

Cardio-Respiratory Assessment



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PRECOURSE WORKBOOK

SWOT ANALYSIS

Prior to identifying learning needs with your mentor complete the SWOT analysis as this will help you with planning your learning needs.

| STRENGTH | WEAKNESSES |
|---------------|------------|
| | |
| OPPORTUNITIES | THREATS |
| | |



RESPIRATORY SESSION

AIMS

To develop your consultation skills and clinical decision-making in managing patients who present with respiratory symptoms in primary care and general practice.

OBJECTIVES

- Explore common upper and lower respiratory infections
- Recognise common respiratory symptoms including cough, shortness of breath, sputum and its implications.
- Differentiate between the common types of obstructive lung diseases, including COPD, asthma, and cystic fibrosis
- Improve knowledge of common treatment options available in primary care using NICE and local guidelines.
- Able to assess, treat and safely discharge or refer respiratory conditions presenting to primary care settings.

RECOMMENDED READING

Respiratory Assessment article by Kirsty Armstrong, session lecturer.

https://www.researchgate.net/publication/336798109_Taking_a_patient_history_as_part_of_respiratory_assessment

Below are the March 2020 Updated guidelines for respiratory disorders

<https://www.uptodate.com/contents/table-of-contents/primary-care-adult/primary-care-pulmonary-disease>

Acute bronchitis: <https://www.uptodate.com/contents/acute-bronchitis-in-adults>

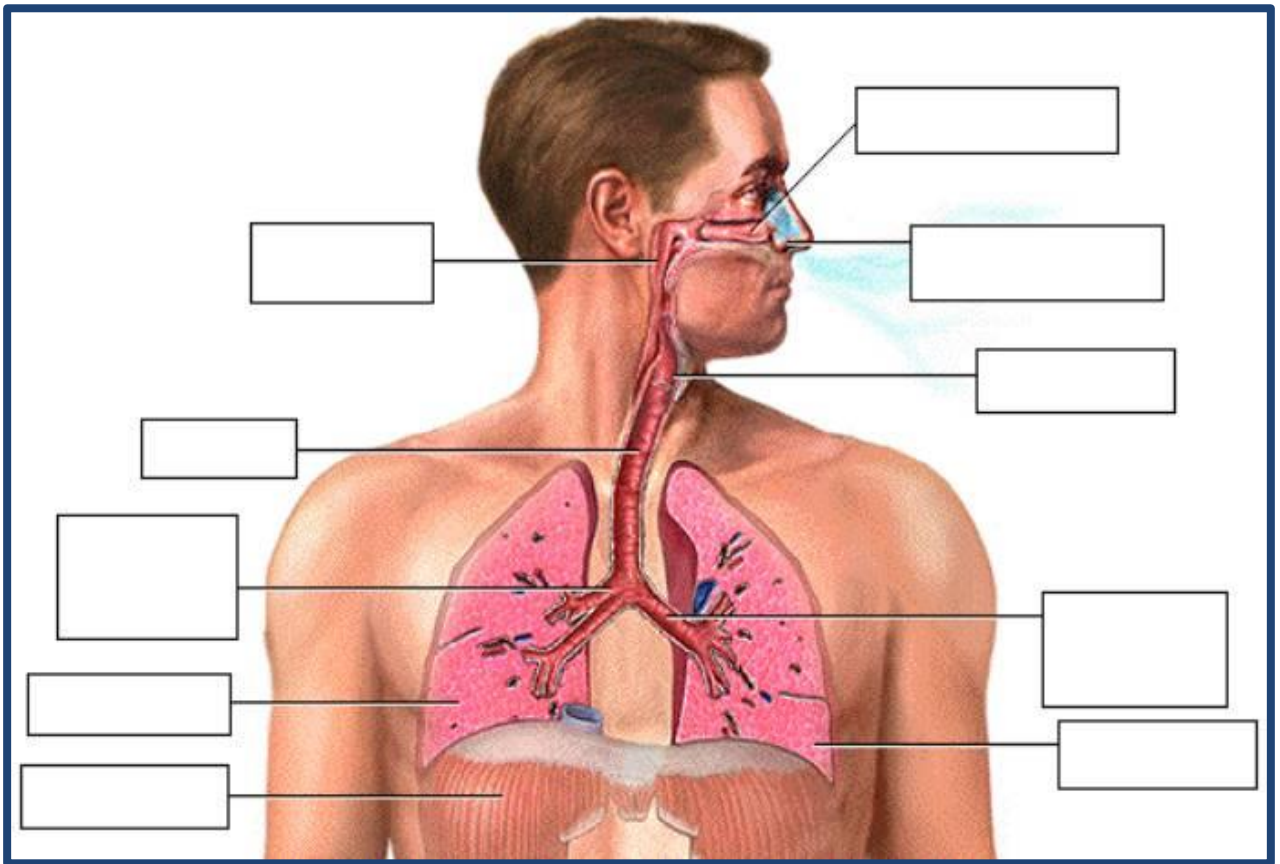
Asthma: <https://www.uptodate.com/contents/acute-exacerbations-of-asthma-in-adults-home-and-office-management>

COPD: <https://www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-definition-clinical-manifestations-diagnosis-and-staging>

Dyspnoea: <https://www.uptodate.com/contents/approach-to-the-patient-with-dyspnea>

Evaluation of acute and subacute cough: <https://www.uptodate.com/contents/evaluation-of-subacute-and-chronic-cough-in-adults>

LABEL THE DIAGRAM



Please watch this video on respiratory anatomy and physiology.

https://www.youtube.com/watch?v=0fVoz4V75_E

<https://www.youtube.com/watch?v=x5x19lwPnbo>

Upper Respiratory Tract Infections

https://www.osmosis.org/learn/Upper_respiratory_tract_infection

CLICK ON LINK TO WATCH VIDEO ON VIRUSES

<https://www.youtube.com/watch?v=s8jhJXgC-bk>

RESPIRATORY PATHOLOGIES

There are 2 types of respiratory disorders and diseases

1. Infectious – Pulmonary infections are usually bacterial or viral
2. Chronic – includes persistent and long lasting diseases such as asthma.

Infectious Diseases : Name 3 viral and bacterial infections that can affect the respiratory tract

| VIRAL | BACTERIAL |
|-------|-----------|
| | |
| | |
| | |

How are viruses and bacteria different? Click on this link to watch a short online video.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5654539/>

INFLUENZA: <https://www.youtube.com/watch?v=85R-6O6rrgw>

PNEUMONIA: <https://www.youtube.com/watch?v=IAQp2Zuqevc>

PLEURAL EFFUSION: https://www.youtube.com/watch?v=gASiQ2I_4KY

LUNG CANCER: <https://www.youtube.com/watch?v=HeEiQKoicd8>

COPD: <https://www.youtube.com/watch?v=yKQJNMUFkjk>

EMPHYSEMA: <https://www.youtube.com/watch?v=ChlSfDBHLvg>

ASTHMA: https://www.youtube.com/watch?v=gvxF_TJhHiA

DESCRIBE THE FOLLOWING CONDITIONS:

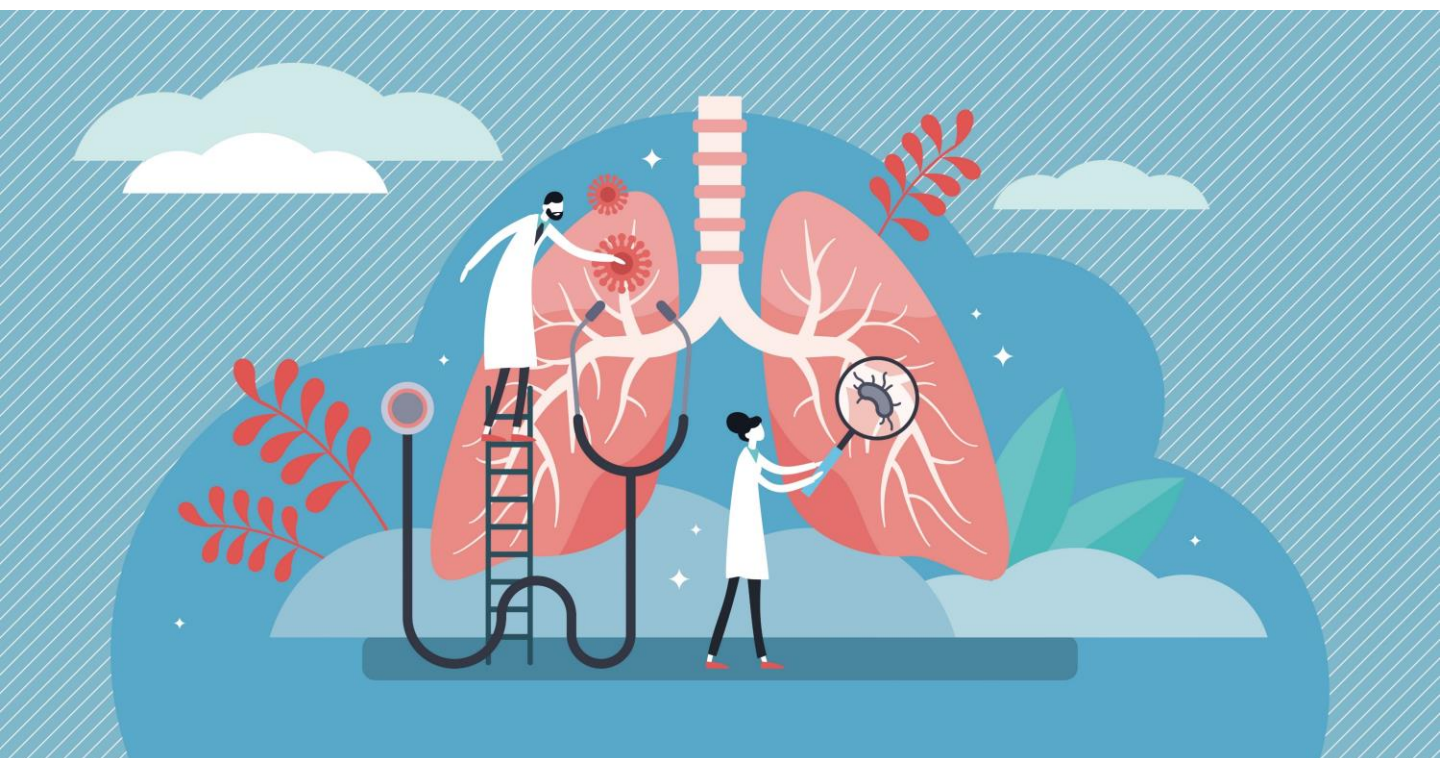
1. CHRONIC OBSTRUCTIVE DISEASE

- a) Emphysema
- b) Chronic Bronchitis

2. What is inherited emphysema and how do you check if a patient has it?

3. What do the following tests examine?

- a) Chest x-ray and CT Chest
- b) ECG
- c) Sputum Analysis
- d) Spo₂
- e) Spirometry
- f) FENO testing
- g) Blood tests: name tests relevant to respiratory conditions and discuss why?
- h) Pulmonary Functions Test



Respiratory Session

Presenting Complaint (PC)

It's important to use **open questioning** to elicit the patient's presenting complaint.

"So what's brought you in today?" or "Tell me about your symptoms"

Allow the patient time to answer, trying not to interrupt or direct the conversation.

Facilitate the patient to expand on their presenting complaint if required.

"Ok, so tell me more about that" "Can you explain what that pain was like?"

Symptoms

- Cough: Productive (bronchiectasis / COPD if older / CF if younger) Dry (asthma if younger / ILD if older)
- Wheeze (expiratory) – asthma / COPD / bronchiectasis
- Stridor (inspiratory) – upper airway obstruction

Shortness of Breath

SOB during activities of daily living

Asthmatic-tightness in chest

CHF- sensation of suffocating

COPD- complain of increased effort to breath

Shortness of Breath

Ask about temperature control over the past 48 hours

Sputum Colour/consistency, odour

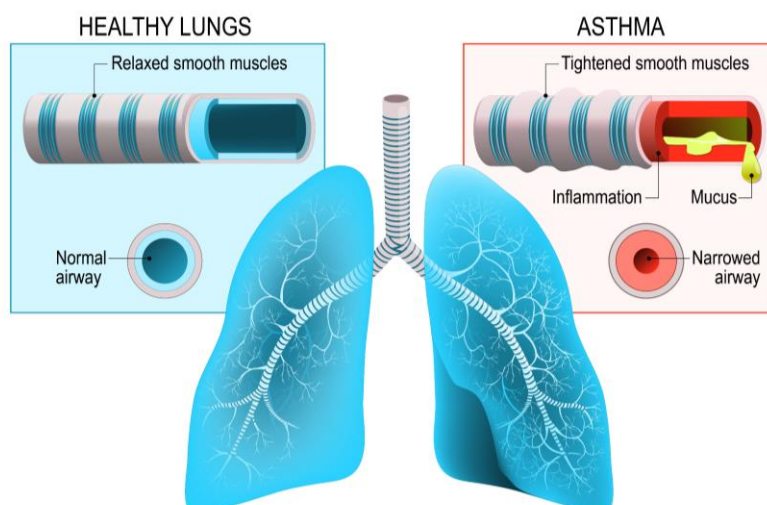
Blood: Consider TB, cancer, paroxysmal

Green: Inflammation

Yellow: Infection

White Frothy: Heart Failure

ASTHMA



Allergies

Consider

Family History

Respiratory disease? – asthma / atopy / lung cancer / cystic fibrosis

Recent contact with others who were unwell? – viral infections / pneumonia / TB

Social History

Smoking – How many cigarettes a day? How long have they smoked for?

Alcohol – How many units a week? – be specific about type / volume / strength of alcohol

Recreational drug use – e.g. Cannabis (increased risk of lung cancer)

Living situation:

- House / Flat – stairs / adaptations / home oxygen
- Who lives with the patient? – important when considering discharge from hospital
- Any carer input? – what level of care do they receive?

Activities of daily living:

- Is the patient independent / able to fully care for themselves?
- Can they manage self-hygiene/housework/food shopping?

Occupation:

- **Shipyard** / Construction / Plumber – Asbestos
- **Miners** – Pneumoconiosis
- **Farmer** – Allergic extrinsic alveolitis

Hobbies – Bird fancier – Allergic extrinsic alveolitis



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Systemic enquiry

Systemic enquiry involves performing a brief screen for symptoms in other body systems. This may pick up on symptoms the patient failed to mention in the presenting complaint. Some of these symptoms may be relevant to the diagnosis (e.g. calf pain in pulmonary embolism).

Choosing which symptoms to ask about depends on the presenting complaint and your level of experience.

Cardiovascular – Chest pain / Palpitations / Dyspnoea / Syncope / Orthopnoea / Peripheral oedema

Respiratory – Dyspnoea / Cough / Sputum / Wheeze / Haemoptysis / Chest pain

GI – Appetite / Nausea / Vomiting / Indigestion / Dysphagia / Weight loss / Abdominal pain / Bowel habit

Urinary – Volume of urine passed / Frequency / Dysuria / Urgency / Incontinence

CNS – Vision / Headache / Motor or sensory disturbance/ Loss of consciousness / Confusion

Musculoskeletal – Bone and joint pain / Muscular pain

Dermatology – Rashes / Skin breaks / Ulcers / Lesions

Systemic enquiry

Assess temperature – ↓ temperature suggests peripheral vasoconstriction / poor perfusion

Palpate pulse – rate and rhythm

Assess respiratory rate – normal adult range = 12-20 breaths per minute

Pulsus paradoxus – pulse wave volume decreases with inspiration – asthma / COPD



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RESPIRATORY EXAMINATION

Introduction

Wash your hands and **don PPE** if appropriate.

Introduce yourself to the patient including your **name** and **role**.

Confirm the patient's **name** and **date of birth**.

Briefly **explain** what the examination will involve using **patient-friendly language**.

Gain consent to proceed with the examination.

Adjust the head of the bed to a **45° angle**.

Adequately **expose** the **patient's chest** for the examination (offer a blanket to allow exposure only when required and if appropriate, inform patients they do not need to remove their bra). Exposure of the patient's **lower legs** is also helpful to assess for peripheral oedema.

Ask the patient if they have any **pain** before proceeding with the clinical examination.



General Inspection

Age:

- Young patients – more likely asthma or cystic fibrosis (CF)
- Older patients – more likely COPD/interstitial lung disease (ILD)/malignancy

Treatments or adjuncts around bed – O2 (ILD, COPD) / inhalers or nebulisers (asthma, COPD) / sputum pots (COPD, bronchiectasis)

Does patient look short of breath? – tripod position / nasal flaring / pursed lips / use of accessory muscles / intercostal muscle recession

Is the patient able to speak in full sentences?

Scars (more details in the close inspection of the thorax section below)

Cyanosis – bluish/purple discolouration – (<85% oxygen saturation)

Chest wall – note any abnormalities or asymmetry – e.g. barrel chest (COPD)

Cachexia – very thin patient with muscle wasting (malignancy, cystic fibrosis, COPD)



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Clinical signs

Inspect the patient from the **end of the bed** whilst at rest, looking for clinical signs suggestive of underlying pathology:

Age: the patient's approximate age is helpful when considering the most likely underlying pathology, with younger patients more likely to have diagnoses such as asthma or cystic fibrosis (CF) and older patients more likely to have chronic obstructive pulmonary disease (COPD), interstitial lung disease or malignancy.

Cyanosis: bluish discolouration of the skin due to poor circulation (e.g. peripheral vasoconstriction secondary to hypovolaemia) or inadequate oxygenation of the blood (e.g. right-to-left cardiac shunting).

Shortness of breath: signs may include nasal flaring, pursed lips, use of accessory muscles, intercostal muscle recession and the tripod position (sitting or standing leaning forward and supporting the upper body with hands on knees or other surfaces). Shortness of breath is a common feature of most respiratory pathology, however possible underlying diagnoses in an OSCE could include asthma, pulmonary oedema, pulmonary fibrosis, lung cancer and COPD. The inability to speak in full sentences is an indicator of significant shortness of breath.

Cough: a productive cough can be associated with several respiratory pathologies including pneumonia, bronchiectasis, COPD and CF. A dry cough may suggest a diagnosis of asthma or interstitial lung disease.

Wheeze: a continuous, coarse, whistling sound produced in the respiratory airways during breathing. Wheeze is often associated with asthma, COPD and bronchiectasis.

Stridor: a high-pitched extra-thoracic breath sound resulting from turbulent airflow through narrowed upper airways. Stridor has a wide range of causes, including foreign body inhalation (acute) and subglottic stenosis (chronic).

Pallor: a pale colour of the skin that can suggest underlying anaemia (e.g. haemorrhage/chronic disease) or poor perfusion (e.g. congestive cardiac failure). It should be noted that healthy individuals may have a pale complexion that mimics pallor.

Oedema: typically presents with swelling of the limbs (e.g. pedal oedema) or abdomen (i.e. ascites) and is often associated with right ventricular failure. Pulmonary oedema often occurs secondary to left ventricular failure.

Cachexia: ongoing muscle loss that is not entirely reversed with nutritional supplementation. Cachexia is commonly associated with underlying malignancy (e.g. lung cancer) and other end-stage respiratory diseases (e.g. COPD).

Hands

The **hands** can provide lots of clinically relevant information and therefore a focused, structured assessment is essential.

Inspection

General observations

Observe the hands and note your findings:

- **Colour:** cyanosis of the hands may suggest underlying hypoxaemia.
- **Tar staining:** caused by smoking, a significant risk factor for respiratory disease (e.g. COPD, lung cancer).
- **Skin changes:** bruising and thinning of the skin can be associated with long-term steroid use (e.g. asthma, COPD, interstitial lung disease).
- **Joint swelling or deformity:** may be associated with rheumatoid arthritis which has several extra-articular manifestations that affect the respiratory system (e.g. pleural effusions/pulmonary fibrosis).

Finger clubbing

Finger clubbing involves **uniform soft tissue** swelling of the **terminal phalanx** of a **digit** with subsequent **loss of the normal angle** between the **nail** and the **nail bed**. Finger clubbing is associated with several underlying disease processes, but those most likely to appear in a respiratory OSCE station include **lung cancer, interstitial lung disease, cystic fibrosis** and **bronchiectasis**.

To assess for finger clubbing:

- Ask the patient to place the **nails** of their **index fingers back to back**.
- In a healthy individual, you should be able to observe a **small diamond-shaped window** (known as **Schamroth's window**).
- When finger clubbing develops, this **window is lost**

Fine tremor

Assess for the presence of a **fine tremor**:

- Ask the patient to hold out their hands in an outstretched position and observe for a fine tremor which is typically associated with **beta-2-agonist** use (e.g. salbutamol).



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Asterixis (flapping tremor)

Asterixis (also known as 'flapping tremor') is a type of negative myoclonus characterised by irregular lapses of posture causing a flapping motion of the hands. In the context of a respiratory examination, the most likely underlying cause is **CO₂ retention** in conditions that result in type 2 respiratory failure (e.g. COPD). Other causes of asterixis include uraemia and hepatic encephalopathy.

- Whilst the patient still has their hands stretched outwards, ask them to **cock their hands backwards** at the **wrist joint** and hold the position for **30 seconds**.
- Observe for evidence of asterixis during this time period.



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Palpation

Temperature

Place the **dorsal aspect** of your hand onto the patient's to assess **temperature**:

In healthy individuals, the hands should be **symmetrically warm**, suggesting adequate perfusion.

Cool hands may suggest **poor peripheral perfusion**.

Excessively warm and sweaty hands can be associated with CO₂ retention.

Heart rate

Assessing heart rate:

- Palpate the patient's **radial pulse**, located at the radial side of the wrist, with the **tips** of your **index** and **middle fingers** aligned longitudinally over the course of the artery.
- Once you have located the radial pulse, assess the **rate** and **rhythm**.

Calculating heart rate:

- You can calculate the heart rate in a number of ways, including measuring for 60 seconds, measuring for 30 seconds and multiplying by 2 or measuring for 15 seconds and multiplying by 4.
- For **irregular rhythms**, you should measure the pulse for a **full 60 seconds** to improve accuracy.

Pulse abnormalities

- **Bounding pulse:** can be associated with underlying CO₂ retention (e.g. type 2 respiratory failure).
- **Pulsus paradoxus:** pulse wave volume decreases significantly during the inspiratory phase. This is a late sign of cardiac tamponade, severe acute asthma and severe exacerbations of COPD (therefore it is unlikely to be relevant to most OSCE scenarios).



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Respiratory rate

Assessing respiratory rate:

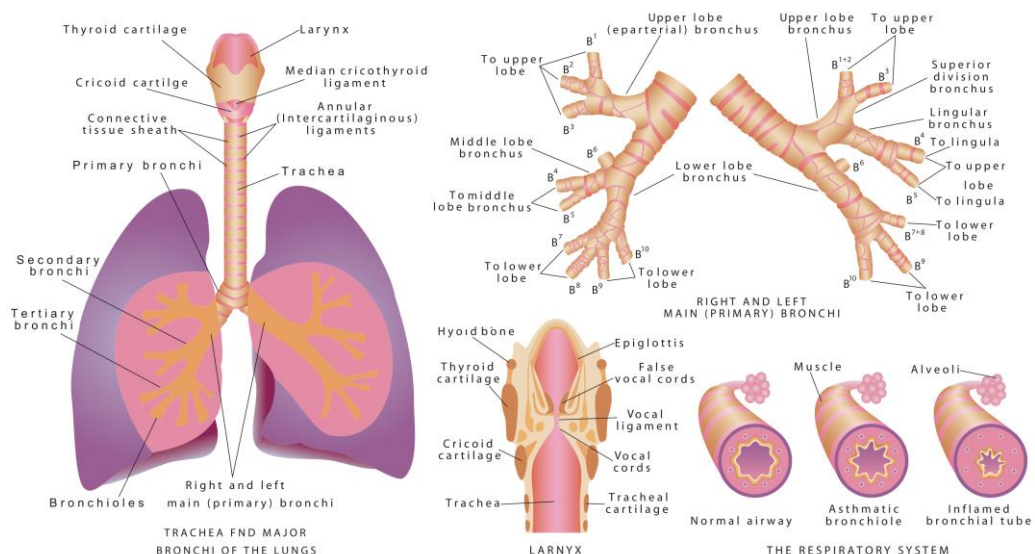
- Whilst still palpating the radial pulse (but no longer counting it), **assess the patient's respiratory rate** (palpation of the radial pulse at this stage purely to avoid making the patient aware you are directly observing their breathing, as this can itself alter the respiratory rate).
- Note any **asymmetries** in the **expiratory** and **inspiratory phases** of respiration (e.g. the expiratory phase is often prolonged in asthma exacerbations and in patients with COPD).

Calculating respiratory rate:

- Assess the patient's respiratory rate for 60 seconds to calculate the number of breaths per minute.

Respiratory rate abnormalities

- In healthy adults, the respiratory rate should be between **12-20 breaths per minute**.
- A respiratory rate of **fewer than 12 breaths per minute** is referred to as **bradypnoea** (e.g. opiate overdose).
- A respiratory rate of **more than 20 breaths per minute** is referred to as **tachypnoea** (e.g. acute asthma).



Jugular venous pressure (JVP)

Jugular venous pressure (JVP) provides an indirect measure of central venous pressure. This is possible because the internal jugular vein (IJV) connects to the right atrium without any intervening valves, resulting in a continuous column of blood. The presence of this continuous column of blood means that changes in right atrial pressure are reflected in the IJV (e.g. raised right atrial pressure results in distension of the IJV).

The IJV runs between the medial end of the clavicle and the ear lobe, under the medial aspect of the sternocleidomastoid, making it difficult to visualise (its double waveform pulsation is, however, sometimes visible due to transmission through the sternocleidomastoid muscle).

Because of the inability to easily visualise the IJV, it's tempting to use the external jugular vein (EJV) as a proxy for assessment of central venous pressure during clinical assessment. However, because the EJV typically branches at a right angle from the subclavian vein (unlike the IJV which sits in a straight line above the right atrium) it is a **less reliable** indicator of central venous pressure.

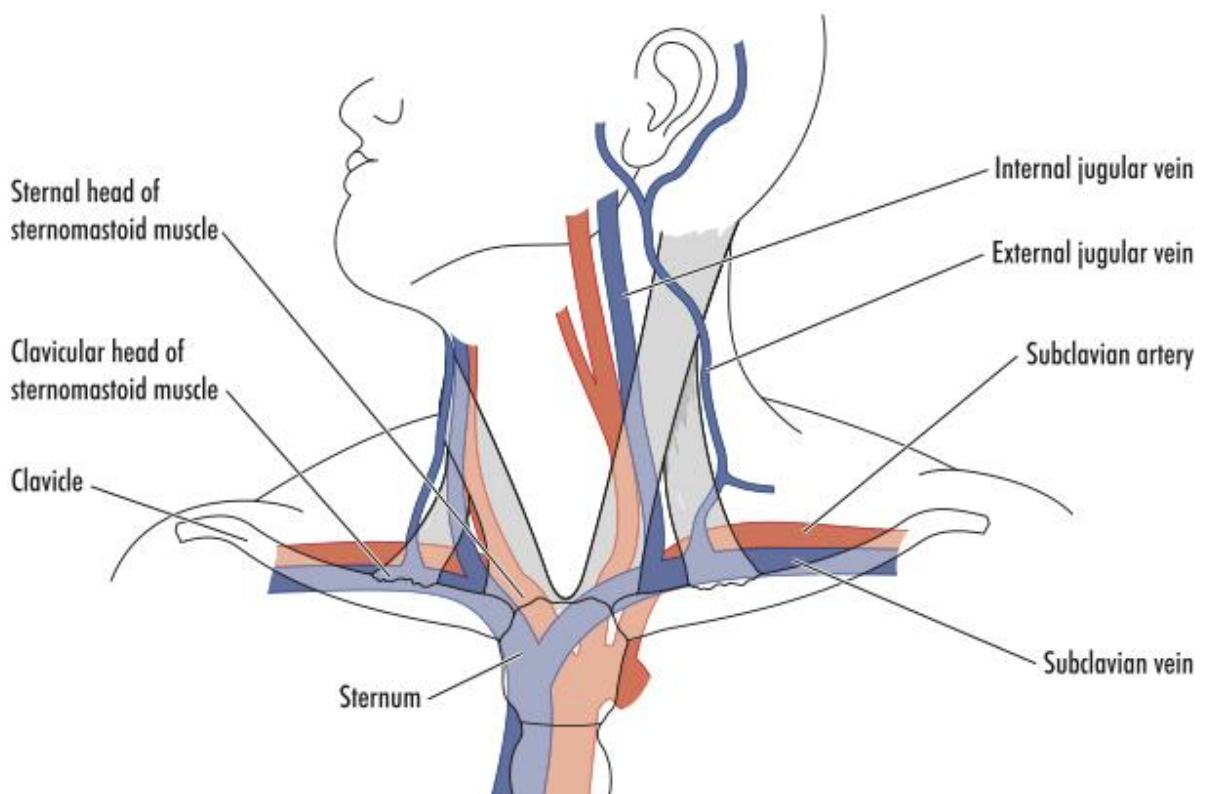
Measure the JVP

1. Position the patient in a semi-recumbent position (at **45°**).
2. Ask the patient to **turn their head** slightly to the **left**.
3. Inspect for evidence of the IJV, running between the medial end of the clavicle and the ear lobe, under the medial aspect of the sternocleidomastoid (it may be visible between just above the clavicle between the sternal and clavicular heads of the sternocleidomastoid. The IJV has a double waveform pulsation, which helps to differentiate it from the pulsation of the external carotid artery).
4. Measure the JVP by assessing the vertical distance between the **sternal angle** and the **top of the pulsation point of the IJV** (in healthy individuals, this should be **no greater than 3 cm**).



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Respiratory causes of a raised JVP

A **raised JVP** indicates the presence of **venous hypertension**. Respiratory causes of a raised JVP include:

- **Pulmonary hypertension:** causes right-sided heart failure, often occurring due to COPD or interstitial lung disease.
- There are several other causes of a raised JVP that relate to the cardiovascular system (e.g. congestive heart failure, tricuspid regurgitation and constrictive pericarditis).

Hepatojugular reflux test

The hepatojugular reflux test involves the application of pressure to the liver whilst observing for a sustained rise in JVP.



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Face

General

Inspect the **face** for any signs relevant to the respiratory system:

- **Plethoric complexion:** a congested red-faced appearance associated with polycythaemia (e.g. COPD) and CO₂ retention (e.g. type 2 respiratory failure).

Eyes

Inspect the **eyes** for signs relevant to the respiratory system:

- **Conjunctival pallor:** suggestive of underlying anaemia. Ask the patient to gently pull down their lower eyelid to allow you to inspect the conjunctiva.
- **Ptosis, miosis and enophthalmos:** all features of Horner's syndrome (anhidrosis is another important sign associated with the syndrome). Horner's syndrome occurs when the sympathetic trunk is damaged by pathology such as lung cancer affecting the apex of the lung (e.g. Pancoast tumour).

Mouth

Inspect the **mouth** for signs relevant to the respiratory system:

- **Central cyanosis:** bluish discolouration of the lips and/or the tongue associated with hypoxaemia.
- **Oral candidiasis:** a fungal infection commonly associated with steroid inhaler use (due to local immunosuppression). It is characterised by pseudomembranous white slough which can be easily wiped away to reveal underlying erythematous mucosa.



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Inspection of the chest

Scars

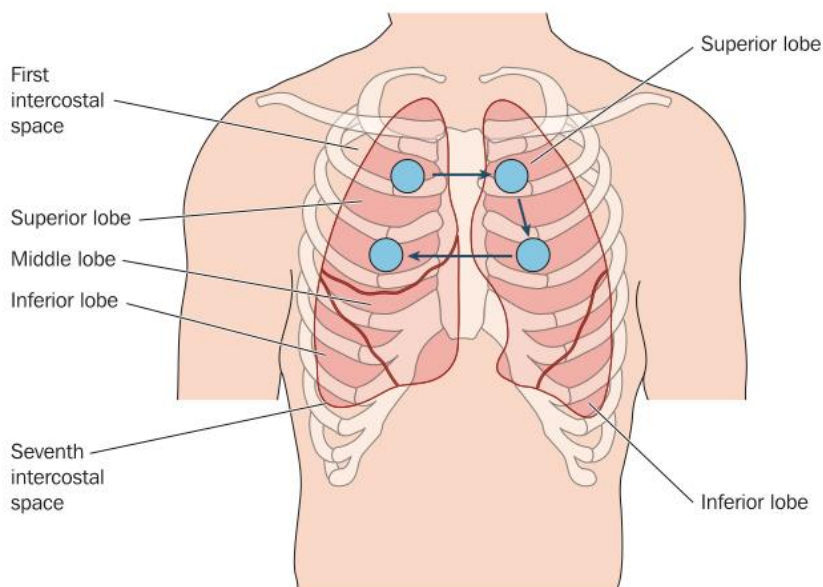
Closely inspect the chest wall for **scars** and **other abnormalities**:

- **Median sternotomy scar:** located in the midline of the thorax. This surgical approach is used for cardiac valve replacement and coronary artery bypass grafts (CABG).
- **Axillary thoracotomy scar:** located between the posterior border of the pectoralis major and anterior border of latissimus dorsi muscles, through the 4th or 5th intercostal space. This surgical approach is used for the insertion of chest drains.
- **Posterolateral thoracotomy scar:** located between the scapula and mid-spinal line, extending laterally to the anterior axillary line. This surgical approach is used for lobectomy, pneumonectomy and oesophageal surgery.
- **Infraclavicular scar:** located in the infraclavicular region (on either side). This surgical approach is used for pacemaker insertion.
- **Radiotherapy-associated skin changes:** may be present in patients who have been treated for lung cancer. Clinical features can include xerosis (dry skin), scale, hyperkeratosis (thickened skin), depigmentation and telangiectasia.

Chest wall deformities

Inspect for evidence of chest wall **deformities**:

- **Asymmetry:** typically associated with pneumonectomy (e.g. lung cancer) and thoracoplasty (e.g. tuberculosis).
- **Pectus excavatum:** a caved-in or sunken appearance of the chest.
- **Pectus carinatum:** protrusion of the sternum and ribs.
- **Hyperexpansion (a.k.a. 'barrel chest'):** chest wall appears wider and taller than normal. Associated with chronic lung diseases such as asthma and COPD.



Trachea and cricosternal distance

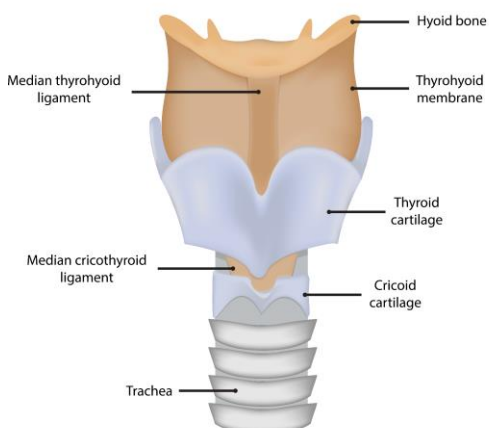
Assess tracheal position

Gently assess the **position of the trachea**, which should be **central** in healthy individuals (this can be uncomfortable, so warn the patient in advance):

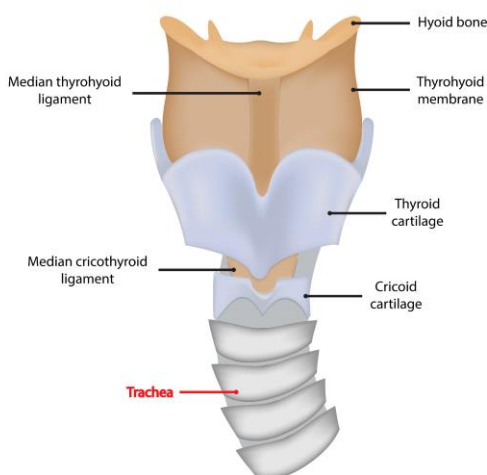
1. Ensure patient's neck musculature is relaxed by asking them to position their chin slightly downwards.
2. Dip your index finger into the thorax beside the trachea.
3. Gently apply side pressure to locate the border of the trachea.
4. Compare this space to the other side of the trachea using the same process.
5. A difference in the amount of space between the sides suggests the presence of tracheal deviation.

Tracheal Deviation

Normal



Trachea Deviated to the Right



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Causes of tracheal deviation

- The trachea deviates **away** from **tension pneumothorax** and **large pleural effusions**.
- The trachea deviates **towards lobar collapse** and **pneumonectomy**.
- Palpation of the trachea can be uncomfortable, so warn the patient and apply a gentle technique

Assess cricosternal distance

Cricosternal distance is the distance between the **inferior border of the cricoid cartilage** and the **suprasternal notch**:

1. Measure the distance between the suprasternal notch and cricoid cartilage using your fingers.
2. In healthy individuals, the distance should be 3-4 fingers.

Cricosternal distance is actually based on the size of the patient's fingers so if their fingers are significantly different in size from your own, it may be worth using their fingers for the assessment.

Causes of abnormal cricosternal distance

- A distance of fewer than 3 fingers suggests underlying lung hyperinflation (e.g. asthma, COPD).

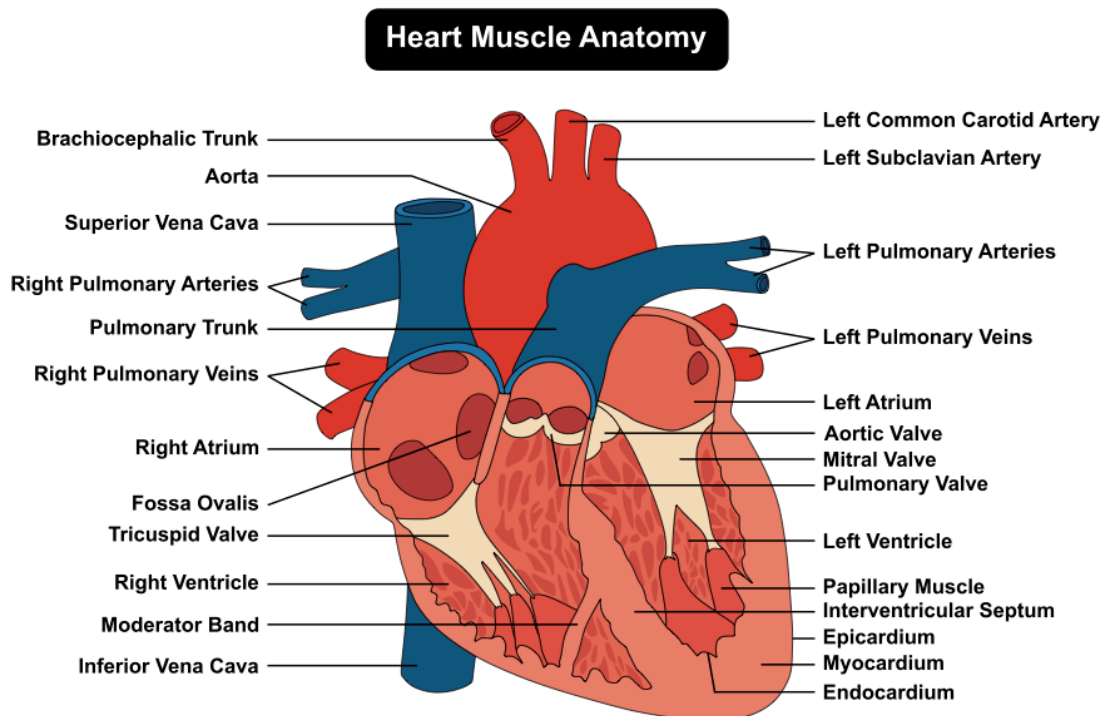


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Palpation of the chest

Palpate the apex beat

1. Palpate the apex beat with your fingers placed horizontally across the chest.
2. In healthy individuals, it is typically located in the **5th intercostal space** in the **midclavicular line**.



Causes of a displaced apex beat

Respiratory causes of a displaced apex beat:

- Right ventricular hypertrophy (e.g. pulmonary hypertension, COPD, interstitial lung disease)
- Large pleural effusion
- Tension pneumothorax



Palpation of the chest

Assess chest expansion

1. Place your hands on the patient's chest, inferior to the nipples.
2. Wrap your fingers around either side of the chest.
3. Bring your thumbs together in the midline, so that they touch.
4. Ask the patient to take a deep breath in.
5. Observe the movement of your thumbs (in healthy individuals they should move symmetrically upwards/outwards during inspiration and symmetrically downwards/inwards during expiration).
6. Reduced movement of one of your thumbs indicates reduced chest expansion on that side.

Respiratory causes of reduced chest expansion

- **Symmetrical:** pulmonary fibrosis reduces lung elasticity, restricting overall chest expansion.
- **Asymmetrical:** pneumothorax, pneumonia and pleural effusion would all cause ipsilateral reduced chest expansion.



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Percussion of the chest

Percussion of the chest involves listening to the volume and pitch of percussion notes across the chest to identify underlying pathology. Correct technique is essential to generating effective percussion notes.

Percussion technique

1. Place your non-dominant hand on the patient's chest wall.
2. Position your middle finger over the area you want to percuss, firmly pressed against the chest wall.
3. With your dominant hand's middle finger, strike the middle phalanx of your non-dominant hand's middle finger using a swinging movement of the wrist.
4. The striking finger should be removed quickly, otherwise, you may muffle the resulting percussion note.

Areas to percuss

Percuss the following areas of the chest, comparing side to side as you progress:

- Supraclavicular region: lung apices
- Infraclavicular region
- Chest wall: percuss over 3-4 locations bilaterally
- Axilla

Types of percussion note

- **Resonant:** a normal finding (listen to the example in the video demonstration).
- **Dullness:** suggests increased tissue density (e.g. cardiac dullness, consolidation, tumour, lobar collapse).
- **Stony dullness:** typically caused by an underlying pleural effusion.
- **Hyper-resonance:** the opposite of dullness, suggestive of decreased tissue density (e.g. pneumothorax).



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Tactile vocal fremitus

Assessing tactile vocal fremitus involves palpating over different areas of the chest wall whilst the patient repeats a word or number consistently (e.g. “ninety-nine”). The presence of increased tissue density or fluid affects the strength at which the patient’s speech is transmitted as vibrations through the chest wall to the examiner’s hands.

Technique

1. Ask the patient to say “99” repeatedly at the same volume and in the same tone.
2. Palpate the chest wall on both sides, using the ulnar border of your hand.
3. Cover all major regions of the chest wall, comparing each side at each location.

Abnormal tactile vocal fremitus

- **Increased vibration** over an area suggests increased tissue density (e.g. consolidation, tumour, lobar collapse).
- **Decreased vibration** over an area suggests the presence of fluid or air outside of the lung (e.g. pleural effusion, pneumothorax).

An alternative method of assessment

Vocal resonance (see below) is an alternative method of assessing the conduction of sound through lung tissue and involves auscultating over different areas of the chest wall whilst the patient repeats a word or number consistently. The presence of increased tissue density or fluid affects the volume at which the patient’s speech is transmitted to the diaphragm of the stethoscope. Given both tests assess the same thing, there is no reason to perform both vocal resonance and tactile vocal fremitus in the same examination.



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Auscultation of the chest

When auscultating the chest, it is important that you have a systematic approach that allows you to compare each area on both the left and the right as you progress.

Auscultate the chest

Technique

1. Ask the patient to relax and breathe deeply in and out through their mouth (prolonged deep breathing should, however, be avoided).
2. Position the diaphragm of the stethoscope over each of the relevant locations on the chest wall to ensure all lung regions have been assessed and listen to the breathing sounds during inspiration and **expiration**. Assess the **quality** and **volume** of breath sounds and note any **added sounds**.
3. Auscultate each side of the chest at each location to allow for direct comparison and increased sensitivity at detecting local abnormalities.

Quality of breath sounds

Vesicular: the normal quality of breath sounds in healthy individuals.

Bronchial: harsh-sounding (similar to auscultating over the trachea), inspiration and expiration are equal and there is a pause between. This type of breath sound is associated with consolidation.

Volume of breath sounds

Quiet breath sounds: suggest reduced air entry into that region of the lung (e.g pleural effusion, pneumothorax).

When presenting your findings, state 'reduced breath sounds', rather than 'reduced air entry'.



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Added sounds

Wheeze: a continuous, coarse, whistling sound produced in the respiratory airways during breathing. Wheeze is often associated with asthma, COPD and bronchiectasis.

Stridor: a high-pitched extra-thoracic breath sound resulting from turbulent airflow through narrowed upper airways. Stridor has a wide range of causes, including foreign body inhalation (acute) and subglottic stenosis (chronic).

Coarse crackles: discontinuous, brief, popping lung sounds typically associated with pneumonia, bronchiectasis and pulmonary oedema.

Fine end-inspiratory crackles: often described as sounding similar to the noise generated when separating velcro. Fine end-inspiratory crackles are associated with pulmonary fibrosis.

Assess vocal resonance

Assessing vocal resonance involves auscultating over different areas of the chest wall whilst the patient repeats a word or number consistently. The presence of increased tissue density or fluid affects the volume at which the patient's speech is transmitted to the diaphragm of the stethoscope.

Technique

1. Ask the patient to say "99" repeatedly at the same volume and in the same tone.
2. Auscultate all major regions of the anterior chest wall, comparing each side at each location.

Abnormal vocal resonance

Increased volume over an area suggests increased tissue density (e.g. consolidation, tumour, lobar collapse).

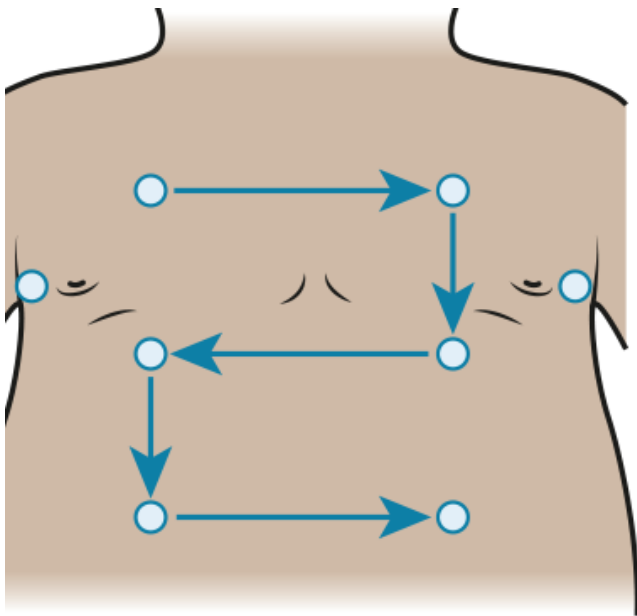
Decreased volume over an area suggests the presence of fluid or air outside of the lung (e.g. pleural effusion, pneumothorax).



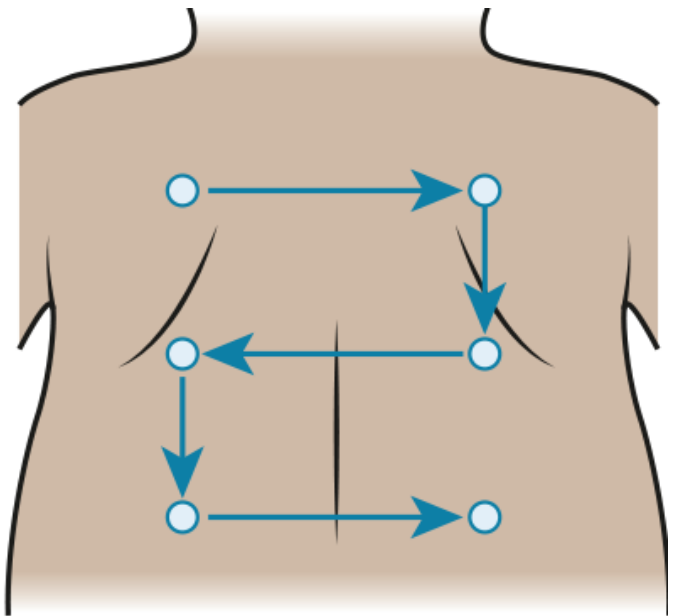
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An alternative method of assessment

Tactile vocal fremitus is an alternative method of assessing the conduction of sound through lung tissue and involves feeling for sound vibrations on the chest wall with your hands as the patient speaks. Given both tests assess the same thing, there is no reason to perform both vocal resonance and tactile vocal fremitus in the same examination.



Anterior



Posterior



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Lymph nodes

Palpate the patient's lymph nodes

1. Position the patient sitting upright and examine from behind if possible. Ask the patient to tilt their chin slightly downwards to relax the muscles of the neck and aid palpation of lymph nodes. You should also ask them to relax their hands in their lap.
2. Inspect for any evidence of lymphadenopathy or irregularity of the neck.
3. Stand behind the patient and use both hands to start palpating the neck.
4. Use the pads of the second, third and fourth fingers to press and roll the lymph nodes over the surrounding tissue to assess the various characteristics of the lymph nodes. By using both hands (one for each side) you can note any asymmetry in size, consistency and mobility of lymph nodes.
5. Start in the submental area and progress through the various lymph node chains. Any order of examination can be used, but a systematic approach will ensure no areas are missed:
 - Submental
 - Submandibular
 - Pre-auricular
 - Post-auricular
 - Superficial cervical
 - Deep cervical
 - Posterior cervical
 - Supraclavicular – left supraclavicular region is where Virchow's node may be noted (associated with upper gastrointestinal malignancy)

Take caution when examining the anterior cervical chain that you do not compromise cerebral blood flow (due to carotid artery compression). It may be best to examine one side at a time here.

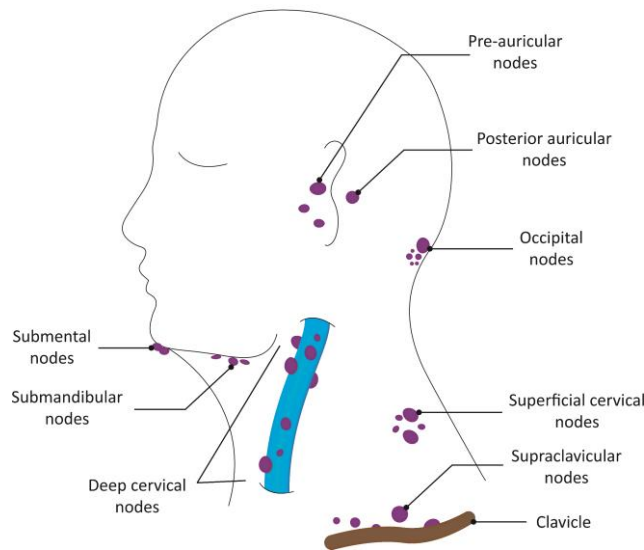
A common mistake is a “piano-playing” or “spider’s legs” technique with the fingertips over the skin rather than correctly using the pads of the second, third and fourth fingers to press and roll the lymph nodes over the surrounding tissue.



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Lymph Nodes of the Head and Neck



Example of logical systematic examination of the lymph nodes

1. Start under the chin (submental lymph nodes), then move posteriorly palpating beneath the mandible (submandibular), turn upwards at the angle of the mandible and feel anterior (preauricular lymph nodes) and posterior to the ears (posterior auricular lymph nodes).
2. Follow the anterior border of the sternocleidomastoid muscle (anterior cervical chain) down to the clavicle, then palpate up behind the posterior border of the sternocleidomastoid (posterior cervical chain) to the mastoid process.
3. Ask the patient to tilt their head (bring their ear towards their shoulder) each side in turn, and palpate behind the posterior border of the clavicle in the supraclavicular fossa (supraclavicular and infraclavicular lymph nodes).

Respiratory causes of lymphadenopathy

- Lung cancer with metastases
- Tuberculosis
- Sarcoidosis



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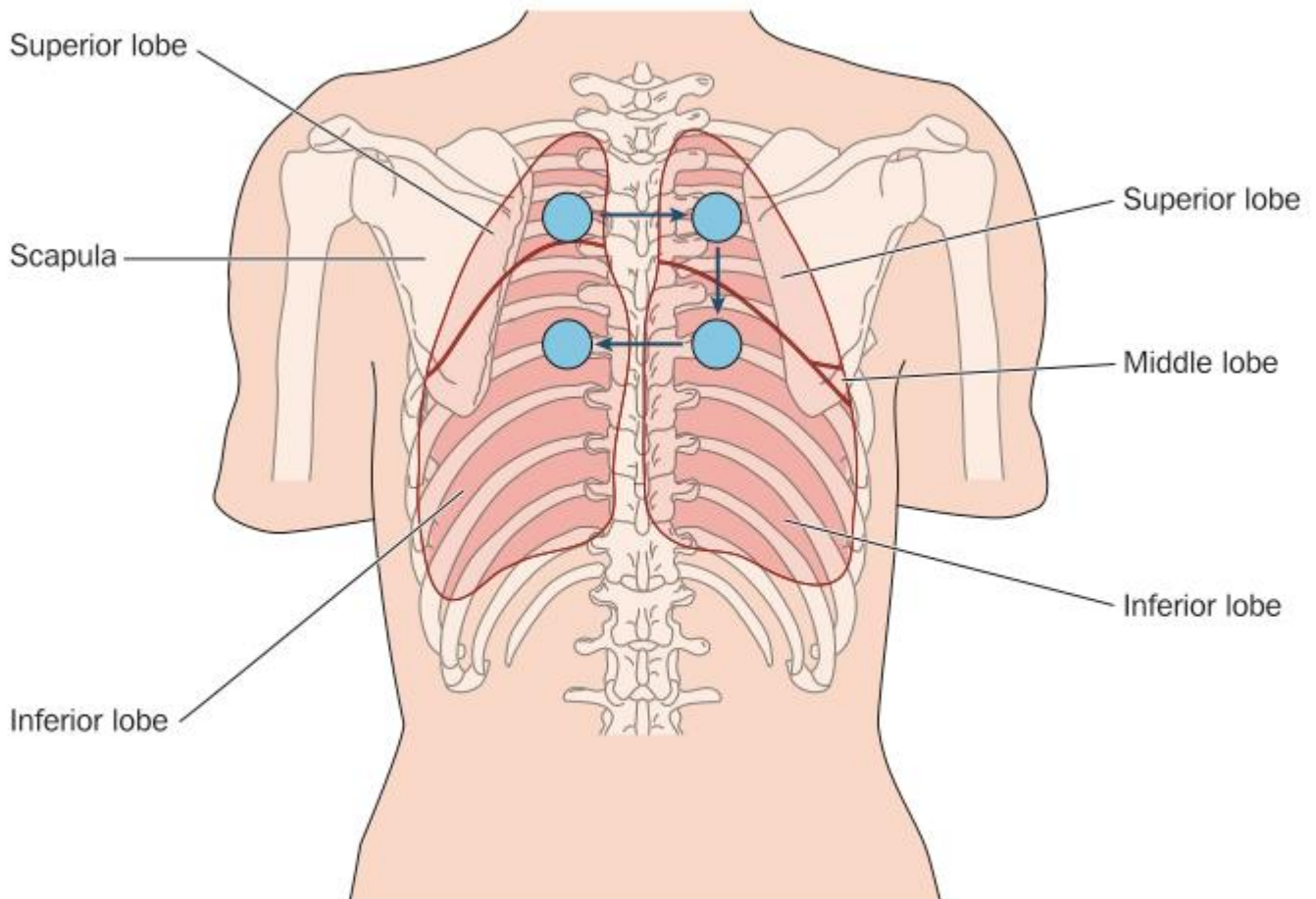
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Posterior chest assessment

With the patient still sitting forwards, ask them to **fold their arms across their chest** so that their hands are touching the **opposite shoulder**. This results in rotation of the scapulae to better expose the underlying chest wall for assessment.

Assess the **posterior chest** including **inspection**, **chest expansion**, **percussion**, **tactile vocal fremitus** (or vocal resonance) and **auscultation**.

Allocate **adequate time** to assessing the posterior aspect of the chest as this is where you are most likely to identify clinical signs.



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Final Steps

Assess for evidence of pitting **sacral** and **pedal oedema** (e.g. congestive heart failure).

Assess the calves for signs of **deep vein thrombosis** (e.g. swelling, increased temperature, erythema, visible superficial veins) as the patient may have shortness of breath secondary to pulmonary embolism.

Inspect for evidence of **erythema nodosum**, which can be associated with sarcoidosis.

To complete the examination...

Explain to the patient that the examination is now **finished**.

Thank the patient for their time.

Dispose of PPE appropriately and **wash your** hands.

Summarise your findings.



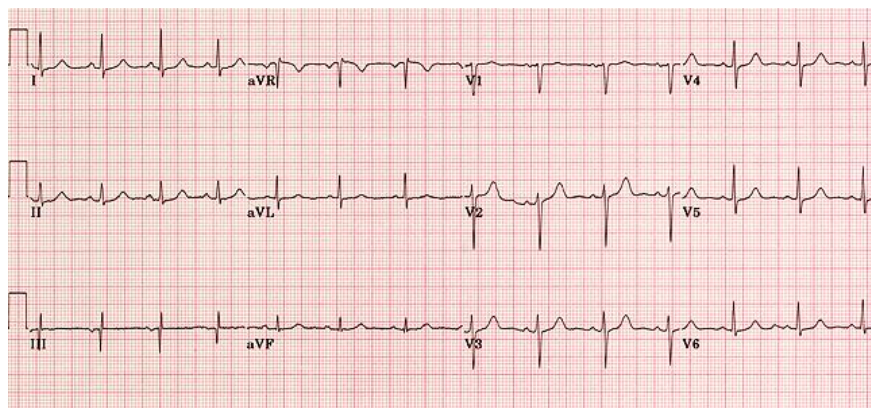
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Further assessments and investigations

Suggest **further assessments** and **investigations** to the examiner:

- Check **oxygen saturation** (SpO₂) and provide **supplemental oxygen** if indicated.
- Check other **vital signs** including **temperature** and **blood pressure**.
- Take a **sputum sample**.
- Perform **peak flow assessment** if relevant (e.g. asthma)
- Request a **chest X-ray** (if abnormalities were noted on examination)
- Take an **arterial blood gas** if indicated (also see ABG interpretation)
- Perform a full **cardiovascular examination** if indicated (e.g. cor pulmonale)



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Red Flags



Arrange emergency admission for people with clinical features of serious illness, including:

Respiratory rate of more than 30 breaths per minute Tachycardia greater than 130 beats per minute.

Systolic blood pressure less than 90 mmHg, or diastolic blood pressure less than 60 mmHg (unless this is normal for them).

Oxygen saturation less than 92%, or central cyanosis (if the person has no history of chronic hypoxia).

Peak expiratory flow rate less than 33% of predicted. Altered level of consciousness.

Use of accessory muscles of respiration (particularly if the person is becoming exhausted).

How do I diagnose the cause of sub-acute cough?

Assess whether the person has clinical features of the following differential diagnoses of sub-acute cough:

1. Foreign body aspiration — suggested by sudden-onset cough, stridor (upper airway) or reduced chest wall movement on the affected side, bronchial breathing, and reduced or diminished breath sounds (lower airway).

2. Lung cancer — suggested by haemoptysis, persistent chest and/or shoulder pain, breathlessness, weight loss, hoarseness, finger clubbing, cervical or supraclavicular lymphadenopathy. For more information

3. Pulmonary tuberculosis — suggested by sputum, breathlessness, haemoptysis, weight loss, fever, night sweats, anorexia, general malaise, and finger clubbing. For more information,

4. Post-infectious cough — suggested by persistent dry cough that started with an obvious respiratory tract infection, systemically well, normal respiratory examination.

5. Bronchitis — suggested by breathlessness, wheeze, or general malaise. Crackles, if present, should clear with coughing..

6. Pneumonia — suggested by at least one symptom of breathlessness, sputum, wheeze, or pleuritic pain, focal chest signs such as dull percussion note, bronchial breathing, or coarse crackles, plus at least one systemic feature such as fever or myalgia.



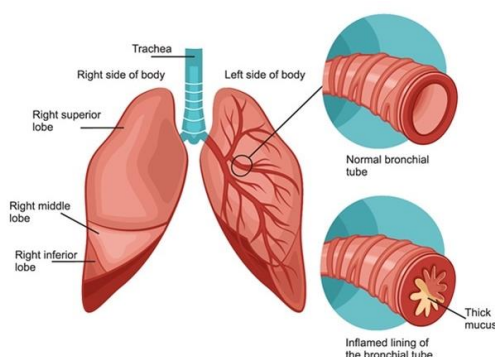
How do I diagnose the cause of sub-acute cough?

There may be signs of an associated pleural effusion..

7. Asthma — suggested by wheeze, breathlessness, worsening symptoms at night, in the morning, or with exercise, and exposure to allergens.

Peak expiratory flow rate is reduced during an episode.

8. Pertussis (whooping cough) — suggested by paroxysms of coughing that often increase in frequency and severity as the condition progresses and usually persist for 2–6 weeks. There may be vomiting after coughing, or an inspiratory whoop. Occasionally the cough may persist for several months.



BRONCHITIS



RED FLAGS

WHEN TO REFER/ TREATMENT

Is systemically unwell.

- Is at high risk of serious complications due to a pre-existing comorbid condition such as heart, lung, kidney, liver or neuromuscular disease, or immunosuppression.
- Is >65 years with ≥ 2 of the following, or >80 years with ≥ 1 of the following:
 - Hospital admission in the previous year.
 - Type 1 or type 2 diabetes mellitus.
 - Known congestive heart failure.
 - Concurrent use of oral corticosteroids.

Prescribe amoxicillin 500 mg three times daily for 5 days, or if there is a true penicillin allergy, doxycycline 200 mg on the first day then 100 mg once daily, for a total of 5 days.

- If amoxicillin and doxycycline are contraindicated, prescribe clarithromycin 500 mg twice daily for 5 days

After the acute infection, consider whether pneumococcal or influenza immunization is necessary



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COMMUNITY ACQUIRED PNEUMONIA



RED FLAGS

The choice of antibiotic indicated is dependent on the severity of the illness.

If CRB-65 score is 0, prescribe amoxicillin 500 mg three times daily for 5 days, or if there is a true penicillin allergy, prescribe doxycycline 200 mg on the first day then 100 mg once daily, for a total of 5 days, or clarithromycin 500 mg twice daily for 5 days.

Review the person after 3 days, and if the response is poor, extend duration of treatment to 7-10 days.

If CRB-65 score is 1 or 2, consider prescribing dual therapy with amoxicillin 500 mg three times daily and clarithromycin 500 mg twice daily for 7-10 days, or monotherapy with doxycycline for 7-10 days.

- For details of how to calculate the CRB-65 score.

- For details of dosing regimens, contraindications, and adverse effects of these antibiotics,

Advise the person to seek medical advice within 3 days if symptoms do not begin to improve, or earlier if symptoms worsen as hospital admission may be needed.

WHEN TO REFER/ TREATMENT

Use [CRB-65](#) score to help decide whether a person with suspected community-acquired pneumonia required hospital admission

- Score of 3 or more, arrange urgent admission to hospital.
- Score of 2, hospital admission is usually advised.
- Score of 0 or 1, treatment at home may be appropriate, depending on clinical judgement and available social support.

Use clinical judgement in deciding if a person should be admitted. Other factors that should also be considered include:

1. The person's wishes.
2. Social support available.
3. Pre-existing comorbid conditions and general frailty.
4. If the person is pregnant.
5. Pulse oximetry - people with oxygen saturation less than 94% require admission to hospital.
6. Arrange chest X-ray after 6 weeks for all people: With symptoms and signs that are slow to resolve or persist despite treatment.
7. Who smoke and are over 60 years of age.
8. Ensure smoking cessation advice is given and reinforced (where appropriate)



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Explain to the person that after starting antibiotic treatment, symptoms should improve, although the rate of improvement will vary with the severity of illness. Discuss the natural history of pneumonia symptoms, that by:

- 1 week - fever should have resolved.
- 4 weeks - chest pain and sputum production should have substantially reduced.
- 3 months - most symptoms should have resolved but fatigue might still be present.
- 6 months - symptoms should have fully resolved.

Additional Tips on Treatment

Analgesics

The recommendation to use paracetamol or ibuprofen for symptomatic relief is pragmatic, based on what CKS considers to be good medical practice.

Preventing dehydration

The recommendation that adequate fluid intake should be maintained is pragmatic, based on what CKS considers to be good medical practice. Dehydration occurs in people with acute bronchitis due to increased fluid losses from sweating and/or a reduced fluid intake due to general malaise. Many of the symptoms of dehydration such as headache, dry mouth, and general malaise may be wrongly attributed to their infective illness rather than dehydration.

Cough Medicines

Over the counter cough medicines are not recommended to suppress a productive cough because they suppress the natural mechanism that keeps the airway clear. Additionally, there is no good evidence that cough medicines available over the counter are effective [Smith, 2014].

Smoking Cessation

The recommendation to advise smoking cessation is pragmatic, based on what CKS considers to be good medical practice. Smoking causes irritation to the bronchial tree which is already inflamed due to infection. Smoking cessation reduces the risk of further episodes of acute bronchitis, in addition to conferring many other health benefits.



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Cardio-Respiratory Competencies



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HISTORY TAKING AND DOCUMENTATION

Demonstrates and reflects upon the use of interpersonal skills in the interaction with patients/clients and the multi-disciplinary team Individual client-centered, holistic care

- Displays active listening, counseling skills
- Uses appropriate techniques to guide consultation
- Modifies questioning techniques as appropriate for client/patient
- Non-verbal communication skills
- Psychosocial and cultural aspects of client assessment
- Appropriate interpersonal skills when liaising with multi-disciplinary team
- Develops opportunities for health education within the consultation
- Prepares appropriate environment .Use of variety of approaches appropriate to consultation
- Gains patient consent at the outset. Enquires about source of referral Systematic approach:
- PQRST/SOCRATES. Any first aid. Relief / aggravation /radiation. Associated symptoms
- Clarifies presenting complain (PC) and uses patients own words when possible
- Past medical / surgical history - past hospitalisation, past & current illness, injuries, medical or surgical interventions and anaesthetics
- Medication – include all current, relevant past medicines, OTC Tetanus immunisation / vaccination history. Allergies - drug & environmental allergies
- Comprehensive social and family history, genogram and systems overview.
- Effective listener. Reassurance to patient & carer/relatives
- Awareness of limitations of history taking process. Accurate documentation



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HISTORY TAKING AND DOCUMENTATION

| HISTORY TAKING | DONE | NOT DONE |
|---|------|----------|
| Introduces themselves, checks patients details and obtains consent | | |
| Presenting complaint | | |
| History of presenting complaint Appropriate use of: OLDCART "" SOCRATES "" PQRST "" | | |
| Past medical history Include/Exclude: Jaundice "" Anaemia/blood "" disorders MI "" TB "" HTN/heart "" disease Rheumatic "" fever Epilepsy "" Asthma/COPD "" Diabetes "" Stroke "" Cancer "" | | |
| Drug history : OTC, Prescribed and Herbal, Street drugs | | |
| Allergies: Medication, Food, Elastoplast, Pollen, Animals | | |
| Social history including sexual history (if appropriate) Occupation, Marital status, Dependents, smoking, diet Travel, hobbies | | |
| Family history: Genogram | | |
| Review of systems: CVS, Resp, HEENT, Musculoskeletal, GI,GU, Skin, Neuro, Gynae | | |
| Appropriate clinical interviewing/questioning. Listens to patient. Structured History Taking | | |

HISTORY TAKING AND
DOCUMENTATION

| | | |
|----------|-----------|------|
| ASSESSOR | SIGNATURE | DATE |
| | | |
| STUDENT | SIGNATURE | DATE |
| | | |

MENTOR FEEDBACK

REFLECTION ON PRACTICE Use this section to reflect on your completion of this competency and any feedback from mentor or service users.



RESPIRATORY

Able to perform systematic examination. See below.

- Accurate documentation. Formulates appropriate plan of care
- **Assessment skills are recommended but not compulsory for meeting this competency.**

However, student must demonstrate an understanding of these techniques.

| CARDIO-RESPIRATORY SYSTEM | DONE | NOT DONE |
|--|------|----------|
| Global assessment of the patient and obtains consent. | | |
| Vital signs requested with appropriate response when provided | | |
| Does JACCOL: Checking for jaundice, anaemia, cyanosis, clubbing, oedema and lymphadenopathy. | | |
| Examines hand for radial pulse commenting on rate and depth. Compares pulses both hands and carotids. | | |
| Inspection <ul style="list-style-type: none"> • Chest symmetry, shape, scarring and visible impulses • Comments on chest shape. • Comments on JVP | | |
| Palpates <ul style="list-style-type: none"> • Trachea and comments on position. • Chest expansion • Tactile vocal fremitus • Uses 'z' manoeuvre to check for heaves and thrills. • Palpates and comments on apex beat. • Checks for generalised chest tenderness. | | |
| Percussion <ul style="list-style-type: none"> • Percusses above clavicles • Percusses anterior, posterior and lateral chest. • Discusses findings including dullness, tympany and hyper-resonance. | | |



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| | | |
|---|--|--|
| Auscultation <ul style="list-style-type: none"> ▪ Carotids ▪ Cardiac sites: Aortic, Pulmonic, Tricuspid and Mitral ▪ Has a brief understanding of cardiac murmurs. ▪ Anterior, Posterior and Lateral Chest ▪ Discusses findings including vesicular sounds, wheeze, stridor and rhonchi | | |
| Provides a provisional diagnosis and discusses differentials | | |
| Clear and logical sequence to the interaction within the consultation | | |
| Clear, feasible clinical impression and decision. Gives guidance as to further action or treatment or follow up and onwards destination including worsening advice. | | |



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CARDIO-RESPIRATORY
ASSESSMENT

MENTOR FEEDBACK

REFLECTION ON PRACTICE Use this section to reflect on your completion of this competency and any feedback from mentor or service users.



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REFERENCES

1. ABPI Medicines Compendium (2014a). Summary of product characteristics for Klaricid XL 500mg tablets. Electronic Medicines Compendium. Datapharm Communications Ltd. www.medicines.org.uk
2. ABPI Medicines Compendium (2014b). Summary of product characteristics for Clarithromycin 250g film-coated tablets. Electronic Medicines Compendium. Datapharm Communications Ltd. www.medicines.org.uk
3. Alberta Medical Association (2008). The management of acute bronchitis. Alberta Medical Association. www.topalbertadoctors.org
4. Braman, S.S. (2006). Chronic cough due to acute bronchitis: ACCP evidence-based clinical practice guidelines. *Chest* 129(Suppl. 1), 95S-103S.
5. British Thoracic Society (2009). BTS guidelines for the management of community acquired pneumonia in adults: update 2009. British Thoracic Society. www.brit-thoracic.org.uk
6. FSRH (2011). . Drug interactions with hormonal contraception. Faculty of Sexual and Reproductive Healthcare. www.fsrh.org
7. HPA and Association of Medical Microbiologists (2008). Management of infection guidance for primary care for consultation and local adaptation .Health Protection Agency. www.hpa.org.uk
8. Lim, W.S., van der Eerden, M.M., Laing, R. et al. (2003) Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. *Thorax* 58(5), 377-382.
9. Macfarlane, J., Holmes, W., Gard, P. et al. (2001) Prospective study of the incidence, aetiology and outcome of adult lower respiratory tract illness in the community. *Thorax* 56(2), 109-114.
10. Metlay, J.P., Kapoor, W.N. and Fine, M.J. (1997). Does this patient have community-acquired pneumonia? Diagnosing pneumonia by history and physical examination. *Journal of the American Medical Association* 278(17), 1440-1445
11. Morice, A.H., McGarvey, L. and Pavord, I. (2006). Recommendations for the management of cough in adults. *Thorax* 61(Suppl 1), i1-i24.
12. NICE (2008a). Respiratory tract infections: antibiotic prescribing. Prescribing of antibiotics for self-limiting respiratory tract infections in adults and children in primary care (NICE guideline). . Clinical guideline 69. National Institute for Health and Care Excellence. www.nice.org.uk
13. NICE (2013). Key therapeutic topics - medicines management options for local implementation. National Institute for Health and Care Excellence. www.nice.org.uk
14. NICE (2014). Pneumonia in adults: diagnosis and management. National Institute for Health and Care Excellence. www.nice.org.uk
15. NPC (2011). Key therapeutic topics 2010/11 - Medicines management options for local implementation .National Prescribing Centre. www.npc.nhs.uk



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REFERENCES

16. PC (2012). Key therapeutic topics - medicines management options for local implementation. National Prescribing Centre. www.npc.nhs.uk
17. Smith, et al. (2014a). Over-the-counter (OTC) medications for acute cough in children and adults in community settings. Cochrane Library. Cochrane Library. www.cochranelibrary.com
18. Taylor-Robinson, D. (2003). Mycoplasmas. In: Warrell, D.A., Cox, T.M., Firth, J.D. and Benz, E.J, Jr. (Eds.) Oxford textbook of medicine. 4th edn. Oxford: Oxford University Press



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