suggested Actions
General	Weight loss	Suggests a variety of conditions, including systemic infections	Consider other illnesses and expand evaluation. May not be an indication to deviate off guideline if thought to be from reflux.
	Lethargy	Suggests another illness	Consider other illnesses
	Fever	May suggest infection	Infection evaluation
	Excessive irritability/pain	Unlikely to be manifestation of GERD	Consider other illnesses
	Dysuria	May suggest urinary tract infection, especially in infants (See CHN UTI Guideline)	
	Onset of regurgitation/vomiting >6 mos increasing/persisting >12-18 mos	Late onset as well as symptoms increasing or persisting after infancy, based on natural course of the disease, may indicate a diagnosis other than GERD.	Urine microbiology investigation and/or referral to specialist
Neurological	<ul style="list-style-type: none"> Bulging fontanelle Rapidly increasing head circumference Seizures Macro or microcephaly 	May suggest raised intracranial pressure for example due to meningitis, brain tumor or hydrocephalus	Imaging or referral to specialist
Gastrointestinal	<u>Bilious vomiting</u>	May suggest intestinal obstruction. Possible causes include Hirschsprung disease, intestinal atresia or mid-gut volvulus or intussusception	Emergency; send to ER, upper GI imaging and/or Pediatric Surgical referral
	Persistent forceful vomiting	Indicative of hypertrophic pyloric stenosis (infants up to ≤ 3 months old)	Upper GI imaging or Surgical referral
	Nocturnal vomiting	May suggest increased intracranial pressure	Imaging or referral
	Hematemesis	Suggests a potentially serious bleed from the esophagus, stomach or upper gut; possibly GERD-associated occurring from acid-peptic disease, Mallory-Weiss tear, or reflux-esophagitis	Pediatric GI referral
	Chronic diarrhea	May suggest food protein-induced gastroenteropathy	Try alternative formula or referral to specialist
	Rectal Bleeding	Indicative of multiple conditions, including bacterial gastroenteritis, inflammatory bowel disease, as well as acute surgical conditions and food protein-induced gastroenteropathy rectal bleeding (bleeding caused by proctocolitis)	Stool microbiology investigation (PCR, culture) Referral to GI or ID as dictated by test results
	Abdominal distension	Indicative of obstruction, dysmotility, or anatomic abnormalities	Imaging or Pediatric Surgical referral

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Table 3: Pediatric GI Referral Instructions, Minnesota Gastroenterology, CHN Affiliate Specialist

<p><u>Minnesota Gastroenterology (MNGI)</u> Pediatric Clinic Scheduling: 612-871-1145 Fax: 612-871-5491 Locations and services: 3001 Broadway Street NE Suite #120 Minneapolis, MN 55413</p>	<p>Pediatric Gastroenterologists (as of 9/1/24): Sundee Arora, MD Ramalingam Arumugam, MD Mark Bartlett, MD Kristin Borovsky, MD Nissa Erickson, MD Emily Kevan, MD Pamela Puthoor, MD Boris Sudel, MD Jessica Ulrich, MD</p>	<p>Pediatric Nurse Practitioners: Kristin Frericks, APRN, PNP Krista Germain, APRN, CNP Abby Wiberg, APRN, CNP</p> <p>Dietitians: Annie Hoese, RD, CSP, LD</p>
<p>Instructions: Use MNGI Referral Form (see page 11) and send patient records supporting the referral. Please include:</p> <ul style="list-style-type: none"> •Patient records (should support reason patient needs to be seen and for what service) •Patient demographics •All relevant lab tests •Any radiology reports done at outside facilities <p>New patients need a referral and are considered those who have not been seen by MNGI previously or not been seen in >3 yrs.</p>		

Table 4: Apnea/GER Program Referral Instructions

<p><u>Children's Minnesota Infant Apnea/ GER Program</u> Program Manager: Jodi Sand, MAN, BSN, RN Office: 651-220-6592</p>	<p>Minneapolis Location: Office: 612-813-5831 Fax: 612-813-6836 Children's Minnesota - MPLS campus 2525 Chicago Avenue South Minneapolis, MN 55404</p>	<p>St. Paul Location: Office: 651-220-6267 Fax: 651-220-5396 Children's Minnesota - St. Paul campus Ritchie Medical Bldg 310 Smith Avenue North St. Paul, MN 55102</p>
<p>Referral Instructions: Please fax the following to the preferred location:</p> <ul style="list-style-type: none"> • Order for Gastroesophageal Evaluation/Management • Facesheet with parent demographic data and insurance • Last clinic note <p>Apnea/GER nurses will contact family to discuss insurance coverage and set up in-person GER education that includes infant CPR and safe sleep.</p>		

Disclaimer: This guideline is designed for general use with most patients; each clinician should use their own independent judgment to meet the needs of each individual patient. This guideline is not a substitute for professional medical advice, diagnosis or treatment.

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Table 5: Doses of frequently used medications for GERD

Medication	Recommended Pediatric Dose	Max Dose (based on adult dose)	Forms & Strengths
Histamine-2 Receptor Antagonists (H2RA)			
Famotidine (Pepcid)	Infants \leq 3 mos: 0.5mg/kg once daily Infants > 3 mos: 0.5mg/kg twice daily • If not effective after 2 weeks, may increase to 1.0mg/kg twice daily • Not to exceed 2mg/kg/day	40mg	10mg, 20mg, 40mg tablet 40mg/5ml suspension
Proton Pump Inhibitors (PPIs)			
Omeprazole (Prilosec)*	1-4 mg/kg/day	40mg	20mg DR tablet 10mg, 20mg, 40mg capsule 2mg/ml suspension 2mg/ml compounded suspension
Lansoprazole (Prevacid)*	Infants: 2 mg/kg/day Children: 0.7-3mg/kg/day	30mg	15mg, 30mg tablet/capsule/oral disintegrating tablet 3mg/ml compounded suspension
Esomeprazole (Nexium)	10 mg/day (weight < 20kg) 20 mg/day (weight > 20kg)	40mg	20mg, 40mg capsule 2.5mg, 5mg, 10mg, 20mg, 40mg packet of powder
Pantoprazole (Protonix)	1-2 mg/kg/day	40mg	20mg, 40mg tablet 40mg packet of powder
Antacids (risks if chronically used without oversight)			
Calcium Carbonate (Tums, Pepto Kids, etc.)	2-5 yrs: 400mg 6-11 yrs: 800mg \geq 12 yrs: 1000-3000mg Per dose, PRN, for up to 2 wks	2-5 yrs:1200mg/day 6-11 yrs: 2400mg/day \geq 12 yrs: 7500mg/day	400mg, 500mg, 750mg, 1000mg, 1177mg chewable tablet 1250mg tablet 400mg/5ml liquid
Aluminum hydroxide, Magnesium hydroxide, Simethicone (Maalox, Mylanta)	200mg-200mg-20mg/5ml: Infants: 1-2 ml/kg per dose Children: 5-15ml every 3-6 hours	4 doses per day	200mg-200mg-20mg/5ml 400mg-400mg-40mg/5ml 400mg-135mg-40mg/5ml

*Formulation/compounding limitations may pose insurance coverage challenges

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References:

1. Rosen R, Vandenplas Y, 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. *J Pediatr Gastroenterol Nutr.* 2018 Mar;66(3):516-554. doi: 10.1097/MPG.0000000000001889. PMID: 29470322; PMCID: PMC5958910.
2. Davies I, Burman-Roy S, Murphy MS; Guideline Development Group. Gastro-oesophageal reflux disease in children: NICE guidance. *BMJ.* 2015 Jan 14;350:g7703. doi: 10.1136/bmj.g7703. PMID: 25591811; PMCID: PMC4707563.
3. Berg EA, Khlevner J. Treatment of Gastroesophageal Reflux Disease in Children. *Pediatr Rev.* 2021 Jan;42(1):51-53. doi: 10.1542/pir.2020-001602. PMID: 33386308.
4. Gonzalez Ayerbe JI, Hauser B, Salvatore S, Vandenplas Y. Diagnosis and Management of Gastroesophageal Reflux Disease in Infants and Children: from Guidelines to Clinical Practice. *Pediatr Gastroenterol Hepatol Nutr.* 2019 Mar;22(2):107-121. doi: 10.5223/pghn.2019.22.2.107. Epub 2019 Mar 8. PMID: 30899687; PMCID: PMC6416385.
5. Chevalier I, Beck CE, Doré-Bergeron MJ, Orkin J. Medical management of gastro-esophageal reflux in healthy infants. *Paediatr Child Health.* 2022 Dec 27;27(8):503-511. doi: 10.1093/pch/pxac068. PMID: 36583075; PMCID: PMC9792283.
6. Harris J, Chorath K, Balar E, Xu K, Naik A, Moreira A, Rajasekaran K. Clinical Practice Guidelines on Pediatric Gastroesophageal Reflux Disease: A Systematic Quality Appraisal of International Guidelines. *Pediatr Gastroenterol Hepatol Nutr.* 2022 Mar;25(2):109-120. doi: 10.5223/pghn.2022.25.2.109. Epub 2022 Mar 10. PMID: 35360381; PMCID: PMC8958056.
7. Njeh M, Helmick R, Alshaiikh E, Marcano K, Alexander A, Osborn E, Jadcherla SR. The Irritable Infant in the Neonatal Intensive Care Unit: Risk Factors and Biomarkers of Gastroesophageal Reflux Disease. *J Pediatr.* 2024 Jan;264:113760. doi: 10.1016/j.jpeds.2023.113760. Epub 2023 Sep 29. PMID: 37777170.
8. Gieruszczak-Białek D, Konarska Z, Skórka A, Vandenplas Y, Szajewska H. No effect of proton pump inhibitors on crying and irritability in infants: systematic review of randomized controlled trials. *J Pediatr.* 2015 Mar;166(3):767-70.e3. doi: 10.1016/j.jpeds.2014.11.030. Epub 2014 Dec 30. PMID: 25556017.
9. Lassalle M, Zureik M, Dray-Spira R. Proton Pump Inhibitor Use and Risk of Serious Infections in Young Children. *JAMA Pediatr.* 2023 Oct 1;177(10):1028-1038. doi: 10.1001/jamapediatrics.2023.2900. PMID: 37578761; PMCID: PMC10425862.
10. Dipasquale V, Cicala G, Spina E, Romano C. A Narrative Review on Efficacy and Safety of Proton Pump Inhibitors in Children. *Front Pharmacol.* 2022 Feb 10;13:839972. doi: 10.3389/fphar.2022.839972. PMID: 35222047; PMCID: PMC8866943.
11. Freedberg DE, Lamoussé-Smith ES, Lightdale JR, Jin Z, Yang YX, Abrams JA. Use of Acid Suppression Medication is Associated With Risk for *C. difficile* Infection in Infants and Children: A Population-based Study. *Clin Infect Dis.* 2015 Sep 15;61(6):912-7. doi: 10.1093/cid/civ432. Epub 2015 Jun 9. PMID: 26060292; PMCID: PMC4551005.
12. Wang YH, Wintzell V, Ludvigsson JF, Svanström H, Pasternak B. Association Between Proton Pump Inhibitor Use and Risk of Fracture in Children. *JAMA Pediatr.* 2020 Jun 1;174(6):543-551. doi: 10.1001/jamapediatrics.2020.0007. PMID: 32176276; PMCID: PMC7076540.
13. 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. doi: 10.1007/s11894-019-0697-2. PMID: 31098722; PMCID: PMC9733977.
14. Ummarino D, Miele E, Martinelli M, Scarpato E, Crocetto F, Sciorio E, Staiano A. Effect of magnesium alginate plus simethicone on gastroesophageal reflux in infants. *J Pediatr Gastroenterol Nutr.* 2015 Feb;60(2):230-5. doi: 10.1097/MPG.0000000000000521. PMID: 25079477.
15. Ornstein AE, Fitzpatrick E, Hatchette J, Woolcott CG, Dodds L. The impact of an educational intervention on knowledge about infant crying and abusive head trauma. *Paediatr Child Health.* 2016 Mar;21(2):74-8. doi: 10.1093/pch/21.2.74. PMID: 27095881; PMCID: PMC4807799.

Additional reviews by: Katie Brunsberg (Clinical Guidelines), Samantha Johnson (Nutrition Services), Jodi Sand (Apnea/GER Program), Mary LaPlant and Mike Raschka (Pharmacy)

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GI – GER/GERD Referral Communication Form

To fill in or use clinic sticker here

PCP: _____

Clinic name: _____

Clinic address: _____

Phone #: _____ Fax #: _____

Referral date: _____

Patient address: _____

Patient name: _____

City: _____ State: _____ Zip: _____

DOB: _____

Parent/Guardian: _____

Preferred Phone: _____

Alternate Phone: _____

GI Consult request for:

- GI evaluation for treatment options
- Patient/parent requested a consult with GI to discuss treatment options
- Refractory GER/GERD
- Other clinical concern: _____

Reason for Referral (check all that apply):

- INFANT GER/GERD - check all therapies that have been attempted**
 - First-Line Therapies: avoiding overfeeding, thickened feeds, feeding at 45-degree angle
 - Second-Line Therapies: extensively hydrolyzed formula, maternal elimination diet for breast-fed infants
 - Third-Line Therapies: 4-8 week trial of H2RA or PPI (circle all that apply)
- CHILD GER/GERD - check all therapies that have been attempted**
 - Lifestyle and Dietary Modifications
 - 4-8-week trial of Acid Suppression
 - Acid Suppression used: (circle all that have been tried) OTC antacid H2RA PPI

Clinical Concerns/Red Flags (check all that apply)

- Weight loss/Poor weight gain
- Feeding refusal
- Excessive irritability/pain with feedings
- Forceful/Excessive vomiting
- Hematemesis
- Dysphagia
- Bilious vomiting (possible UGI obstruction-urgent referral to ER for evaluation)
- Aspiration/Chronic cough/Wheezing
- Other: _____

Include all relevant records and any comments (check documents that are included)

- Recent relevant encounter notes
- Growth Charts
- Radiology imaging reports
- Other relevant lab results: _____

Additional comments:

Primary Care Clinician Signature: _____ **Date:** _____

Fax completed form and other documents to Minnesota Gastroenterology Pediatric Clinic: 612-871-5491

What is Infant GER/Reflux and How to Thicken Feeds

What is GER/Reflux? Gastroesophageal Reflux (GER) is when food and drink stomach contents travel up the tube from the stomach or esophagus. This may result in frequent episodes of spitting up and non-forceful vomiting. For more information see the Children's Minnesota [Gastroesophageal reflux](#) patient & family materials.



How do I help my child? Follow your pediatric clinician's recommendations to manage symptoms. To reduce GER, DO NOT over feed your baby. Instead, try smaller, more frequent feeds. Hold your baby upright at a 45-degree angle while feeding. Keep your baby upright for 30 minutes after feeding. Use the QR code to search for more information on [KidsHealth.org](#) and to find videos on how to [How to Breastfeed Your Baby](#), [Formula Feeding FAQs: How Much and How Often](#) and [Formula Feeding FAQs: Preparation and Storage](#).



How do thickened formula or breastmilk help with GER/Reflux? Your pediatric clinician may recommend thickened formula or breastmilk to help reduce the amount and frequency of spit up. Thickened formula or breastmilk helps food stay at the bottom of your baby's stomach.

- Do not add more thickener than instructed by your healthcare provider.
- Do not add solid foods to a bottle unless instructed by your healthcare provider.
- If your child coughs or chokes while eating, STOP.

Three ways to thicken infant food for reflux:

1. Infant oat or rice cereal to thicken formula
2. Premade anti-reflux (A.R.) formulas
3. Breastmilk thickeners (Gelmix®)

Many options are available. Store brand and generic products may be more affordable and are safe and effective. Always follow the manufacturer's guidelines when mixing or adding to food.

1. Infant oat or rice cereal for formula: Using oatmeal or rice thickener for GER/Reflux is based on personal preference. Recent reports have found more than the recommended amount of arsenic in some rice cereals. When rice cereal is used as directed, a baby who has GER/Reflux would not consume enough arsenic to cause concern. More information is available at [Oatmeal: The Safer Alternative for Infants & Children Who Need Thicker Food](#).



Instructions to thicken formula:

Formula Bottle size	Infant Oat or Rice Cereal
2 oz bottle	Add 1 teaspoon
3 oz bottle	Add 1 ½ teaspoons
4 oz bottle	Add 2 teaspoons
5 oz bottle	Add 2 ½ teaspoons
6 oz bottle	Add 3 teaspoons
7 oz bottle	Add 3 ½ teaspoons
8 oz bottle	Add 4 teaspoons

- Prepare formula per manufacturer's instructions.
- Add ½ teaspoon thickener for every 1 oz formula according to the bottle size.
- Add thickener just prior to feeding. Some formulas will become too dense to bottle feed if mixed too far in advance.
- Dispose of unused formula with thickener.
- Do NOT save mixed formula for later use.
- You may need to change the nipple size to make it easier for your baby to suck the thickened formula.
- Never cut the nipple unless instructed by your healthcare professional.

This information is not specific to your child but provides general information. If you have any questions, please call your clinic.

2. Anti-reflux formulas are made to reduce reflux and do not require additional thickeners after mixing per the manufacturer's directions. Anti-reflux formulas usually have "A. R." in the name. The rice starch thickens the formula when it combines with stomach acid.

Instructions for anti-reflux formulas:

- Follow the manufacturer's instructions.
- Do NOT add additional rice or oat cereal to anti-reflux formulas.

3. Breastmilk thickener: Gelmix® is made from tapioca and carob. It can be added to thicken pumped breastmilk and then be fed by bottle.

- Do not thicken breastmilk with infant oat or rice cereal - the enzymes in breastmilk will break down the cereal and breastmilk will become thin again. For more information see [Gelmix® Manufacturer Website](#).



Instructions for Gelmix® breastmilk thickeners:

- Follow the package instructions for the lowest level of thickness. This is called "slightly thick" or "thin nectar".
 - *If using jar of powder:*

Bottle size	Amount of Gelmix® Thickener
3-4 oz bottle of breastmilk	Add 1 scoop (1.2g) of Gelmix®
4-6 oz bottle of breastmilk	Add 2 scoops (2.4g) of Gelmix®

- *If using single serving packets (2.4 g),* add contents of 1 packet to 6-8 oz of lukewarm breastmilk.
- Mix and let sit for 5-10 minutes. Mix again prior to feeding.
- Do not feed your baby "thick" or "nectar thick" to treat GER/Reflux unless instructed by your pediatrician. Nectar thick feeds are used for babies with swallowing difficulties and can make transition to solid foods and thin liquids (water, whole milk, or juice) more difficult for your baby or can cause other problems.
- Gelmix® may cause gassiness and loose stools. This usually gets better on its own within 1-2 weeks of use or by reducing the amount of Gelmix® used.

What is covered by WIC? How do I get and use a prescription? If you receive WIC benefits and would like to use these benefits for infant formula or breastmilk thickener, contact your primary care clinician for a prescription. Minnesota WIC covers Enfamil brand formulas and thickeners; Wisconsin WIC covers Similac brand formulas and thickeners. If you run out before you receive additional WIC benefits, comparable store or generic brands are safe and effective.

Gastroesophageal Reflux Disease: Diet and Lifestyle Changes For Older Children and Teens

Here are some lifestyle changes that may help children with gastroesophageal reflux disease (GERD) reduce symptoms without or along with medication:

- Avoid foods that trigger reflux symptoms
 - Caffeine, chocolate, and peppermint: These foods can relax the muscle at the bottom of the tube from the stomach, or esophagus. This muscle relaxation allows acid to move up and cause reflux.
 - Acidic food and drinks: Foods like tomato sauce and citrus fruits and drinks like colas, sodas, or orange juice are acidic. They can increase stomach acid and worsen GERD symptoms.
 - Spicy foods: Spicy foods are also acidic and can make GERD symptoms worse.
 - High-fat, fried foods: Examples of processed and fatty foods are pizza, french fries and high-fat meats, such as bacon. The fat in these foods can slow stomach emptying and prevent the muscle at the top of the stomach from fully tightening. This can cause stomach acids to flow upward and worsen GERD symptoms.
 - Alcohol: Can also relax muscles at the bottom of the esophagus and increase reflux.
- Eating habits
 - Eat smaller meals more often.
 - Eat slowly and eat at a table rather than on the sofa or on the go.
 - Eat your evening meal early, at least 2-3 hours before bedtime. Avoid eating late and right before going to bed.
 - Avoid overeating. Listen to your body to tell you when you are hungry or full.
 - Add small snacks between meals if you are hungry.
- Other lifestyle changes to help reduce reflux
 - Wear clothes that are loose-fitting around the stomach and abdomen.
 - Stay upright, like sitting up or standing and walking, for 2-3 hours after meals.
 - Sleep with your head elevated or at slight incline (only children over 1 year of age).
 - Keep a healthy weight. Excess weight can put more pressure on your stomach increasing reflux. Talk to your clinician about a healthy weight for you.
 - Avoid second hand smoke. If you smoke, talk to your clinician about help quitting. Smoking makes reflux worse.

Patient/Family/Guardian Education Materials

1. [Gastroesophageal Reflux & Gastroesophageal Reflux Disease: Parent FAQs](#)



2. [GER in Teens](#)



3. [Digestive System for Kids and Teens](#)

