

ACUTE GASTROENTERITIS (AGE)

1. Fundamentals & Epidemiology

- **Definition:** Diarrheal disease of rapid onset (< 2 weeks) +/- vomiting, fever, or abdominal pain.
Dysentery = blood/mucous in stool.
- **Epidemiology:** 2nd most common cause of death in pediatric age group globally (mostly developing world).
- **Most Common Cause:** **Rotavirus** is the most common cause worldwide.
- **Risk Factors:** Poverty, poor hygiene, young age, malnutrition (Zinc/Vit A deficiency), immunodeficiency.

2. Mechanisms of Diarrhea

Stool Osmotic Gap Formula: $290 - 2(K + Na)$

Type	Pathophysiology	Examples	Key Features (MCQ Clues)
Osmotic	Unabsorbable solute or enzyme deficiency.	Lactase deficiency, Sorbitol, viral infections.	Stops with fasting. Low stool pH. Positive reducing substances. No WBCs.
Secretory	Active chloride secretion mediated by toxins.	Cholera, ETEC, Shigella.	Continues despite fasting. Very watery.
Exudative	Inflammation causing decreased reabsorption.	Shigella, Amebiasis, IBD.	Blood, mucus, and WBCs in stool.
Decreased Area	Reduction in anatomic surface area.	Short bowel syndrome, Celiac, villous atrophy.	History of surgery or chronic enteropathy.

3. Etiology: The Pathogens (MCQ Goldmine)

Viral (70-80%)

- **Rotavirus:** dsRNA (Reoviridae). Vomiting followed by watery diarrhea. Prevented by vaccine.
- **Norovirus/Sapovirus:** Leading cause in the USA. **Vomiting is prominent** in children.

Bacterial (Enteric / Invasive)

- **Campylobacter jejuni:** Poultry. Can **mimic appendicitis**. Complications: Guillain-Barré (GBS), Reactive arthritis.
- **Salmonella (Non-typhoidal):** Eggs/chicken. **NO ANTIBIOTICS** unless: <3 mos old, immunodeficient, sickle cell (risk of osteomyelitis).

Bacterial (Toxin-Mediated / Fast Onset)

- **Staph aureus:** Onset 1-6 hrs. Sudden severe N/V.
- **Bacillus cereus:** Onset 1-6 hrs. **Fried rice.** Can cause fulminant hepatic failure.
- **C. perfringens:** Poorly prepared meat/poultry.
- **Shigella:** Invades colon. Bloody. **Complications: Seizures, HUS, rectal prolapse.** Tx: Ceftriaxone/Ampicillin.
- **E. Coli:** EHEC (O157:H7) causes bloody diarrhea & HUS. ETEC causes Traveler's watery diarrhea.
- **Yersinia enterocolitica:** Pork. **Mimics appendicitis.** Post-infectious erythema nodosum/arthritis.
- **Vibrio Cholerae:** "Rice water" stools. Life-threatening dehydration.

Parasitic

- **Entamoeba histolytica:** Bloody/mucus. **Complication: Liver/lung abscesses.** Tx: Metronidazole + luminal agent (Paromomycin).
- **Cryptosporidium:** Watery diarrhea, severe in immunodeficiency. Tx: Nitazoxanide.
- **Giardia:** Foul-smelling, fatty stools (cysts/trophozoites).

MEMORY AID: PSEUDO-APPENDICITIS CAUSES

If a board question describes a child with diarrhea and right lower quadrant pain mimicking appendicitis, think of the **C-Y** bugs:

- **Campylobacter jejuni**
- **Yersinia enterocolitica**

4. Dehydration Assessment

Physical exam clue: **Doughy skin** indicates **Hypernatremia**.

Sign	Mild (3-5% weight loss)	Moderate (6-10% weight loss)	Severe (9-15% weight loss)
Mental Status	Alert	Restless, irritable	Lethargic, unconscious
Thirst / HR	Normal / Normal	Drinks eagerly / Tachycardia	Drinks poorly / Tachycardia
Eyes / Tears	Normal / Present	Slightly sunken / Decreased	Deeply sunken / Absent
Skin Pinch (Recoil)	Instant	< 2 seconds	> 2 seconds
Cap Refill / Pulses	Normal	Prolonged / Normal to decreased	Prolonged / Weak or unpalpable

5. Management & Treatment

- **Oral Rehydration Solution (ORS):** Treatment of choice for Mild-Moderate.
 - Mild: 2-10 ml/kg for each diarrhea/vomiting episode.
 - Moderate: 50-100 ml/kg over 2-4 hours, then continue maintenance.
- **IV Fluids:** Indicated for **Severe Dehydration**. Immediate 20 mL/kg bolus of Normal Saline.
- **Contraindications to ORS:** Shock, Ileus/Intussusception, Severe emesis, High stool output (>10 mL/kg/hr).
- **Feeding:** **Continue feeding!** Encourage breastfeeding. Use age-appropriate diet.
- **Medications:**
 - **Antiemetics:** Ondansetron reduces vomiting/admission rates. Metoclopramide **avoided** (extrapyramidal side effects).
 - **Anti-diarrheals:** Loperamide is **CONTRAINDICATED** in kids (causes severe distention/death).
 - **Zinc & Probiotics:** Zinc used in developing countries/malnutrition. Probiotics (L. rhamnosus, S. boulardii) decrease duration of diarrhea.

MEMORY AID: WHEN TO GIVE ANTIBIOTICS IN SALMONELLA

Salmonella is usually self-limiting. **DO NOT** give antibiotics unless the patient is at high risk for bacteremia/osteomyelitis. Remember "S.I.I.I.":

- Sickle Cell Anemia
- Immunodeficient
- Infant < 3 months
- Ill-looking (toxic)

6. Prevention & Vaccines

- **Rotavirus Vaccine:** Oral live attenuated (Rotarix 2 doses, RotaTeq 3 doses).
- **Contraindications for Rota Vaccine (MCQ Favorites):**
 1. History of **Intussusception** or uncorrected GI malformation (e.g., Meckel's).
 2. **SCID** (Severe Combined Immunodeficiency) or severe immunosuppression.
 3. Infants aged < 6 weeks or > **32 weeks**.