College of Pharmacy
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# Selective Topics

## 1-Intestinal Gas (Gastrointestinal condition):

## Introduction

1-Intestinal gas symptoms and conditions that predispose patients to intestinal gas are common, and they may cause considerable discomfort and lifestyle impairment [(1)].

2-The most frequent symptoms are **eructation** (belching of swallowed air), **bloating** (sensation of **tension in the abdominal area** after eating or as a subjective sensation that the **abdomen is larger than normal**), and **flatulence** (excessive passage of air from the stomach or intestines through the anus) [(1)].

3-Flatulence is a common and logical consequence of intestinal gas [(2)]. Passing gas is **normal** and occurs either consciously or unconsciously even while sleeping [(1)]. The average person passes gases 10-25 times daily (more than 25 times/day may be considered excessive) [(4)].

## Pathophysiology of Intestinal Gas

The pathophysiology of intestinal gas is poorly understood [(1)]. Various sources of excess gas have been identified, including **air swallowing**, **diet**, **lactose intolerance**, irritable bowel syndrome (IBS) [(2)], and certain medications [(1)].

## A-Diet:

1-**Diet is a major cause of bloating and gas**. If certain food residues (mostly carbohydrates) reach the large intestine (since may be incompletely absorbed in the small intestine), normal bacteria utilize them as food sources, producing carbon dioxide, hydrogen, and sometimes methane as by-products [(1, 2)]. Table-1[(3)].

2-**Dietary sugars** (e.g., **lactose** in dairy products ; **fructose** in fruits, vegetables, candies, and soft drinks; **sucrose** from "table sugar"; and **glucose** from the breakdown of starches) may be **incompletely absorbed** in the healthy human small intestine. These sugars are the principal substrates for hydrogen gas (H2) production in the colon [(1)].

**Table-1. Gas Producing Foods** [(3)]

| |
|---|
| 1-**Beans**, eggs, and fried and fatty foods |
| 2–**Beverages**: Carbonated drinks, fruit drinks |
| 3–**Diary**: Milk and foods made with milk (eg, cheese) |
| 4–**Fruits**: Apricots, bananas, melons, peaches, pears, prunes, raw apples |
| 5–**Grains**: Wheat and wheat bran |
| 6-**Vegetables**: Broccoli, cabbage, cauliflower, cucumbers, green peppers, onions, peas, radishes, raw potatoes |
| القرنبيط، ملفوف، قرنابيط، خيار، فلفل أخضر، بصل، بازلاء، فجل، بطاطا خام |

## B-Aerophagia (air swallowing)

1-We **automatically swallow** up to 2 quarts (1 quart= 1/4 gallon= **4 cups**) of **air** each day, usually while **eating and drinking**. A lot of air is also swallowed when we chew gum or drink with a straw. More than 1 cup of air is swallowed when we drink a full glass of water [3].

2-Eating **fast**, **gulping** food, **drinking** beverages **too rapidly**, **eating too much**, **smoking**, **chewing gum**, **sucking** on **hard candies** or feeling **stressed** increases the **amount of air we swallow**. We burp about 50% of this air, and the rest passes through the intestines and is released from the rectum [1, 3].

## C-Lactose Intolerance

1-In addition, up to **30% of adults** have problems digesting a type of sugar called **lactose** found in milk and other dairy products [3].

2-In patients with **lactase deficiency**, the lactase enzyme is not available in sufficient quantities to break down lactose in dairy products before it reaches the colon [1]. It may be congenital (mutation in the gene) or acquired (more common and may be due gastroenteritis , celiac disease,…) [4]. Bacteria in the colon feed on undigested lactose, producing gas [3].

3-Individuals with lactase deficiency **experience GI symptoms** (e.g., gas pains, bloating, nausea, and diarrhea) upon exposure to **dairy** and other products containing milk or milk derived carbohydrates (e.g., caramel) [1].

## D-Irritable Bowel Syndrome (IBS) and other conditions:

Conditions such as **IBS** may predispose patients to intestinal gas symptoms. Intestinal gas symptoms also may result from other less common medical conditions (e.g., celiac disease). Patients with **celiac disease have an intolerance to gluten** (a protein contained in wheat, barley, and oats الشوفان). Intestinal gas symptoms may result from the inflammatory response that occurs in the GI tract after exposure to gluten [1].

## E-Drugs [1].

A variety of drugs may cause intestinal gas symptoms. These drugs can be categorized broadly by the mechanisms that cause symptoms:

1-Drugs that affect **intestinal flora** (lactulose and antibiotics).

2-Drugs that affect **metabolism of glucose and other dietary substances** (alpha-glucosidase inhibitors, including acarbose and miglitol; and the biguanides, including metformin); and **GI lipase inhibitors** (orlistat).

3-Drugs that affect GI motility (narcotics, anticholinergics, and calcium channel blockers).

4-Drugs that are high in **fiber** (psyllium) or nonabsorbable polymers (**cholestyramine**).

5-Drugs that **contain or release gas** (**effervescent solutions**) also may cause intestinal gas symptoms

## Clinical Presentation of Intestinal Gas

1-Patients with symptoms of intestinal gas complain most commonly of excessive **belching**, **abdominal discomfort or cramping**, **bloating**, and **flatulence** [(1)].

2-Other less common symptoms include nausea; **audible bowel sounds** and dyspepsia or indigestion [(1)].

3-patients with alarm symptoms (weight loss, blood in vomit or stool, moderate-severe abdominal pain, vomiting, fever or chills) [(4)].

# Treatment

## Nonpharmacologic Therapy

1-Avoid **rush through a meal**. Eat and drink slowly in a calm environment [(1)].

2-**Chew** food thoroughly [(1)].

3-Avoid **washing down solids with a beverage** [(1)].
4-Avoid **gulping** and **sipping** liquids, drinking out of **small mouthed bottles or straws**, or drinking **from water fountains** [(1)].

5-Avoid **chewing gum** and **sucking hard candy**, especially those that contain artificial sweeteners (e.g., **sorbitol** or **mannitol**) [(1)].

6-**Do not overload the stomach at** any one meal [(1)]. Eating smaller more frequent meals throughout the day may help decreasing the symptoms [(4)].

7-Avoid **gas-producing foods**, **carbonated** beverages (e.g., sodas), **caffeinated** beverages (e.g., coffee, energy drinks) and **smoking** [(1)].

8-Avoid or minimize the use of **drugs that may cause intestinal gas symptoms** [(1)].

9-Patients with lactose intolerance either should avoid milk and dairy products or should use lactase replacement products [(3)].

## Pharmacologic Therapy

1-**Simethicone** and **activated charcoal** may relieve symptoms after intestinal gas has formed [(1)].
2-**Alphagalactosidase** and **lactase enzymes** are taken with foods to prevent gas from forming [(1)].
3-Lactase replacement products may be beneficial for the treatment of intestinal gas and diarrhea associated with **lactose intolerance** [(1)].
4-The usual **adult and pediatric dosages** of these drugs are provided in **Table-3.**

## Simethicone

1-Simethicone (a mixture of inert silicon polymers) is used as a defoaming agent to relieve gas (it aid to make gas bubbles eliminated more easily by belching or passing gas through the rectum) [1].
2-Because simethicone is **not absorbed** from the GI tract, it **has no known systemic side effects**; its safety has been well documented [1].

3-Simethicone is contraindicated in patients with a known hypersensitivity to simethicone products or suspected intestinal perforation and obstruction [1].

## Activated Charcoal

1-Activated charcoal also is promoted for relief of intestinal gas; However, it is **neither approved nor shown to be effective for this indication** [1]. (**Should not be recommended**) [4].
2-Activated charcoal also has **poor palatability** [1].
4-External devices containing activated charcoal also are available to reduce the odor of flatus in patients with ostomies [1].

## Alpha-Galactosidase

1-This enzyme hydrolyzes oligosaccharides into their component parts before they can be metabolized by colonic bacteria [1].

2-Because high fiber foods contain large amounts of oligosaccharides, alpha-galactosidase is recommended as a **prophylactic treatment of intestinal gas symptoms produced by high fiber diets or foods that contain oligosaccharides** (table-2) [1].

Table-2: Oligosaccharide Containing Foods That Alpha-Galactosidase might affect [1].

| Vegetables | Grains | Beans |
|---|---|---|
| Beets, Broccoli, Cabbage, Corn, Cucumbers, Leeks, Lettuce, Onions, Parsley, Peppers<br>البنجر، قرنبيط، ملفوف، ذرة، خيار، نبات كرّاث، خسّ، بصل، بقدنوس، فلفل | Barley, Pasta, Wholegrain breads, Wheat bran, Rice bran | Broad beans, Chickpeas, Mung beans, Peanuts and peanut butter, Seed flour (sesame, sunflower), Soy products (including lentils, soy milk)<br>الباقلاء، حمص،بقلة الماش وفستق وزبدة مخلوطة بالفستق، طحين بذرةِ (سمسم، عبّاد شمس)، مُنتَجات صويا (تَتضمّنُ العدسَ، حليب صويا) |

4-Because the enzyme produces galactose, this product should not be used by patients with **galactosemia** (an inherited metabolic disorder in which galactose accumulates in the blood because of the deficiency of an enzyme that catalyzes galactose's conversion to glucose) [1].

5-Similarly, patients with **diabetes** should be cautioned about the use of the enzyme, which may produce 26 grams of carbohydrates per 100 grams of food [(1)].
6-Enzyme products should **not be put on hot foods** as heat inactivates the enzyme. Patient should place liquid enzyme **on the first spoonful of food** [(4)].

## Lactase Replacement Products

1-Lactase replacement products are used in patients with lactose intolerance. Lactase enzymes break down lactose, a disaccharide, into the monosaccharides glucose and galactose, which are absorbed [(1)].

2-Lactase replacement products should be used in patients with lactose intolerance to **aid in the digestion of dairy products** [(1)].

3-There are **no adverse effects** listed for lactase replacement products [(1)].

## Probiotics

Although data about the benefits of probiotics remain heterogeneous; however, many **studies showed significant improvement** with certain probiotic formulations [(4)].

## Bismuth subsalicylate (adsorbent):

It capable of binding a considerable amount of sulfide gas. Therefore, it may be effective in short-term relief of gases. However, to avoid salicylate toxicity, do not recommend it for long-term use (> 3-4 weeks) or high doses (>150 mg/ kg) [(4)].
Adult dose: 524 mg qid ( maximum 8 doses/day) [(4)].

**Table-3: Dosage Guideline for Intestinal Gas Products** [(1)].

| **Agent** | **Adults** | **Children ≥ 12 Years** | **Children 2 to < 12 Years** | **Children < 2 Years** |
|---|---|---|---|---|
| **Simethicone** | 40-360 mg after meals and at bedtime, as needed | 40-360 mg after meals and at bedtime, as needed | 40 after 4 times daily | 20 mg 4 times daily, as needed |
| **Activated charcoal** | 520 mg (2 capsules) orally after meals, as needed; may repeat hourly | Specific guidelines not available | | |
| **Alpha-galactosidase** | 300-450 units per serving of food | Not recommended | | |
| **Lactase enzyme** | 3000-9000 units at first bite of food or drink containing lactose | Specific guidelines not available | | |
| **Probiotics** | Specific guidelines not available | Specific guidelines not available | | |

## References:

1-APHA. Handbbook of nonprescription drugs. 18th edition 2016.
2-W. Steven Pray. Strategies for the Relief of Bloating and Gas. US Pharm. 2009; 34(12):16-22.
3-Guido R. Zanni. coping with Intestinal Gas. Pharmacy times. August 18, 2010.
4-CPhA. CTMA: Compendium of Therapeutics for Minor Ailments. 2014.


# 2-Hemorrhoids (Gastrointestinal condition):

Hemorrhoids (also known as piles): are abnormally dilated, swollen, bulging of hemorrhoidal vessels and the overlying skin in the anorectal region [(1)].

## Prevalence and epidemiology

Hemorrhoids can occurs at any age but are rare in children and adults under the age of 20. Prevalence appears to be increased with increasing age and is most common in patients between the ages of 40-65 years. In addition, there is a high incidence of hemorrhoids in pregnant women [(2)].

## Etiology:

The cause of hemorrhoid is probably multifactorial with **anatomical** (degeneration of elastic tissue), **physiological** (increased anal canal pressure), and **mechanical** (straining at defecation) processes implicated [(2)].
In addition hemorrhoid is often exacerbated by inadequate dietary fiber or fluid intake [(3)]. **Pregnancy** is believed to **precipitate** hemorrhoids in **susceptible women** [(5)].

## Types of hemorrhoids:

1-Superior to the anal sphincter there is an area known as the dentate line (see the figure-1). Hemorrhoids above the dentate line are classified as **internal**, while hemorrhoids below the dentate line are classified as **external** [(2)]. The term **mixed hemorrhoids** is used when internal and external hemorrhoids coexist [(5)].

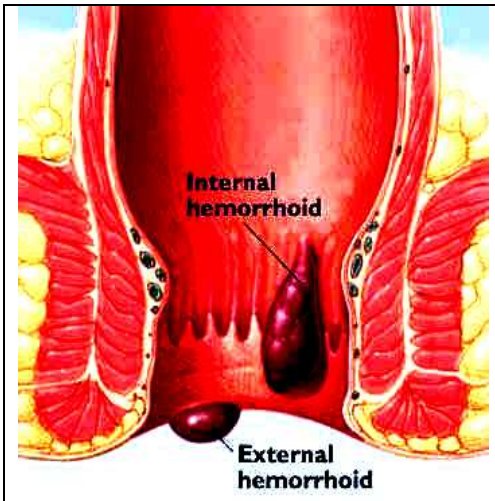


Figure-1: types of **hemorrhoids**

2-**Internal** hemorrhoids should **not cause pain** unless complications develop, since this area has **no nerve fibers** [(5).]

3-Furthermore ***internal*** haemorrhoids are graded according to severity: **grade I**, do not prolapse out of the anal canal; **grade II**, prolapse on defecation but reduce spontaneously; **grade III**, require manual reduction; and **grade IV**, cannot be reduced [(2)].

## Patient Assessment (Specific questions to ask)

### 1-Duration:

Patient with symptoms that have been present for **more than 3 weeks** --------refer for further investigations [(2)].

## 2-Severity:

Medication is unlikely to help patient who has to **manually reduce hemorrhoids** or of **3rd or 4th degree** ----------referral [2] (fourth degree hemorrhoids are at risk of **thrombosis** and **gangrene** [5].

## 3-Pain:

Pain is not always present [3] pain associated with hemorrhoids tend to occurs on defecation and at other time for example when sitting. It is usually described as a dull ache [2]. **Sharp** or **stabbing pain** at the **time of defecation** can suggest an **anal fissure** and required referral [3].

## 4-Itching:

Which is one of the most troublesome symptoms for many patients [3].

## 5-Bleeding [4, 5]:

-**Bright blood** does not normally have a sinister significance, but patients experiencing this for the **first time** should be referred.

-**Blood mixed** in the stools, giving them a tarry red or black appearance. This indicates bleeding within the gastrointestinal system and must be investigated.

-**Large volumes of blood** not associated with defecation; this may indicate carcinoma and must be investigated (patient with hemorrhoids does not usually bleed at time other than defication).

## 6-Constipation:

Constipation is a common causatory or exacerbatory factor in hemorrhoids. In addition if piles are painful, patient try to avoid defecation which makes the constipation worse [3].

## 7-Bowel habit:

**A persisting change in bowel habit** (persisting alteration from normal habit) ---- referral (may be due to tumor) [3].

## 8-Associated symptoms:

Symptoms of hemorrhoids are usually local (pain, itching…). Other symptoms such as abdominal pain, **vomiting**, loss of appetite, **tenesmus** (desire to defecate when there is no stool), **seepage** (involuntary passage of fecal material) ------ referral [2-4].

## 9-Medication

To know [3]:

A- Products already used to treat hemorrhoids.

B- Drug-induced constipation which exacerbate the condition.

## Treatment timescale:

Patient should see the Dr. If the symptoms have not **improved after a week** [1].

# Management

## A-Non-drug measures [1, 3]:

1-**Increase** the amount of **fiber and fluid** in the diet.
2-**Avoid lifting heavy objects**.
3-**Avoid delaying the urge** to defecate.
4-Avoid **prolonged sitting** in the toilet (no more than 10 minutes) to reduce straining and pressure on the hemorrhoids vessels.
5-**Wash the perianal area with warm water** after each bowel movement. In addition many patients find that warm bath soothes their discomfort.

## B-pharmacological therapy:

1-The OTC products for hemorrhoids include the followings (alone or commonly in combined products) [1-3]:

| Type | Example(s) | Purpose(and mechanism) |
|---|---|---|
| **Anesthetics** | Lidocaine, benzocaine | Reduce pain and itching |
| **Astringents** | Bismuth, zinc, Peru balsam | ppt the surface protein producing coat over hemorrhoids to reduce itching, irritation, …. |
| **Anti-inflammatory** | Hydrocortisone (the only OTC) | Reduce inflammation and swelling to relief Pain and itching. |
| **Protectants** | Zinc oxide, AL-hydroxide, calamine, shark liver oil | Form a barrier on skin to prevent irritation , itching, and loss of moisture |
| **Antiseptics** | resorcinol | antiseptic |
| **Counter-irritants** | menthol | Give tingling sensation to overcome pain and Itching. |
| **Vasoconstrictor** | Phenylphrine, ephedrine… | Reduce swelling to relief pain and itching. |

**2-Laxatives**: The short-term use (1-2 days) of a stimulant laxative to relieve constipation while dietary fiber and fluid are being increased [3].
For patients who cannot adapt their diet, bulk-forming laxative may be used long term [3].

## How to use OTC products

1-Ointments and creams can be used for internal and external hemorrhoids while **suppositories are used for internal hemorrhoids**. However both are used twice daily (morning and evening) and after each bowel movement [3].

2-Many people prefer **suppositories**, but these products are often **not effective** because they **tend to slip into the rectum and melt, thus bypass the anal canal where the medication is needed** [5]. In general Ointments and creams are preferred over **suppositories** [5].

3-When used intrarectally, the ointment may be inserted using an applicator or finger but the **applicator is preferred** because it can reach an area where the finger cannot reach. The applicator should be **lubricated** by the ointment before insertion [(1)].

4-Products that contain hydrocortisone are restricted to those aged above 18 years and for no longer than of 7 days of continuous treatment [(3)].

**References:**

1-Handbook of Non-prescription drugs: An Interactive Approach to Self-Care. 16th edition: 2010.
2-Community Pharmacy. Symptoms, Diagnosis and Treatment. 3rd edition. By Paul Rutter.2013.
3-Symptoms in the pharmacy. A guide to the managements of common illness. 7th edition By Alison Blenkinsopp and Paul Paxton .2014.
4-Nathan A. fasttrack. Managing Symptoms in the Pharmacy. Pharmaceutical Press; 2008.
5-CPhA. CTMA: Compendium of Therapeutics for Minor Ailments. 2014.

# 3-Fever (childhood condition)

## Background:

1-Fever is simply **a rise in body temperature above normal**. Normal body temperature is 37 $^{o}$C, plus or minus 1$^{o}$C, although **rectal** temperature is **about 0.5 higher** and **underarm** the temperature is about **0.5 lower than oral temperature** [(1)].

2-Fever is often classified as being either **mild** (**low-grade**) (up to 39°C) or **high** (above 39°C) [(1)].

3-Rectal temperature has long been considered the gold standard measurement; However, its utility has been challenged. **Many patients prefer other methods** of temperature measurement because of comfort and ease of use [(2)].

4-Fever is a common symptom of many conditions, and in children **viral**, and to a lesser extent **bacterial**, causes are **most commonly implicated.** It has been reported that fever is probably the commonest reason for a child to be taken to a doctor [(1)].

## Measurement of body temperature

1-Oral, rectal and axillary temperature may be taken with an **electronic thermometer** with a digital probe [(4)].

**2-Standard mercury in glass** thermometers are **no longer recommended** due to **potential toxicity if they break** and **problems with proper use** [(4)].

3-Recomenndations for temperature measuring techniques are shown in table-1 [(4)].

| Age | Recommended technique | |
|---|---|---|
| | First choice | Second choice |
| **Birth -2 years** | Rectum | Axillary |
| **2-5 years** | Rectum | Axillary |
| **Older than 5 years** | Mouth | Axillary |

A-**Rectal** is the most **accurate**, **less acceptable by toddlers**, **contraindicated** in **premature infants**, **recent** anorectal **surgery** or **severe hemorrhoids** [4].

B-**Oral**: **younger children** may **bite** the **thermometer** or have **difficulty keeping it** in **the closed mouth** (this may also be a problem for **mentally impaired** or elderly with **dementia** since they have difficulty understanding the instructions) [4]. **Avoid oral route** when nasal breathing is difficult (e.g. due to viral upper respiratory tract infection). **Beverage** (hot or cold) and **smoking** should be **avoided for at least 10 minutes** before taking an oral temperature [4].

C-**Axillary**: have many **disadvantages** they take a **longer tim**e to measure and **affected by a number of factors** including hypotension [4].

## Patient assessment with Fever

### 1-Age:

Children **under 3 months** should be referred automatically because diagnosis can be very difficult and serious complication can arise [1, 2].
(They have an immature CNS thermoregulatory system-------less able to mount a febrile response----------therefore when they do become febrile----------**it may indicate a major illness**) [4].

### 2-How poorly is the child:

A-The parent will know how poorly the child is relative to normal behavior. A child might have a high temperature but be relatively normal whereas a child with a mild temperature may be quite poorly [1].
Obviously ill child or child who fails to respond to stimuli----------referral [1].

B-Fever rises **above 40°C** in a child of any age------ referral [3].

### 3-Duration:

Children < 2 years with fever that persists > 24 hours ---------- referral [2].
Children > 2 years with fever that persists > 3days ---------- referral [2].

### 4-Associoated symptoms:

A-**Viral upper respiratory** tract infections are usually accompanied by one or more symptoms including cough, cold or sore throat [1].

B-If the patient has suffered any **febrile seizur**e (or has a **history of febrile seizures**) ----------referral [2].

(**Febrile seizures** occur in 2%-5% of all children from the ages of 6 months to 5 years, with the peak occurrence in children ages 18-24 months, generally seizure is less than 15 minutes in duration, with only one occurrence in a 24 hour period [2].

C-If **no other symptoms are present,** fever suggest a bacterial infection, often a urinary tract infection ----------referral [1].
(Other symptoms can be present and include irritability, poor feeding, or vomiting) [1].

D-Child with who is **vomiting**, **very sleepy**, **hard** to **wake up**, **irritable**, or develops **spots** or **rash**, **neck stiffness**, **joint swelling**, **diarrhea**, **increased respiration rates** or **signs** of **dehydration**--------- referral [1, 2].

**5**-Children with **impaired immune function** (e.g. cancer) ---------- referral [2].

## Treatment timescale:

Patient should seek medical attention if fever persists **after 3 days** of drug treatment [2].

## A-Non-pharmacological advice:

1-Nonpharmacologic interventions, regardless of the temperature, include wearing **lightweight clothing**, **removing blankets**, **maintaining a comfortable room temperature** of approximately (20°C), and **drinking sufficient fluid** to replenish insensible losses. Because a fever will cause a child to lose fluids more rapidly, sufficient fluid intake is recommended [2].

2-**Body sponging with tepid water** may facilitate heat dissipation, given that only a small temperature gradient between the body and the sponging medium is necessary to achieve an effective antipyretic response. However, sponging is not **routinely recommended for those with a temperature less than** (40°C); Sponging is usually **uncomfortable** and often induces **shivering**, which **could further raise the temperature** [2]. Sponging does not **reset hypothalamic set point.** If used administer **antipyretics 30 minutes before sponging** to reduce the hypothalamic set point [4].

## Pharmacological therapy

1-Both **ibuprofen** and **acetaminophen** are effective in reducing fever, with both showing reductions of approximately 1-2 degrees within 30 minutes to 1 hour [2].

2- Avoid alternating antipyretics (**ibuprofen** with **acetaminophen**) because of the increased risk for potential **dosing errors** and adverse effects, especially in children [3, 4].

2-Acetaminophen typically reaches a maximum temperature reduction at 2 hours at the usual recommended dosing of **10-15 mg/kg every 4-6 hours**, with a maximum **of 5 doses per day** [2].

3-Acetaminophen is also available as a **rectal suppository**. Although a suppository may be an advantage for caregivers who have problems giving their children oral medications, or for children who are vomiting or are having a febrile seizure, the **suppository's absorption is erratic**, and studies on its antipyretic activity are conflicting [2].

4-Ibuprofen can be given to children **over 3 months old** in UK[1]( 6 months in USA) [2]. Ibuprofen is the most common NSAID used as an antipyretic; it typically reaches a maximum temperature reduction at 2 hours at the recommended dosing of **5-10 Mg/kg per dose every 6-8 hours**, with a maximum **of 4 doses per day** [2].

## References


1-Community Pharmacy. Symptoms, Diagnosis and Treatment. By Paul Rutter.2013.
2-APHA. Handbbook of nonprescription drugs. 18th edition 2016.
3-Yvette C. T. Facts About Fever: A Guide to OTC Antipyretics. Pharmacy times. February 08, 2015
4-CPhA. CTMA: Compendium of Therapeutics for Minor Ailments. 2014.


# Further reading [1]

Table 9.12
**MHRA guidance on a dosing schedule for paracetamol**

| | | | |
|---|---|---|---|
| 3 to 6 months | 2.5 mL | 125 mg/mL | |
| 6 to 24 months | 5.0 mL | | |
| 2 to 4 years | 7.5 mL | | |
| 4 to 6 years | 10 mL | | |
| 6 to 8 years | | 5 mL | 250 mg/mL |
| 8 to 10 years | | 7.5 mL | |
| 10 to 12 years | | 10 mL | |

### *Ibuprofen (e.g Nurofen, Calprofen)*

Ibuprofen can be given to children over 3 months old. Doses for ibuprofen, like paracetamol, are age dependant as shown below:

- Age 3 months to 5 months: 50 mg three times a day.
- Age 6 months to 1 year: 50 mg three to four times a day.
- Age 1 year to 4 years: 100 mg three times a day.
- Age 4 years to 7 years: 150 mg three times a day.
- Age 7 years to 10 years: 200 mg three times a day.
- Age 10 years to 12 years: 300 mg three times a day.