

Cough

BY

DR Mohamed Abd Elrahman

Lecturer of clinical pharmacy

Defintion

- Coughing is a protective reflex action caused when the airway is being irritated or obstructed.
- Its purpose is to clear the airway so that breathing can continue normally.
- The majority of coughs presenting in the pharmacy will be caused by a viral respiratory tract infection
- They will often be associated with other symptoms of a cold



- Coughs can be described as either productive (chesty) or non-productive (dry, tight, tickly).
- Coughs are either classed as acute or chronic in nature.
- The British Thoracic Society Guidelines (2006) recommend that:
 - an acute cough lasts less than 3 weeks
 - chronic cough lasts more than 8 weeks.
- The guidelines acknowledge that a 'grey area' exists for those coughs lasting between 3 and 8 weeks as it is difficult to define their aetiological basis because all chronic coughs will have started as an acute cough.

Prevalence and epidemiology

- Statistics from general medical practice show that respiratory illness accounts for more patient visits than any other disease category.
- Acute cough is usually caused by a viral upper respiratory tract infection (URTI) and constitutes 20% of consultations.
- Schoolchildren experience the greatest number of coughs, with an estimated 7–10 episodes per year (as compared to adults with 2–5 episodes per year).
- Acute viral URIs exhibit seasonality, with higher incidence seen in the winter months.

differential diagnosis

- The most likely cause of acute cough in primary care for all ages is viral URTI.
- Recurrent viral bronchitis is most prevalent in preschool and young school-aged children and is the most common cause of persistent cough in children of all ages.

Causes of cough and their relative incidence in community pharmacy

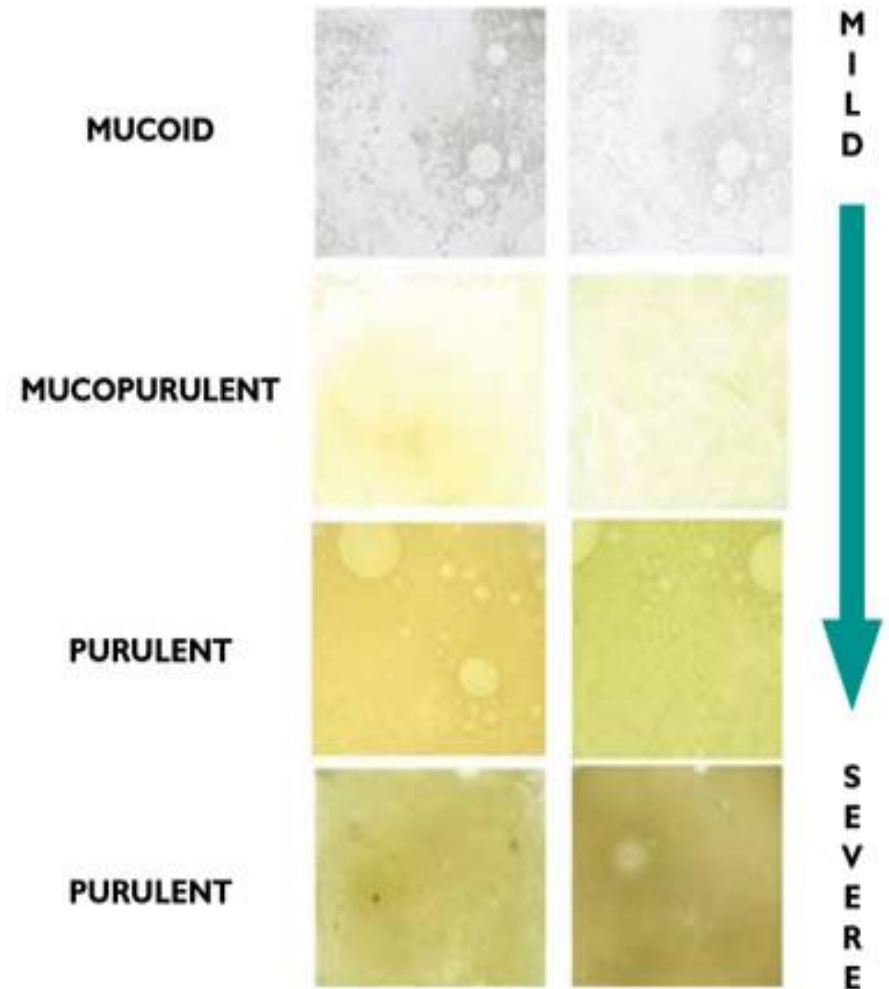
- **Incidence Cause**
- Most Likely Viral infection
- Likely Upper airways cough syndrome (formerly known as postnasal drip and includes allergies), acute bronchitis
- Unlikely Croup, chronic bronchitis, asthma, pneumonia, ACE inhibitor induced
- Very unlikely Heart failure, bronchiectasis, tuberculosis, cancer, pneumothorax, lung abscess, GERD

Specific questions to ask the patient:

Cough

- 1. Sputum colour
- Muroid (clear and white) is normally of little consequence and suggests that no infection is present
- Yellow, green or brown sputum normally indicates infection.
- Mucopurulent sputum is generally caused by a viral infection and does not require automatic referral
- Haemoptysis can either be rust coloured (pneumonia), pink tinged (left ventricular failure) or dark red carcinoma).
- Occasionally, patients can produce sputum with bright red blood as one-off events. This is due to the force of coughing causing a blood vessel to rupture. This is non-serious and does not require automatic referral

- Sputum may be clear or white and frothy (mucoid).
- Sputum which is slightly thicker and cloudy or opaque (mucopurulent).
- If you have an infection you may see the colour of your sputum getting darker with either a yellow or green tinge. (purulent)
- If the sputum is darker green (severe purulent) it may also start to become thicker and more difficult to cough up in order to clear your airways



	green or yellow	brown	white	black	clear	red or pink
allergic rhinitis					✓	
bronchitis	✓	✓	✓		✓	
chronic obstructive pulmonary disease (COPD)			✓			
congestive heart failure			✓			✓
cystic fibrosis	✓	✓				
fungal infection				✓		
gastroesophageal reflux disease (GERD)			✓			
lung abscess		✓		✓		✓
lung cancer						✓
pneumonia	✓	✓			✓	✓
pneumoconiosis		✓		✓		
pulmonary embolism						✓
sinusitis	✓					
smoking				✓		
tuberculosis						✓

2- Nature of sputum

- Thin and frothy suggests left ventricular failure
- Thick, mucoid to yellow can suggest asthma
- Offensive foul-smelling sputum suggests either bronchiectasis or lung abscess

- 3- Onset of cough
- A cough that is worse in the morning may suggest bronchiectasis or chronic bronchitis
- Recurrent night –time cough can indicate asthma
- Asthma may sometimes present as a chronic cough without wheezing, usually worse first thing in the morning.
- A family history of eczema, hay fever and asthma is worth asking about.

- 4- Duration of cough
- at 3 days duration will be a URTI;
- at 3 weeks duration will be acute or chronic bronchitis;
- and at 3 months duration conditions such as chronic bronchitis, tuberculosis and carcinoma become more likely
- URTI cough can longer for more than 3 weeks and is termed 'postviral cough

- 5- age
- Adult patients with recurrent cough might have chronic bronchitis, especially if they smoke
- Care should be exercised in children who present with recurrent cough and have a family history of eczema, asthma or hay fever. This might suggest asthma and referral would be required for further investigation.

- 6- Smoking
- history Patients who smoke are more prone to chronic and recurrent cough. Over time this might develop in to chronic bronchitis and COPD .

Causes of cough

- Mostly Likely causes

Upper respiratory tract infection (URTI)

Likely causes

- Upper airways cough syndrome(UACS)
- (previously referred to as postnasal drip)
- UACS is characterised by a sinus or nasal discharge that flows behind the nose and into the throat.
- Patients should be asked if they are swallowing mucus or notice that they are clearing their throat more than usual.
- Allergies are one cause of UACS.
- Coughs caused by allergies are often non-productive and worse at night.

- there are usually other associated symptoms, such as sneezing, nasal discharge/blockage, conjunctivitis and itching oral cavity.
- Cough of allergic origin might show seasonal variation, for example hay fever.
- Hay fever is usually worse between late march and september.
- Other causes include vasomotor rhinitis (caused by odours and changes in temperature/humidity)
- it is better to direct treatment at the cause of UACS (e.g. antihistamines or decongestants) rather than just treat the cough

likely causes

- Acute bronchitis
- Most cases are seen in autumn or winter and symptoms are similar to viral URTI but patients also tend to exhibit dyspnoea and wheeze.
- The cough usually lasts for 7–10 days but can persist for three weeks.
- The cause is normally viral, but sometimes bacterial. Symptoms will resolve without antibiotic treatment, regardless of the cause.

Unlikely causes

- 1. Laryngotracheobronchitis (croup)
- Symptoms are triggered by a recent viral infection, with para influenza virus accounting for 75% of cases, although other viral pathogens implicated include the rhinovirus.
- It affects infants aged between 3 months and 6 years old and affects 2 to 6% of children. The incidence is highest between 1 and 2 years of age and occurs in boys more than girls;
- it is more common in autumn and winter months. It often follows on from an URTI and occurs in the late evening and night



- The cough can be severe and violent and described as having a barking (seal-like) quality.
- In between coughing episodes the child may be breathless and struggle to breathe properly.
- Typically, symptoms improve during the day and often recur again the following night.
- with the majority of children seeing symptoms resolve in 48 hours.
- Warm moist air as a treatment for croup has been used
- since the 19th century. This is either done by moving the child to a bathroom and running a hot bath or shower or by boiling a kettle in the room

- Standard treatment for those children with stridor would be oral or intra-muscular dexamethasone or nebulised budesonide.

2. Chronic bronchitis

- Chronic bronchitis (CB), along with emphysema, is characterised by the destruction of lung tissue and collectively known as chronic obstructive pulmonary disease (COPD)
- CB has been defined as coughing up sputum on most days for three or more consecutive months over the previous 2 years

- CB is caused by chronic irritation of the airways by inhaled substances, especially tobacco smoke.
- A history of smoking is the single most important factor in the aetiology of CB.
- CB starts with a non-productive cough that later becomes a mucopurulent productive cough.
- The patient should be questioned about smoking habit.
- If the patient is a smoker the cough will usually be worse in the morning.
- Secondary infections contribute to acute exacerbations seen in CB.
- It typically occurs in patients over the age of 40 and is more common in men.

3- Asthma

- The exact prevalence of asthma is unknown due to differing terminologies and definitions plus difficulties in correct diagnosis, especially in children, and co-morbidity with COPD in the elderly.
- Asthma prevalence in children is more than adults.
- Asthma is a chronic inflammatory condition of the airways characterised by coughing, wheeze, chest tightness and shortness of breath.
- Classically these symptoms tend to be variable, intermittent, worse at night and provoked by triggers

- possible associated features are family or personal history of atopy and worsening symptoms after taking non-steroidal anti-inflammatory drugs (NSAIDs) or beta-blockers.
- presentations to a community pharmacist, asthma can present as a non-productive cough, especially in young children (6-8 years) where the cough is often worst at night.
- In these cases pay particular attention to other possible symptoms such as chest tightness, wheeze and difficulty in breathing, which may be frequent and recurrent and occur even when the child does not have a cold.

4- Pneumonia (community acquired)

- Bacterial infection is usually responsible for pneumonia and most commonly caused by *Streptococcus pneumoniae* (80% of cases). Initially, the cough is non-productive and painful (first 24 to 48 hours), but rapidly becomes productive, with sputum being stained rust red.
- The intensity of the redness varies depending on the causative organism.
- The cough tends to be worst at night. The patient will be unwell, with a high fever, malaise, headache, breathlessness, and experience pleuritic pain
- Urgent referral to the doctor is required as antibiotics should be started as soon as possible.

5-Medicine-induced cough or wheeze

- (ACE) inhibitors are most commonly associated with cough.
- onset is variable, ranging from a few hours to more than 1 year after the start of treatment.
- Cough invariably ceases after withdrawal of the ACE inhibitor but takes 3 to 4 weeks to resolve.
- Other medicines that are associated with cough or wheeze are NSAIDs and beta-blockers.

Very unlikely causes

- Heart failure
- Bronchiectasis
- Carcinoma of the lung
- Gastro-oesophageal reflux disease (GORD)
- Lung abscess
- A typical presentation is of a non-productive cough with pleuritic pain and dyspnoea.
- It is more common in the elderly. Signs of infection such as malaise and fever can also be present. Later the cough produces large amounts of purulent and often foul-smelling sputum.

When to refer

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

treatment

- The choice of treatment depends on the type of cough.
- Suppressants (e.g. pholcodine) are used to treat unproductive coughs,
- while expectorants such as guaifenesin (guaiphenesin) are used in the treatment of productive coughs

- Suppressants: They may cause sputum retention and this may be harmful in patients with chronic bronchitis and bronchiectasis.

Cough suppressants

- Codeine/pholcodine
- Pholcodine has several advantages over codeine in that it produces fewer side effects (even at OTC doses, codeine can cause constipation and, at high doses, respiratory depression) and pholcodine is less liable to be misused.
- Both pholcodine and codeine can induce drowsiness, although in practice this does not appear to be a problem.
- Codeine is well known as a drug, which is misused, and many pharmacists choose not to recommend it.
- Codeine containing cough suppressants should not be used for children under 18 years old.

- Dextromethorphan
- Dextromethorphan is less potent than pholcodine and codeine. It is generally non-sedating and has few side effects
- Dextromethorphan can be given to children of age 6 years and over

Demulcents

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

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 (guaiphenesin)
- Guaifenesin is commonly found in cough remedies. In adults, the dose required to produce expectoration is 100–200 mg, so in order to have a theoretical chance of effectiveness, any product recommended should contain a sufficiently high dose.

Cough remedies: Other constituents

- 1-Antihistamines Examples used in OTC products include diphenhydramine and promethazine.
- 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 anticholinergic side effects,

2- Sympathomimetics

- Pseudoephedrine is used in cough and cold remedies for its bronchodilator and decongestant actions.
- Oral sympathomimetics should be used with caution, or avoided, in patients with the following:
 - Diabetes
 - Coronary heart disease (e.g. angina)
 - Hypertension
 - Hyperthyroidism

3- Theophylline

- Theophylline is sometimes included in cough remedies for its bronchodilator effect.
- OTC medicines containing theophylline should not be taken at the same time as prescribed theophylline since toxic blood levels and side effects may occur.
- The action of theophylline can be potentiated by some drugs, for example, 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.