

OTC therapies

# Respiratory System

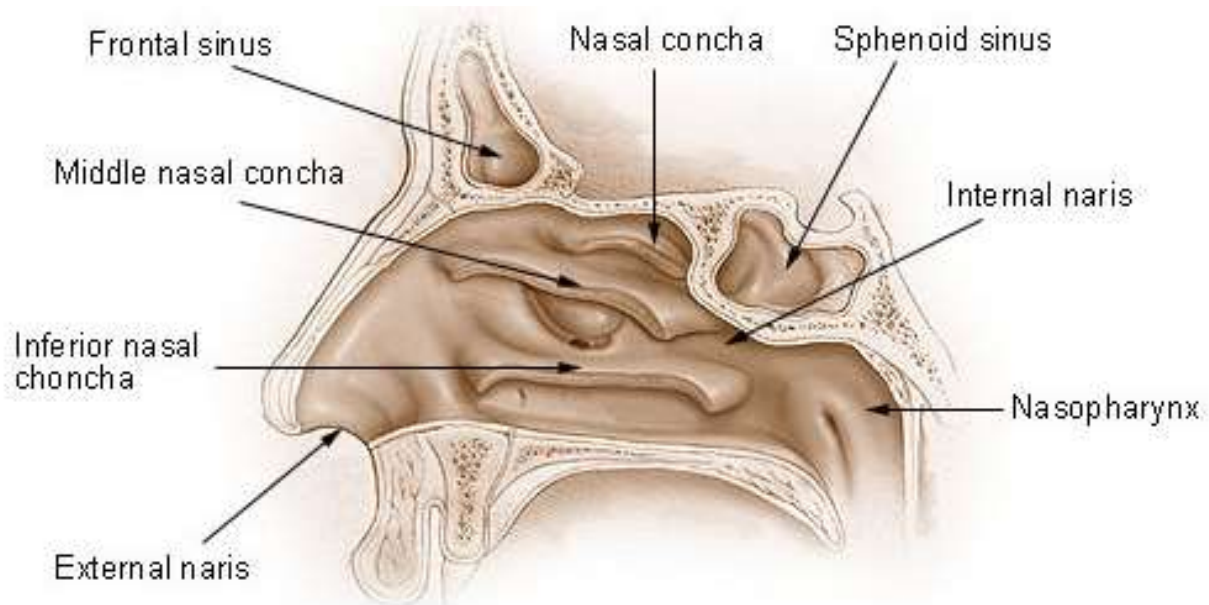
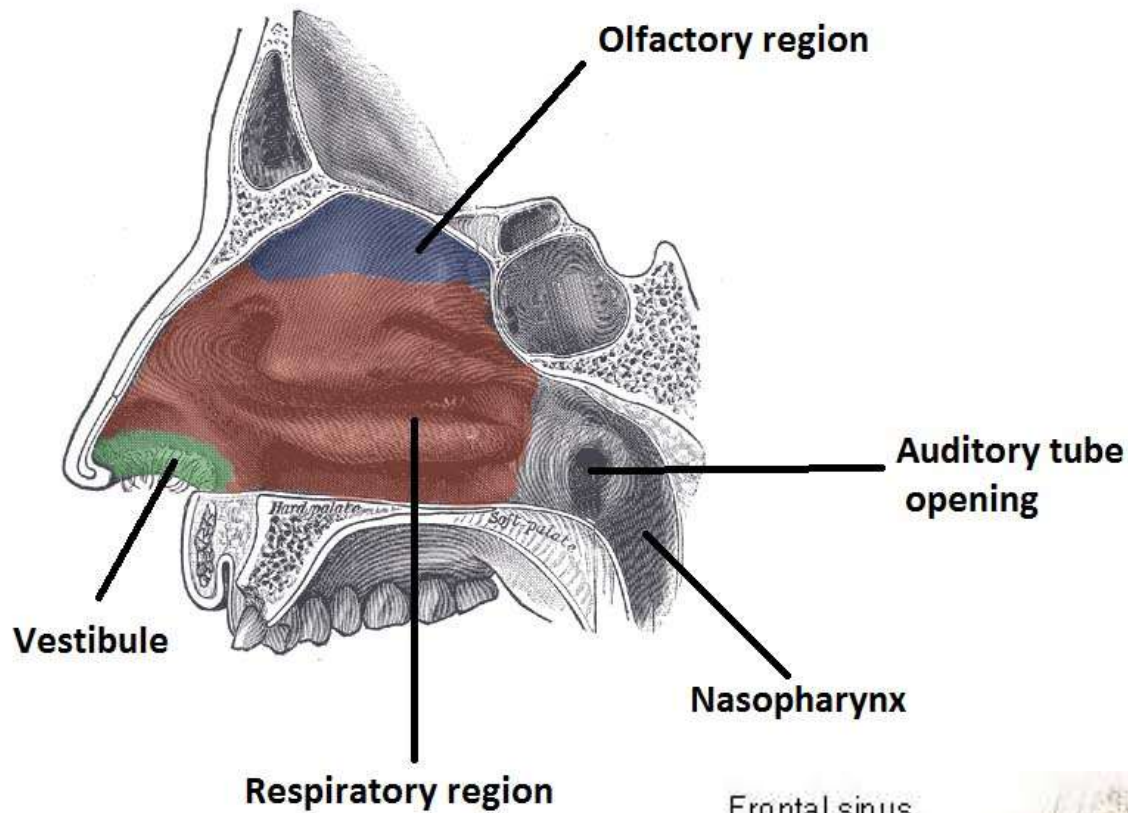
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# Background

- The average GP sees  $\approx 700 \sim 1000$  patients/yr
- Although respiratory disease can cause significant morbidity and mortality, the vast majority are minor and self-limiting

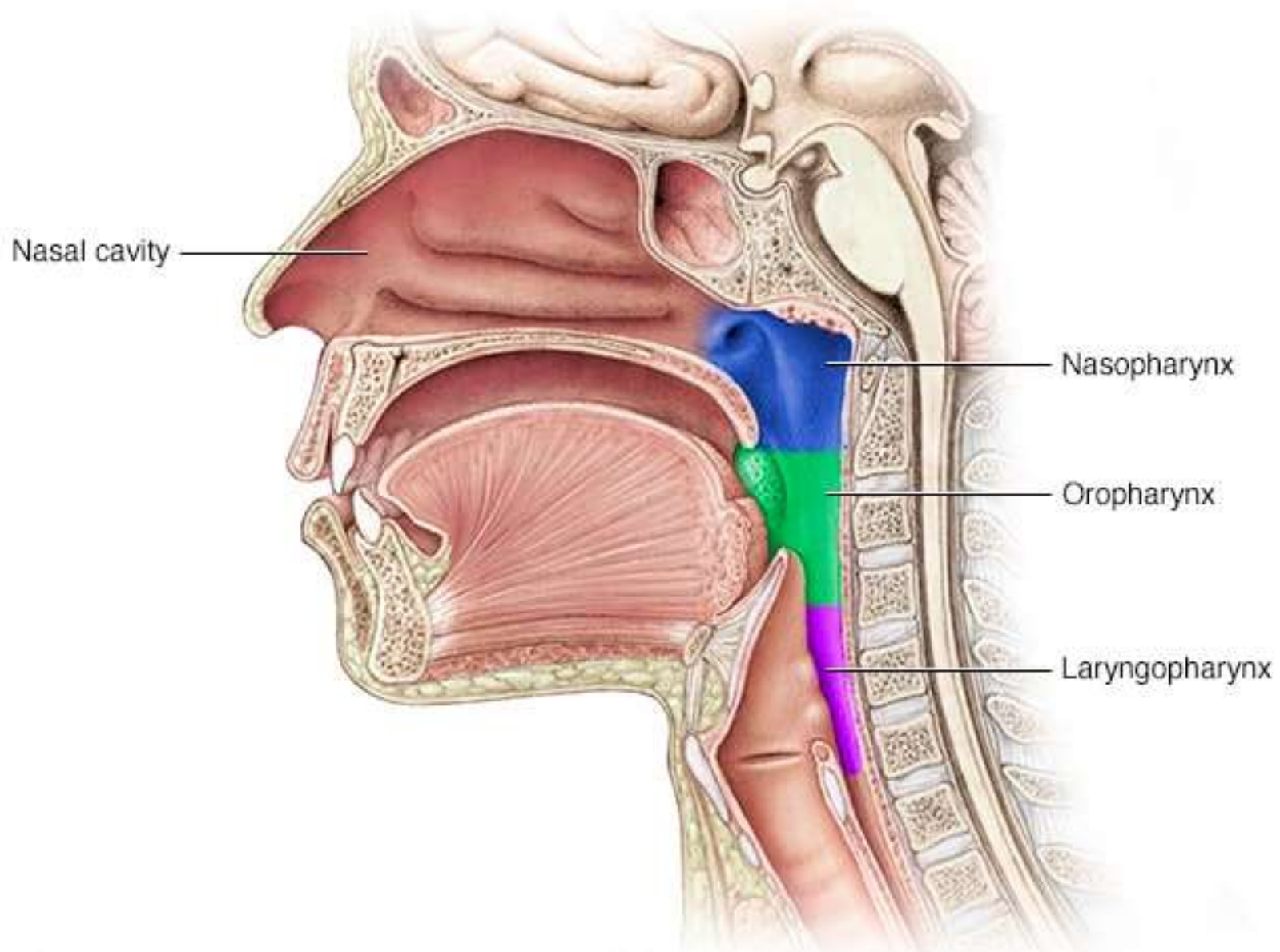
# Anatomy

- To supply O<sub>2</sub> and eliminate CO<sub>2</sub>
- Upper respiratory tract: structures located outside the thorax → the nasal cavity, pharynx and larynx
- Nasal cavity: a hollow structure that is separated by the septum with a rich blood supply → nose trauma → nosebleed
- The cavity: a larger respiratory region and a smaller olfactory region
- The cavity is connected to the pharynx through two openings (internal nares)
- The respiratory region is lined with cilia → filters large particles
- Capillaries warm the inhaled air
- Mucus secreted from goblet cells moisten the air



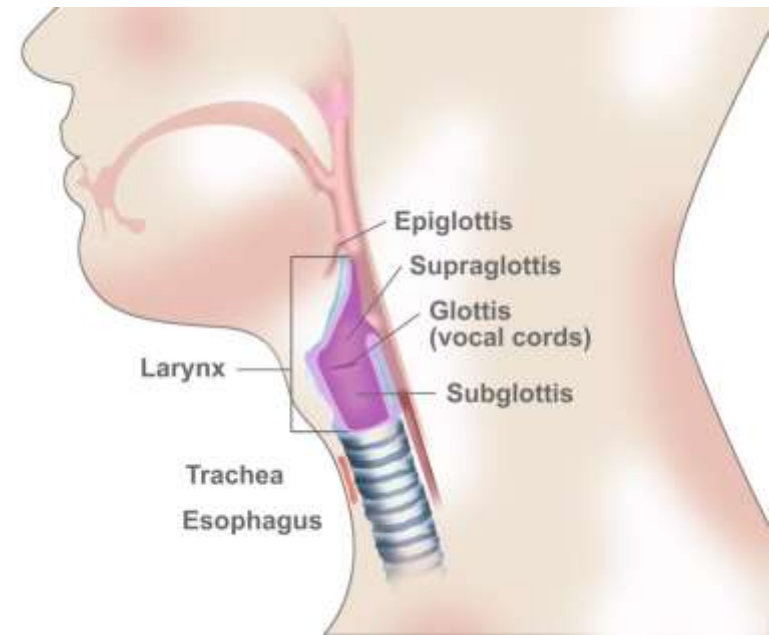
# Anatomy

- Pharynx: a tubelike structure,  $\approx 12$  cm
- a common pathway for the respiratory and digestive tracts
- 3 anatomical divisions: nasopharynx, oropharynx and laryngopharynx
- Lined with a ciliated mucous membrane → removal of dust particles
- It affects speech production by changing shape to allow vowel sounds to be formed



# Anatomy

- Larynx: a short passageway that connects the pharynx with the trachea; voice box
- It protects the airway against the entrance of liquids and foods during swallowing via the glottis and epiglottis

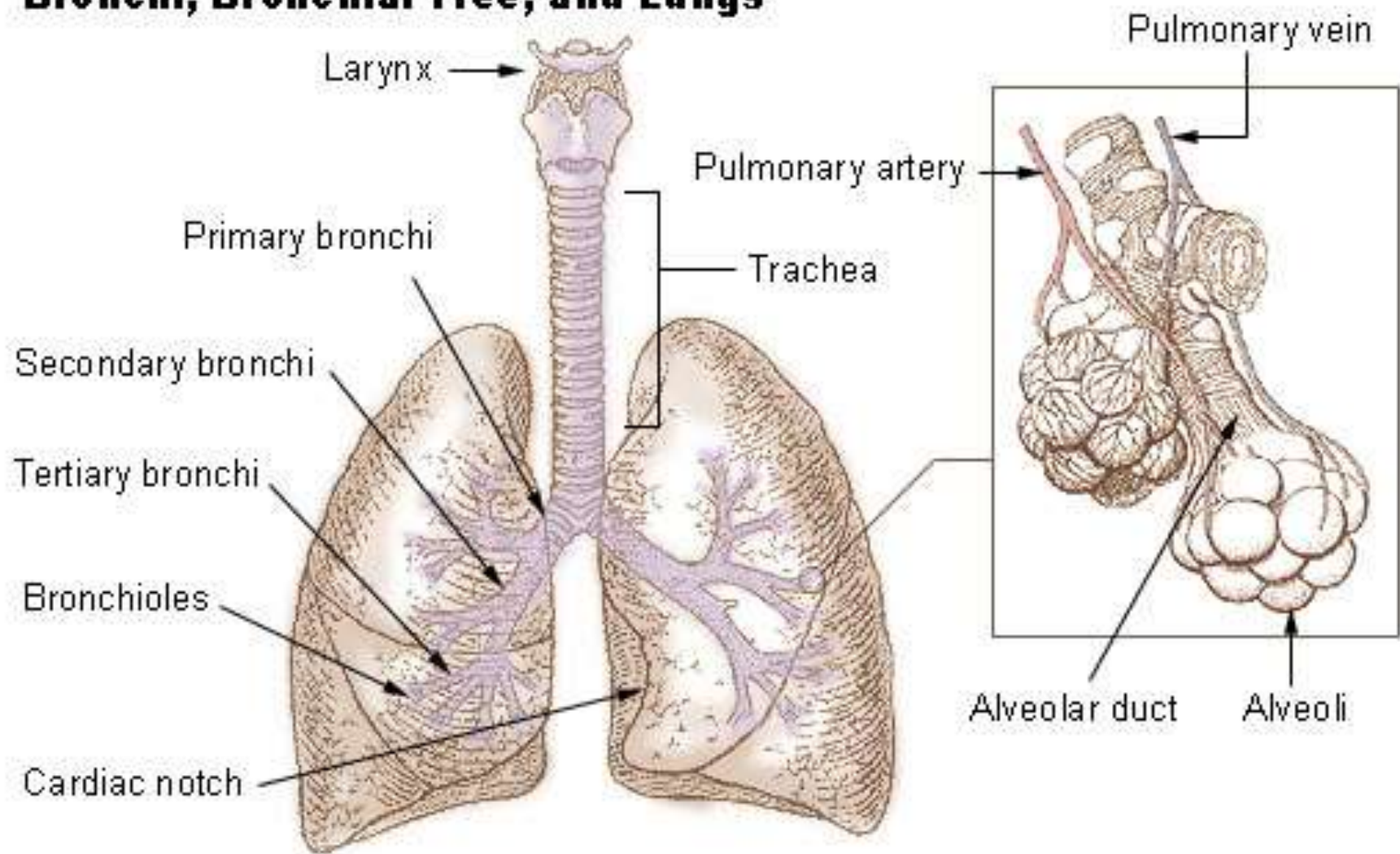


# Anatomy

- Lower respiratory tract: trachea, bronchial tree and lungs
- The trachea: 11-cm tube, lies in front of the oesophagus, from the larynx to T5 vertebra → it divides into the right and left primary bronchi
- The bronchi divide and subdivide into bronchioles → bronchial tree
- Terminal bronchioles → alveolar ducts and sacs → alveoli (gas exchange)
- The epithelial lining of the bronchial tree acts as a defence mechanism (mucociliary escalator)
- Cilia beat upwards in organized waves of contraction → expelling foreign bodies



## Bronchi, Bronchial Tree, and Lungs



# Anatomy

- The left lung has two lobes and the right lung three lobes
- Surround the lungs are the pleural membranes; the inner membrane covers the lungs, and the outer membrane is attached to the thoracic cavity
- Between the membranes is the pleural cavity, which contains fluid and prevents friction between the membranes
- Pleural inflammation → painful respiration

**COUGH**

# Background

- A defence mechanism to clear the airways of foreign bodies and particulate matter
- The most common respiratory symptom
- It can be very debilitating and can also be disruptive to others
- Productive or nonproductive
- Many patients will say that they are not producing sputum, although they may say that they 'can feel it on their chest' → productive
- Cough is usually self-limiting and will resolve in 3~4 weeks without the need for antibiotics
- Classification:
  - Acute: <3 weeks
  - Subacute: 3~8 weeks
  - Chronic: >8 weeks
- Patients who present with cough, other than acute cough (not being systemically unwell) → refer

# Prevalence and epidemiology

- Respiratory illness accounts for more patient visits than any other disease
- Acute cough constitutes 20% of consultations → the largest single cause of primary care consultation
- Community pharmacy: 2000 visits per UK pharmacy/yr
- School-children experience the greatest number of coughs, with an estimated 7~10 episodes /yr
- Adults: 2~5 episodes /yr
- Acute viral URTIs exhibit seasonality (winter)

# Etiology

- 90% of URTIs are caused by viruses (respiratory syncytial virus, rhinovirus, influenza)
- 10% involve bacteria (*S.pneumoniae*, *H.influenzae*, *S.aureus*, *Klebsiella pneumoniae*) although these infections often have a viral element
- A five-part cough reflex:
  1. Receptors in the pharynx, larynx, trachea and bifurcations are stimulated (mechanical, irritant or thermal)
  2. Neural impulses are carried with the vagal and superior laryngeal nerves, which terminate at the cough centre (medulla)
  3. Efferent fibres of the vagus and spinal nerves carry impulses to the muscles of the diaphragm, chest wall and abdomen
  4. These muscles contract
  5. Followed by the sudden opening of the glottis

# Differential diagnosis

- The most likely cause → viral infection
- Recurrent viral bronchitis is most prevalent in preschool and young school-aged children, and is the most common cause of persistent cough in children

Causes of cough	
Most likely	Viral infection
Likely	Upper airways cough syndrome (formerly postnasal drip; includes allergies), acute bronchitis
Unlikely	Croup, chronic bronchitis, COPD, asthma, pneumonia, ACE-I
Very unlikely	HF, bronchiectasis, TB, cancer, pneumothorax, lung abscess, nocardiosis, GERD, psychogenic cough



Specific questions	
Sputum color	Mucoid (clear and white) → little consequence, no infection; yellow, green or brown →infection; mucopurulent is caused by a viral infection → no referral Haemoptysis can be rust coloured (pneumonia), pink tinged (LV failure), or dark red (carcinoma); bright red blood as a single event are due to the force of coughing, causing a blood vessel to rupture→ no referral required
Sputum nature	Thin and foamy suggests LV failure; thick, mucoid to yellow, can suggest asthma. Offensive foul-smelling sputum suggests bronchiectasis or lung abscess.
Onset	Cough worse in the morning → upper airways cough syndrome, bronchiectasis or chronic bronchitis.
Duration	Acute cough can sometimes take $\geq 4$ wk to resolve. However, coughs $>3$ weeks should be viewed with caution – the longer the more serious pathology. ex., the likely Dx at 3d will be URTI; at 3wk acute, or chronic bronchitis; and at 3mo chronic bronchitis, GERD, and carcinoma.
Periodicity	Adult recurrent cough → chronic bronchitis, especially if they smoke. Caution in children with recurrent cough and a family Hx. of eczema, asthma or hay fever→ asthma? → referral
Age	Children will most likely be suffering from a URTI but asthma and croup should be considered; with increasing age, conditions such as bronchitis, pneumonia and carcinoma become more prevalent.
Smoking	Patients who smoke are more prone to chronic and recurrent cough. Over time, this might develop into chronic bronchitis COPD

# Clinical features of acute viral cough

- Viral coughs → sudden onset and fever, sputum production is minimal, symptoms are often worse in the evening
- Associated cold symptoms are often present
- They last 7~10d
- Duration >14d suggest post-viral cough or possible bacterial secondary infection → clinically difficult to distinguish without sputum analysis
- A common misconception is that mucopurulent sputum is bacterial and requires referral



▲ Serosa/frothy/pink  
Pulmonary oedema



▲ Mucopurulent  
Bronchial or pneumoniaic  
infection



▲ Purulent  
Bronchial or pneumoniaic  
infection



▲ Blood-stained  
Cancer, tuberculosis,  
bronchiectasis,  
pulmonary embolism

# Differential Dx: Likely causes

- **Upper airways cough syndrome** (postnasal drip or rhinosinusitis)
- Characterized by a sinus or nasal discharge that flows behind the nose and into the throat, experienced as abnormal sensations arising from the throat (described as something stuck in the throat)
- ⇒ Ask whether they are swallowing mucus or notice that they are clearing their throat more than usual
- Allergies are one cause of UACS → often nonproductive and worse at night+ other symptoms (sneezing, nasal discharge or blockage, conjunctivitis, itchy oral cavity)
- Other causes: vasomotor rhinitis and post-infectious
- If UACS is present, it is better to direct treatment at the cause (e.g., antihistamines) rather than just treat the cough

# Differential Dx: Likely causes

- **Acute bronchitis**
- Most cases are seen in autumn or winter
- Symptoms are similar to those of viral URTI, + dyspnea and wheeze
- Lasts 7~10d but can persist for 3 weeks
- The cause is normally viral (sometimes bacterial)
- Symptoms will resolve without antibiotic treatment
- If the person is systemically unwell→ refer

# Differential Dx: Unlikely causes

- **Laryngotracheobronchitis (croup)**
- Parainfluenza virus (75% of cases), rhinovirus, respiratory syncytial virus
- It affects infants 3mo~6yr, 2~6% of children; highest between 1~2yr, slightly more in boys
- More common in the autumn and winter
- Symptoms occur in the late evening and night improve during the day and often recur again the following night
- The cough can be severe and violent, described as barking (seal-like), between coughing episodes, the child may be breathless and struggle to breathe properly
- Symptoms resolve in 48h
- Warm moist air → no evidence
- Management is based on severity
- If symptoms >48h, or exhibit stridor or distress → refer
- Standard treatment for children with stridor would be oral or IM dexamethasone or nebulized budesonide

# Differential Dx: Unlikely causes

- **COPD**
- Destruction of lung tissue
- Chronic bronchitis (CB), emphysema
- Treatable although not curable
- Prevalence increases with age and is more common in men
- Symptoms: chronic cough, sputum production, breathlessness on exertion, wheezing and recurrent chest infections
- Diagnosis by spirometry
- Acute exacerbations: a reduction in activities and more pronounced breathlessness → refer for potential antibiotics and steroid therapy
- Hx of smoking is the single most important risk factor → early intervention by pharmacist to stop smoking could help prevent deterioration
- In nonsmokers, the likely cause of CB is UACS, asthma or GERD

# Differential Dx: Unlikely causes

- **Asthma**
- Adult prevalence 4~10%; higher in children (10%–15%)
- A chronic inflammatory condition of the airways characterized by coughing, wheezing, chest tightness, and shortness of breath
- Symptoms tend to be variable, intermittent, worse at night, and provoked by triggers (e.g., allergens, infections, irritant exposure)
- Possible risk factor: a family or personal Hx of atopy
- It can present as a nonproductive cough (or minimally productive) especially in young children, in whom the cough is often worst at night and recurrent

# Differential Dx: Unlikely causes

- **Pneumonia** (community-acquired)
- 0.5~1% of adults annually
- Bacterial (*S. pneumoniae* 80% of cases, Chlamydia, Mycoplasma)
- Initially, the cough is nonproductive and painful (first 24–48h), but it rapidly becomes productive with red sputum
- The redness varies depending on the organism
- The cough is worst at night
- Unwell patient with high fever ( $>38^{\circ}\text{C}$ ), malaise, headache, SOB, pleuritic pain
- Older patients are often afebrile and may present with confusion
- Most cases occur during the autumn and winter
- Urgent referral is required → ASAP antibiotics



# Differential Dx: Unlikely causes

- **Medicine-induced**
- A number of medicines may cause bronchoconstriction  
→ coughing or wheezing
- ACE-Is are most common, 16%; it is not dose-related, and time to onset is variable, ranging from a few hours to >1yr
- Cough invariably ceases after withdrawal of the ACE-I takes 3~4 wk to resolve
- Other medications: NSAIDs and beta blockers
- If an ADR is suspected, the pharmacist should discuss an alternative medicine with the prescriber

# Differential Dx: Very unlikely causes

- **Heart failure**
- A condition of older adults; The prevalence rises with increasing age; rare <65yr
- One in seven people >85yr
- Characterized by an insidious progression; diagnosing early mild HF is extremely difficult because symptoms are not pronounced and are nonspecific
- The first symptoms are fatigue, SOB, orthopnea and dyspnea at night
- Moderate to severe → ankle swelling, productive foamy cough, pink-tinged sputum and may worsen at night

# Differential Dx: Very unlikely causes

- **Bronchiectasis**
- Irreversible dilation of the bronchi, often due to a previous lower respiratory tract infection
- Under-diagnosed because some sufferers are often thought to have COPD
- More common in women; prevalence increases with age
- Chronic cough of very long duration
- >75% of patients will cough daily with sputum production
- Breathlessness is very common
- $\frac{1}{3}$  will suffer from wheezing and chest pain

# Differential Dx: Very unlikely causes

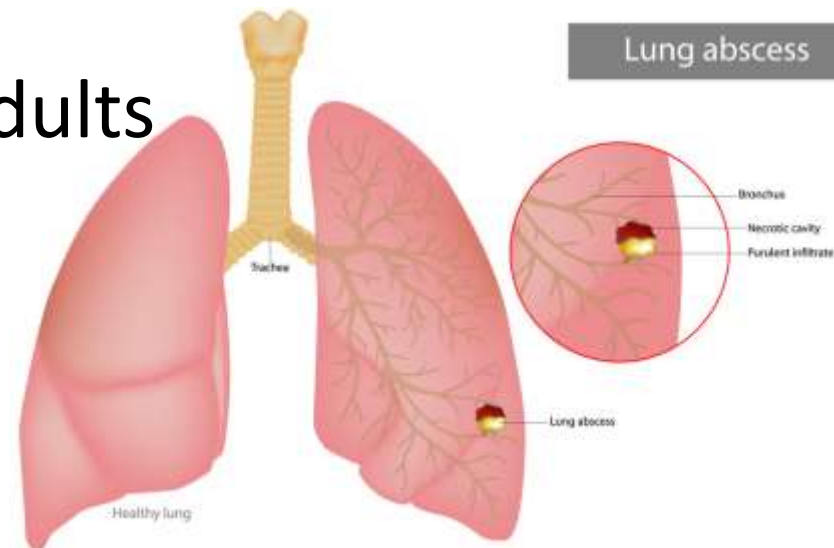
- **Tuberculosis**
- *Mycobacterium tuberculosis*, transmitted primarily by inhalation
- TB still remains concentrated in the most deprived populations
- Slow onset and initial mild symptoms
- It should be considered in those at high risk with symptoms of fever, weight loss, night sweats, anorexia, malaise
- Cough is chronic in nature, and sputum production can vary from mild to severe, + hemoptysis (a late presentation)
- Productive cough >3wk + one or more of the associated symptoms → refer

# Differential Dx: Very unlikely causes

- **Carcinoma of the lung**
- Lung cancer is the third most common cancer
- Strongly related to increasing age (>40 to 45 years)
- Multiple symptoms: cough (47~86% of patients), fatigue, SOB, chest pain, weight loss, ↓appetite
- If >40yr +two or more of these symptoms → refer
- Small amounts of sputum that might be blood-streaked
- The possibility increases in long-term cigarette smokers who have had a cough for a number of months or who have developed a marked change in the character of their cough

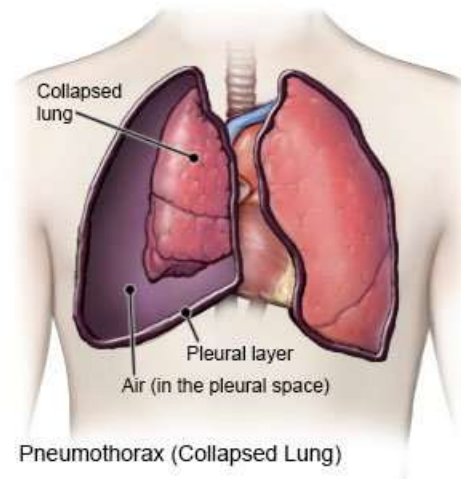
# Differential Dx: Very unlikely causes

- **Lung abscess**
- Nonproductive cough, pleuritic pain, dyspnea, signs of infection (malaise and fever)
- Later→ large amounts of purulent and often foul-smelling sputum
- More common in older adults



# Differential Dx: Very unlikely causes

- **Spontaneous pneumothorax**
- Rupture of the bullae → spontaneous pneumothorax, no underlying cause
- 1~2 people in every 10,000
- Most common in young men
- Smoking is the most important risk factor
- 10% of patients have a family Hx
- Symptoms: sharp unilateral pleuritic pain + SOB
- Distress
- A life-threatening disorder → immediate referral to hospital



# Differential Dx: Very unlikely causes

- **GERD**
- It does not usually present with cough, but patients with this condition might cough when lying down
- $\pm$  Heartburn
- Patients have increased cough reflex sensitivity and respond well to PPIs
- It should always be considered in all cases of unexplained cough



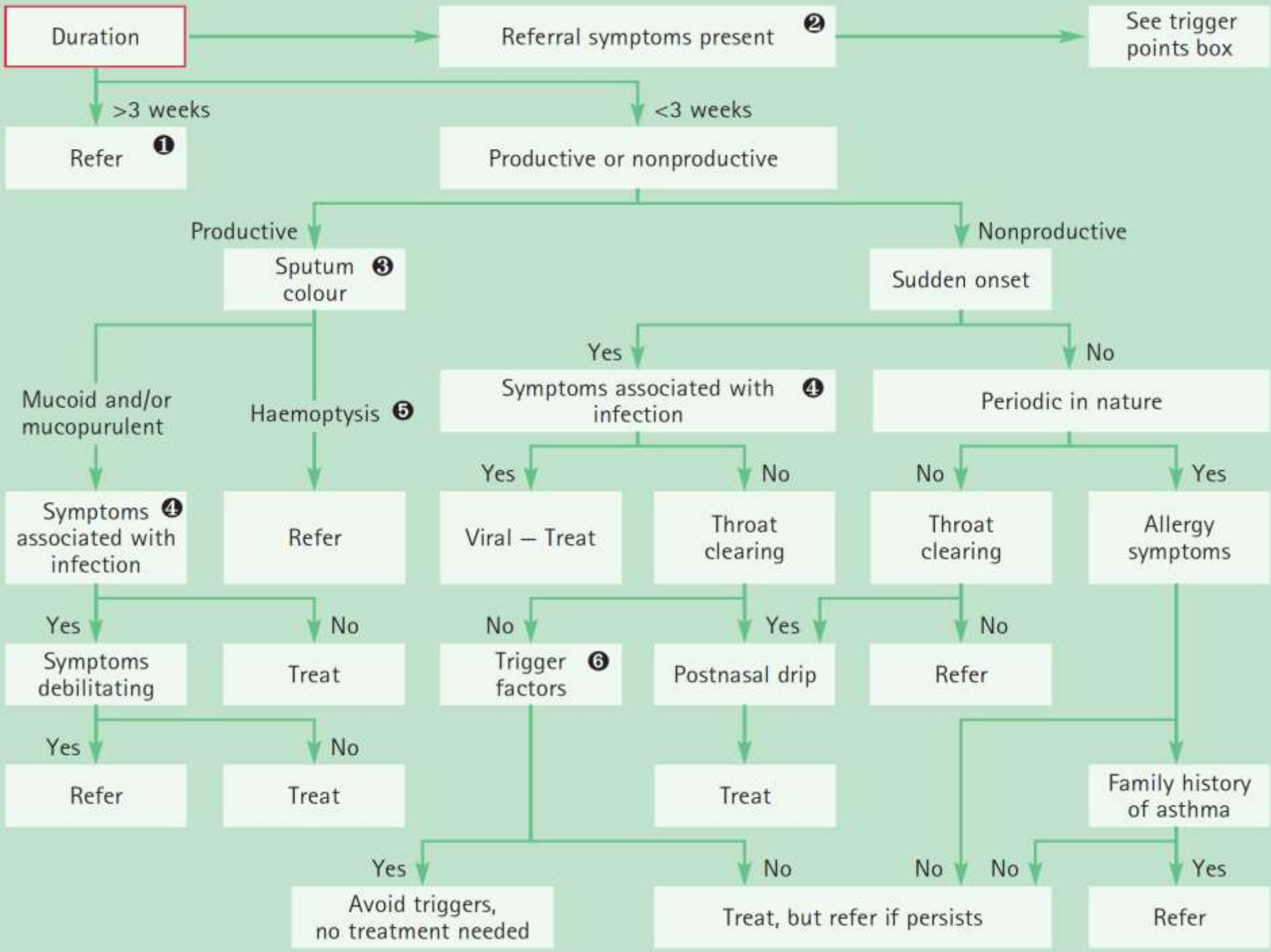
# Differential Dx: Very unlikely causes

- **Nocardiosis**

- Nocardiosis is an extremely rare bacterial infection
- Transmitted primarily by inhalation
- Higher incidence in older adults, especially in men
- The sputum is purulent, thick and possibly blood-tinged
- Fever, night sweats, pleurisy, weight loss

- **Psychogenic cough**

- If no organic cause can be found→ psychogenic cough
- Cough is absent at night
- In children, it is associated with attention seeking, and in adults it is linked to anxiety disorders



Indicative of referral		
Chest pain Haemoptysis Pain on inspiration Wheezing and/ or SOB	All symptoms suggest possible sinister pathology or severe cases of simple viral Infection	Urgent same day referral. Depending on severity, may mean referring to hospital rather than GP
Duration >3 weeks Cough that recurs on a regular basis	Suggests non-acute cause of cough and requires further investigation	As soon as practicable
Debilitating symptoms in older adults	This patient group at greater risk of complications	Urgent same day referral
Persistent nocturnal cough in children	Suggests possible asthma	As soon as practicable

# Evidence base

- Antitussives have been evaluated in animal studies or cough-induced models on healthy volunteers
- No comparative studies of sound study design
- $\Rightarrow$  Antitussives have a limited role in acute non-productive cough
- Patients should not be routinely prescribed antitussives  $\rightarrow$  drink more fluids and told that their symptoms will resolve in time
- Dextromethorphan is the only agent with any evidence of effectiveness
- The use of codeine or antihistamines seems difficult to justify

# Combination cough mixtures

- Other ingredients that target other symptoms
- Some combination products contain sub-therapeutic doses of the active ingredients
- Illogical combinations: cough suppressants + expectorant → avoid

# Medications for children

- Cochrane review: there was no good evidence to support the effectiveness of cough medicines in acute cough
- Simple measures of keeping well hydrated and the use of demulcents are more appropriate

# Herbal products

- *Pelargonium sidoides* (geranium), *echinacea*, *Andrographis paniculata* (green chiretta), ivy, primrose and thyme
- Review: very low-quality evidence for ivy, primrose or thyme in acute cough

# Demulcents

- Simple linctus and honey → inert, they reduce irritation by coating the pharynx and thus prevent coughing
- Mainly for their placebo effect
- Cochrane review: honey in acute cough in children, N=899, moderate- to low-quality evidence, more effective than no treatment or placebo
- A safe alternative for at-risk patient (elderly, pregnant women, young children, polypharmacy)
- TDS-QID



# Guaifenesin

- Stimulates secretion of respiratory tract fluid, increasing sputum volume and decreasing viscosity→ removal of sputum
- Systematic review: conflicting results
- RCT, N =239, participants stated that guaifenesin significantly reduced cough frequency and intensity vs. placebo
- RCT, N=65, guaifenesin was found to have no effect on cough frequency or severity vs. placebo
- RCT: ER guaifenesin vs. placebo (N=378), no difference in spontaneous symptom severity scores on day 7, but a reduction from baseline in scores on day 4 (7.1 vs 5.7; P=.04)

# Guaifenesin

- Adults and children >12yr: 200 mg QID
- Children: 100 mg QID
- No precautions, no side effects; no clinically significant interactions



# Ammonium salts

- Ammonium salts, ipecacuanha, were traditionally used to induce vomiting
- It was believed that at subemetic doses, they would cause gastric irritation, triggering reflex expectoration; but this has never been proven and belongs in the annals of folklore



# Codeine



- Animal models, and cough-induced studies in humans → effective
- But less reproducible in acute and chronic cough
- Recent studies have failed to demonstrate a significant clinical effect vs. placebo in acute cough patients
- Adults and children >18y: 5 mL TDS-QID

# Dextromethorphan

- Trial data are limited
- Cochrane review: Two studies → ↓cough counts and cough effort( 8 to 10 coughing bouts q30min); The third study found no difference with placebo
- Limited abuse potential and fewer side effects than codeine
- Age>12: 10 mL QID



# Codeine/ Dextromethorphan

- They potentiate sedation→ warn the patient
- Dextromethorphan may increase the risk of serotonin syndrome if given with MAOIs, SSRIs, tramadol
- Care in asthmatics because, in theory, cough suppressants can cause very rarely respiratory depression

# Antihistamines

- MOA: Anticholinergic drying action on the mucous membranes; not via histamine
- Citric acid-induced cough studies → significant antitussive activity vs. placebo
- Small RCTs on chronic cough: an antitussive activity for diphenhydramine
- Poor methodological design in acute cough
- Less sedating antihistamines → no benefit

# Antihistamines

- ADR is useful for sleep
- Interaction with other sedatives
- Antimuscarinic ADR: dry mouth and possibly constipation, avoid in glaucoma and BPH





Name of medicine	Use in children: Age (years)	Very common ( $\geq 1/10$ ) or common ( $\geq 1/100$ ) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy & breastfeeding
<i>Cough expectorants</i>					
Guaifenesin	>6	None	None	None	OK
<i>Cough suppressants</i>					
Codeine (best avoided)	>18	Sedation, constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Asthmatics	Pregnancy – best avoided in third trimester; short periods OK in breastfeeding; reports of dextromethorphan causing drowsiness and poor feeding in the baby
Pholcodine	>6 <sup>a</sup>	Possible sedation			
Dextromethorphan	>12 <sup>a</sup>				
<i>Antihistamines</i>					
Diphenhydramine	>6	Dry mouth, sedation, constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Glaucoma, prostate enlargement	Pregnancy – standard references state OK, although some manufacturers advise avoidance; breastfeeding OK, because amount secreted into breast milk is small but may, however, reduce milk supply; reports of poor feeding in the baby
<i>Demulcents</i>					
Simple linctus	>1 month	None	None	None	OK

HINTS AND TIPS	
Treatment for children <6 years	
	Parents should be advised to make the child drink more fluid and potentially try a non-pharmacological cough mixture, such as a demulcent
Insulin-dependent diabetics	
	People with insulin-dependent diabetes should be asked to monitor their blood glucose level more frequently because insulin requirements increase during acute infections
Avoid theophylline	
	Theophylline is available as a pharmacy-only medicine, but is best avoided because patients requiring medication to help with SOB or wheeze need further assessment

**COMMON COLD**

# Background

- Colds+ coughs→ the largest caseload for primary healthcare workers
- No specific cure; self-limiting;  $\frac{2}{3}$  recover within 1 week  $\Rightarrow$  unimportant condition

# Prevalence and epidemiology

- Extremely prevalent, a viral URTI
- Children contract more than adults, with on average 5~6 colds./yr vs. 2~4 in adults
- Children aged 4~8yr are most likely to contract a cold
- By the age of 10, the number of colds contracted is half that observed in preschool children
- Peak in winter, possibly due to increased crowding indoors during cold weather

# Etiology

- >200 virus subtypes: rhinoviruses (30~50% of all cases), coronaviruses, parainfluenza virus, respiratory syncytial virus, adenovirus
- Transmission primarily by contaminated hands, which then touch the nose, mouth and eyes (direct contact transmission)
- Droplets shed from the nose on surfaces such as door handles and telephones (viable on these surfaces for several hours)
- Transmission by coughing /sneezing (secondary mechanism) → good hygiene (washing hands, using disposable tissues) to reduce the spread

# Etiology

- Virus is exposed to the mucosa → invades the nasal and bronchial epithelia → attaching to specific receptors → damage ciliated cells → inflammatory mediators → inflammation of mucosa → ↑ permeability of capillary cell walls → edema → nasal congestion and sneezing
- Fluid might drip down the back of the throat, spreading the virus to the throat and upper chest → cough and sore throat
- Most contagious during the first 1~2d of symptoms

Specific questions to ask	
Onset of symptoms	<p>Peak incidence of flu is in the winter months; the common cold occurs any time throughout the year.</p> <p>Flu symptoms tend to have a more abrupt– a matter of hours vs. 1~2d</p> <p>Summer colds are common, but they must be differentiated from seasonal allergic rhinitis</p>
Nature of symptoms	<p>Myalgia, chills, malaise, and loss of appetite are more prominent in flu</p>
Aggravating factors	<p>Headache and pain that is worsened by sneezing, coughing and bending over suggests sinus complications.</p> <p>If ear pain is present, especially in children, middle ear involvement is likely</p>



# Clinical features

- The nature and severity of symptoms influenced by the causative agent, age and underlying medical conditions
- Incubation period of 1~3d (can be as short as 10~12h) → sore throat and sneezing, followed by profuse nasal discharge and congestion, cough and UACS
- Headache, mild to moderate fever ( $<38.9^{\circ}\text{C}$ ), general malaise
- Most resolve in 1 week, but up to 25% of people will have symptoms  $\geq 14\text{d}$

# Differential diagnosis

- Extremely likely to be a viral infection
- Most people will accurately self-diagnose a common cold → pharmacist's role to confirm this self-diagnosis and assess the severity
- If debilitating symptoms that effectively prevents normal daily routines → manage more carefully
- Severe colds can mimic symptoms of flu
- Secondary complications can occur

Causes of cold and their relative incidence in a community pharmacy	
Incidence	Cause
Most likely	Viral infection
Likely	Rhinitis, rhinosinusitis, otitis media
Unlikely	Influenza

# Differential diagnosis: Likely causes

- **Rhinitis**
- A blocked or stuffy nose, acute or chronic, common

# Differential diagnosis: Likely causes

- **Acute rhinosinusitis** (formerly sinusitis)
- Inflammation of paranasal sinuse(s) (frontal, ethmoid, maxillary, sphenoid)
- A complication of the common cold (2%)
- Sinuses are air-filled spaces that drain into the nasal cavity, following a cold, filled with secretions → secondary bacterial infection (Streptococcus, Haemophilus)
- Dx: at least two of these symptoms: blockage or congestion, discharge or UACS, facial pain or pressure, ↓smell
- The pain in the early stages is mild and localised, usually unilateral and dull → becomes bilateral and more severe
- Bending, moving the eyes from side to side, coughing, sneezing → ↑pain
- Sinuses tenderness upon palpation
- Symptoms resolve in 2~3 weeks → analgesics, PO/nasal sympathomimetics
- Antibiotics if systemically unwell, risk of complications due to underlying conditions, or symptoms >10d → penicillin V or co-amoxiclav (doxycycline or clarithromycin if penicillin allergy)

# Differential diagnosis: Likely causes

- **Acute otitis media**
- Commonly seen in children following a common cold
- Results from the virus spreading to the middle ear via the Eustachian tube → accumulation of pus in the middle ear or inflammation of the tympanic membrane
- → ear pain, but the child may rub or tug at the ear and become irritable
- Refer
- Examination reveals a bulging tympanic membrane, loss of normal landmarks, and a change in color (red or yellow)
- Rupture of the eardrum → purulent discharge and relieves the pain

# Differential diagnosis: Unlikely causes

- **Influenza**
- RNA viruses, types: A, B, and C, many different strains
- Types A and B are most virulent, type C produces mild symptoms
- Spread is the same as the common cold
- The flu season tends to occur in winter, the common cold, although more common in the winter, can occur at any time
- Sudden onset → shivering, chills, malaise, limb pain, insomnia, fatigue, non-productive cough (cough in the common cold is usually productive), ↓appetite
- Patient is much more likely to send a third party into a pharmacy
- Symptoms improve after ≈5d, with resolution after 1 week or more
- Vaccination is the most important preventive measure
- England: community pharmacies administered >1 million vaccines

Indicative of referral		
Acute sinus involvement that fails to respond to OTC decongestant therapy	Possible need for nasal steroids or Antibiotics	As soon as practicable
Middle ear pain that fails to respond to analgesia	Possible need for antibiotics	As soon as practicable
Patients with symptoms indicative of flu; vulnerable patient groups, such as the very old	Need an assessment of symptom severity by physician	Same-day referral



# Evidence base

- Evidence of efficacy for Western and alternative medicines in preventing and treating the common cold are weak
- PRN decongestants probably have the strongest evidence

# Antihistamines

- Cochrane review: antihistamines when used as monotherapy had a small effect on nasal congestion, rhinorrhoea or sneezing in older children and adults on the first 2d but did not have significant benefit after 3~4d
- In young children: no benefit

# Sympathomimetics

- Cochrane review: low quality, and insufficient data to compare PO and nasal treatment, a small but significant improvement in nasal congestion in adults
- Data were lacking in children <12yr
- systematic review: single-dose phenylephrine significantly improved nasal airway resistance at 60min vs. placebo; small difference (16% at 60min)
- Four of the eight studies: no benefit for phenylephrine
- Systematic review: insufficient evidence for the efficacy
- RCT: doses up to 40 mg q4h→ no significant difference

# Sympathomimetics

- They constrict dilated blood vessels and swollen mucosa, easing congestion and helping breathing
- Interaction with MAOIs → fatal hypertensive crisis; the danger persists ~2wk after MAOI DC
- Systemic sympathomimetics → ↑BP, unlikely with short courses, and disturb blood glucose control in diabetics
- A topical sympathomimetic to negate this potential interaction
- ADR: insomnia, restlessness, tachycardia
- Not to take HS → mild stimulant, sleep disturbance
- Should not be given to children <6yr (oral or nasal)
- 6~12yr → a maximum of 5d duration
- Max pack sizes are limited to 720 mg, one pack per person, concerns over illicit manufacture of methylamphetamine

# Sympathomimetics

- **Phenylephrine**
- 5~12 mg TDS-QID for adults and children >12yr
- Some restrict it to those >16 years
- **Pseudoephedrine**
- Adult dose is 60 mg TDS-QID; and 30 mg for children 6~12yr



# Nasal sympathomimetics

- The safest route of administration → can be given to most patient groups (pregnancy after the first trimester, preexisting heart disease, DM, HTN, hyperthyroidism)
- A degree of systemic absorption is possible, especially with drops, because a small quantity might be swallowed → avoid with MAOIs
- Topical decongestants should be used <5~7d → rhinitis medicamentosa (rebound congestion)

# Multiingredient preparations

- Many combine three or more ingredients
- In most cases, the patient will not require all the active ingredients
- $\Rightarrow$  match symptoms with active ingredients with known evidence of efficacy
- Preparations with multiple ingredients, have a very limited role
- Patients might perceive an all-in-one medicine as better value for money and, adherence might be improved
- Review: 27 RCTs, N>5000  $\rightarrow$  in adults and older children, all four combinations (antihistamine-analgesic-decongestant, analgesic-decongestant, analgesic-antihistamine, and decongestant-antihistamine) were effective, although they had an increased risk of ADR

# Anticholinergics

- Intranasal ipratropium
- Cochrane review: 4 RCTs, statistically significant improvement in the severity of rhinorrhea and two that demonstrated a significantly greater global assessment
- No studies found an improvement
- Ipratropium is effective in rhinorrhea



# Alternative therapies

- **Zinc lozenges**
- Systematic review: 13 RCTs, low to moderate quality , the results indicated differences in efficacy depending on the dose and the salt of zinc used
- No significant difference in the duration of colds at doses <75 mg/d
- >75 mg/d acetate salt → 42% reduction in the duration; 20% reduction in duration with non-acetate salts ⇒ 1~3d ↓duration

# Alternative therapies

- **Vitamin C**
- Cochrane review: vitamin C at doses  $>200$  mg/d in preventing and treating the common cold, 29 RCTs,  $N=11,306 \Rightarrow$  prophylaxis had no effect on the incidence in the general community and only a small effect (8% reduction) on the duration of the cold
- 50% reduction in the incidence in people undergoing high physical stress (marathon runners, skiers, and soldiers on subarctic exercises) with the prophylactic use



# Alternative therapies

- **Echinacea**
- Several reviews have reported echinacea's effect as being inconsistent
- Cochrane review: 24 RCTs, N=4631, evidence was weak in preventing and treating colds



# Vapour inhalation

- Review: 6 RCTs, N=387, adults, conflicting evidence in symptom relief of the common cold
- Cheap and does not carry any significant risks, apart from minor discomfort and irritation of the nose
- Steam is the key and not any additional ingredient that is added

# Saline sprays

- Cochrane review: 5 RCTs, N=205 adults and 544 children, no difference
- One study involving children demonstrate statistically significant reductions in nasal secretion scores → uncertain clinical improvement
- No serious side effects, minor irritation and discomfort
- ≈40% of babies not tolerating saline nasal drops



# Garlic

- Cochrane review: N=146, 180 mg/d allicin for 12 weeks, self-report  $\Rightarrow$  garlic may prevent occurrences of the common cold



Name of medication	Use in children (age, years)	Very common ( $\geq 1/10$ ) or common ( $\geq 1/100$ ) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy & breastfeeding
<i>Antihistamines</i>					
Diphenhydramine	>6	Dry mouth, sedation, constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics, antidepressants	Glaucoma, prostate enlargement	Pregnancy – standard references state OK, although some manufacturers advise avoidance. Breastfeeding OK because amount secreted into breast milk is small. It may, however, reduce milk supply.
<i>Systemic sympathomimetics</i>					
Phenylephrine	>12	Insomnia	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis. Avoid in patients taking beta blockers and TCAs.	Control of hypertension and diabetes may be affected, but a short treatment course is unlikely to be clinically important.	Best avoided in pregnancy because mild foetal malformations have been reported. Breastfeeding OK because amount secreted into breast milk is small. It may, however, reduce milk supply.
Pseudoephedrine	>6				
<i>Topical sympathomimetics</i>					
Oxymetazoline	>12	Possible local irritation in ~5% of patients	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis.	None	Pregnancy – not adequately studied, avoid. Breastfeeding OK
Xylometazoline	>6 (Otrivine Child Nasal Drops)				

HINTS AND TIPS
Limiting viral spread
<p>Use disposable tissues rather than handkerchiefs.</p> <p>Wash hands frequently, especially after nose blowing.</p> <p>Do not share hand towels.</p> <p>Try to avoid touching your nose.</p>
Stuffy noses in babies
<p>Saline nose drops can be used from birth to help with congestion. This would be a more suitable and safer alternative than a topical sympathomimetic.</p>
General sales list of cold remedies
<p>Some products contain paracetamol. It is important to ensure that patients are not taking excessive doses of analgesia unknowingly. Also, many products contain subtherapeutic doses of sympathomimetics.</p>
Administration of nasal drops
<p>The best way to administer nose drops is to have the head in the downward position facing the floor. Tilting the head backward and towards the ceiling is incorrect because this facilitates the swallowing of the drops. However, most patients will find the latter way of putting drops into the nose much easier than the former.</p>





Wrong



Choose any position you feel  
comfortable with

**SORE THROATS**

# Background

- Respiratory mucosa of the throat can exhibit symptoms of pain → pharyngitis and tonsillitis
- Clinical distinction between pharyngitis and tonsillitis is unclear
- Pain can range from irritation to severe pain
- Often associated with the common cold

# Prevalence and epidemiology

- Extremely common
- A GP with 2000 patients will see about 120 people each year
- 4~6x will visit the pharmacy
- An adult will experience 2~3 sore throats each year

# Etiology

- Viral infection in 70~90%
- Remaining cases are nearly all bacterial; most common group A beta-haemolytic Streptococcus (*Streptococcus pyogenes*)

# Physical examination

- After questioning, the pharmacist should inspect the mouth and cervical glands
- The examination requires a good light source:
  1. Get the person seated (at eye level)
  2. Ask the patient to say 'ah' to see the posterior throat. Pay particular attention to the size of the tonsils. Are they red and swollen? Is there any exudate present? Is there any sign of ulceration?
  3. Check for the posterior wall of the throat. It should appear pink and moist, without exudate or lesions. Redness or exudate suggests pharyngitis



# Clinical features

- Acute pharyngitis: rapid onset of sore throat and pharyngeal inflammation ( $\pm$ exudate)
- It is exceedingly difficult to differentiate viral and bacterial infection on patient Hx and clinical findings
- Sore throat as an isolated symptom or as part of a cluster of symptoms (rhinorrhoea, cough, malaise, fever, headache, hoarseness (laryngitis))
- Symptoms are relatively short-lived, with 40% of people being symptom free after 3d and 85% after 1wk



Specific questions to ask	
Age of the patient	Although viruses are the most common cause of sore throat, there are epidemiological variances with age: Streptococcus is uncommon those <3yr and more prevalent in <30yr, particularly those of school age (5~10yr) and young adults (15~25yr); glandular fever is most prevalent in adolescents.
Tender cervical glands	On examination, patients suffering from glandular fever and streptococcal sore throat often have markedly swollen glands. This is less so in viral sore throat.
Tonsillar exudate present	Marked tonsillar exudate is more suggestive of a bacterial rather than a viral cause
Ulceration	Herpetiform and herpes simplex ulcers can also cause soreness in the mouth, especially in the posterior part of the mouth.

# Differential diagnosis

- Majority → acute and self limiting, whether viral or bacterial

Causes of sore throat and their relative incidence in community pharmacy	
Most likely	Viral infection
Likely	Streptococcal infection
Unlikely	Glandular fever, trauma
Very unlikely	Carcinoma, medications

# Differential diagnosis: Likely cause

- **Streptococcal sore throat**
- Pharyngeal or tonsillar exudates, swollen anterior cervical glands, nasal congestion, Hx of or current high-grade fever ( $>39.4^{\circ}\text{C}$ ), and absence of cough  $\rightarrow$  bacterial infection (Centor criteria)
- Refer if  $\geq 3$  criterion; even if all four (+)  $\rightarrow \approx 40\%$  will not have a bacterial infection
- More common during winter
- Throat swabs is not recommended because asymptomatic carriage affects up to 40% of people
- Antibiotics only decrease duration by  $<1\text{d}$ ; choice penicillin V, (erythromycin or clarithromycin for penicillin allergy)
- Doctors are encouraged to adopt delayed prescription to reduce the number of inappropriate antibiotics
- Complications: otitis media, acute sinusitis

# Differential diagnosis: Unlikely cause

- **Glandular fever (infectious mononucleosis)**
- Epstein-Barr virus
- AKA kissing disease because transmission from saliva
- Peak incidence: 15~19yr
- The signs and symptoms can be difficult to distinguish from sore throat → pharyngitis (occasionally with exudates), fever and cervical lymphadenopathy, malaise (disproportionate to the symptoms)
- Rash in 10% of patients, appearing in the first days of the illness, and lasts 1 week
- Splenomegaly in 50% of patients



# Differential diagnosis: Unlikely cause

- **Trauma-related sore throat**
- From direct irritation of the pharynx
- Due to substances such as cigarette smoke, a lodged foreign body or from acid reflux

# Differential diagnosis: Very unlikely causes

- **Medicine-induced sore throat**
- Agranulocytosis, a rare complication with certain medication, sore throat + signs of infection (fever and chills)

Captopril

Carbimazole

Cytotoxics

Neuroleptics (e.g., clozapine)

Penicillamine

Sulfasalazine

Sulphur-containing antibiotics

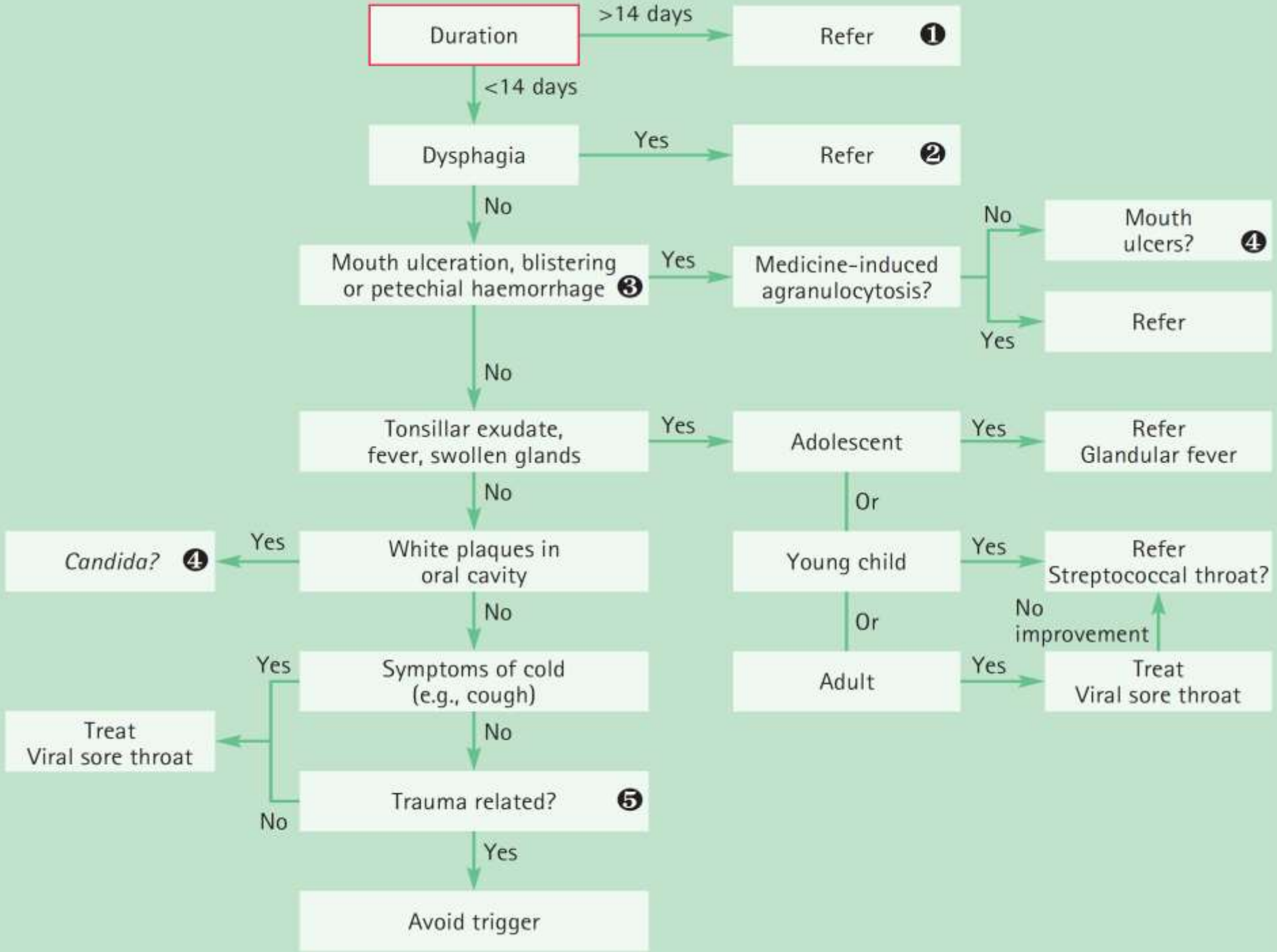


# Differential diagnosis: Very unlikely causes

- **Laryngeal and tonsillar carcinoma**
- Strong link with smoking and excessive alcohol intake
- Four times more common in men
- Sore throat, hoarseness, dysphonia and dysphagia
- Tonsillar cancer → referred ear pain
- Any person who presents with dysphagia should be referred

Features of viral and bacterial sore throat						
Infection	Age	Tonsillar, pharyngeal exudate	Duration	Cervical glands	Cough present	Other symptoms
Viral	Any age	Possible, but generally limited	3–7d	Normal	Common	Low-grade fever, headache
Bacterial	Schoolchildren	Often present and can be substantial	3–7d	Swollen	Rare	High-grade fever, possible rash

Indicative of referral		
Duration >2 weeks	Suggests non-acute cause and requires further Investigation	As soon as practicable
Marked tonsillar exudate, accompanied with high temperature and swollen glands	Possible bacterial cause and may require antibiotics	
People taking medications that can interfere with the immune response (e.g., immunosuppressants, DMARDs) or those known to cause agranulocytosis	Requires doctor involvement to monitor	
Dysphagia	Suggests sinister pathology	Urgent referral



# Evidence base

- Viral origin and self-limiting → medication aims to relieve symptoms and discomfort
- Lozenge and spray formulations incorporating antibacterial and anaesthetics → mainstay of treatment
- Systemic analgesics and antipyretics will help reduce the pain and fever

# Local anaesthetics

- Lidocaine and benzocaine
- Study: two strengths of lidocaine (1 & 8 mg) in lozenges, no difference in pain relief between the two strengths, no placebo arm
- Short duration of action → frequent dosing
- No drug interactions, minimal side effects, can be given to most patients, including pregnant and breastfeeding women
- Rare hypersensitivity reaction (more common with benzocaine)
- Cross-sensitivity is unusual



# Antibacterial and antifungal agents

- Antibacterial agents (chlorhexidine, benzalkoniumchloride), in vitro and in vivo tests shown antibacterial effects
- They should not be routinely recommended because the vast majority of sore throats are caused by viral infections
- Rare ADR
- Stimulation of saliva from sucking the lozenge  
→ symptomatic relief



# Anti-inflammatories

- Benzydamine mouthwash
- Greater relief of pain compared with placebo
- Adults and children >12yr q1.5~3h PRN
- Occasionally causes stinging→ dilute with water
- No drug interactions of note
- Can be used by all patient groups





# Analgesics

- There is good evidence to indicate that simple systemic analgesia is effective in reducing the pain
- Review: 22 RCTs, both NSAIDs and paracetamol were effective, not as PRN

# Aspirin and saltwater gargles

- No trials appear to have been conducted on their effectiveness→ they should not be recommended

Name, type of medicine	Use in children	Very common ( $\geq 1/10$ ) or common ( $\geq 1/100$ ) side effects	Drug interactions of note	Patients in whom care is exercised	Pregnancy & breastfeeding
<i>Local anaesthetics</i>					
Lidocaine	>12 years	Can cause sensitization reactions	None	None	OK
Benzocaine	Lozenge: >3 years Spray: >6 years				
<i>Antiinflammatory</i>					
Benzydamine	Rinse: >12 years Spray and lozenge: >6 years	Oral rinse may cause stinging	None	None	OK, but in pregnancy, limit use after 30 weeks.
Flurbiprofen	>12 years	None reported	None	Avoid in patients with peptic ulcers.	Avoid if possible.

## HINTS AND TIPS

### Stimulation of saliva production

Sucking a lozenge or pastille promotes saliva production, which will lubricate the throat and thus exert a soothing action.

### Gargles or lozenges?

Gargles have a very short contact time with inflamed mucosa and therefore any effect will be short lived. A lozenge or a pastille is preferable because contact time will be longer.

### Benzydamine rinse

The manufacturers advise that the product should be stored in the box away from direct sunlight, even though the stability of the product is not known to be affected by sunlight.

Thank you!

