Respiratory Problems
Lecture1

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Part I


38.5 C

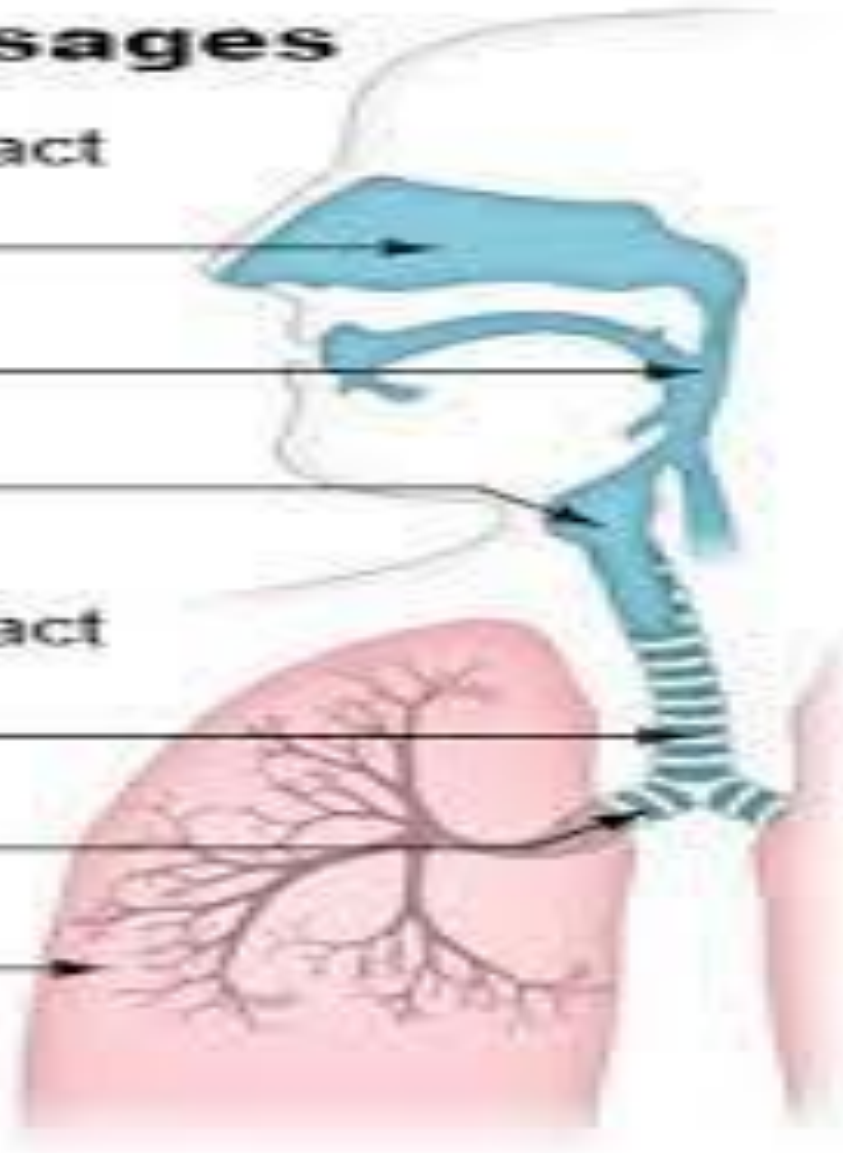
Conducting Passages

Upper Respiratory Tract

- Nasal Cavity
- Pharynx
- Larynx

Lower Respiratory Tract

- Trachea
- Primary Bronchi
- Lungs



COUGHS AND COLDS

- Coughs and colds comprise a mixture of viral respiratory tract infections (RTIs).
- Self-management or getting advice and support from a pharmacist are usually much better options.
- Many people choose to buy **over-the-counter**(**OTC)** medicines for symptomatic relief.
- However, some of the ingredients of OTC cold remedies may interact with prescribed therapy, occasionally with serious consequences.
- Therefore, careful attention needs to be given to taking a medication history.

- **Respiratory tract infections (self-limiting) – usual durations**

The average total lengths of the illnesses are as follows:

- • Acute otitis media (AOM): ***4 days***
- • Acute sore throat/acute pharyngitis/acute tonsillitis: ***1 week***
- • Common cold: ***One and a half weeks***
- • Acute rhinosinusitis: ***Two and a half weeks***
- • Acute cough/acute bronchitis: ***3 weeks***

Age

- Establishing who the patient is – child or adult – will influence the pharmacist's decision about the necessity of referral to the doctor and choice of treatment.

Duration

- Patients may describe a rapid onset of symptoms **over hours** or a gradual onset of symptoms over a day or two; the former is said to be more commonly true of **flu (as well as COVID-19)** and the latter of the common cold.
- The symptoms of the common cold usually last for 7–14 days. Some symptoms, such as a cough, may persist after the worst of the cold is over and coughing for 3 weeks is not unusual.

Symptoms

Runny/blocked nose

- Most patients will experience a runny nose

(i.e. rhinorrhoea). This is initially a clear watery fluid, which later becomes a thicker and more tenacious, often coloured, mucus.

- **Nasal congestion** occurs because of dilatation of blood vessels, which leads to swelling of the lining surfaces of the nose and can cause discomfort. This swelling narrows the nasal passages that are further blocked by increased mucus production.

Sneezing/coughing

- Sneezing occurs because the nasal passages are **irritated** and **congested**. A cough may be present either because the pharynx is irritated (producing a dry, tickly cough) or as a result of irritation of the bronchus due to postnasal drip.

Aches and pains/headache

- Headaches may be experienced **because** of inflammation and congestion of the nasal passages and sinuses. A fever may also cause headache.
- A persistent or worsening frontal headache (pain above or below the eyes) may be due to **sinusitis.**

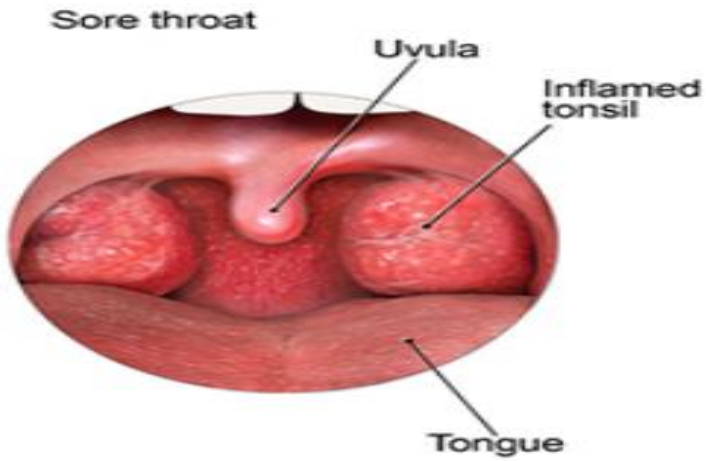
People often report **muscular** and **joint aches** and these are more likely to occur with **flu and COVID-19** than with the common cold.

High temperature

Those suffering from a cold often complain of feeling hot; however, in general, a high temperature (e.g. exceeding 38°C) will not be present.

The presence of fever may be an indication that the patient has **flu** or **COVID-19** rather than a cold.

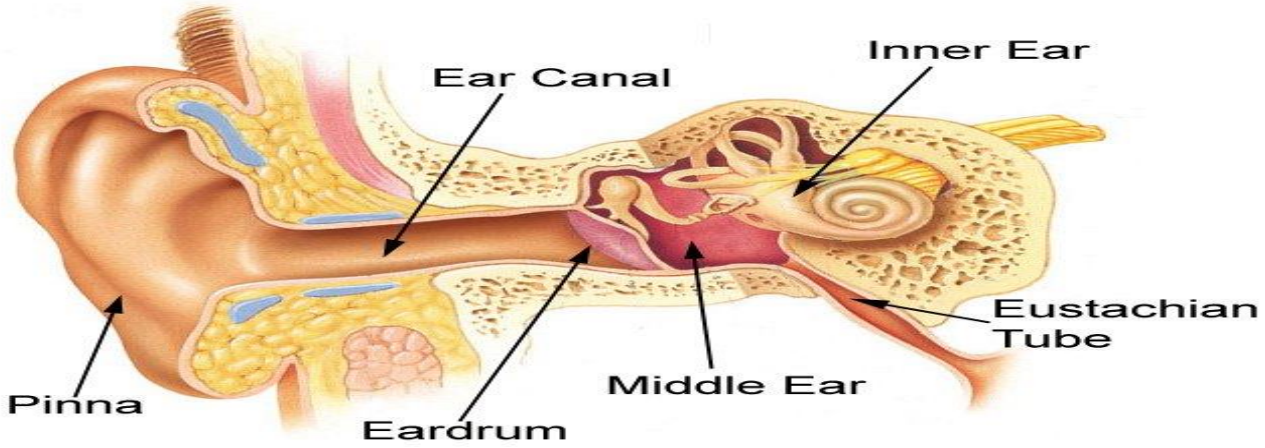
Sore throat



- The patient often feels their throat is **dry** and **sore** during a cold and this may sometimes be **the first sign that a cold is imminent**.
- A sore throat can be a prominent feature in colds and flu, and it is often treated erroneously as a throat infection.

Earache/otalgia

- Earache is a common complication of colds, especially in children. When nasal mucus and congestion is present, the ear can feel blocked.



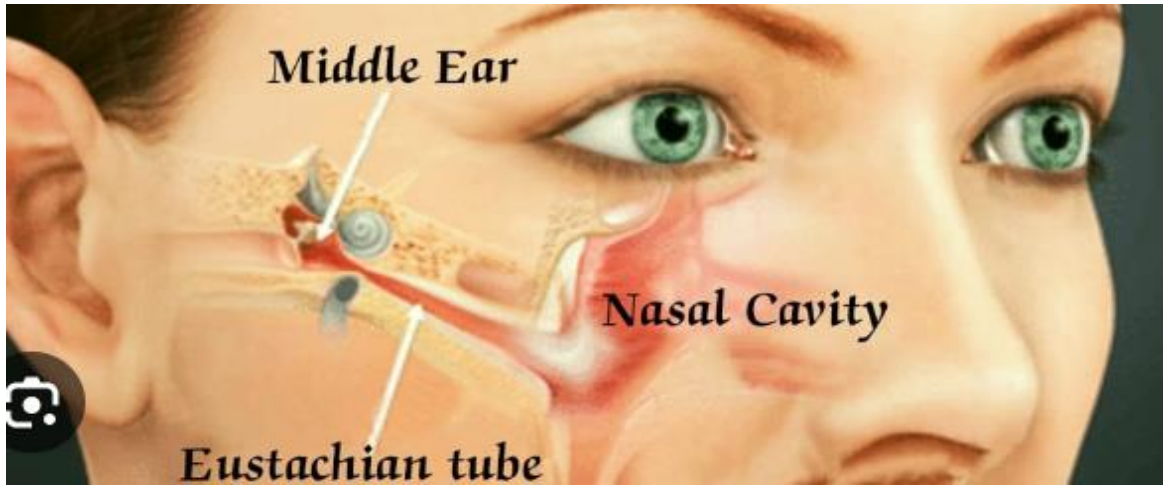
- This is due to the blockage of the Eustachian tube, which connects the middle ear to the back of the nasal cavity. Under normal circumstances, the middle ear is an air-containing compartment.

- However, if the Eustachian tube is blocked, the ear can no longer be cleared or air pressure equilibrated through swallowing, which may make the patient feel uncomfortable and deaf.

- This situation often **resolves spontaneously**, *but* **decongestants** and **inhalations** can be helpful.

- Sometimes, the situation worsens when the middle ear fills up with fluid and is under pressure.

- When this does occur, the ear becomes acutely painful (otalgia). This ear pain is common in young children and usually the best treatment is pain-relief medicine. A secondary infection with inflammation may follow and when this occurs, this is called **acute otitis media (AOM).**



- In a Cochrane review of AOM, overall the evidence from clinical trials shows that **without antibiotic treatment**, symptoms will **improve within 24 h in 60%** of children and **will settle spontaneously within 3 days in 80% of children**.

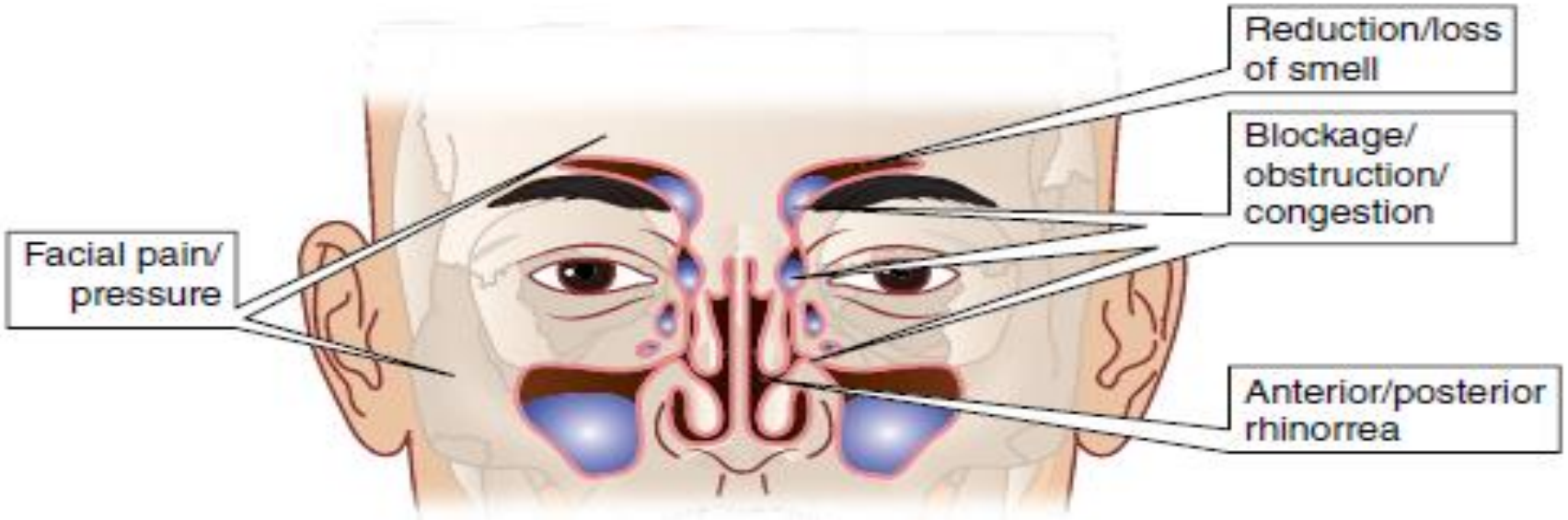
- **Antibiotics** are most useful in children **under 2 years** of age who have pain in both ears or a painful ear with discharge from that ear (i.e. otorrhoea); therefore, in these circumstances, suggesting getting a fairly rapid assessment by a doctor or nurse is appropriate.

- In summary, a painful ear can initially be managed by the pharmacist. There is evidence that ***paracetamol*** and ***ibuprofen*** are effective treatments for both **otalgia** and **AOM**.

- However, if **pain persists** or is associated with an **unwell child** (e.g. high fever, very restless or listless, and vomiting), then refer to the GP practice.

Facial pain/frontal headache

Facial pain or frontal headache may signify *sinusitis*



- The paranasal sinuses are air-containing spaces in the bony structures **adjacent to the nose** (**maxillary sinuses**) and **above the eyes** (**frontal sinuses**).

- During a cold, their lining surfaces become inflamed and swollen, producing mucus.

- The secretions drain into the nasal cavity. If the drainage passage becomes blocked, fluid builds up in the sinus, which causes pain from pressure and is called ***acute sinusitis.***

- It can become secondarily (bacterially) infected, but this is rare.

However, **antibiotics** may be recommended if :

1. The symptoms of sinusitis persist for more than 10 days .
2. Severe symptoms with fever (i.e. a temperature of >38°C).
3. Severe local pain and discoloured or purulent nasal discharge.
4. If a marked deterioration in sinusitis symptoms develops following a recent cold that had started to settle (so-called ‘double sickening’).

- When these features are not present, treatment should be aimed at symptoms relief. Options include:

✓ To reduce pain *Paracetamol* or *ibuprofen used*.

✓ An *intranasal decongestant* (for a maximum of 1 week, in adults only) may help if nasal congestion is problematic. *Oral decongestants*, which are commonly found in combination products with an analgesic, are generally not recommended for sinusitis.

✓ Steam inhalation or nasal irrigation with saline are sometimes advised for painful sinuses. Care should be taken to avoid scalding with steam inhalation and it is not advised in children.

- ✓ Sitting in the bathroom with a running hot shower is a safer option. There is some evidence that nasal irrigation is more effective than steam inhalation in the context of persistent or recurrent sinusitis.

- ✓ Drinking adequate fluids and rest will generally help.

Flu

- Differentiating between colds and influenza (and now COVID-19) may be needed to make a decision about whether referral is needed for patients in ‘at-risk’ groups who might need to be considered for antiviral treatment.

Influenza (flu) is generally considered to be likely, if:

❖• Temperature is 38°C or higher (37.5°C in the elderly).

❖• A minimum of one respiratory symptom, such as cough, sore throat, nasal congestion or rhinorrhoea, is present.

❖• A minimum of one constitutional symptom, such as headache, malaise, myalgia, sweats/chills or prostration, is present.

- Infection with the **influenza virus** usually starts **abruptly** with sweats and chills, muscular aches and pains in the limbs, dry sore throat, cough and high temperature. Someone with flu may be bedbound and unable to go about usual activities, which differentiates it from viruses causing a cold.

- There is often a period of **generalised weakness** and **malaise** following the worst of the symptoms, and this may last a **week** or **more**. A dry cough may also persist for some time.
- It is important to avoid overuse of antibiotics to reduce the development of bacteria that are resistant to them, called antibiotic resistance.

- Because of damage caused to the airways by the influenza virus, flu can be complicated by secondary lung infection (**pneumonia** or **pneumonitis**).
- Such complications are much more likely to occur in **young babies**, who have not yet developed resistance, **the very old** and **frail**, who may have impaired immunological responses, and those who have pre-existing heart disease or respiratory disease, where further damage is more critical.
- In these cases, antibiotics may be an important treatment and their use should be reserved for such cases so that antibiotic resistance resulting from overuse does not compromise their effectiveness.

Previous history

- People with a history of COPD, also sometimes called chronic bronchitis or emphysema, may need referral.
- The diagnosis of COPD should be considered in patients over the age of 35 years who are or have been long-term smokers and who have shortness of breath while doing exercise, persistent cough, regular sputum production and frequent winter 'bronchitis' or wheeze.
- Ideally, all COPD patients **should get an annual flu immunisation**.

When to refer

- Earache not settling with analgesic
- In the very young
- In the frail and old
- In those with heart or lung disease
- With persisting fever and productive cough
- With delirium
- With pleuritic-type chest pain
- Asthma

MANAGEMENT

- The pharmacist's role is to select appropriate treatment based on the patient's symptoms and available evidence, as well as taking into account the patient's preferences.
- The pharmacist can decide whether a combination of two or more drugs is needed.
- As a result, the UK's Medicines and Healthcare products and Regulatory Agency (MHRA) advised that the following OTC cough and cold remedies should no longer be sold for children under the age of 6 years:

1) • **Antitussives**: *Dextromethorphan* (for children over 12 years only) and *pholcodine* – the British National Formulary (BNF) advises that these are now not generally recommended in children.

2) • **Expectorants**: *Guaifenesin* and ipecacuanha

3) • **Nasal decongestants**: *Ephedrine*, *oxymetazoline*, *phenylephrine*, *pseudoephedrine* and *xylometazoline.*

4) • **Antihistamines**: *Brompheniramine*, *chlorphenamine*, *diphenhydramine*, *doxylamine*, *promethazine* and *triprolidine*

✓Children aged between **6** and **12** years can still use these preparations, but with advice to limit treatment to **5 days or less**.

❖**The MHRA rationale** was that for children aged over 6 years, ***'the risk from these ingredients is reduced because: they suffer from cough and cold less frequently and consequently require medicines less often; with increased age and size, they tolerate the medicines better; and they can say if the medicine is working'.***

- ***Simple cough remedies*** (such as those containing **glycerine**, **honey** or **lemon**) are still licensed for use in children. Alternatively, for children over the age of 1 year, a warm drink of honey and lemon could be given.

- Remember that all *aspirin*-containing products are contraindicated in all children under the age of 16 years. This includes oral *salicylate gels*. **Why ??**

1- Decongestants

- **Sympathomimetics** (e.g. *pseudoephedrine*) can be effective in reducing the symptoms of nasal congestion. **Nasal decongestants** work by constricting the dilated blood vessels in the nasal mucosa. The nasal membranes are effectively shrunk; therefore, drainage of mucus and circulation of air is improved, and the feeling of nasal stuffiness is relieved.

- These medicines can be given **orally** (Tablets and syrups) or **applied topically**(nasal sprays and drops).

- For nasal sprays/drops, advise the patient not to use the product for longer than **7 days**. **Rebound congestion** (i.e. rhinitis medicamentosa) can occur with topically applied sympathomimetics, but not with orally given ones.
- The decongestant effects of topical products containing ***oxymetazoline*** or ***xylometazoline*** are longer lasting **(up to 6 h)** than those of some other preparations, such as ***ephedrine***.
- The MHRA advises that these decongestants can be used in children between the ages of **6 and 12 years** for no more than **5 days**, but they should not be used in children under the age of 6 years.

- A combination topical product containing *xylometazoline* and *ipratropium* in a nasal spray is also available through pharmacy for the symptomatic treatment of nasal congestion and rhinorrhoea in connection with common colds in adults aged 18 years and above. Use should not exceed 7 days.
- ***Ipratropium*** is an antimuscarinic/anticholinergic drug that helps to reduce mucus secretion.

- **Problems**

- ***Ephedrine*** and ***pseudoephedrine***, when taken orally, have the theoretical potential to keep patients awake because of their stimulating effects on the central nervous system (CNS). In general, ***ephedrine*** is more likely to produce this effect than ***pseudoephedrine***.

- Sympathomimetics can cause stimulation of the heart and an increase in blood pressure, and may affect diabetic control **because** they can increase blood glucose levels.

Sympathomimetics are most likely to cause unwanted effects when taken **orally** and are unlikely to do so when used topically. Nasal drops and sprays containing sympathomimetics can therefore be recommended for those patients in whom oral drugs are less suitable.

- The ***interaction*** between sympathomimetics and monoamine oxidase inhibitors (MAOIs) is potentially extremely serious; **the interaction** can induce a hypertensive crisis and several deaths have occurred due to this.
- This interaction can occur up to 2 weeks after a patient has stopped taking the MAOI; Therefore, avoid both oral and topical sympathomimetics in these patients.

- ***Cautions***

➢Diabetes

➢Heart disease

➢Hypertension

➢Hyperthyroidism

Interactions: Avoid in those taking

- ✓MAOIs (e.g. *phenelzine*)
- ✓Reversible inhibitors of monoamine oxidase A (e.g. *moclobemide*)
- ✓Beta blockers
- ✓Tricyclic antidepressants (e.g. *amitriptyline*) – a theoretical interaction that appears not to be a problem in practice.

2-Antihistamines

- **<u>Antihistamines</u>** could theoretically reduce some of the symptoms of a cold, such as <u>runny nose</u> (rhinorrhoea) and <u>sneezing</u>, ***because*** of their antimuscarinic action.

- This is more pronounced in the older drugs (e.g. *chlorphenamine*, and *promethazine*) than the non-sedating antihistamines (e.g. Loratadine*, cetirizine* and *acrivastine*).

- Some (e.g. *diphenhydramine*) may also be included in cold remedies for their supposed **antitussive action** or to help the patient to **sleep** (included in combination products intended to be taken at night).

Problems & Interactions:

- The problem of using antihistamines, particularly the older types (e.g. *chlorphenamine*), is that they can cause **drowsiness.**

- Antihistamines with known sedative effects should not be recommended for anyone who is driving or in whom an impaired level of consciousness may be dangerous.

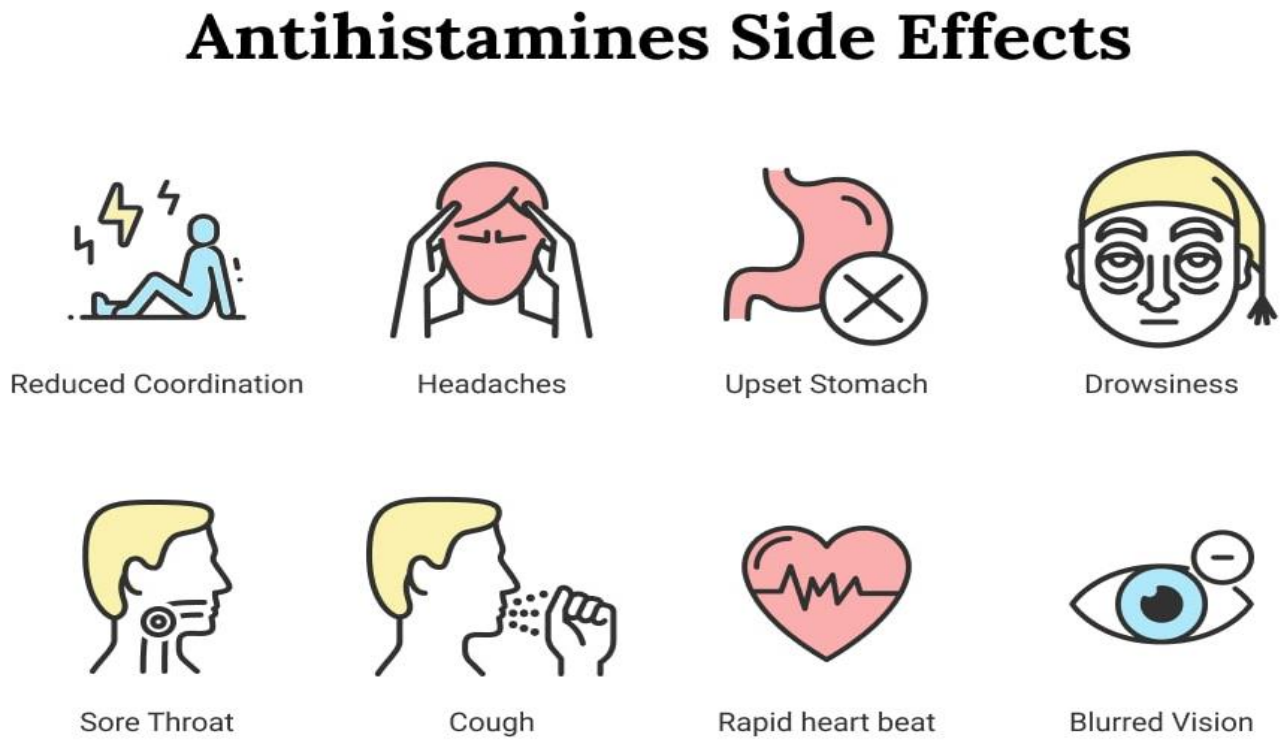
- The older antihistamines may produce the same adverse effects as antimuscarinic/ anticholinergic drugs (i.e. dry mouth, blurred vision, constipation and urinary retention).
- These effects are more likely if antihistamines are given concurrently with antimuscarinics, such as ***hyoscine***, or with drugs that have antimuscarinic actions, such as **tricyclic antidepressants** or **bladder antispasmodics** (e.g. *oxybutynin*).
- Antimuscarinic drugs' adverse effects are also more likely to be problematic if antihistamines are taken by people using some inhaled drugs containing antimuscarinics used for COPD, such as ***ipratropium*** or ***tiotropium*****.**

Interactions

- Alcohol
- Hypnotics
- Sedatives
- Antimuscarinics

Side effects

- Drowsiness (driving, occupational hazard)
- Constipation
- Blurred vision
- Urinary symptoms
- Confusion



Cautions

- Closed-angle glaucoma
- LUTS (Lower urinary tract symptoms) in men
- Epilepsy
- Liver disease

3- Zinc

- Two systematic reviews have found limited evidence that *zinc gluconate* or *acetate lozenges* may reduce continuing symptoms at 7 days compared with placebo. Therefore, it is generally not recommended that people take *zinc supplements* for colds.

4- Vitamin C

- A systematic review found that high-dose *vitamin C* (over 1 g/day) taken prophylactically could reduce the duration of colds by a slight amount (about 8%). Although it is relatively cheap and safe, general advice is that there is not much to be gained from taking extra *vitamin C* for colds

5- Echinacea

- A systematic review of trials indicated that some echinacea preparations might be better than placebo or no treatment for the prevention and treatment of colds. Echinacea has been reported to cause allergic reactions and rashes.

6- Analgesics

- The pharmacy choice of oral analgesic comprises three main agents: ***paracetamol***, ***ibuprofen*** and ***aspirin***.
- These medications may be combined with other constituents, such as *codeine*, *dihydrocodeine*, *doxylamine* and caffeine.
- Other combination therapies may sometimes be useful, for example, an **analgesic** and **decongestant** (systemic or topical) in sinusitis.

PRACTICAL POINTS

- **Inhalations**
- Breathing in warm moist air generated by steam (with or without the addition of aromatic oils) has traditionally been used to reduce nasal congestion and soothe the air passages.
- The BNF warns against using boiling water because of the risk of burns. Inhalants for use on handkerchiefs, bedclothes and pillowcases are available. These usually contain aromatic ingredients, such as ***eucalyptus*** or ***menthol*.**

Nasal sprays or drops?

- Nasal sprays are preferable for **adults** and **children over 6 years** old *because* the small droplets in the spray mist reach a large surface area.

- Drops are more easily swallowed, which increases the possibility of **systemic effects**. For **children** under the age of 6 years, drops are preferred *because* in young children, the nostrils are not sufficiently wide to allow the effective use of sprays.
- Nasal *saline* drops or sprays may help to reduce nasal congestion in babies and young children.

Prevention of colds and flu

- ***Flu immunisation – adults***

- Pharmacists should encourage those eligible to have an **annual flu vaccination**.

- In the UK, until 2019, the health service was providing vaccinations to all patients over the age of 65 years. Starting in 2020, annual flu jabs had been offered to all those over the age of 50 years **because** *of the concern that the combination of coronavirus and flu infection may be particularly dangerous*, and also *because reducing flu infections may help to reduce pressure on the National Health Service (NHS) and social care staff who may be dealing with coronavirus*.

The **flu jab** is also offered to all other people, aged **over 6 months**, who are deemed at high clinical risk. This includes those with *chronic respiratory disease (including asthma)*, *chronic heart disease*, *chronic renal failure*, *chronic neurological disease*, and *diabetes mellitus* or *immunosuppression* due to disease or treatment.

- **All pregnant women**, and **people living in long-stay residential care,** are also advised to have immunisation alongside those who are the main carer for an **older** or **disabled person**, particularly if the person they care for is at high risk from coronavirus.

- All frontline health or social care workers are also advised to be immunised, and this would include pharmacy staff.

- Community pharmacists are in a good position to use their patient medication records (PMRs) to target patients each **autumn** and remind them to have their vaccination, or in some cases administer it.

Flu immunisation – children

- It is useful to be aware of the use of flu immunisations in children. As with adults the guidance is usually updated annually.

- The **nasal spray flu vaccine** is currently provided

for all children aged between **2 years** and **15 years**.

- If a person is aged **16** or **17** years and requires flu vaccine because they are at high clinical risk they should also receive the **nasal spray** rather than an **injection**.

- If the child is aged between **6 months** and **2 years** and is in a high-risk group for flu, he/she will be offered a **flu vaccine injection** instead of the nasal spray.
- This is *because* the nasal spray is not licensed for children under the age of 2 years.
- Children aged 2–17 years may also have the flu vaccine injection if the nasal spray vaccine is not suitable for them.

Reducing transmission – hand hygiene and face masks:

- **Routine handwashing** with **soap and water** for at least **20 s** (the advice is for the time taken to sing happy birthday twice) reduces the transmission of respiratory viruses.
- **Ethanol-based hand sanitisers** can be used if immediate access to soap and water is difficult in everyday settings. Cold viruses and both SARS-CoV-2 and the influenza virus are susceptible to alcohol in formulations of **greater than 60% ethanol**

- Coronavirus survives longer than the cold or flu virus. Touching contaminated hands, surfaces and objects can transfer the virus, and washing hands or using hand sanitiser as soon after exposure as possible is important to reduce transmission.

- The rationale is that these viruses can **survive** for up to 72 h on hard surfaces and for several hours on the skin.

- Other guidance related to experience with COVID-19 is **the wearing of a face mask covering the nose and mouth** whenever it is hard to stay away from people, such as in shops or on public transport, when this is local or national policy. This reduces the chances of spreading viruses to others.

- **Keeping a distance** as much as possible is also a reasonable precaution – ideally 2 metres or more.
- **Ventilation** has proved important by opening windows, doors and air vents whenever this can be done.

Antivirals and seasonal flu

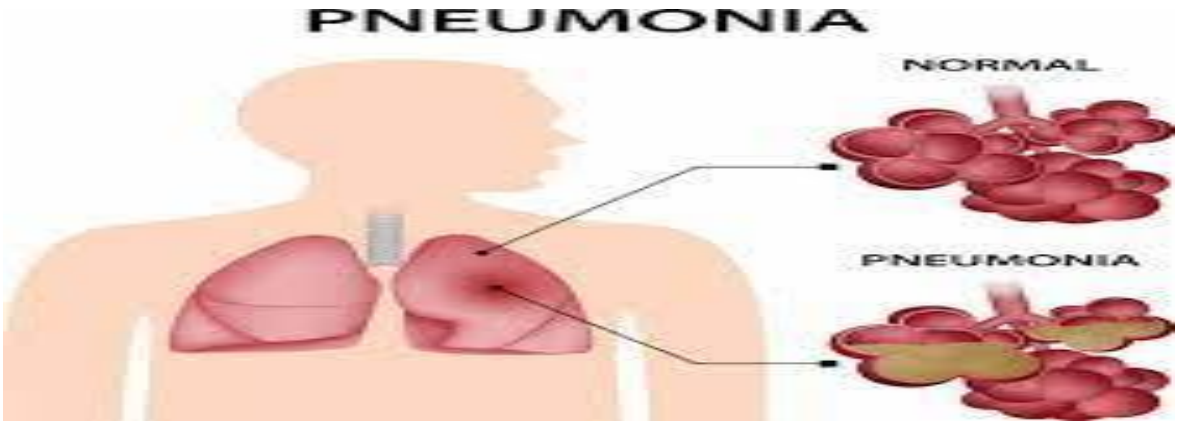
- The National Institute for Health and Care Excellence (NICE) supports the use of ***oseltamivir*** and ***zanamivir*** (**neuraminidase inhibitors**) in seasonal flu outbreaks for those who are in at-risk groups if treatment is started within **36 h** (*zanamivir*) or within **48 h** (*oseltamivir*).
- The other licensed antiviral ***amantadine*** is generally not recommended ***because*** of its lower efficacy and adverse effects, as well as due to the fact that rapid resistance can develop to its use.

- It is believed that these drugs are likely to reduce the chance of developing complications, including the **chance of dying**, and **shorten the time taken to recover from an infection**

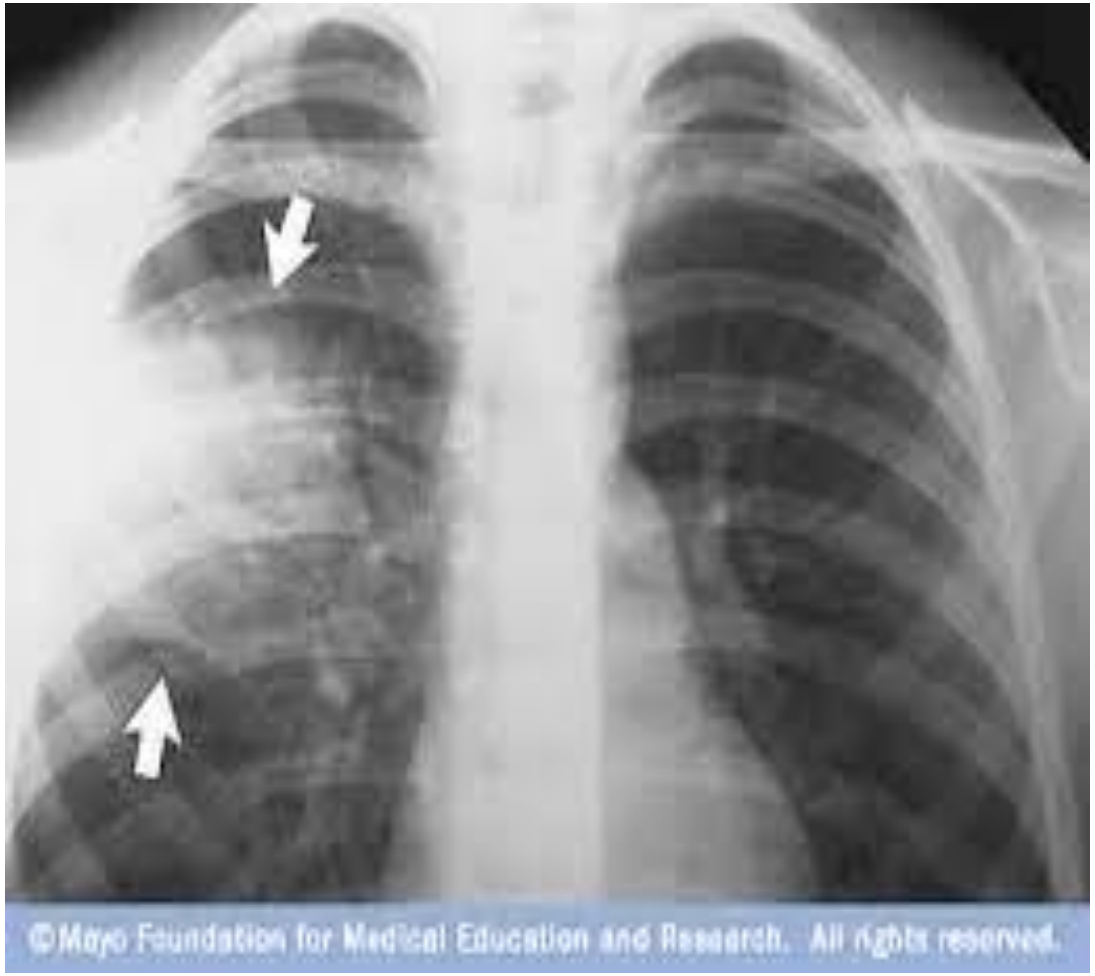
Antibiotics

- A serious complication of flu (as well as COVID-19) is the development of **pneumonia**, which can be either directly due to the virus or due to a secondary bacterial infection.
- In uncomplicated influenza infections in the community, antibiotics may be considered in those at risk, such as people who have **pre-existing COPD**, **compromised immunity**, **diabetes** or **heart** or **lung disease**.
- In these situations, if there is no improvement within **48 h** of starting antibiotics, then the person should be reviewed by the GP.

- Typical flu chest symptoms include **cough**, **retrosternal discomfort**, **wheeze** and **phlegm** (symptoms of acute bronchitis) and by themselves do not require antibiotics in a person who is not at risk.



- However, if these symptoms worsen **with** a persistent or recurring fever, pleuritic-type chest pain or breathlessness, then pneumonia might be developing.
- In this situation, review by a doctor or nurse would be essential and either treatment with antibiotics in the community or hospital admission could follow.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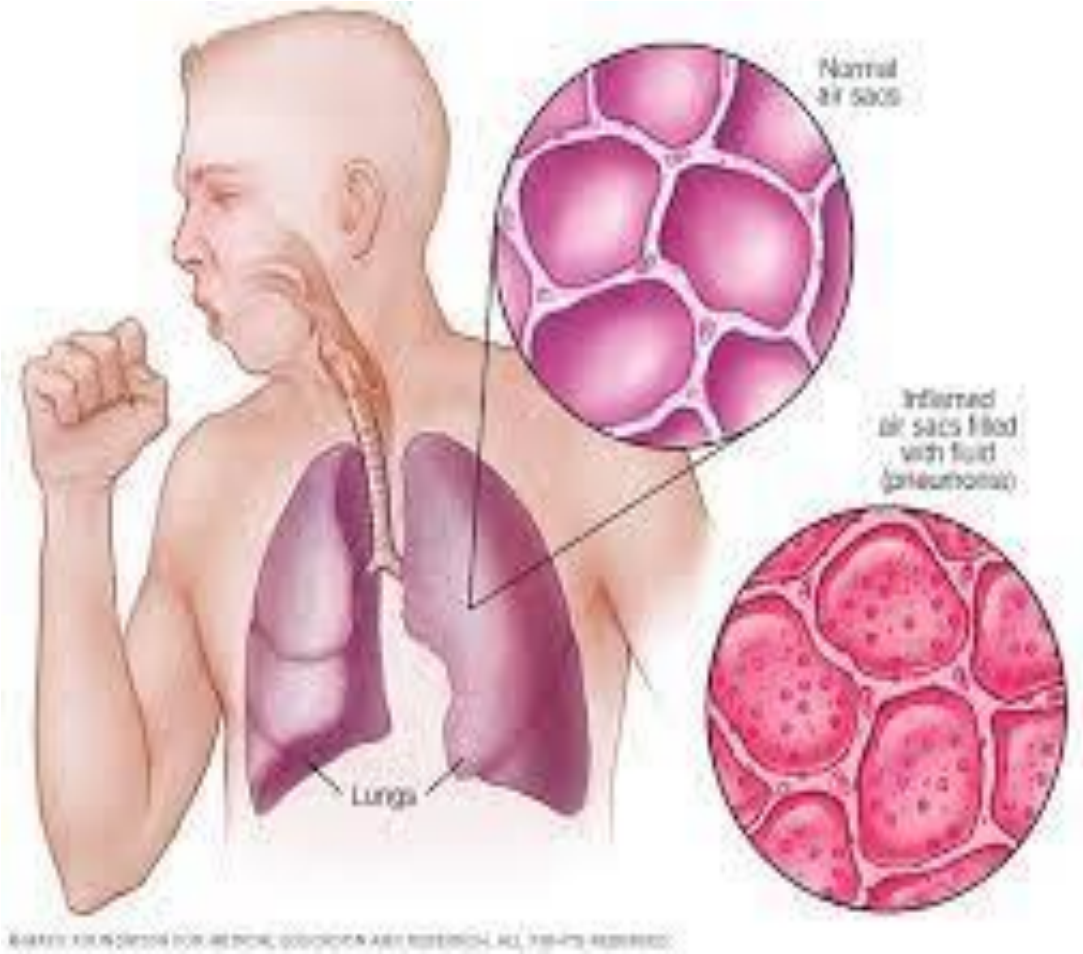

Normal air sacs
Inflamed air sacs filled with fluid (pneumonia)
Lungs

COUGH

- The respiratory tract between the nose and the lung is exposed daily to inhaled **viruses** and **bacteria**, **particulates**, such as **dirt** or **smoke**, and also *gaseous* or *irritant material* with potentially harmful effects

- *Defence mechanisms* protect the airways from these insults or inhaled foreign bodies, such as bits of food. Healthy airways are lined by ciliated cells and covered with a mucus layer that traps inhaled particles and foreign pathogens.
- The cilia beat upwards and propel the mucus and trapped debris up the trachea and out of the respiratory system (sometimes called the 'mucociliary escalator').

- When viruses invade the cells of the respiratory tract, they trigger inflammation and stimulate the production of mucus; these are the commonest causes of an increase in coughing, which becomes uncomfortable and can cause distress. The majority of coughs presenting in the pharmacy will be due to viral RTIs.
- The infection usually lasts for a few days, but damage to the respiratory tract lining causing irritation takes longer to heal and a cough can last for several weeks.
- Alongside a high temperature and change in or loss of taste and/or smell, a common symptom of COVID-19 is a new continuous cough.

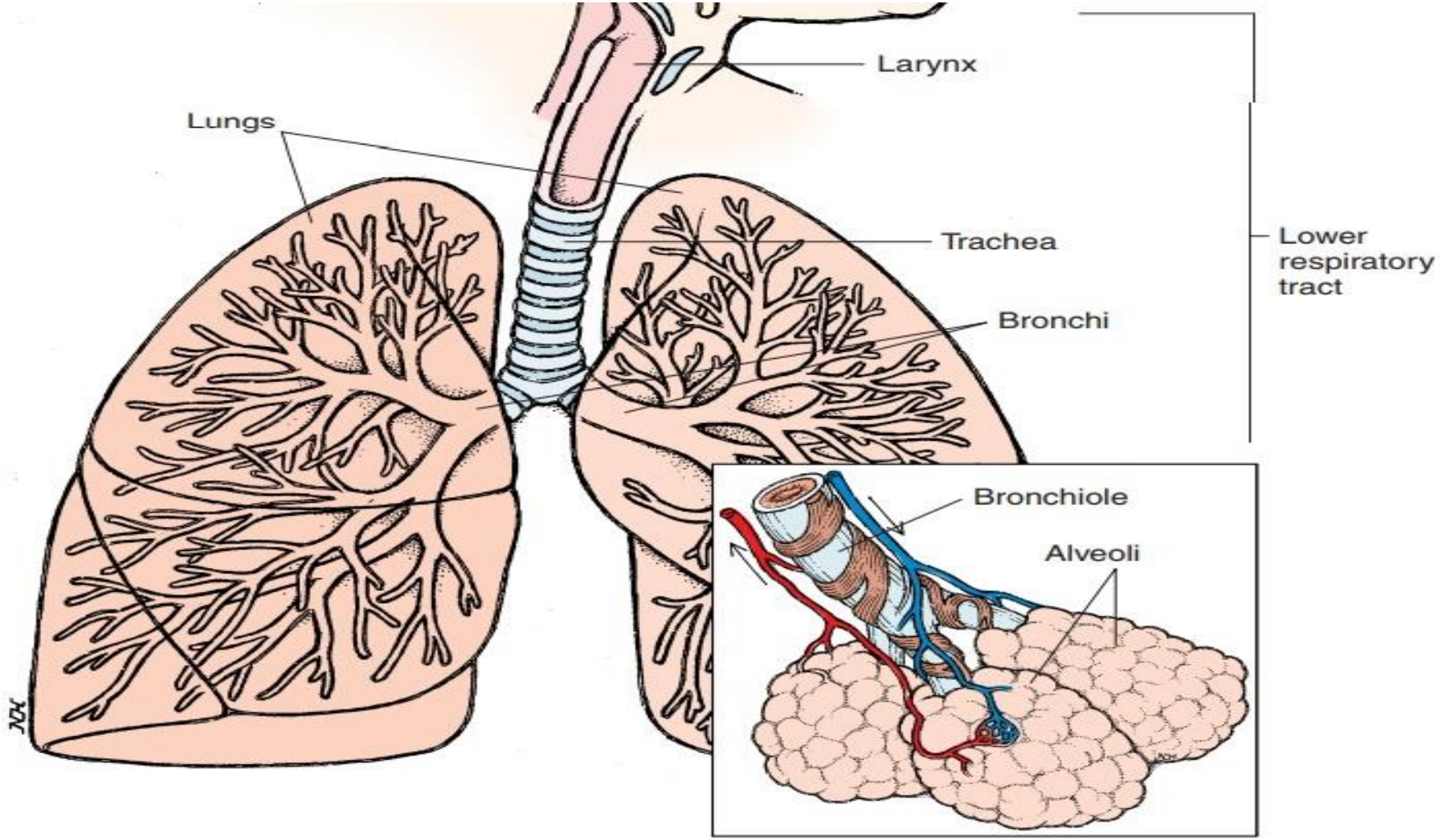


FIGURE The Structures of the Respiratory System (Anterior View)

SIGNIFICANCE OF QUESTIONS AND ANSWERS

Age

Establishing who the patient is – child or adult – will influence the choice of treatment and the decision whether referral to the doctor's is necessary.

Duration

- Most coughs are self-limiting and will get better with or without treatment. Cough can often go on **for 3 weeks** or **more** after a bad cold, flu or COVID-19, but usually slowly subsides.

- **Nature of cough**
- *Unproductive (dry, tickly or tight)*

In an unproductive cough, **no sputum** is produced. Such a cough is usually caused by viral infection that temporarily damages and irritates the airway and is self-limiting.

- *Productive (chesty or loose)*
- **Over secretion of mucus** leads to coughing, and production of copious sputum is often called a productive cough. This may be caused by irritation of the airways due to infection, allergy, etc., or when the cilia are not working properly as the lining of the respiratory tract has been damaged; this is seen in long-term smokers. Non-coloured (clear or whitish) sputum is uninfected and known as mucoid

- **Green sputum** is not unusual in people with asthma and is thought to be due to **eosinophils**.
- It may be more useful as a sign in people who have other lung complications. For example, in people with ***COPD***, an exacerbation of their condition with more purulent sputum (e.g. a change in colour to green or yellow) may be a sign that there are bacteria involved and hence antibiotics may be indicated.
- Sometimes, blood may be present in sputum (haemoptysis), with a colour ranging from pink to deep red. Blood may be an indication of a relatively minor problem, such as a burst capillary following a bout of violent coughing during an acute infection, but may be a warning of more serious problems. **Haemoptysis** is an indication for referral.

- Some people who have a tendency towards asthma develop wheeziness with a respiratory viral infection. They may benefit from inhalation treatment used in asthma, or possibly a short course of oral corticosteroids

- If a person has had repeated episodes of bronchitis over the years, they might have developed COPD. This is defined as a **chronic cough**, **excess sputum production**, **shortness of breath on exertion** and **wheeze**, usually with a history of long-term smoking when other causes of chronic cough have been excluded. Therefore, careful questioning is important to determine this.

- **Antibiotics are usually considered if the person:**

- **Has severe symptoms**, particularly sputum colour changes and increase in volume or thickness beyond normal

- **Is systemically very unwell**

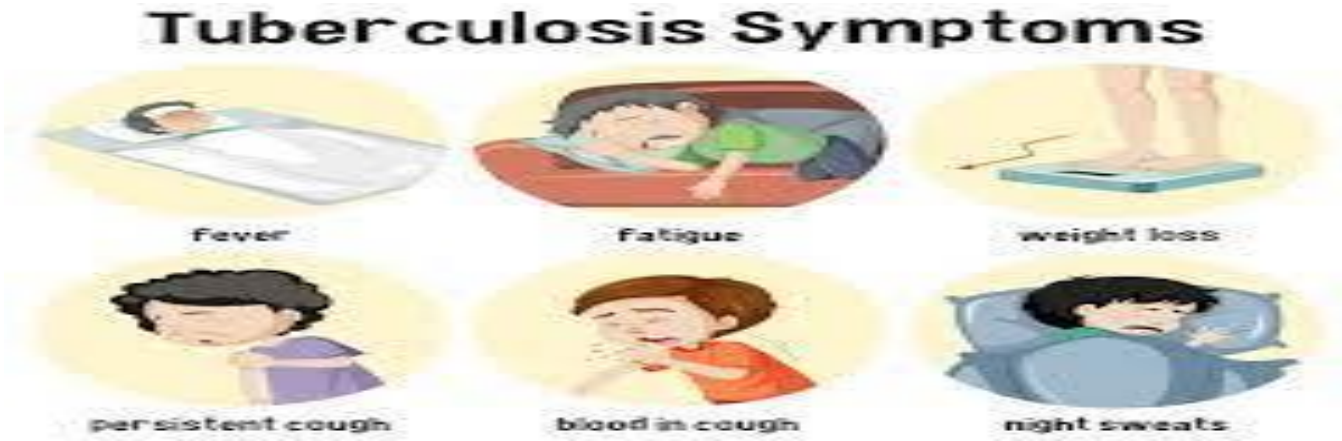
- **Is at high risk of serious complications** because of a pre-existing comorbid condition, such as heart, lung, kidney, liver or neuromuscular disease or immunosuppression

- **Is older or frail** with one or more of the following:

  - Hospital admission in the previous year
  - Type 1 or type 2 diabetes mellitus
  - Known congestive heart failure
  - Use of oral corticosteroids

- In heart failure and mitral stenosis, sputum is sometimes described as pink and frothy or it can be bright red. Confirming symptoms would be breathlessness (especially in bed during the night) and swollen ankles.

- ***Tuberculosis***

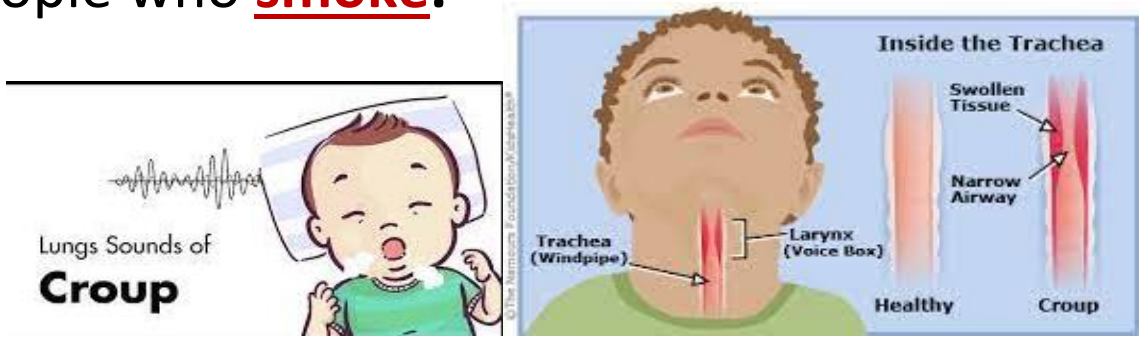


The number of tuberculosis (TB) cases has slowly declined after a rise in 2000 and 2010, but there is increasing concern about resistant strains. **Chronic productive cough** associated with **breathlessness** and **haemoptysis** are classical symptoms. There may also be **weight loss**, **chronic fever** and **night sweats**.

- ***Prolonged cough and lung cancer***

Current advice is that if a cough **lasts more than 3 weeks**, the patient should be assessed by a clinician to consider the possibility of other lung diseases, particularly **cancer**. This is especially important for people who **smoke**.

- ***Croup (acute laryngotracheitis)***



- Croup usually occurs in **infants**. The cough has a harsh barking quality. It develops within a day or so after the onset of cold-like symptoms. It is often associated with difficulty in breathing and an inspiratory stridor (noise in the throat on breathing in). Referral is usually necessary, particularly if the child has breathing problems or is so distressed that it affects eating, drinking or play.

- **Whooping cough (pertussis)**

- It starts with symptoms similar to viral respiratory infections. The characteristic whoop is not present in the early stages of infection. The whoop is the sound produced when breathing in after a paroxysm of coughing. The bouts of coughing prevent normal breathing and the whoop represents the desperate attempt to get a breath. If suspected, referral is necessary.

Previous history

- **COPD** (‘chronic bronchitis’ or emphysema) Questioning may reveal a history of COPD.

- ***Asthma***

- A recurrent night-time cough can indicate asthma, especially in children, and such patients should be referred.

- ***Cardiovascular***

- Coughing can be a symptom of heart failure. If there is a history of heart disease, especially with a persisting cough, then referral is advisable.

➢ *Gastro-oesophageal reflux*

- Gastro-oesophageal reflux can cause coughing. Sometimes, reflux is asymptomatic apart from coughing. Some patients are aware of acid coming up into their throat at night when they are in bed. It may also be indicated by cough that is worse during or after eating, as well as with talking and bending.

➢ *Smoking habit*

- Smoking will exacerbate a cough and can cause coughing since it is irritating to the lungs. **One in three long-term smokers develops a chronic cough** that is usually worse in the **morning**. If coughing is recurrent and persistent, offer health education advice about the benefits of quitting smoking, including suggesting nicotine replacement therapy when appropriate.

➢ *Angiotensin-converting enzyme inhibitors*

- Chronic coughing may occur in people taking angiotensin-converting enzyme (ACE) inhibitors, such as ***enalapril, perindopril, lisinopril*** and ***ramipril***. Cough may start within days of starting treatment or after a few weeks or even months, and is estimated to affect from **2** to **10%** of patients.
- ACE inhibitors cause bradykinin to accumulate in the lungs, which can trigger a cough. Typically, the cough is irritating, non-productive and persistent. Any ACE inhibitor may induce coughing; therefore, there seems to be little advantage to be gained in changing from one ACE inhibitor to another.
- If cough is a problem, **angiotensin II receptor antagonists**, also known as the '**sartans**', which have properties similar to that of ACE inhibitors and do not affect bradykinin, can be used as an alternative treatment.

- **When to refer**
- Cough lasting 2–3 weeks or more and not improving
- Cough associated with significant fever, malaise or feeling of being unwell
- Distressing cough in frail, older people
- Concern about comorbidity, such as diabetes or heart disease
- Sputum (purulent sputum in COPD), rusty or bloodstained
- Haemoptysis – blood in sputum, coughing blood
- Chest pain
- Shortness of breath
- Wheezing
- Whooping cough or croup
- Recurrent nocturnal cough
- Suspected adverse drug reaction, ACE inhibitors
- Failed medication

MANAGEMENT

Many people who visit the pharmacy for advice do so *because* they want some relief from their symptoms

The *BNF* gives the following guidance:

- ***Suppressants:*** When there is no identifiable cause of cough, suppressants may be useful. They cause sputum retention
- ***Demulcent cough preparations*** contain soothing substances, such as **syrup** or **glycerol**, and some patients believe that such preparations relieve a dry irritating cough.

- • ***Expectorants*** are claimed to promote expulsion of bronchial secretions.

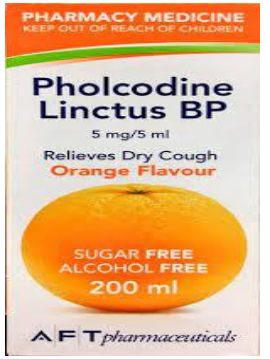
- • ***Compound preparations*** are on sale to the public for the treatment of cough and colds, but these preparations **should not** be used in children under the age of **6 years**; the rationale for some is dubious. Care should be taken to give the correct dose and to not use more than one preparation at a time.

- There is no logic in using expectorants (which promote coughing) and suppressants (which reduce coughing) together as they have opposing effects. Therefore, products that contain both properties are not therapeutically sound.

Cough suppressants

- **1- Pholcodine/codeine**

- ***Pholcodine*** has several advantages over *codeine*. *Pholcodine* produces **fewer side effects** and is **less liable to be misused**. Both *pholcodine* and *codeine* can induce drowsiness, although in practice this does not appear to be a problem.



- ***Pholcodine*** should not be given to those under the age of **6 years**.

- It is also not generally recommended for older children, although

a dose of **5 mg** can be given to children over 6 years of age

- **Adults** may take doses of up to 15 mg three or four times daily. The drug has a long half-life and may be more appropriately given as a twice-daily dose.

- ***Codeine*** is well known as a drug of **misuse** and **dependence**, and many pharmacists choose not to recommend it.
- *codeine*-containing cough suppressants should **not** be used for children under 12 years and for children of any age known to be ultra-rapid metabolisers.
- *Codeine* can cause constipation (even at OTC doses) and respiratory depression (at high doses).

- **2-Dextromethorphan**
- ***Dextromethorphan*** is **less potent** than *pholcodine* and *codeine*. It is generally non-sedating and has few side effects. Occasionally, drowsiness has been reported but, as for *pholcodine*, this does not seem to be a problem in practice.
- *Dextromethorphan* is generally **not** recommended for children, although it can be given to children of age **12 years** and **over** .
- ***Dextromethorphan*** was generally thought to have a low potential for misuse. However, there have been rare reports of mania following misuse and consumption of very large quantities, and pharmacists should be aware of this possibility if regular purchases are made.

Demulcents

- Preparations such as ***glycerine***, ***lemon*** and ***honey*** or ***simple linctus*** are popular remedies and are useful for their ***soothing effect***. These preparations do not contain any active ingredient and are considered to be safe in children and pregnant women. They are now the favoured treatment for children under the age of 6 years.

Expectorants

- Two mechanisms have been proposed for expectorants. They may act **directly** by stimulating bronchial mucus secretion, leading to increased liquefying of sputum, making it easier to cough up. Alternatively, they may act **indirectly** via irritation of the gastrointestinal tract, which has a subsequent action on the respiratory system, resulting in increased mucus secretion.

Guaifenesin

- *Guaifenesin* is commonly found in cough remedies. In adults, the dose required to produce expectoration is **100–200 mg**.

Cough remedies: Other constituents

- **Antihistamines :**Examples used in OTC products include ***diphenhydramine*** and ***promethazine***. Theoretically, these drugs reduce the frequency of coughing and have a drying effect on secretions, but in practice they also induce drowsiness.

- Combinations of antihistamines with expectorants are **illogical** and best avoided.

- A combination of an **antihistamine** and a **cough suppressant** may be useful in that antihistamines can help to dry up secretions through their antimuscarinic side effects; therefore, this combination can be given as a night-time dose if the cough is disturbing sleep. *This is one of the rare occasions when a side effect may prove useful*.

Sympathomimetics

- ***Pseudoephedrine*** is used in cough and cold remedies for its **bronchodilator** and **decongestant** actions. It has a stimulant effect that may theoretically lead to a sleepless night if taken close to bedtime.

- ***Pseudoephedrine*** may be useful if the patient has a blocked nose, as well as a cough, and an **expectorant/decongestant combination** can be useful in **productive coughs**. Sympathomimetics can cause raised blood pressure, stimulation of the heart and alterations in diabetic control.

- Oral sympathomimetics should be used with caution, or avoided, in patients with the following:

- **Diabetes** • **Coronary heart disease** (e.g. **angina**) • **Hypertension** • **Hyperthyroidism**

- ***Interactions*** – *Avoid in those taking:*

- MAOIs (e.g. *phenelzine*)

- Reversible inhibitors of monoamine oxidase A (e.g. *moclobemide*)

- Beta blockers

- Tricyclic antidepressants

Theophylline

- ***Theophylline*** is sometimes included in cough remedies for its **bronchodilator effect**.
- The action of *theophylline* can be **potentiated** by some drugs, e.g. ***cimetidine*** and ***erythromycin***.
- Levels of *theophylline* in the blood are reduced by **smoking** and drugs such as ***carbamazepine***, ***phenytoin*** and ***rifampicin*** that induce liver enzymes, so the metabolism of *theophylline* is increased and lower serum levels result.
- Side effects include **gastrointestinal irritation**, **nausea**, **palpitations**, **insomnia** and **headaches**. The adult dose is typically **120 mg**, **three** or **four** times daily. It is not recommended in children.

Steam inhalations

- The steam helps to liquefy lung secretions and patients find the warm moist air comforting. While there is no evidence that the addition of medications to water produces a better clinical effect than steam alone, some may prefer to add a preparation such as ***menthol*** and ***eucalyptus*** or **a proprietary inhalant**.
- A cloth or towel can be put over the head to trap the steam. This method should not be used in young children **because** of the risk of scalding; sitting in the bathroom with a running hot shower is a safer option.

Fluid intake

- Maintaining a good fluid intake helps **maintain hydration**, and *hot drinks* can have a *soothing effect*.
- For children, a warm drink of honey and lemon can also be soothing.