Diarrhoea
Definition

- **Stool consistency** - increased fluidity of stool
- **Stool frequency** - Three or more bowel movements daily
- **Stool weight** - 200 g daily in Western countries, 300 g when a high-fiber diet is consumed (developing countries)
Organic/ Functional Diarrhea

- Faecal weight
- Weight loss
- Nocturnal
- Blood in stools
- Onset
- Incontinence
- Dehydration / Electrolyte imbalance
CLINICAL CLASSIFICATION

- ACUTE / PERSISTANT / CHRONIC DIARRHEA
- LARGE BOWEL / SMALL BOWEL DIARRHEA
- WATERY (OSMOTIC / SECRETORY DIARRHEA)
  FATTY
  INFLAMMATORY DIARRHEA
- EPIDEMIOLOGIC SITUATIONS
Water flux in GIT

- Water flux from Beverages: 2.0 L
- Water flux from Food: 2.0 L
- Saliva: 0.5-1.5 L
- Gastric acid secretion: 3 L
- Pancreas secretion: 2 L
- Bile secretion: 0.7 L
- Intestine secretion: 7.8 L
- Stools: 0.1 L
Small / Large bowel diarrhea

- Volume
- Number
- Site of pain
- Malabsorption
- Blood in stools
- Undigested food particles
- Tenesmus
# Acute Diarrhoea

<table>
<thead>
<tr>
<th>Category</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral infection</td>
<td>Norovirus, rotavirus</td>
</tr>
<tr>
<td>Bacterial infection</td>
<td>Salmonella, Campylobacter, Shigella, Escherichia coli, Clostridium difficile</td>
</tr>
<tr>
<td>Parasitic infection</td>
<td>Giardia, Entamoeba histolytica, Cryptosporidia</td>
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<tr>
<td>Food poisoning</td>
<td>Staphylococci, Bacillus cereus, Clostridium perfringens</td>
</tr>
<tr>
<td>Drugs</td>
<td>Laxatives, Mg-containing antacids, caffeine, antineoplastic drugs, many antibiotics, colchicine, quinine/quinidine, prostaglandin analogs, excipients (eg, lactose) in elixirs</td>
</tr>
</tbody>
</table>
Chronic Diarrhea

• **Fatty Diarrhea**
  - Malabsorption syndromes
    - Mesenteric ischemia
    - Mucosal diseases (e.g., celiac disease, Whipple's disease)
    - Short bowel syndrome
    - Small intestinal bacterial overgrowth
  - Maldigestion
    - Inadequate luminal bile acid concentration
    - Pancreatic exocrine insufficiency

• **Inflammatory Diarrhea**
  - Diverticulitis
  - Infectious diseases
    - Invasive bacterial infections (e.g., tuberculosis, yersiniosis)
    - Invasive parasitic infections (e.g., amebiasis, strongyloidiasis)
    - Pseudomembranous colitis (Clostridium difficile infection)
    - Ulcerating viral infections (e.g., cytomegalovirus, herpes simplex virus)
  - Inflammatory bowel diseases
    - Crohn's disease
    - Ulcerative colitis
    - Ulcerative jejunoileitis
  - Ischemic colitis
  - Neoplasia
    - Colon cancer
    - Lymphoma
  - Radiation colitis
Watery Diarrhea

- **Osmotic diarrhea**
  - Carbohydrate malabsorption
  - Osmotic laxatives (e.g., Mg+2, PO4−3, SO4−2)

**Secretory diarrhea**
- Bacterial toxins
- Congenital syndromes (e.g., congenital chloridorrhea)
- Disordered motility, regulation
- Diabetic autonomic neuropathy
- Irritable bowel syndrome
- Postsympathectomy diarrhea
- Postvagotomy diarrhea

**Diverticulitis**

**Endocrinopathies**
- Addison's disease
- Carcinoid syndrome
- Gastrinoma
- Hyperthyroidism
- Mastocytosis
- Medullary carcinoma of the thyroid
- Pheochromocytoma
- Somatostatinoma
- VIPoma

- **Idiopathic secretory diarrhea**
  - Epidemic secretory (Brainerd) diarrhea
  - Sporadic idiopathic secretory diarrhea

**Ileal bile acid malabsorption**

**Inflammatory bowel disease**
- Crohn's disease
- Microscopic colitis
- Collagenous colitis
- Lymphocytic colitis
- Ulcerative colitis

**Laxative abuse** (stimulant laxatives)

**Medications and toxins**

**Neoplasia**
- Colon carcinoma
- Lymphoma
- Villous adenoma in rectum

- **Vasculitis**
## Secretory versus Osmotic Diarrhea

<table>
<thead>
<tr>
<th>TYPE OF DIARRHEA</th>
<th>CAUSES</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretory diarrhea</td>
<td>Exogenous secretagogues</td>
<td>Enterotoxins (e.g., cholera)</td>
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<tr>
<td></td>
<td>Endogenous secretagogues</td>
<td>Neuroendocrine tumors (e.g., carcinoid syndrome)</td>
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<tr>
<td></td>
<td>Absence of ion transporter</td>
<td>Congenital chloridorrhea</td>
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<td></td>
<td>Loss of intestinal surface area</td>
<td>Intestinal resection, diffuse intestinal mucosal disease</td>
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<tr>
<td></td>
<td></td>
<td>Intestinal ischemia</td>
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<tr>
<td></td>
<td>Rapid intestinal transit</td>
<td>Diffuse mesenteric atherosclerosis</td>
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<tr>
<td></td>
<td></td>
<td>Intestinal hurry following vagotomy</td>
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<tr>
<td>Osmotic diarrhea</td>
<td>Ingestion of poorly absorbed agent</td>
<td>Magnesium ingestion</td>
</tr>
<tr>
<td></td>
<td>Loss of nutrient transporter</td>
<td>Lactase deficiency</td>
</tr>
</tbody>
</table>
How to distinguish
Secretory versus Osmotic Diarrhea

1. Osmotic diarrhea disappears with fasting or cessation of ingestion of the offending substance.
2. Osmotic gap in stool
290 - 2 ( Na+K )

- 290 mOsm/kg, the osmolality of stool in the body

- **A small osmotic gap (<50 mOsm/kg)**, which signifies that the osmolality of stool water is attributable mostly to incompletely absorbed electrolytes, is characteristic of **secretory diarrhea**

- **A large osmotic gap (>100 mOsm/kg)** indicates that much of the stool osmolality is composed of nonelectrolytes, is characteristic of an **osmotic diarrhea**
Fatty diarrhea- Pancreatic / Mucosal

- Consistency
- Volume
- Stool number
- Degree of fat malabsorption / associated fat sol. vitamin def.
- Associated carbohydrate malabsorption
Likely Causes of Diarrhea in Well-Defined Patient Groups or Settings

- **Travelers**
  - Bacterial infection (mostly acute)
  - Protozoal infections (e.g., amebiasis, giardiasis)
  - Tropical sprue

- **Epidemics and Outbreaks**
  - Bacterial infection
  - Epidemic idiopathic secretory diarrhea (e.g., Brainerd diarrhea)
  - Protozoal infection (e.g., cryptosporidiosis)
  - Viral infection (e.g., rotavirus)

- **Diabetic Patients**
  - Altered motility (increased or decreased)
  - Associated diseases
  - Celiac disease
  - Pancreatic exocrine insufficiency
  - Small intestinal bacterial overgrowth
  - Drug side effects (especially acarbose, metformin)

- **Patients with Acquired Immunodeficiency Syndrome**
  - Drug side effects
  - Lymphoma
  - Opportunistic infections (e.g., cryptosporidiosis, cytomegalovirus, herpes virus, *Mycobacterium avium* complex)

- **Institutionalized and Hospitalized Patients**
  - *Clostridium difficile* toxin–mediated colitis
  - Drug side effects
  - Fecal impaction with overflow diarrhea
  - Ischemic colitis
  - Tube feeding
Medications and Toxins Associated with Diarrhea

Acid-reducing agents (H2 receptor antagonists, proton pump inhibitors)
Antacids (e.g., those that contain magnesium)
Antiarrhythmics (e.g., quinidine)
Antibiotics (most)
Anti-inflammatory agents (e.g., 5-aminosalicylates, gold, NSAIDs)
Antihypertensives (e.g., β-adrenergic blocking drugs)
Antineoplastic agents (many)
Antiretroviral agents
Colchicine
Heavy metals
Herbal products
Prostaglandin analogs (e.g., misoprostol)
Theophylline
Vitamin and mineral supplements
CONSTIPATION
Constipation

• Definition: varies among physicians and other health care providers.
• Three or fewer bowel movements/week
Constipation

• Primary/ Functional
• Secondary
Secondary Causes of Constipation

• Mechanical Obstruction
  Anal stenosis
  Colorectal cancer
  Extrinsic compression
  Rectocele or sigmoidocele
  Stricture

Medications
  Antacids
  Anticholinergic agents (e.g., antiparkinsonian drugs, antipsychotics, antispasmodics, tricyclic antidepressants)
  Anticonvulsants (e.g., carbamazepine, phenobarbital, phenytoin)
  Antineoplastic agents (e.g., vinca derivatives)
  Calcium channel blockers (e.g., verapamil)
  Diuretics (e.g., furosemide)
  5-Hydroxytryptamine3 antagonists (e.g., alosetron)
  Iron supplements
  Nonsteroidal anti-inflammatory drugs (e.g., ibuprofen)
  Mu-opioid agonists (e.g., fentanyl, loperamide, morphine)

• Metabolic and Endocrinologic Disorders
  Diabetes mellitus
  Heavy metal poisoning (e.g., arsenic, lead, mercury)
  Hypercalcemia
  Hyperthyroidism
  Hypokalemia
  Hypothyroidism
  Panhypopituitarism
  Pheochromocytoma
  Porphyria
  Pregnancy

Neurologic and Myopathic Disorders
  Amyloidosis
  Autonomic neuropathy
  Chagas' disease
  Dermatomyositis
  Intestinal pseudo-obstruction
  Multiple sclerosis
  Parkinsonism
  Progressive systemic sclerosis
  Shy-Drager syndrome
  Spinal cord injury
  Stroke
Rome III Criteria for Functional Constipation

≥2 / 6 must be present*:

- Straining during at least 25% of defecations
- Lumpy or hard stools in at least 25% of defecations
- Sensation of incomplete evacuation for at least 25% of defecations
- Sensation of anorectal obstruction/blockage for at least 25% of defecations
- Manual maneuvers to facilitate at least 25% of defecations (e.g., digital evacuation, support of the pelvic floor)
- Fewer than three defecations/wk

* Criteria fulfilled for the previous 3 months with symptom onset at least 6 months prior to diagnosis.
# Clinical Classification of Functional Constipation

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>FEATURES</th>
<th>CHARACTERISTIC FINDINGS</th>
</tr>
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<tbody>
<tr>
<td>Normal-transit constipation</td>
<td>Incomplete evacuation; abdominal pain may be present but not a predominant feature</td>
<td>Normal physiologic test results</td>
</tr>
<tr>
<td>Slow-transit constipation</td>
<td>Infrequent stools (e.g., ≤1/wk); lack of urge to defecate; poor response to fiber and laxatives; generalized symptoms, including malaise and fatigue; more prevalent in young women</td>
<td>Retention in colon of &gt;20% of radiopaque markers five days after ingestion</td>
</tr>
<tr>
<td>Defecatory disorders (pelvic floor dysfunction, anismus, descending perineum syndrome, rectal prolapse)</td>
<td>Frequent straining; incomplete evacuation; need for manual maneuvers to facilitate defecation</td>
<td>Abnormal balloon expulsion test and/or rectal manometry</td>
</tr>
</tbody>
</table>