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 Beverages Food: 2.0 L
- Saliva: 0.5-1.5 L
- Pancreas secretion: 2 L
- Bile secretion: 0.7 L
- Gastric acid secretion: 3 L
- Intestine secretion: 7.8 L
- Stools: 0.1 L
- Total: 15 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>
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<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 Diffuse mesenteric atherosclerosis</td>
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<td></td>
<td>Rapid intestinal transit</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>
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<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>
</thead>
<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., $\leq 1/wk$); 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</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>
<tr>
<td>(pelvic floor dysfunction, anismus, descending perineum syndrome, rectal prolapse)</td>
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