

# Management of Diarrhea

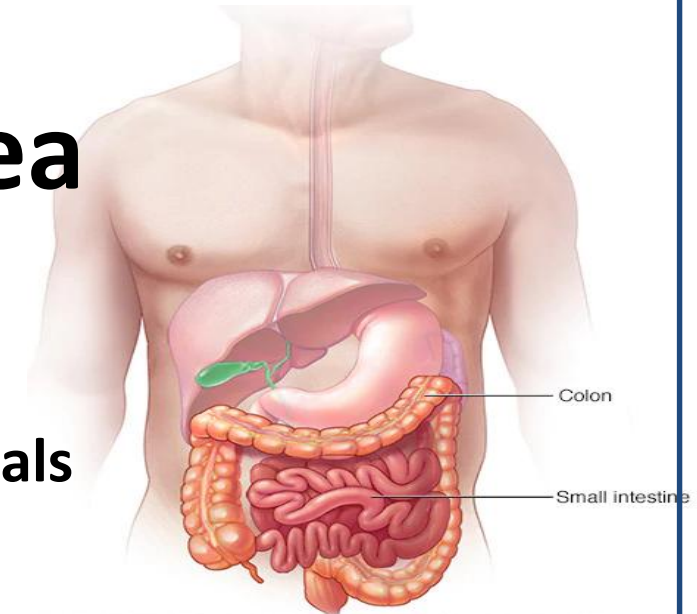
## Non-Prescription Drugs and Parapharmaceuticals

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# Introduction

Diarrhea is defined as an **increased frequency of bowel evacuation**, with the **passage of abnormally soft or watery feces**.

**WHO definition of Diarrhea:** the passage of **three or more loose or liquid stools** per day (or more frequent passage than is normal for the individual).

Associated with perianal discomfort, urgency, incontinence.

Diarrheal disease is the **second leading cause of death** in children under five years old.

# What Causes Diarrhea?

- Alcohol abuse.
- Allergies to certain foods.
- Diabetes.
- Diseases of the intestines (such as Crohn's disease or ulcerative colitis)
- Infection by bacteria (the cause of most types of food poisoning) or other organisms.
- Medications.

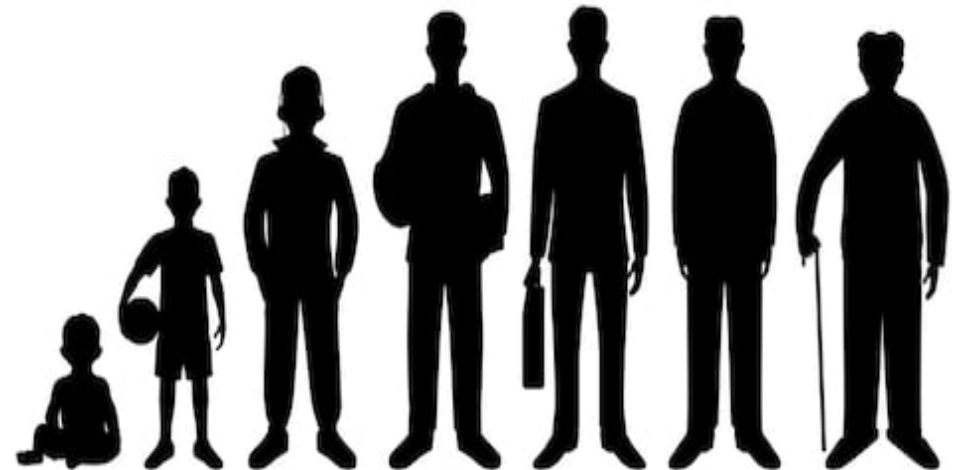
# Drugs Causing Diarrhea

1. Laxatives
2. Antacids containing magnesium
3. Antineoplastics
4. Antibiotics
5. Cholinergics agonists
6. Nonsteroidal anti-inflammatory drugs
7. Misoprostol
8. Colchicine

## What you need to know/ 1. Age

Particular care is needed in the very young and the very old.

Infants (younger than 1 year) and older people are especially at risk of becoming dehydrated.



## What you need to know / 2. Duration

Most cases of diarrhea will be acute and self-limiting.

Because of the dangers of dehydration, it would be wise to refer infants with diarrhea of **longer than 1 day's duration to the doctor.**



## What you need to know/ 3. Associated Symptoms

Acute diarrhea arising **from infection** is usually **rapid in onset** and produces **watery stools** that are passed **frequently**. Abdominal **cramps**, **flatulence** and **weakness** or **malaise** may also occur.

**Nausea and vomiting** may be associated with diarrhea, **as may fever**.

The pharmacist should always ask about **vomiting and fever** in infants; both will increase the likelihood that severe **dehydration** will develop.

Another important question to ask about diarrhea in infants is **whether the baby has been taking milk feeds and other drinks as normal**. **Reduced fluid intake predisposes to dehydration**.

## What you need to know/ 3. Associated Symptoms

The most severe threat posed by diarrhea is **dehydration**.

During a diarrheal episode, water and electrolytes (sodium, chloride, potassium and bicarbonate) are lost through liquid stools, vomit, sweat, urine and breathing.

**Dehydration occurs when these losses are not replaced.**

## What you need to know/ 3. Associated Symptoms

The pharmacist should **question the patient about food intake** and also **about whether other family** members or friends are suffering from the same symptoms, since acute diarrhea is usually due to an infection.

Often there are localized minor outbreaks of gastroenteritis, and the pharmacist may be asked several times for advice and treatment by different patients during a short period of time.

**The presence of blood or mucus in the stools is an indication for referral.**

**Diarrhea with severe vomiting or with a high fever would also require medical advice.**

## What you need to know/ 5. Recent travel abroad

Diarrhea in a patient who has recently travelled abroad **requires referral since it might be infective in origin.**

**Giardiasis** (a diarrheal disease caused by the microscopic **parasite** Giardia) should be considered in travelers recently returned from South America or the Far East.



## What you need to know/ 6. Causes: Infections

Most cases of diarrhea are short lived, the bowel habit being normal before and after.

In these situations, the cause is likely to be infective (viral or bacterial).

Diarrhea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of **bacterial**, **viral** and **parasitic** organisms.

Infection is spread through contaminated **food or drinking-water**, or from **person-to-person as a result of poor hygiene**.

**Rotavirus** and **Escherichia coli**, are the two most common etiological agents of moderate-to-severe diarrhea in **low-income countries**.

## What you need to know/ 6. Causes: Infections

	Viral	Bacterial	Protozoa
Cause	Infants--- Rotavirus All age groups--- Norovirus	consumed through contaminated food or water; Campylobacter, Salmonella, Shigella, Clostridium difficile and Escherichia coli (E. coli)	Entamoeba histolytica Giradia lamblia
Duration	2-3 days	From hours to one week	From hours to weeks
treatment	Fluids and electrolytes No antibiotics	Fluids and electrolytes Antibiotics is needed in sever cases	Fluids and electrolytes Antimicrobial therapy

## What you need to know/ 6. Causes: Infections (Bacterial)

**Table 2.4** Features of some infections causing diarrhoea

Infection	Incubation	Duration	Symptoms
<i>Staphylococcus</i>	2–6 h	6–24 h	Severe, short lived; especially vomiting
<i>Salmonella</i>	12–24 h	1–7 days	Mainly diarrhoea
<i>Campylobacter</i>	2–7 days	2–7 days	Diarrhoea with abdominal colic
<i>B. cereus</i>	1–5 h	6–24 h	Vomiting
<i>B. cereus</i>	8–16 h	12–24 h	Diarrhoea
<i>L. monocytogenes</i>	3–70 days		Flu-like, diarrhoea

## What you need to know/ 6. Causes: Antibiotics and Clostridium Difficile

A quarter of cases of antibiotic-associated diarrhea are due to *Clostridium difficile*.

Many **people carry small amounts of this bacteria in their gut**, and as it is resistant to many antibiotics, the antibiotic kills off other flora in the gut and allows the *C. difficile* to flourish.

Some strains of *C. difficile* **produce a toxin that damages the large bowel lining**, which results in **profuse watery diarrhea**.

These strains can get passed to other patients if hand washing and careful hygiene practice is not followed.

## What you need to know/ 6. Causes: Antibiotics and Clostridium Difficile

In **fitter, mobile people**, the infection causes **unpleasant diarrhea** lasting a few weeks.

In **debilitated (weaken) people** the complications of *C. difficile* infection can be more severe and include **dehydration, perforation of the colon, sepsis and death**.

Usually it can be treated by careful attention to rehydration.

**Anti-diarrheal medications should not be used as this can aggravate the condition.**

# Diarrhea

## What you need to know/ 6. Causes: Antibiotics and Clostridium Difficile

If the diagnosis is confirmed using a stool sample to test for *C. difficile* toxin, an antibiotic such as **metronidazole**, which *C. difficile* is sensitive to, may be used.

If pharmacists see a case of persistent diarrhea following a course of antibiotics, they should ask the patient to get in touch with the GP.

If an antibiotic is necessary to treat an ongoing infection, the health care provider may choose an antibiotic that is less likely to allow further growth of *C. difficile*, when possible.

## Antimicrobial agents that may induce *Clostridioides difficile* diarrhea and colitis

Frequently associated	Occasionally associated	Rarely associated
<ul style="list-style-type: none"><li>▪ Fluoroquinolones</li><li>▪ Clindamycin</li><li>▪ Penicillins and combinations (broad spectrum)</li><li>▪ Cephalosporins (2<sup>nd</sup>/3<sup>rd</sup>/4<sup>th</sup> generation)*</li><li>▪ Carbapenems</li></ul>	<ul style="list-style-type: none"><li>▪ Macrolides</li><li>▪ Penicillins (narrow spectrum)</li><li>▪ Cephalosporins (1<sup>st</sup> generation)</li><li>▪ Trimethoprim-sulfamethoxazole</li><li>▪ Sulfonamides</li></ul>	<ul style="list-style-type: none"><li>▪ Aminoglycosides</li><li>▪ Tetracyclines</li><li>▪ Tigecycline</li><li>▪ Chloramphenicol</li><li>▪ Metronidazole</li><li>▪ Vancomycin</li><li>▪ Nitrofurantoin</li></ul>

\* Use of 1 to 2 doses of a first-generation cephalosporin for surgical antibiotic prophylaxis does not confer significant risk for *C. difficile* infection.

## What you need to know/ 6. Causes: Persistent or chronic diarrhea

Persistent, chronic or recurrent diarrhea may be due to:

- Irritable bowel.
- Bowel tumor.
- Inflammation of the bowel (e.g. ulcerative colitis or Crohn's disease).
- Inability to digest or absorb food (malabsorption, e.g. celiac disease).
- Diverticular disease of the colon.

# Goals of self-treatment

1. Prevent or correct fluid and electrolyte loss
2. Identify the cause
3. Relieve symptoms.
4. Prevent acute morbidity

## **Patient evaluation**

- **Pharmacists who are consulted by patients should ask the patient for the following information before recommending a therapy:**
  - a. Age of the patient**
  - b. Onset and duration of the diarrhea**
  - c. Description of stool (frequency, blood, watery)**
  - d. Other symptoms (e.g., abdominal cramping, fever , nausea, vomiting, weight loss)**
  - e. Medications recently started or medications used to relieve the diarrhea.**
  - f . Recent travel (where and how long ago)**
  - g. Medical history (history of GI disorders)**



Table 7.14  
Specific questions to ask the patient: Diarrhoea

Question	Relevance
Nature of the stools	Diarrhoea associated with blood and mucus (dysentery) requires referral to eliminate invasive infection such as <i>Shigella</i> , <i>Campylobacter jejuni</i> , <i>Salmonella</i> , <i>Clostridium difficile</i> and <i>Escherichia coli</i> O157. Bloody stools are also associated with conditions such as inflammatory bowel disease.
Periodicity	A history of recurrent diarrhoea of no known cause should be referred for further investigation.
Duration	A person who presents with a history of chronic diarrhoea should be referred. The most frequent causes of chronic diarrhoea are irritable bowel syndrome (IBS), inflammatory disease, and colon cancer.
Onset of symptoms	Ingestion of bacterial pathogens can give rise to symptoms in a matter of a few hours (toxin-producing bacteria) after eating contaminated food or up to 3 days later. It is therefore important to ask about food consumption over the last few days, establish if anyone else ate the same food, and check the status of his or her health.
Timing of diarrhoea	Patients who experience diarrhoea first thing in the morning might have underlying pathology such as IBS.
Recent change of diet	Changes in diet can cause changes to bowel function; for example, when away on holiday. If the person has recently been to a non-Western country, giardiasis is a possibility.
Signs of dehydration	Mild (<5%) dehydration can be vague but includes tiredness, anorexia, nausea and light-headedness Moderate (5%–10%) dehydration is characterized by dry mouth, sunken eyes, decreased urine output, moderate thirst and decreased skin turgor (pinch test of 1–2 seconds or longer).

## What you need to know/ 7. When to Refer

- Diarrhea of greater than:

1 day's duration in children younger than 1 year

2 days' duration in children under 3 years and elderly patients

3 days' duration in older children and adults

- Persistent diarrhea after course of antibiotics
- Association with severe vomiting
- Feverish, high temperature
- Suspected outbreak of 'food poisoning'
- Recent travel abroad
- Suspected drug-induced reaction to prescribed medicine
- Presence of blood or mucus in the stools
- Pregnancy

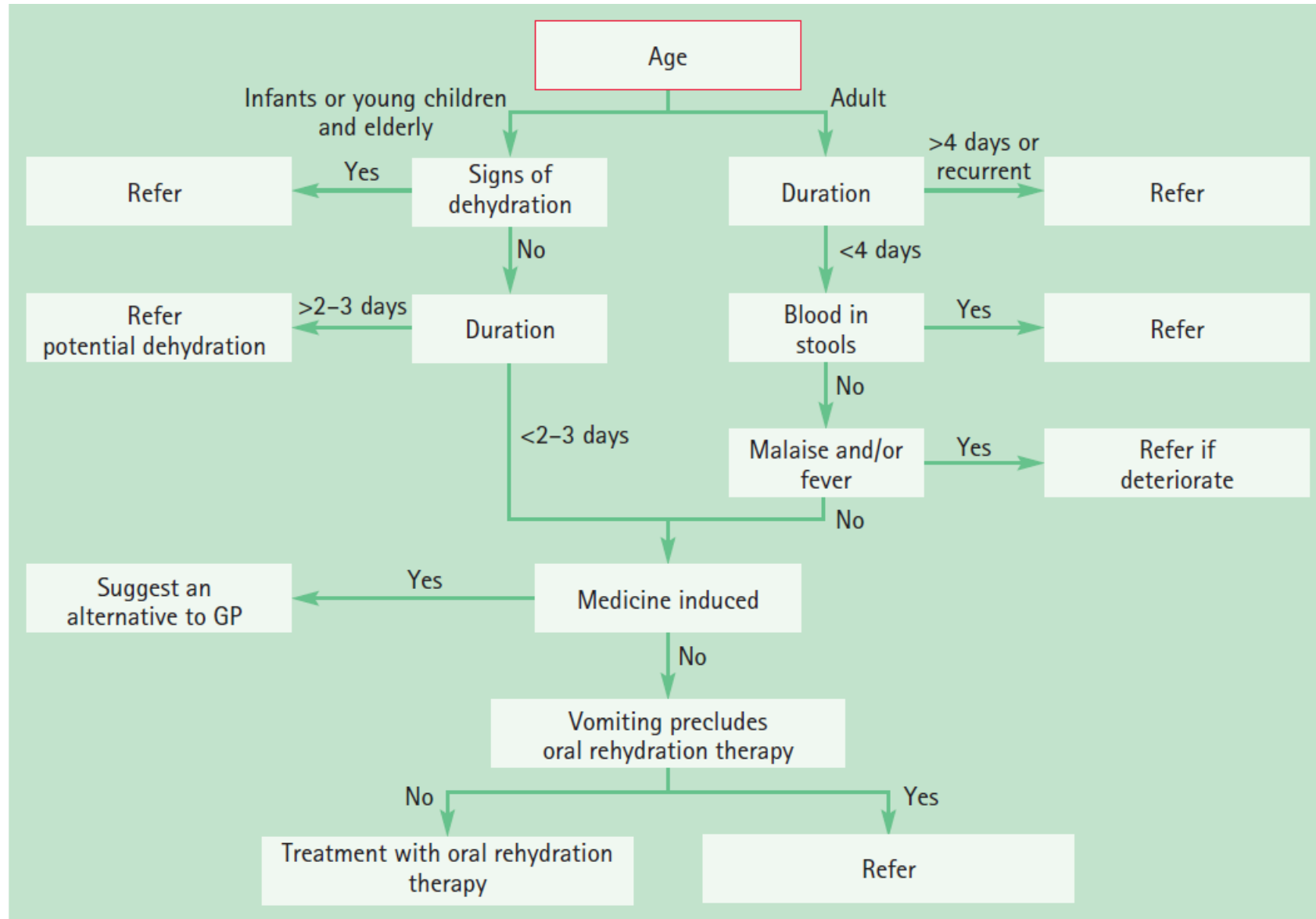
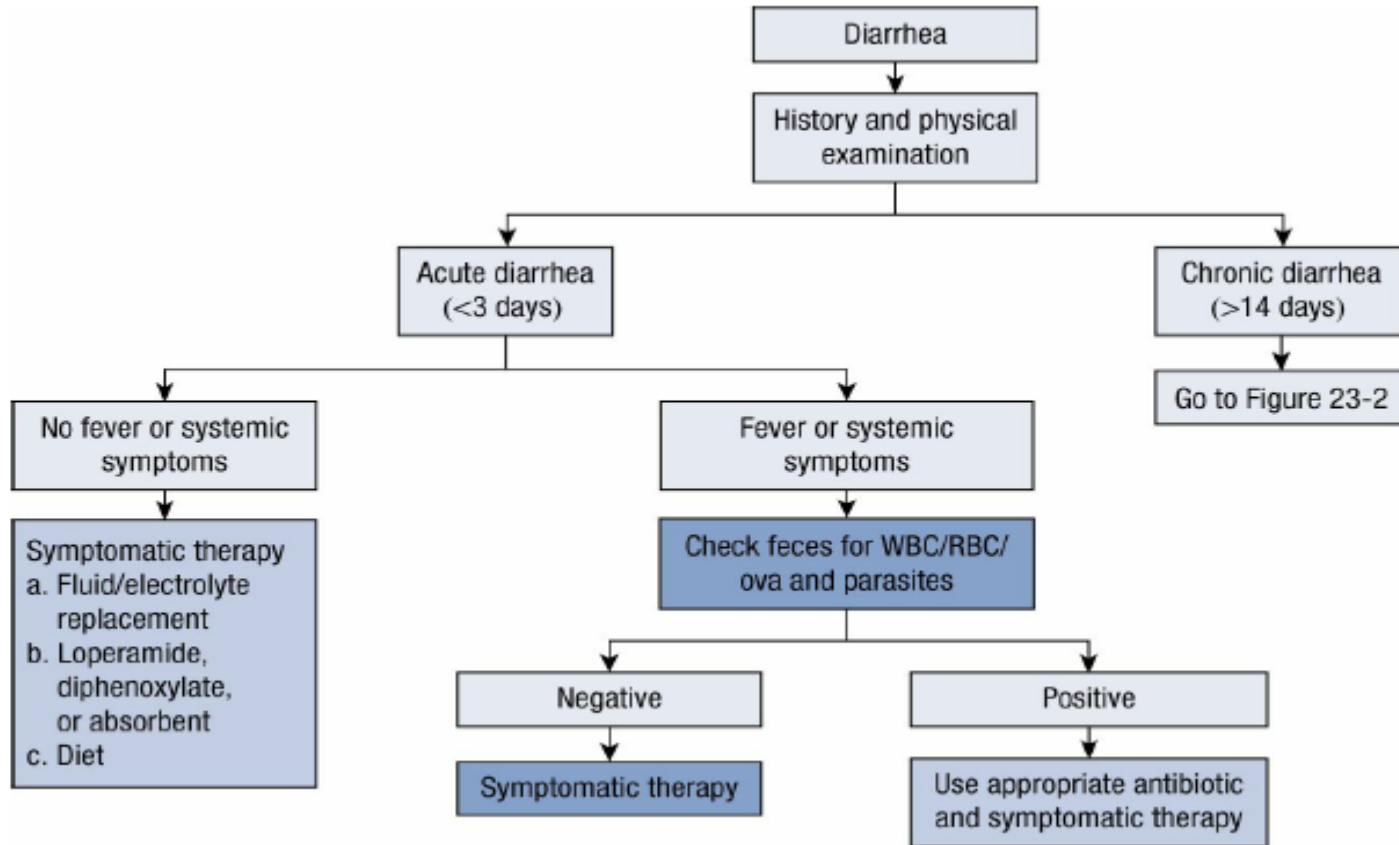


Fig. 7.11 Primer for the differential diagnosis of diarrhoea.

## Non-pharmacological treatment

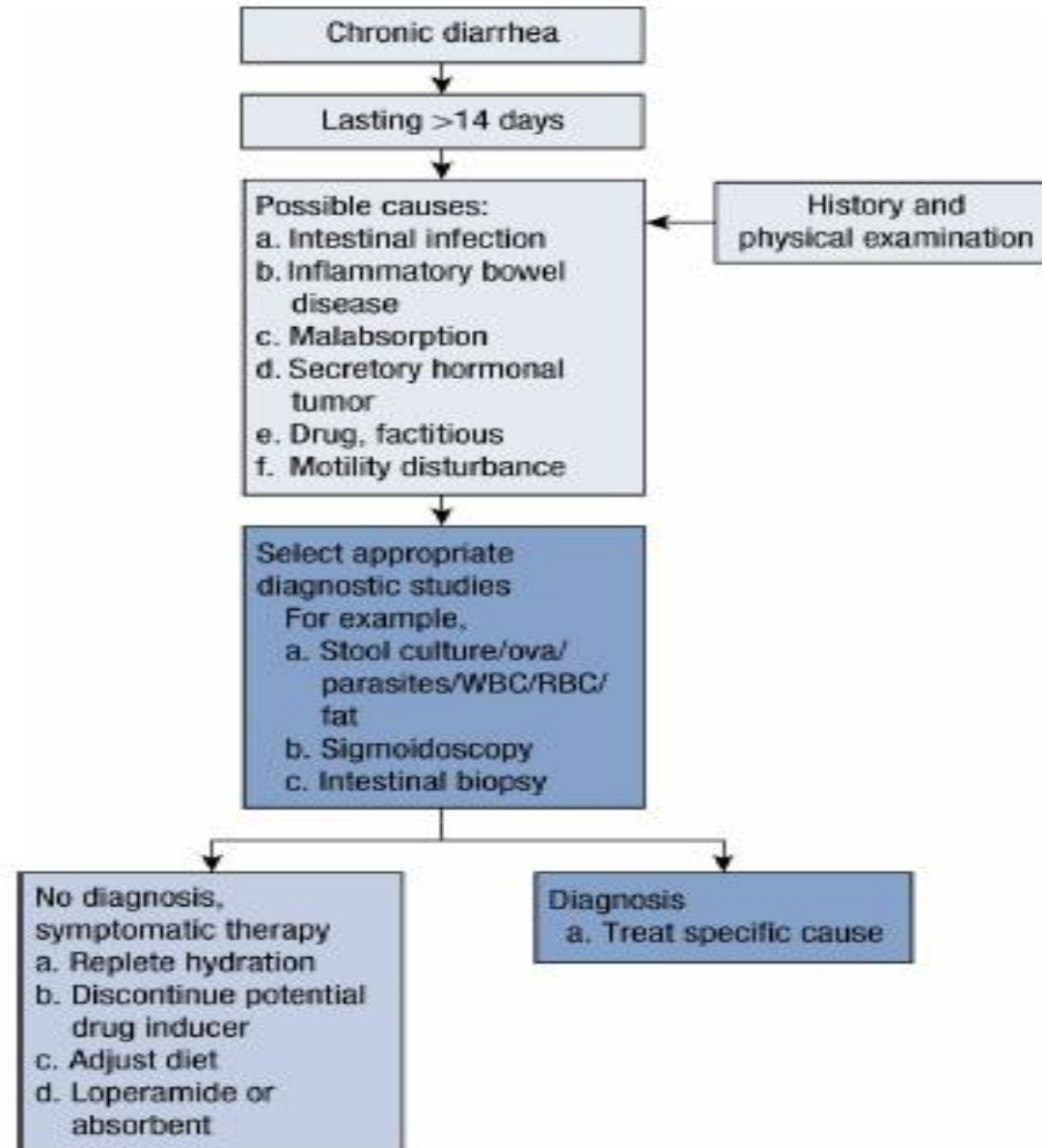
- All patients should receive their normal diet or breast – feeding for infants during bouts of diarrhea because these do not make the diarrhea worse and may actually improve the condition.
- Fatty foods, foods rich in simple sugars (can cause osmotic diarrhea) , and spicy foods (may cause GI upset ) should be avoided.
- Caffeine-containing beverages, which may worsen the diarrhea, should also be avoided.

# General approach to treatment



(RBC, red blood cells; WBC, white blood cells.)

# General approach to treatment



# Diarrhea

## Management

**A. Oral  
rehydration  
therapy**

**B.  
Loperamide**

**C. Kaolin**

**D. Probiotics**

# Management

- The **first line** of treatment in acute diarrhea is replacement of fluid and electrolyte loss.
- ***Severe dehydration requires immediate admission to hospital and urgent replacement of fluid and electrolytes.***

# Management – Oral Rehydration Therapy (ORT)

- Very essential for infants and children
- Powder for reconstitution in sachets
- Reconstitute in water (boiled and cooled for babies < 1 year)
- Don't use fruit, fizzy drinks or milk to reconstitute → they will produce a hyperosmolar solution which will induce osmotic diarrhoea
- Store in refrigerator for max. 24 hours.
- ORT does not stop the diarrhea, but it replaces the lost fluids and essential salts thus preventing or treating dehydration and reducing the danger.
- **Home-made salt and sugar solutions should not be recommended, since the accuracy of electrolyte content cannot be guaranteed, and this accuracy is essential, especially in infants, young children and elderly patients.**

# Oral Rehydration Therapy (ORT)

- Sachets of powder for ORT contain:
  - sodium as chloride and bicarbonate
  - glucose
  - potassium.
- Amounts to be offered to patients:

Age	<u>Quantity of solution</u>
Under 1 year	50 mL (quarter of a glass)
1-5 years	100 mL (half a glass)
6-12 years	200 mL (one glass)
Adult	400 mL (two glasses)

**Fluids to be avoided include hypertonic fruit juices and drinks as**

apple juice, powdered drink mixes, carbonated beverages, and caffeine-containing beverages, which can make diarrhea worse and do not contain needed electrolytes ( i.e.,  $\text{Na}^+$  ,  $\text{K}^+$  ).

# ANTIDIARRHEAL DRUGS

## Antidiarrheals include:

- Antimotility agents
  - Anticholinergic drugs
  - Opioid-related drugs
- Adsorbent drugs: kaolin and pectin....etc

# Pharmacologic therapy

## **b. Loperamide**

Loperamide binds to the opiate receptor in the gut wall, reducing propulsive peristalsis, increasing intestinal transit time.

Loperamide has minimal or no euphoric or analgesic effects, as it is poorly penetrate the CNS.

Loperamide increases the tone of the anal sphincter, which helps reduce fecal incontinence and urgency.

# Pharmacologic therapy

## b. Loperamide

The pharmacist should remind patients to drink plenty of extra fluids. Oral rehydration sachets may be recommended in addition.

	Dose Form	Adult Dose
Loperamide	2 mg/capsule 2 mg/capsule	Initially 4 mg, and then 2 mg after each loose stool; do not exceed 16 mg/day



# Anti - infectives

**Depending on the suspected origin of the infectious diarrhea, prescription antibiotics and antiprotozoal medications can be used**

to eradicate the organisms and decrease the duration of symptoms

# Other therapies

- Adsorbents (pectin, kaolin)
- Traditional drug, but becoming less common now
- Claimed MOA: Physical → absorption of water and adsorption of bacteria and toxins (not proved)
- Don't give to children < 12 years old
- They are not absorbed systemically, so they produce **few adverse effects.**



# Probiotics

- A systematic review concluded that, when used with rehydration, probiotics appear to reduce stool frequency and shorten the duration of infectious diarrhea.
- Many of the studies were in otherwise healthy people, and the researchers also concluded that more research is needed before recommendations could be made to guide the use of probiotics. There is some evidence that specific strains of probiotics (*Lactobacillus rhamnosus* or *Saccharomyces boulardii*) can help prevent diarrhea caused by antibiotics, and some people advocate particular types of probiotics to prevent *C. difficile*.

# Practical points

1. Patients with diarrhea should be advised to drink plenty of clear, non-milky fluids, such as water and diluted squash. If the diarrhea is severe, ORS may be useful.
2. ORS should be considered in people who are 60 years of age or older, frail, or with comorbidities such as cardiovascular disease or thrombotic tendencies (for example, history of deep vein thrombosis).
3. The patient can be advised to continue their usual diet, but fatty foods and foods with a high sugar content might be best avoided as they may not be well tolerated. Light soup is a good compromise.

## Practical points

4. Breast- or bottle-feeding should be continued in infants. This should be supplemented with ORS. The severity and duration of diarrhea are not affected by whether milk feeds are continued.

5. Hygiene is essential with diarrhea. Advise family members to wash hands thoroughly with soap and warm water after going to the toilet and before eating or preparing food. Clean the toilet, including the handle and the seat, with disinfectant, and avoid sharing towels or utensils with others. It is a good idea to keep away from work or school for at least 48 h after diarrhea has settled.

6. Patients often ask about what they can take on holiday with them in case of diarrhea. *Loperamide* and ORS are useful first-aid items. Advice should be given about drinking bottled water if the quality of tap water is unknown and avoiding 'street food'.

## PATIENT EDUCATION FOR Diarrhea

The primary objective of self-treatment is to prevent excessive fluid and electrolyte losses. For most patients, carefully following product instructions and the self-care measures listed here will help ensure optimal outcomes.

### Nondrug Measures

#### *Infants and Children 6 Months to 5 Years*

- For mild-to-moderate diarrhea, indicated by three to five unformed bowel movements per day, give the child or infant an oral rehydration solution (ORS) at a volume of 50–100 mL/kg of body weight over 2–4 hours to replace the fluid deficit. Give additional ORS to replace ongoing losses. Continue to give the solution for the next 4 to 6 hours or until the child is rehydrated.
- If the child is vomiting, give 1 teaspoon of ORS every few minutes.

- If the child is not dehydrated, give 10 mL/kg or one-half to 1 cup of the ORS for each bowel movement, or 2 mL/kg for each episode of vomiting. As an alternative, to replace ongoing fluid losses, children weighing less than 10 kg should be given 60–120 mL of ORS for each episode of vomiting or diarrheal stool, and children weighing more than 10 kg should be given 120–240 mL for each episode of vomiting or diarrheal stool.
- After the child is rehydrated, reintroduce food appropriate for the child's age, while also administering an ORS as maintenance therapy.



# Patient education

- If breast-feeding an infant with diarrhea, continue the breast-feeding. If the infant is bottle-fed, consult your doctor or pediatrician about substituting a milk-based formula with a lactose-free formula.
- Give children complex carbohydrate-rich foods, yogurt, lean meats, fruits, and vegetables. Do not give them fatty foods or sugary foods. Sugary foods can cause osmotic diarrhea.
- Do not withhold food for more than 24 hours.

## Adults and Children Older Than 5 Years

- For mild-to-moderate dehydration, indicated by a 3%–9% drop in body weight or three to five unformed stools per day, drink 2–4 liters of an ORS over 4 hours.
- If not dehydrated, drink one-half to 1 cup of ORS or fluids after each unformed bowel movement.
- If you have no medical conditions, you may consume sport drinks, diluted juices, salty crackers, soups, and broths until the diarrhea stops.
- Do not withhold food for more than 24 hours.

## Nonprescription Medications

- See Table 17-6 for dosages of loperamide and bismuth subsalicylate.

### Loperamide

- Note that loperamide can cause dizziness and constipation.
- Do not take this agent if you are taking sedatives, antianxiety drugs, or other antidepressants.
- Do not give this agent to children 2 years of age or younger. Loperamide is not recommended for children younger than 6 years, except under the supervision of a primary care provider.
- If loperamide is not effective in treating your diarrhea (if no clinical improvement is observed in 48 hours), check with your



If the diarrhea has not resolved after 72 hours of initial treatment, see your primary care provider.



Monitor for excessive number of bowel movements, signs of dehydration, high fever, or blood in the stool. If any of these complications are present, discontinue bismuth subsalicylate and consult your primary care provider.