RESP MEDICINE
Questions&Answers

Q-1

A 32 year old female smoker has a history of wheeze, shortness of breath and fever. Her past medical history includes eczema. FEV1/forced vital capacity (FVC) was measured and was found to be low. This was improved after taking bronchodilators. What is the SINGLE most likely diagnosis?

A. COPD
B. Infective exacerbation of asthma
C. Tuberculosis
D. Bronchiectasis
E. Chronic bronchitis

ANSWER:
Infective exacerbation of asthma

EXPLANATION:
Asthma - Risk factors, presentation and diagnosis
Asthma is characterised by paroxysmal and reversible obstruction of the airways.

It is a clinical diagnosis based on:
- A history of recurrent episodes of wheeze, chest tightness, breathlessness,and/or
cough, particularly at night
- Evidence of generalized and variable airflow obstruction, which may be detectedas
intermittent wheeze on examination or via tests such as peak expiratory flow(PEF)
measurement

Acute asthma involves:
- Bronchospasm (smooth muscle spasm narrowing airways)
- Excessive production of secretions (plugging airways)

Risk factors
Asthma is due to a combination of genetic and environmental factors
- Personal history of atopy
- Family history of asthma or atopy
- Inner city environment; socio-economic deprivation

- Prematurity and low birth weight
- Viral infections in early childhood
- Smoking
- Maternal smoking

Presentation
- Cough
- SOB
- Wheeze
- Chest tightness.

Classically, these are variable, intermittent, worse at night and in early morning, and are
associated with specific triggers

Triggers include
- Pollens
- cat and dog dander
- cold air
- perfumes

Note: Symptoms may present after taking aspirin or beta-blockers

Examination:
- May be entirely normal

In a mild attack
- Slight tachypnoea, tachycardia
- Classically, expiratory wheeze is heard (widespread wheeze)

In a severe life-threatening attacks
- Use of accessory muscles of respiration
- Diminished breath sounds, loud wheezing, hyper-resonance (increased vocalfremitus)
and intercostal retraction
- The chest may appear hyperinflated
- Sometimes, in severe life-threatening asthma, there may have no wheeze at alland a
silent chest

In long standing/poorly controlled asthma
- Chest deformity/hyperinflation may be seen

Diagnosis:
This is often a clinical diagnosis but should be supported by objective measurements.
The diagnosis is based on the presence of:
- Symptoms (cough, wheeze, breathlessness)
- PFTs show an obstructive pattern that typically reverses with bronchodilation
- Day-to-day peak flow variability
- Otherwise unexplained low forced expiratory volume in one second (FEV1) orpeak
expiratory flow (historical or serial readings)

- Otherwise unexplained peripheral blood eosinophilia

Where diagnosis is uncertain (intermediate probability) but with demonstration ofairway obstruction (FEV1/forced vital capacity (FVC) <0.7), reversibility testing and/or atrial of treatment are suggested.

Chest x-ray findings are nonspecific in an asthmatic attack. It should not be usedroutinely in the assessment of asthma but consider CXR in any patient presenting withan atypical history or with atypical findings on examination. CXR if atypical symptoms,may show hyperinflation. The chest x-ray may be helpful in ruling out acute infection asthe cause of an acute attack.

Asthma VS COPD
One differential diagnosis that is worth mentioning is COPD.
- Reversibility distinguishes asthma from COPD
- COPD is rarely totally refractory to medication.
- Almost all patients with COPD do smoke or have smoked in the past.
Asthmaticscan
also develop COPD.

Q-2

A 6 year old girl has had 2 short episodes of cough and wheeze over the last 12 months. These 2 acute episodes responded quickly to bronchodilator. She has no symptoms or abnormal physical signs at the moment. She has slight eczema and her mother has a history of asthma when she was young. What is the SINGLE most appropriate investigation?

A. Chest X-ray
B. Peak flow rate diary
C. Pulse oximetry
D. Spirometry
E. Sweat test

ANSWER:
Spirometry

EXPLANATION:
Spirometry is now preferred over peak flow masurement for initial confirmation of obstrucion of airways in the diagnosis of asthma, as it is felt to offer clearer identification of airway obstruction, to be less effort-dependent and more repeatable.

Q-3

A 68 year old woman presents to the emergency department from her nursing home complaining of shortness of breath. She has a temperature of 38.7 C and productive cough. Her sputum is noted to be a rusty colour. On auscultation, crackles are heard over the right lung base. A chest X-ray was done and shows right lower lobe consolidation. She has a blood pressure of 100/65 mmHg and a pulse rate of 102 beats/minute. A urinalysis shows 1+ leukocytes with no nitrates or protein. What is the SINGLE most likely organism causing her symptoms?

A. Streptococcus pneumoniae
B. Staphylococcus aureus
C. Coxiella burnetti
D. Mycoplasma pneumoniae
E. Escherichia coli

ANSWER:
Streptococcus pneumoniae

EXPLANATION:
This is a typical presentation of streptococcus pneumoniae infection. Streptococcuspneumoniae (pneumococcus) is the most common cause of community-acquiredpneumonia.

The urinalysis has no correlation with the pneumonia. It is important to remember thaturinary tract infections are a common cause of sepsis in the elderly, but in this case, it isnot a UTI as the findings are associated with pneumonia.

Q-4

A 48 year old man with a 30 pack year smoking history is found to have an incidental finding of a chest X-ray showing a 2 cm hilar mass and was referred to the respiratory team for a biopsy. The histology report has returned with findings of large polygonal cells containing keratin pearls and intercellular bridges. What is the SINGLE most likely type of lung cancer?

A. Adenocarcinoma
B. Squamous cell carcinoma
C. Large cell carcinoma
D. Undifferentiated non-small cell lung cancer
E. Mesothelioma

ANSWER:
Squamous cell carcinoma

EXPLANATION:
Histopathologically, squamous cell carcinomas can be divided into keratinizing and nonkeratinizing types. Keratinizing carcinomas are defined as tumours in which malignant cells produce extracellular keratin, most frequently in the form of keratin pearls.

This question tests your histopathology knowledge. Knowing that squamous cell carcinoma cell histology can be described as islands of large polygonal malignant cells containing keratin pearls and intercellular bridges is the only step to get this answer correct.

Other hints to help you with this question:

- Squamous cell carcinoma has a strong smoking history link whereas adenocarcinomas are the most common type of lung cancer in NON-smokers

Note: Although adenocarcinoma is the most common type of cancer in non-smokers, majority of patients who develop adenocarcinoma are indeed smokers

- Squamous cell carcinomas usually present centrally whereas adenocarcinoma and large cell lung carcinoma present peripherally
  *Mnemonic: **S***
  ***S**quamous cell carcinoma and **S**mall cell lung cancer present **S**entrally (central lesions)*

Q-5

A 27 year old female attends outpatient department with a fever and dry cough. She has had a headache, muscle pain and joint pain for more than one week. She has a temperature of 37.5 C, a pulse of 100 beats/minute, a blood pressure of 110/70 mmHg and a respiratory rate of 20 breaths/minute. A Chest X-ray report shows bilateral patchy consolidation. What is the SINGLE most likely causative organism?

A. Pneumococcal pneumonia
B. Legionella
C. Mycoplasma pneumoniae
D. Klebsiella
E. Chlamydia pneumoniae

ANSWER:
Mycoplasma pneumoniae

EXPLANATION:
Mycoplasma pneumoniae
Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects youngadults.

Features
- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray

Note: Occasionally, PLAB may also give a presentation of erythema multiforme alongwith the atypical pneumonia symptoms. Erythema multiforme is one of the features ofinfection with mycoplasma pneumoniae.

Q-6

A 67 year old smoker presents with cough, breathlessness and wheeze. 24% oxygen by Venturi face mask was initiated and nebulized salbutamol and hydrocortisone were administered. As his dyspnoea did not improve, intravenous aminophyllin was administered and an arterial blood gas was sent. He has a respiratory rate of 32 breaths/minute. His arterial blood gas results show:

pH 7.32
pCO2 7.7 kPa
pO2 10.1 kPa

What is the SINGLE most appropriate next step in management?

A. Non-invasive ventilation
B. Invasive mechanical ventilation
C. Long-acting beta-adrenoceptor agonist
D. Intravenous doxapram hydrochloride
E. Oral amoxicilin

ANSWER:
Non-invasive ventilation

EXPLANATION:
This question is testing your knowledge on the management of acute exacerbation ofCOPD. The reason that this is likely COPD instead of asthma is because of his age, thefact that he is a smoker, and the choice of administering 24% of oxygen rather than100% oxygen. 24% of oxygen gives the clue that he is on controlled O2 therapy with theattempt to maintain saturations between 88% and 92% to balance hypoxia, hypercapniaand pH which is seen as part of the management for COPD.

Non-invasive ventilation would be the next step in management as it is particularlyeffective in supporting patients during an exacerbation especially when maximal medicaltreatment has not been effective like in this case. Its use is appropriate for consciouspatients with ongoing respiratory acidosis (< pH 7.35).

Note that oral antibiotics should ONLY be given if there is purulent sputum or clinicalsigns of pneumonia. While it is common practice for all patients with an exacerbation ofCOPD to receive antibiotics in the hospital, it is not according to NICE guidelines and forthe purpose of this exam, antibiotics should not be administered to manage acuteexacerbation COPD unless we suspect pneumonia.

The reason why invasive mechanical ventilation is an inappropriate answer is that it hasits own complications such as pneumonia, barotrauma, and failure to wean tospontaneous ventilation. Thus, it should not be used unless non-invasive ventilation failsor is contraindicated such as in scenarios like respiratory arrest, high aspiration risk, orimpaired mental status.

Doxapram is also an incorrect answer. Doxapram is a respiratory stimulant. It is givenintravenously and can be used to drive respiratory rate if respiratory rate was less than20 breaths/minute. In this case, the respiratory rate is 32 breaths/minute hence there isno problem with the respiratory drive. Its use has largely been replaced by non-invasiveventilation.

Management of acute exacerbation of COPD
- Antibiotics if sputum is purulent or clinical signs of pneumonia
- Prednisolone 30mg/day for 7-14 days
- Inhaled or nebulized bronchodilators
- Controlled O2 therapy 24% via Venturi face mask, with oximetry → Maintain saturations between 88% and 92%
- IV aminophylline → Beneficial if the patient is wheezy and has not improvedwith

nebulizers alone
- Non-invasive ventilation → Effective in supporting patients during an exacerbation when maximal medical treatment has not been shown to be effective

Q-7

A 27 year old man presents with chest pain and respiratory distress following a road traffic accident. On examination, his neck veins are noted to be distended and trachea is deviated to right. Breath sounds are absent on the left and diminished on the right lung field. He has a blood pressure of 80/40 mmHg and a heart rate of 120 beats/minute. What is the SINGLE most appropriate next action?

A. Chest X-ray
B. Insertion of a cannula into the left second intercostal space
C. Insertiion of a cannula into the right second intercostal space
D. Insertion of a chest drain into the right mid-axillary line
E. Insertion of a chest drain into left mid-axillary line

ANSWER:
Insertion of a cannula into the left second intercostal space

EXPLANATION:
The features described is diagnostic of left sided tension pneumothorax

Tension Pneumothorax
Presentation
- Acute respiratory distress
- Hypotension
- Raised jugular venous pressure
- Tracheal deviation away from the pneumothorax side
- Reduced air entry on affected side

Management of a tension pneumothorax
If strong clinical suspicion, give high-flow oxygen and insert large-bore cannula into
second intercostal space in midclavicular line on side of pneumothorax.
- Do not wait for a chest X-ray if patient seriously compromised or cardiac arrest has occurred or if the diagnosis is clinically certain
- Hiss of escaping air confirms diagnosis
- Air should be aspirated until the patient is less distressed. Then insert a chest drain in mid-axillary line, leaving the cannula in place until you have finished and the underwater seal is bubbling satisfactorily

Comparing simple and tension pneumothorax

Simple pneumothorax		Tension Pneumothorax	
Trachea	↓	**Trachea**	→
Expansion	↓	**Expansion**	↓
Percussion Note	↑	**Percussion Note**	↑
Breath sounds	→	**Breath sounds**	→
		Neck veins	↑

PNEUMOTHORAX TYPES

Primary spontaneous pneumothorax

- Occurs without an apparent cause

Secondary spontaneous pneumothorax

- Occurs in presence of existing lung pathology e.g. COPD

Simple pneumothorax

- Non-expanding collection of air around the lung

Tension pneumothorax

- Expanding collection of air around the lung

Think of tension pneumothorax as a "one way valve" where air is allowed to enter around the lung but cannot escape it. Although this is not entirely true because air can actually still escape a little, hopefully this analogy gives you the idea of a tension pneumothorax.

Q-8

A 20 year old man suddenly develops shortness of breath over the last day. It started when he was playing football. The shortness of breath was associated with right sided pleuritic chest pain. On examination, reduced air entry with hyper-resonance was noted over the right lung field. His oxygen saturation was 91% on room air. What is the SINGLE most likely diagnosis?

A. Asthma
B. Spontaneous pneumothorax
C. Tension pneumothorax
D. Sarcoidosis
E. Chronic obstructive pulmonary disease (COPD)

ANSWER:
Spontaneous pneumothorax

EXPLANATION:
Dyspnoea and chest pain in a young man are features of primary spontaneouspneumothorax. This occurs when a subpleural bullous ruptures.

One of the major differences between spontaneous pneumothorax from tensionpneumothorax is that the patient does not have a deviated trachea away from theaffected side.

Primary pneumothorax
Primary spontaneous pneumothoraces occur most commonly in tall thin men agedbetween 20 and 40. They usually occur in the healthy.

Cigarette is a major risk factor for pneumothorax. The mechanism is unclear; asmokinginducedinflux of inflammatory cells may both break down elastic lung fibres (causingbulla formation) and cause small airways obstruction (increasing alveolar pressure andthe likelihood of interstitial air leak)

- More common on the right side
- Less than 10% of cases are bilateral
- Usually caused by rupture of small subpleural blebs (collections of air < 2cm)

Presentation
- Dyspnoea, chest pain, cough, tachypnoea
- Ipsilateral decreased chest wall movement, hyperresonant hemithorax topercussion

Q-9

A 33 year old man is brought into the emergency department following a road traffic accident. He is seen to be very short of breath. He has no breath sounds over the right side of his chest. On percussion, the right chest is noted to be hyper-resonant. On examination, his trachea is deviated to the left. His heart rate is 120 beats/minute. His blood pressure is 90/65 mmHg, and has an oxygen saturation of 85% on 15 L of oxygen. What is the SINGLE most appropriate course of action?

A. Arterial blood gas
B. Urgent chest X-ray
C. Needle decompression
D. Urgent computed tomography scan of chest
E. Insertion of a chest drain

ANSWER:
Needle decompression

EXPLANATION:
This man has rapidly developed the signs of a pneumothorax. Needle decompression needs to be immediately done using a large bore cannula into the second intercostal space at the midclavicular line just above the third rib to avoid the neurovascular bundle.

As the needle is withdrawn, a hiss will be heard as the lung decompresses. Air should be remvoed until the patient is no longer compromised. This is usually followed by anxillary drain

The other less appropriate answers:
Investigations like ABG and chest X-ray → should be deferred as this is a serious
situation that would lead to cardiorespiratory arrest unless addressed.

Insertion of a chest drain → will be needed but not until the air has been removed and lung decompressed.

Insertion of a cannula into the left second intercostal space → Clearly a wrong answeras the trachea is deviated towards the left. This means that the tension pneumothorax ison the right.

Q-10

A 50 year old woman returned by air to UK from Australia. 3 days later, she presents with a sharp chest pain and breathlessness. Her chest X-ray and ECG are normal. What is the SINGLE most appropriate investigation?

A. Bronchoscopy
B. Cardiac enzymes
C. CT pulmonary angiogram (CTPA)
D. MRI
E. Pulse oximetry

ANSWER:
CT pulmonary angiogram (CTPA)

EXPLANATION:
Prolonged plane journey is a recognized risk factor for thromboembolism and hencepulmonary embolism as well. Sharp chest pain and breathlessness after 3 days of planejourney is highly suggestive of pulmonary embolism. CTPA is the answer here as it is thebest test among the other options which provide a definitive diagnosis of pulmonaryembolism.

TWO-LEVEL PE WELLS SCORE

Clinical feature	**Points**
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3
An alternative diagnosis is less likely than PE	3
Heart rate > 100 beats per minute	1.5
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment, treated in the last 6 months, or palliative)	1

Clinical probability simplified scores
- PE likely - more than 4 points
- PE unlikely - 4 points or less

More than 4 points → Arrange an immediate computed tomography pulmonaryangiogram (CTPA)

4 points or less → Arranged a D-dimer test. If this is positive arrange an immediatecomputed tomography pulmonary angiogram (CTPA)

If anytime there is a delay in getting the CTPA → Give low-molecular weight heparinuntil the scan is performed

If the patient has an allergy to contrast media or renal impairment → A V/Q scanshould be used instead of a CTPA

Occasionally, questions will have a question with a patient with typical signs and symptoms of pulmonary embolism and options of a CTPA and V/Q scans would be in the
mix. Which one would you perform?
- *Pick the CTPA over the V/Q scans*

The consensus view from the British Thoracic Society and NICE guidelines is as follows:

- *Computed tomographic pulmonary angiography (CTPA) is now therecommended initial lung-imaging modality for non-massive PE. Advantagescompared to V/Q scans include speed, easier to perform out-of-hours, a reduceneed for further imaging and the possibility of providing an alternative diagnosisif PE is excluded*
- *If the CTPA is negative then patients do not need further investigations ortreatment for PE*

MORE ON PULMONARY EMBOLISM AND PREGNANCY

What should you pick if you suspect PE in a pregnant woman? CTPA or V/Q scans?

The Royal College of Obstetricians and Gynaecologists (RCOG) recommends that a chest x-ray should be ordered before deciding whether a V/Q scan or CTPA should be done. The reason that RCOG recommends a chest X-ray first is that it may identify other pulmonary disease such as pneumonia, pneumothorax or lobar collapse and the radiation dose to the fetus from a chest X-ray is so low it is negligible.

The choice of an imaging modality for definitive diagnosis (CTPA or V/Q scan) will usually depend on local availability and individual hospital protocols.

So what should we pick if given such a question?

- Pick CTPA if chest X-ray is abnormal and there is a clinical suspicion of pulmonary embolism
- Pick V/Q if chest X-ray is normal and there is a clinical suspicion of pulmonary embolism

CTPA	V/Q Scan
Lower risk of radiation to fetus but higher radiation to maternal breast tissue - Increased risk of breast cancer for mom More readily available compared to V/Q scan	More risk of radiation to fetus but lower radiation to maternal breast tissue - Increased risk of childhood cancers

Note in both CTPA and V/Q scans, the absolute risk for the above is very small.

Q-11

A 49 year old man was admitted 5 days ago with feve, poor oral intake, cough and shortness of breath. His medical history includes a recent renal transplant which he has been on immunosuppressants. A chest X-ray during admission demonstrates streaky and fibrotic lesions in both lungs. As his symptoms worsened, the respiratory team performed a diagnostic bronchoscopy with bronchoalveolar lavage which results demonstrate pneumocystis jiroveci cysts. What is the SINGLE most appropriate antibiotic to prescribe?

A. Co-trimoxazole
B. Co-amoxiclav
C. Cefalexin
D. Tazocin
E. Erythromycin

ANSWER:
Co-trimoxazole

EXPLANATION:
The first line treatment for pneumocystis jiroveci is co-trimoxazole (trimethoprim/sulfamethoxazole). This can be given by mouth or intravenously.

Atovaquone is a second-line agent, although it is used only for mild-to-moderate pneumocystis jiroveci.

PNEUMOCYSTIS CARINII PNEUMONIA (PCP) (PNEUMOCYSTIS JIROVECI PNEUMONIA)
Whilst the organism Pneumocystis carinii is now referred to as Pneumocystis jiroveci,the term Pneumocystis carinii pneumonia (PCP) is still in common use.

Pneumocystis pneumonia (PCP) is a major cause of morbidity and mortality amongimmunocompromised people. It remains a leading AIDS-defining opportunistic infectionin HIV-infected individuals.

HIV infection is a particularly important risk factor especially if CD4 count < 200/mm³thusall patients with a CD4 count < 200/mm³ should receive PCP prophylaxis

Features
- Exertional dyspnoea
- Gradual onset of dry cough
- Fever
- Tachypnoea
- Chest pain or retrosternal tightness
- May be signs of AIDS e.g. Thrush
- Chest examination is typically normal

Think of flu-like symptoms in an immunocompromised patient.

Desaturation on exercise may suggest the diagnosis in individuals at risk of PCP withnormal saturations at rest. This is pathognomonic for PCP so in the outpatient setting, it is good practice to monitor oxygenation by pulse oximetry after walking in patients you suspect having PCP.

Remember, there are so many causes of pneumonia. The question writers would have togive you some sort of clue if they would want you to pick PCP. The two major clues thatthey can give are a HIV patient, and desaturation on exercise.

Investigation
Sputum often fails to show PCP, bronchoalveolar lavage may be needed todemonstrate PCP. Bronchoscopy with bronchoalveolar lavage is the diagnosticinvestigation of choice in non-HIV-infected patients and in patients with HIV inwhom induced sputum analysis is non-diagnostic.

Management
- Co-trimoxazole (trimethoprim-sulfa) remains the first line treatment

Q-12

A 56 year old lady with lung cancer presents with urinary retention, postural hypotension, diminished reflexes and sluggish pupillary reaction. What is the SINGLE most likely explanation for her symptoms?

A. Paraneoplastic syndrome
B. Progression of lung cancer
C. Brain metastasis
D. Hyponatraemia
E. Spinal cord compression

ANSWER:
Paraneoplastic syndrome

EXPLANATION:
These features are well known features of autonomic neuropathy which can be a resultof paraneoplastic syndrome.

Paraneoplastic syndromes are rare and believed to occur when cancer-fightingantibodies (white blood cells) mistakenly attack normal cells in the nervous system.When one of these syndromes is associated with lung cancer, it is often with small celllung cancer or because the cancer has metastasized to a particular part of the body.

Autoimmune paraneoplastic autonomic neuropathy is a rare paraneoplastic syndrome(PNS), which manifests as disturbance in sympathetic and/or parasympathetic nervoussystem function.

Q-13

A 45 year old chronic smoker attends the outpatient department with complaints of persistent cough and copious amount of purulent sputum. He had history of measles in the past. On examination, finger clubbing is noted and inspiratory crepitations on auscultation is heard. A chest X-ray shows tram track opacies. What is the SINGLE most likely diagnosis?

A. Interstitial lung disease
B. Bronchiectasis
C. Asthma
D. COPD
E. Sarcoidosis

ANSWER:
Bronchiectasis

EXPLANATION:
The history of smoking here is irrelevant as smoking does not appear to be anindependent risk factor but smoking cessation is important as part of the management if
the patient does smoke.

The persistent cough and copious amount of purulent sputum are symptoms ofbronchiectasis. Measles is a childhood viral infection that is one of the aetiologies ofbronchiectasis. Finger clubbing is not a specific sign but has been seen in bronchiectasisalthough not very frequently. Inspiratory crepitations and a chest-x ray that showstramlines give a more specific picture pointing towards bronchiectasis. Although theseare not diagnostic, the most probable diagnosis among the others is bronchiectasis. Onlya high-resolution computed tomography (HRCT) chest would give you the diagnosis ofbronchiectasis.

Bronchiectasis
Is the irreversible abnormal dilatation of of small and medium sized bronchi, withchronic airway inflammation. It is associated with chronic sputum production, chroniccough, recurrent acute chest infections, and airflow obstruction.

Aetiology
The disease is caused by chronic inflammation of the airways. It may therefore becaused by a large number of disorders which cause inflammation and infection,particularly conditions that facilitate infections, which therefore tend to be recurrentand more severe and so cause damage to the lungs. In general, the aetiology is either aone-off infectious insult or an underlying immune deficiency.
Post-infection: childhood respiratory viral infections (measles, pertussis,influenza, respiratory syncytial virus), tuberculosis, bacterial pneumonia.Infection is the most common cause of bronchiectasis
*Immunodeficiency:*HIV infection. Always consider this as a cause in all ages,particularly if there have been serious, persistent or recurrent infections
*Connective tissue diseases*e.g. rheumatoid arthritis, Sjögren's syndrome,systemic sclerosis, systemic lupus erythematosus (SLE), Ehlers-Danlos syndrome,Marfan's syndrome
*Toxic insults:*Gastric aspiration, inhalation of toxic gases
*Congenital defects:*The most important one being cystic fibrosis

Bronchial obstruction and bronchopneumonia are more likely to cause a focalbronchiectasis, whereas the other causes are more likely to result in diffuse disease.

All conditions cause dilation of the airways (due to continued inflammation destroyingtheir elastic and muscular structure) followed by poor mucus clearance, and bacterialcolonisation of collected mucus. This then can progress, as chronic infection causesfurther inflammation in a cyclical fashion.

Note
- The most important cause to exclude is CF. Even relatively mild bronchiectasis diagnosed in middle age can be due to CF
- In the PLAB examination, look out for a history of recurrent pneumonias in the question

Clinical features
- Persistent cough with purulent copious sputum production
- Nonspecific respiratory symptoms including dyspnoea, chest pain andhaemoptysis.
Bronchiectasis may progress to respiratory failure and corpulmonale
- Coarse crackles are the most common finding, heard in early inspiration andoften in
the lower zones
- Large airway rhonchi (low-pitched snore-like sounds)
- Wheeze may be present
- Clubbing is found infrequently

Diagnosis
- Usually made clinically, with high-resolution computed tomography (HRCT) chestfor
confirmation.
- A baseline chest x-ray should be done in all patients. Early chest x-ray findingsmay be
normal in patients with bronchiectasis. Chest x-ray in advanced casesmay show 1 to 2
cm cysts, crowding of the bronchi (tramlines) or ring opacities.The main value of a
CXR is excluding other causes of symptoms.

Treatment
Damaged lung cannot be repaired and so the basis of management is to prevent or atleast slow down further deterioration.
- Bronchodilators, chest physical therapy, and postural drainage are used tocontrol and
improve drainage of bronchial secretions
- If the patient smokes this must be stopped
- Immunisation against influenza and pneumococcus
- Long-term oral antibiotics for patients having three or more exacerbations peryear
requiring antibiotic therapy or patients with fewer exacerbations that arecausing significant morbidity should be considered for long-term antibiotics.Choice will be dictated by sensitivities and local microbiology advice fromsputum test results.

Q-14

A 48 year old presents with increasing shortness of breath over the last few months and a dry cough. He has worked in coal mines for 18 years. Chest x-ray and CT scan of the chest demonstrate characteristic upper zone mass-like scarring with calcification and volume loss. The lung opacifications are seen to be associated with radiating strands. What is the SINGLE most likely diagnosis?

A. Churg-Strauss syndrome
B. Cryptogenic organizing
C. Extrinsic allergic alveolitis
D. Goodpasture's syndrome
E. Progressive massive fibrosis

ANSWER:
Progressive massive fibrosis

EXPLANATION:
The first step to recognition of the answer is to understand that with a history of working in coal mines this is likely Coal worker's pneumoconiosis. Progressive massive fibrosis refers to the formation of large conglomerate masses of dense fibrosis, predominantly in the upper pulmonary lobes. These classically develop in the context of certain pneumoconioses (especially Coal worker's pneumoconiosis and silicosis).

Q-15

A 10 year old girl with diagnosed asthma ishaving frequent coughs and wheezing that wakes her up at night. She is compliant with her asthma medications which consist of a short-acting B2 agonist inhaler as required, inhaled corticosteroid 400 mcg/day and a long-acting B2 agonist inhaler. Her inhaler technique is good. What is the SINGLE most appropriate next step in management?

A. Add daily steroid tablets
B. Increased dose of inhaled corticosteroid
C. Add sodium cromoglicate
D. Intramuscular adrenaline
E. Magnesium sulphate

ANSWER:
Increase dose of inhaled corticosteroid

EXPLANATION:
The answer here is to increase the dose of ICS. The patient is considered to be at step 4 of the BTS guideline which recommends increasing the ICS dose to 800 mcg/day or to consider a trial of Theophylline. Be mindful that children and adult recommendations are different

ASTHMA STEP UP MANAGEMENT ACCORDING TO SIGN/BTS 2016

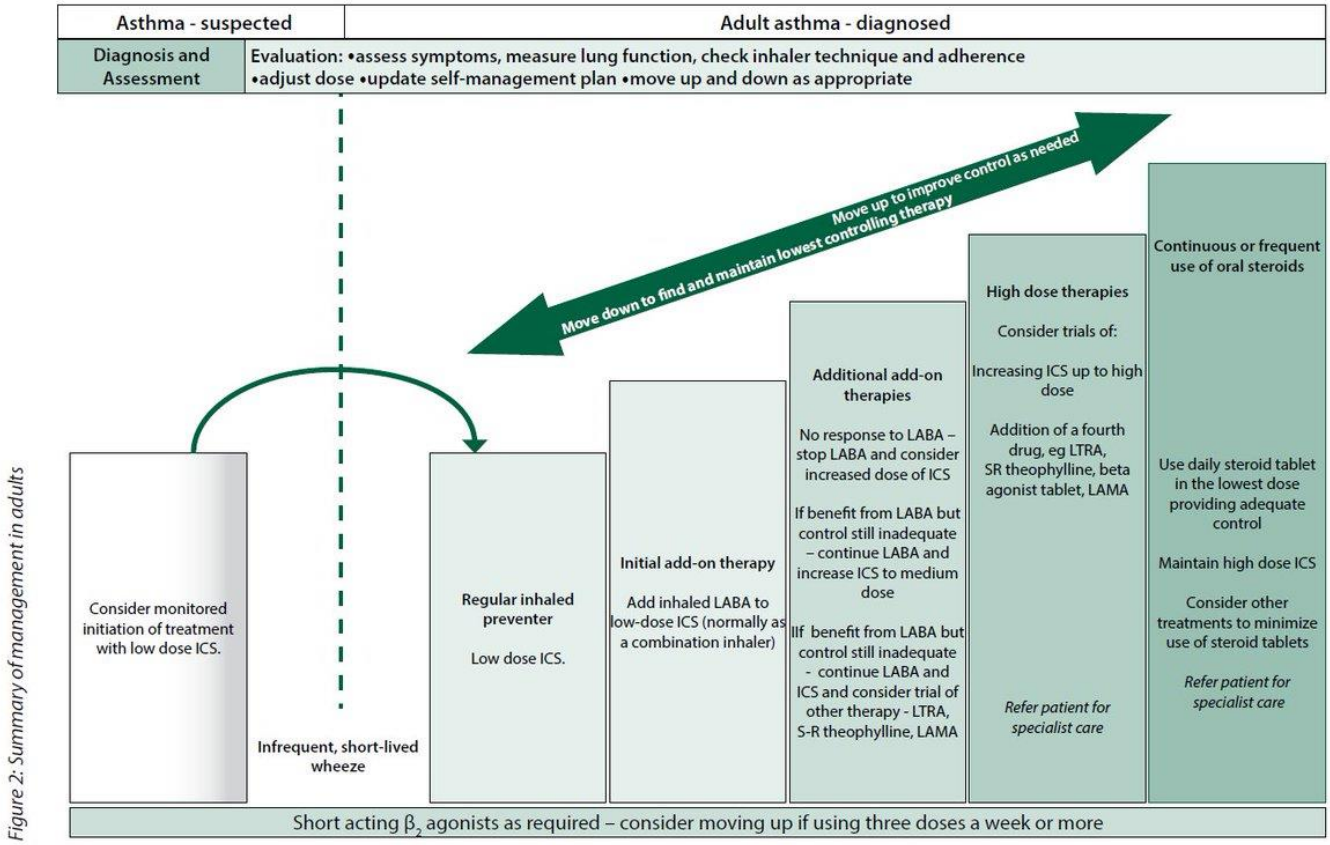
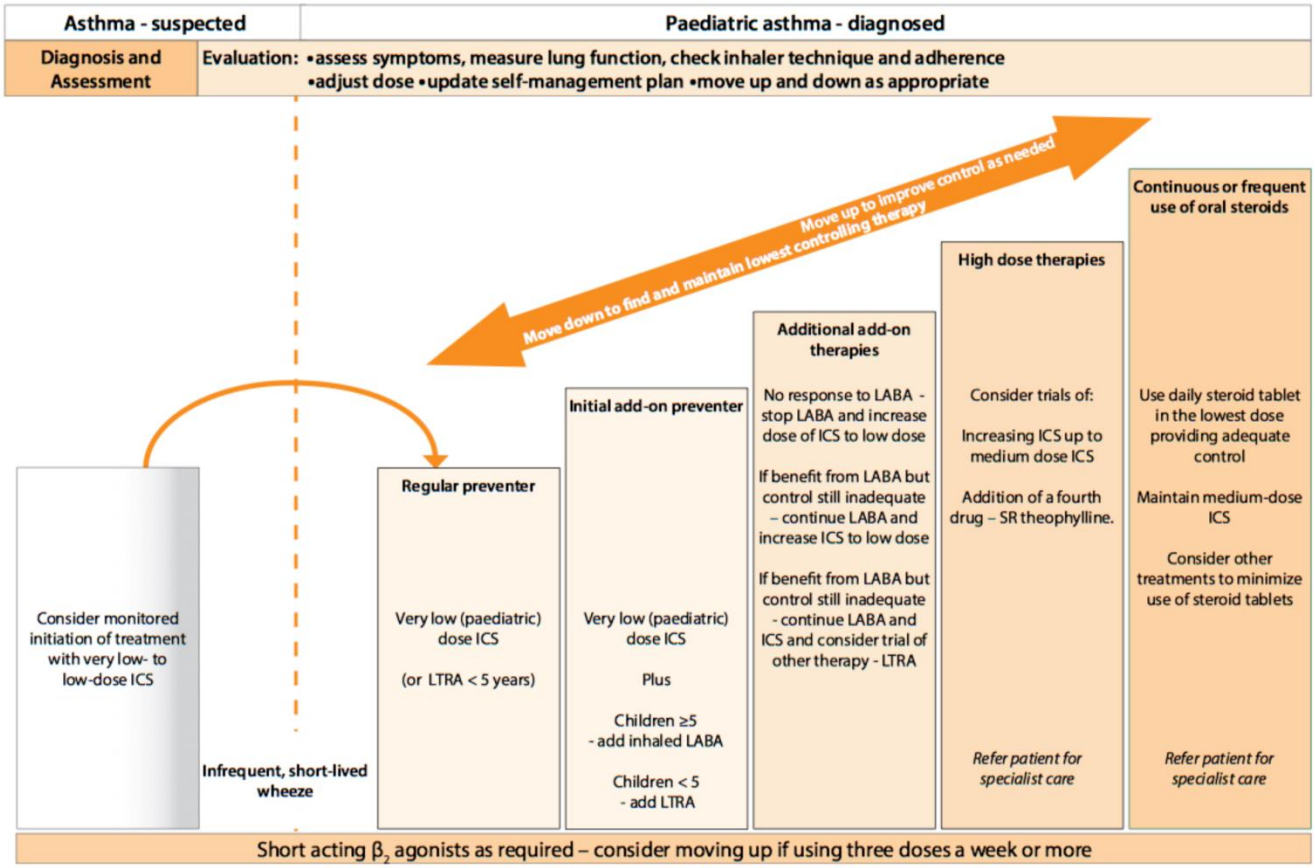


Figure 2: Summary of management in adults



ASTHMA NICE VS BTS/SIGN GUIDELINES FOR CHILDREN

Asthma is characterised by paroxysmal and reversible obstruction of the airways.

Stepwise approach if asthma remains uncontrolled

NICE 2017	SIGN/BTS 2016
Age 5-16	Age 5-12
Step 1 Inhaled short-acting B2 agonist (SABA)as required	*Step 1* Inhaled short-acting B2 agonist (SABA)as required
Step 2 Add paediatric low dose inhaled corticosteroid (ICS) upto 200 mcg/day	*Step 2* Add paediatric very low dose inhaled corticosteroid (ICS) up to 200 mcg/day
Step 3 Add leukotriene receptor antagonist (LTRA) Review response in 4-8 weeks	*Step 3* Add inhaled long-acting B2 agonist (LABA) then assess - If good response to LABA, then continue LABA - If benefit from LABA but control still inadequate then continue LABA and increaase inhaled corticosteroid dose to 400 mcg/day - If no response to LABA, stop LABA and increase inhaled corticosteroid to 400 mcg/day. If control still inadequate, consider leukotriene receptor antagonist
Step 4 Stop LTRA and start inhaled long-acting B2 agonist (LABA) in combination with paediatric low dose inhaled corticosteroid	*Step 4* Consider trials of - Increasing inhaled steroid up to 8000 mcg/day - Add SR theophylline
Step 5 Stop LABA and ICS and start MART* regimen with a paediatric low dose ICS	*Step 5* Use daily steroid tablets
Step 6 Increase to paediatric moderate maintenance dose ICS (either continuing MART or changing to fixed dose ICS + LABA and SABA as reliever	
Step 7 Refer to a respiratory physician for further escalation	

*Maintenance and reliever therapy (MART) is a form of combined ICS and LABA treatment in which a single inhaler, containing both ICS and a fast-acting LABA, is used for both daily maintenance therapy and the relief of symptoms as required. The use of SABA is not needed when on MART.

NICE 2017	SIGN/BTS 2016
Under 5 years	
Step 1 Inhaled short-acting B2 agonist (SABA)as required	*Step 1* Inhaled short-acting B2 agonist (SABA)as required
Step 2 Add paediatric low dose inhaled corticosteroid (ICS) upto 400 mcg/day on an 8-week trial	*Step 2* Add inhaled corticosteroid (ICS) at very low paediatric dose of 200 mcg/day but consider leukotriene receptor antagonist (LTRA) who are unable to take ICS
Step 3 After 8 weeks stop ICS treatment and monitor symptoms. If symptoms - Did not resolve during the trial period, review likelihood of alternative diagnosis - Resolved but re-occurred **beyond** 4 weeks after stopping ICS treatment, repeat the 8-week trial of a paediatric moderate dose of ICS - Resolved then re-occurred **within** 4 weeks of stopping ICS treatment, restart the ICS at a paediatric low dose as first-line maintenance therapy and see Step 4	*Step 3* Add leukotriene receptor antagonist (LTRA) for under 5 years if not already on this
Step 4 Add leukotriene receptor antagonist (LTRA)	*Step 4* Refer to a respiratory physician for further management
Step 5 Refer to a respiratory physician for further management	

Q-16

A 27 year old male is admitted with acute exacerbation of asthma. He is treated intiated with 100% oxygen and salbutamol nebulizers. Intravenos hydrocortisone was prescribed but it was not available in the department. He has a respiratory rate of 21 breaths/minute, a heart rate of 90 beats/minute and an oxygen saturation of 92%. What is the SINGLE most appropriate next step in management?

A. Oral prednisolone 40 mg
B. IV magnesium sulphate
C. IV salbutamol
D. IM adrenaline
E. IV adrenaline

ANSWER:
Oral predinsolone 40 mg

EXPLANATION:
Oral prednisolone and intravenous hydrocortisone has been shown to have similar efficacy. The only benefit of intravenous hydrocortisone compared to oral prednisolone for asthma is for those patients who are vomiting or having severe dyspnoea where they cannot consume oral medication.

ASTHMA – MANAGEMENT OF ACUTE EXACERBATION IN ADULTS
Immediate treatment:

- Start O2 if saturations < 92%, aim sats 94-98%
- Salbutamol 5 mg (or terbutaline 10 mg) nebulized with O2
- Hydrocortisone 100 mg IV or prednisolone 40-50 mg PO

If life-threatening features present:

- Give salbutamol nebulizers every 15 minutes, or 10 mg continuously
- Add in ipratropium 0.5 mg to nebulizers
- Give single dose of magnesium sulphate (MgSO4) 1.2-2 g IV over 20 minutes

If improving within 15-30 minutes

- Nebulized salbutamol every 4 hours
- Prednisolone 40-50 mg PO OD for 5-7 days

Q-17

A 50 year old chronic smoker attended the outpatient department with complaints of chronic productive cough, dyspnoea and wheeze. A chest X-ray was ordered and reported as hyperinflated lung with flattened hemidiaphragm and a small cardiac silhouette. Full blood count shows an increase in haematocrit. What is the SINGLE most likely diagnosis?

A. Interstitial lung disease
B. Wegener's granulomatosis
C. Lung cancer
D. Chronic obstructive pulmonary disease (COPD)
E. Amyloidosis

ANSWER:
Chronic obstructive pulmonary disease (COPD)

EXPLANATION:
The findings are in keeping with COPD. Haematocit can be raised in COPD. Chest X-ray is not required for diagnosis of COPD, and repeated CXR is unnecessary, unless other diagnoses are being considered (most importantly, lung cancer or bronchiectasis).
If a chest X-ray is ordered, these are the findings:

- Hyperinflated lung fields
- >7 posterior ribs seen
- Flattened diaphragms
- Small heart
- May see bullae

Q-18

A 29 year old woman has been short of breath for the last 15 hours and is feeling unwell. An arterial blood gas is taken:

PaO2 8.8 kPa
PaCO2 3.2 kPa
pH 7.50
Bicarbonate (HCO3-) 20 mmol/L

Normal Values:

PaO2 > 10 kPa
PaCO2 4.7-6 kPa
pH 7.35 – 7.45
Bicarbonate (HCO3-) 22-26 mmol/L

What is the SINGLE most likely diagnosis?

A. Diabetic ketoacidosis
B. Methanol overdose
C. Panic attack
D. Pulmonary embolus
E. Severe vomiting

ANSWER:
Pulmonary embolus

EXPLANATION:
This woman has become acutely breathless from a pulmonary emboli. She is hypoxic and, as a reflex to this, is hyperventilating (as evidenced by the low PaCO2). As a result, she has developed an alkalosis.

The other options are much less likely to be the answer:

Diabetic ketoacidosis and methanol overdose → both causes acidosis. The scenario that was given is alkalosis

Panic attacks → This does cause acute alkalosis via hyperventilation (and therefore low PaCO2 and a high pH), but tends to happen in the absence of hypoxia rather than as a response to it (as in pulmonary embolism).

Severe vomiting → causes a metabolic alkalosis (i.e. a high pH with a high HCO3–). PaO2 is not likely to decrease

To understand this question, we have to go back to basics.

First, is the patient hypoxic?
- the Pa02 >10 kPa is normal

Second, is the patient acidaemic (pH <7.35) or alkalaemic (pH >7.45)

Third, what is the respiratory component: What has happened to the PaCO2?
- PaCO2 > 6.0 kPa suggests a respiratory acidosis (or respiratory compensation for a metabolic alkalosis)
- PaCO2 < 4.7 kPa suggests a respiratory alkalosis (or respiratory compensation for a metabolic acidosis)

Fourth, what is the metabolic component: What is the bicarbonate level/base excess?
- bicarbonate < 22 mmol/l suggests a metabolic acidosis (or renal compensation for a respiratory alkalosis)
- bicarbonate > 26 mmol/l suggests a metabolic alkalosis (or renal compensation for a respiratory acidosis)

In summary
She has developed respiratory alkalosis with very minimal renal compensation taking into account that renal compensation usually takes around 48 hours to manifest.

ARTERIAL BLOOD GASES, CAUSES

METABOLIC ACIDOSIS	**METABOLIC ALKALOSIS**

• Excess Production of Organic Acids
  • Ketoacidosis
  • Alcoholic
  • Violent convulsions
• Excessive ingestion of Toxins
• Aspirin
• Methanol Alcohol
• Excess loss of HCO3
• Diarrhoea
• Addison's disease
• Retention of Organic Acids
• Renal insufficiency of Any Cause
	• HCl loss
	• Vomiting
	• Excessive Administration of HCO3
	• Hypokalaemia
	• Hypovolaemia
	• Increased Renal Excretion of Acid
	• Diuretic therapy
	• Secondary Hypoparathyroidism

RESPIRATORY ACIDOSIS	**RESPIRATORY ALKALOSIS**

• Airway obstruction
• Aspiration
• COPD
• Respiratory center depression
• Circulatory collapse
• Cardiac arrest
• Pulmonary oedema
• Neurogenic causes
  • Cervical spine injury
  • Drugs (paralytic agents, organophosphates)
  • Multiple sclerosis
• Restrictive effects
• Haemothorax
• Pneumothorax
• Ascites
	Any event causing hyperventilation
	• Lung disease
	• Pulmonary embolism
	• CNS-Respiratory stimulation
	• Cerebral Vascular Accident (Stroke)
	• Anxiety-Hyperventilation syndrome
	• Salicylate Intoxication
	• Congestive cardiac failure
	• Mechanical ventilation

Q-19

A 79 year old man with longstanding chronic obstructive pulmonary disease has become progressively breathless over the last 2 years. His medications for his COPD include salbutamol and salmeterol inhalers, inhaled corticosteroids and theophylline. His forced expiratory volume in one-second (FEV1) is less than 30%. His oxygen saturations are 89% onroom air. What is the next appropriate management?

A. Assesment for lung transplant
B. Trial of continuous positive airway pressure
C. Trial of noninvasive ventilation
D. Assessment for long term oxygen therapy
E. Assessment for a short course of oxygen therapy

ANSWER:
Assessment for a short course of oxygen therapy

EXPLANATION:
COPD is the disease for which long-term oxygen therapy (LTOT) is most commonly prescribed. There is strong evidence of survival benefit of long-term oxygen therapy (LTOT) in patients with COPD and severe chronic hypoxaemia when used for at least 15 hours daily. Once LTOT is started, it is likely to be lifelong. It is usually given over a minimum of 15 hours a day.

When do you assess the need for oxygen therapy?
- Very severe airflow obstruction → forced expiratory volume in one second (FEV1) less than 30% predicted
- Polycythaemia
- Oxygen saturation 92% or less on room air

Conditions for assessment for LTOT
- Needs to be stable and more than 5 weeks have passed since any exacerbation of COPD
- On a fully optimized treatment for COPD
- 2 sets of ABG are taken 3 weeks apart to ensure the patient is sufficiently hypoxic

When to offer LTOT to patients?
- pO2 of < 7.3 kPa or
- pO2 of 7.3 - 8 kPa and one of the following:
  - o Secondary polycythaemia
  - o Nocturnal hypoxaemia
  - o Peripheral oedema
  - o Pulmonary hypertension

Q-20

A 25 year old tall man presents to A&E with increasing dyspnoea and right sided chest pain. He has been a heavy smoker for the past 4 years. He has not past medical history. What is the SINGLE most likey diagnosis?

A. Pulmonary embolism
B. Myocardial infarction
C. Asthma
D. Pleural effusion
E. Primary Pneumothorax

ANSWER:
Primary pneumothorax

EXPLANATION:
Dyspnoea and chest pain in a young tall man with no past medical history could only be primary spontaneous pneumothorax.

The giveaway here is the word “tall”. When the word “tall” is used in combination with dyspnoea, pneumothorax should be in your differential.

Primary pneumothorax
Primary spontaneous pneumothoraces occur most commonly in tall thin men aged between 20 and 40. They usually occur in the healthy.

Cigarette is a major risk factor for pneumothorax. The mechanism is unclear; a smokinginduced influx of inflammatory cells may both break down elastic lung fibres (causing bulla formation) and cause small airways obstruction (increasing alveolar pressure and the likelihood of interstitial air leak)

More common on the right side
- Less than 10% of cases are bilateral
- Usually caused by rupture of small subpleural blebs (collections of air <2cm)

Presentation
- Dyspnoea, chest pain, cough, tachypnoea
- Ipsilateral decreased chest wall movement, hyperresonant hemithorax to percussion

Diagnosis
Chest X-ray is the diagnostic test in most cases, revealing a visible lung edge and absent lung markings peripherally.

Q-21

A 34 year old HIV positive man presents to the outpatient clinic with fever, dry cough and shortness of breath. He is tachypnoeic but his chest is clear. Oxygen saturation is normal at rest but drops on walking. What is the SINGLE most likely diagnosis?

A. Cytomegalovirus infection
B. Candida infection
C. Pneumocystis carinii infection
D. Cryptococcal infection
E. Toxoplasmosis

ANSWER:
Pneumocystis carinii infection

EXPLANATION:
There are so many cases of pneumonia and so the stem would have to give you some sort of clue in order to pick pneumocystis carinii pneumonia (PCP). The two major clues that are seen here is a HIV patient and desaturation on exercise which is pathognomic for PCP.

Q-22

A 10 year old girl is brought to the emergency department by her dad after having fallen in the park. Her elbows are full of cuts and she has not stopped crying since the injury. Her medical history includes asthma. What is the SINGLE most appropriate analgesia to administer?

A. Aspirin
B. Diclofenac
C. Co-codamol
D. Ibuprofen
E. Paracetamol

ANSWER:
Paracetamol

EXPLANATION:
Symptoms of asthma may present after taking aspirin, NSAIDS or beta-blockers. Thus, NSAIDS like ibuprofen and diclofenac should not be used here.

The association between non-steroidal anti-inflammatory drugs (NSAIDs), including aspirin, and the precipitation of asthma is well documented but, in reality, it is not often seen. So in clinical practice, one may use NSAIDS even if patient has asthma, but for the purpose of PLAB, never give NSAIDS if the patient has asthma.

Codeine should only be used to relieve acute moderate pain in children older than 12 years and only if it cannot be relieved by other painkillers such as paracetamol or ibuprofen alone.

Since the child here is under 12, co-codamol should not be used. Paracetamol is the only available choice.

Q-23

A 68 year old smoker has left sided chest pain which worsens when taking deep breaths. His medical history includes diabetes mellitus and hypertension. On examination, he has a miotic left eye and partial ptosis on the left. There is also wasting of small muscles of the left hand. What is the SINGLE most likely diagnosis?

A. Costochondritis
B. Lung cancer
C. Goodpasture's syndrome
D. Motor neuron diseaase
E. Progressive massive fibrosis

ANSWER:
Lung cancer

EXPLANATION:
The likely diagnosis here is a pancoast tumour which is a type of lung cancer defined primarily by its location situated at the top end of the right or left lung. In this case, it would be the left lung. This would explain the chest pain firstly and also the miosis and ptosis which are part of Horner's syndrome.

Pancoast tumour
- A tumour of the pulmonary apex
- It is a type of lung cancer defined primarily by its location situated at the top end of
  either the right or left lung

Presentation
- Ipsilateral invasion of the cervical sympathetic plexus leads to Horner's syndrome
  (ptosis, anhidrosis, miosis)
- Brachial plexus invasion can lead to wasting of the intrinsic hand muscles and paraesthesiae in the medial side of the arm along with shoulder and arm pain

*Mnemonic for Horner's syndrome → "Horny **PAME**LA"*
P → Ptosis (drooping of the eyelid)
A → Anhidrosis (lack of sweating)
M → Miosis (constriction of the pupils)
E → Enophthalmos (sunken eyeball)

Q-24

A 35 year old lady had an emergency C-section following an ultrasound labour. Three days post-op she develops a sudden onset of left sided chest pain associated with breathlessness. Her heart rate is 105 beats/minute. Her left leg is swollen and has pain on palpation. What is the SINGLE best investigation to provide a definitive diagnosis?

A. Arterial blood gases
B. Chest X-ray
C. CT pulmonary angiogram (CTPA)
D. D-dimer
E. Electrocardiogram (ECG)

ANSWER:
CT pulmonary angiogram (CTPA)

EXPLANATION:
CTPA is the answer here as it is the best test among the other options which provide a definitive diagnosis of pulmonary embolism.

Q-25

A 23 year old woman who is on several medications and inhalers for her asthma presents to the hospital with palpitations. Her heart rate is 110 beats/minute. Her peak expiratory flow rate is 400 L/minute. What is the SINGLE most appropriate management?

A. Lifestyle changes
B. Review medications
C. 24 hour ECG monitoring
D. Admit for investigations
E. Chest X-ray

ANSWER:
Review medications

EXPLANATION:
One of the common side effects of beta agonist is palpitations and tachycardia. Both of which are seen here. Reviewing the medications would be appropriate.

Q-26

A 21 year old lady who smokes has a history of wheezing, chest tightness and coughing at night. She also notices these symptomsoccur when she goes out in the cold and breathes cold air. What is the SINGLE most likely diagnosis?

A. COPD
B. Asthma
C. Pneumoconiosis
D. Bronchiectasis
E. Chronic bronchitis

ANSWER:
Asthma

EXPLANATION:
Please see Q-1

Q-27

A 45 year old man has been having a productive cough for the past 3 weeks. He has been having a fever since then. He has not gone to work for the past 2 weeks as he feels too unwell. He presents to the hospital with chest pain and shortness of breath. On auscultation, there is decreased breath sounds on the right upper lobe with crackles. Percussion is dull in the same area. He has a temperature of 39 C, a respiratory rate of 28 breaths/minute and a pulse rate of 110 beats/minute. His blood results are as follows:

Haemoglobin 129 g/L
White cell count 15 x 10^9/L
Platelets 450 x 10^9/L
CRP 110 mg/L

What is the SINGLE most likely diagnosis?

A. Lobar pneumonia
B. Pleural empyema
C. Pneumothorax
D. Haemothorax
E. Bronchitis

ANSWER:
Lobar pneumonia

EXPLANATION:
The blood results are consistent with an infection. Lobar pneumonia is more common than pleural empyema although pneumonia may later develop into a pleural empyema. Empyema describes pus in a cavity. Pleural empyema describes pus in the pleural space. It starts off with pneumonia that is complicated by an inflammatory response leading to parapneumonic effusion. When secondary infection of this effusion occurs, it produces an empyema.

Pneumonia – Parapneumonic effusion – Pleural empyema

Pneumona and empyema share similar clinical features however symptoms of empyema usually include swinging fevers, night sweats, weight loss and chest pain. One should suspect pleural empyema if pneumonia does not improve with antibiotics.

Dullness to percussion, crackles on auscultation and decreased breath sounds are features of lung consolidationfrom pneumonia and can also be seen once an empyema develops so they are not a useful discriminating physical finding.

Q-28

A 35 year olf man presented to the Accident and Emergency department with a productive cough and fever. A chest X-ray demonstrated right lower zone pneumonia. His CURB-65 score was 1 and he discharged with oral antibiotics. 5 days later he presents with ongoing fever (38.9 C) and pleuritic chest pain. On examination there is reduced breath sounds at the right base with crepitations. A repeat chest x-raydemonstrates a new right sided pleural effusion. What is the most important investigations to perform?

A. Blood culture
B. Induced sputum microscopy
C. Computed tomography (CT) of the chest
D. Pleural aspiration
E. Chest drain

ANSWER:
Pleural aspiration

EXPLANATION:
Pleural aspiration is required to rule out an empyema – a collection of pus within

the pleural cavity. It is a complication of pneumonia, as well as invasive procedures of the thorax.

If an empyema is confirmed (pH of the pleural aspirate < 7.2) or the effusion is causing respiratory compromise then a chest drain should be inserted. The aspirate should be sent for microscopy and culture

Blood and sputum cultures shouldalso be repeated, however these are not the most important investigations. The patient will be managed as an inpatient and treated with intravenous antibiotics. Note a HIV test should be requested.

The CURB-65 score has also been mentioned in this question. It is wroth knowing that the score is a predictor of 30 daymortality for community-acquired pneumonia and ranges from a score of 0 to 5. It is made up of:

Confuision	(AMTS < 8/10)
Urea	(> 7 mmol/L)
Respiratory rate	(≥ 30 bpm)
≥ 65 years	

Scores of 0-2 can be managed as an outpatient if the patient is well.

Q-29

A 56 year old man who has a history of hypertension and asthma recently had a change of medication which was prescribed by his GP. 2 days after starting the new medication, he develops wheezing and shortness of breath. What is the SINGLE most likely medication that would have caused this?

A. Atenolol
B. Rampiril
C. Bendroflumethiazide
D. Verapamil
E. Furosemide

ANSWER:
Atenolol

EXPLANATION:
Symptoms of asthma may present after taking aspirin, NSAIDs or beta-blockers.

Q-30

A 29 year old HIV positive man attends the outpatient department with complaints of persistent cough and copious amount of purulent sputum. He also has dyspnoea and chest pain. On auscultation, inspiratory crepitations are heard at the base of the lung. A chest X-ray shows tram track opacities. What is the SINGLE most likely diagnosis?

A. Interstitial lung disease
B. Bronchiectasis
C. Tuberculosis
D. Influenza

E. Sarcoidosis

ANSWER:
Bronchiectasis

EXPLANATION:
The persistent cough and copious amount of purulent sputum are symptoms of bronchiectasis. HIV that is one of the aetiologies of bronchiectasis. Inspiratory crepitations and a chest-x ray that shows tramlines give a more specific picture pointing towards bronchiectasis. Although these are not diagnostic, the most probable diagnosis among the others is bronchiectasis. Only a high-resolution computed tomography (HRCT) chest would give you the diagnosis of bronchiectasis.

Q-31

A 62 year old man has been smoking 15 cigarettes a day for the past 40 years. He is a retired builder and has been working since he was 24 years old. He presents with chest pain, shortness of breath, and has lost significant weight over the last couple of years. Chest X-ray shows bilateral fibrosis and left sided pleural effusion. What is the SINGLE best investigations that will lead to diagnosis?

A. Acid fast staining
B. Cytology of pleural fluid aspiration
C. Magnetic resonance imaging
D. Pleural biopsy
E. Computed tomography

ANSWER:
Pleural biopsy

EXPLANATION:
Histology is the most appropriate way to diagnose mesothelioma. The history of working
as a builder is the question writers way of of hinting of asbestos exposure. The association with smoking greatly increases the possibility of developing mesothelioma. The best investigation is pleural biopsy.

Pleural fluid aspiration and cytological analysis may provide the diagnosis (sensitivity range 32–84%) but still the most definitive diagnosis is histology thus pleural biopsy gives the best choice.

Mesothelioma
Malignant mesothelioma is a tumour of mesothelial cells that usually occurs in the pleura, and rarely in the peritoneum or other organs. It is associated with occupational exposure to asbestos

The latent period between exposure and development of the tumour may be up to 45 years.
Compensation is often available.

Clinical features:
- Chest pain
- Dyspnoea
- Weight loss
- Finger clubbing
- Recurrent pleural effusions

Remember: Shortness of breath, chest pain and weight loss are the most common symptoms

Signs of metastases:
- Lymphadenopathy
- Hepatomegaly
- Bone pain or tenderness
- Abdominal pain or obstruction (peritoneal malignant mesothelioma)

Tests:
- CXR or CT will show pleural thickening or effusion

Diagnosis is made on histology, usually following a thoracoscopy. Thoracoscopy under local anaesthetic enables drainage of pleural fluid, pleural biopsy and pleurodesis. Often the diagnosis is only made post-mortem.

Management:
Is usually symptomatic, as cure is usually only possible with surgery for extremely localised (stage I) mesothelioma. The role and order of adjuvant or neoadjuvant use of chemotherapy, radiotherapy and surgery has still not been established although chemotherapy has been shown can improve survival. Surgery is hard to evaluate as there are too few randomized trials. Radiotherapy is controversial. Pleurodesis and indwelling intra-pleural drain may help

Q-32

A 68 year old man has malaise and cough for 5 days. He has a temperature of 38.5 C. There is dullness on percussion of the left lung base. What is the SINGLE most appropriate investigation?

A. Bronchoscopy
B. Chest X-ray
C. CT chest
D. MRI
E. V/Q scan

ANSWER:
Chest X-ray

EXPLANATION:
The given presentation is suggestive of pneumonia for which the most appropriate investigation is a Chest X-ray.

Q-33

A 62 year old man who used to work in the shipyard industry presented to

the hospital with gradual increase in shortness of breath, chest pain and weight loss. He has been feeling fatigued and having a mild fever for the past few weeks. On examination, finger clubbing and a palpable chest wall mass was noted. A computed tomography was performed which showed patchy infiltrates, pleural thickening and pleural effusion. He died 7 days later. What is the SINGLE most appropriate management to deal with this patient's death certificate?

A. Ask permission from family members to perform an autopsy
B Consult with the coroner
C. Sign the death certificate as pneumonia as the cause of death
D. Sign the death certificate and write asbestosis as the diagnosis
E. Signe the death certificate as pneumonia, cancer and asbestosis as the cause of death

ANSWER:
Consult with the coroner

EXPLANATION:
It is clear that this patient had probably died from mesothelioma. Mesothelioma is classed as an industrial disease. In England and Wales, all deaths from mesothelioma must be referred to the local coroner's office. The coroner will then decide if a post-mortem examination is required and will hold an inquest. An inquest is a legal investigation to estbalish the circumstances surrounding a person's occupational disease and one needs to determine whether the death was due to mesothelioma or some other cause.

The coroner will give the final verdict and issue the final death certificate.

Remember: If someone has died of a disease that might be related to asbestosis this could be an 'unnatural death' so an investigation or 'inquest' will be needed.

Q-34

A 33 year old chronic smoker attends the outpatient department with complaints of persistent cough, copious amount of purulent sputum and dyspnoea. He has a history of recurent chest infections in the past. Coarse crackles are found at the base of his lung on auscultation. Bronchiectasis is suspected. What is the SINGLE most definitive test to diagnose bronchiectasis?

A. High-resolution computed tomography (HRCT) chest
B. Serum immunoglobulins
C. Chest X-ray
D. Lung function tests
E. Bronchoscopy

ANSWER:
High-resolution computed tomography (HRCT) chest

EXPLANATION:
The gold standard for diagnosis is HRCT of the chest. HRCT has a very high sensitivity and specificity for diagnosis and has now replaced bronchography.

In adults, bronchoscopy and bronchoscopic sampling of the lower respiratory tract do not have a place in the routine investigation of patients with bronchiectasis. Bronchoscopy is used for patients in whom serial testing of sputum does not yield microbiological information and who are not responding well to treatment or if HRCT suggests atypical mycobacterial infection and sputum culture is negative.

Q-35

A 65 year old retired builder complains of persistent dull chest pain and shortness of breath. He is a smoker and started smoking since a young age. He looks thin and his clothes are oversized. Finger clubbing is noted on examination. What is the SINGLE most likely diagnosis?

A. Fibrosing alveolitis
B. Bronchiectasis
C. Tuberculosis
D. Mesothelioma
E. Cystic fibrosis

ANSWER:
Mesothelioma

EXPLANATION:
The history that he is a builder is the question writers way to hint to you that this patient had asbestos exposure in the past. Exposure to asbestos is a well-established cause of mesothelioma, with occupational exposure being documented in 70-80% of those affected.

Finger clubbing is usually caused by underlying asbestosis. Although finger clubbing is commonly seen in questions with mesothelioma, it is actually very rare in clinical practice. Finger clubbing is seen in less than 1% of patients with mesothelioma

Q-36

A 38 year old woman is brought to the A&E after falling down the stairs and injuring her rib. She complains of shortness of breath. A chest X-ray was perforemd to rule out a rib fracture. Bilateral hilar lymphadenopathy was seen on the chest X-ray. On auscultation, there are vesicular breath sounds. On examination, there are red lesions on both her shins which are tender. What is the SINGLE most likely diagnosis?

A. Bronchial asthma
B. Cystic fibrosis
C. Sarcoidosis
D. Bronchiectasis
E. Silicosis

ANSWER:
Sarcoidosis

EXPLANATION:
In PLAB, whenever you see the term “bilateral hilar lymphadenopathy” with a lesion on the shin, you should be thinking of Sarcoidosis.

The lesion on the shin is erythema nodosum which are blue or red lesions and are seen in people suffering from sarcoidosis.

The syndrome here is Lofgren syndrome which includes erythema nodosum, arthritis, and hilar adenopathy. Lofgren is a distinct sarcoid syndrome.

SARCOIDOSIS
Sarcoidosis is a systemic disease of unknown cause, characterized histologically by the presence of nonspecific noncaseating granulomas in the lung and other organs.

Presentation
- Up to 50% are asymptomatic *(Chest X-ray for another indication reveals the diagnosis from hilar lymphadenopathy)*
- Involves almost any organ system, but pulmonary involvement is most common (around 90% of symptomatic patients)
- Fatigue
- Skin: Erythema nodosum
- Lymphadenopathy
- Eyes: Uveitis
- Kidneys: Stones

Acute presentations usually have the following:
- *Erythema nodosum,*
- *Bilateral hilar lymphadenopathy*
- *Fever*
- *Polyarthralgia*

There are two distinct sarcoid syndromes with acute presentation
- Lofgren syndrome includes:
  - Erythema nodosum
  - Arthritis
  - Hilar adenopathy
- Heerfordt-Waldenstrom syndrome, which describes
  - Fever
  - Parotid enlargement
  - Uveitis
  - Facial palsy

Investigations
- Chest X-ray shows bilateral hilar adenopathy
- Bloods:
  - Elevation in angiotensin-converting enzyme (ACE) can be seen in 60% of patients with sarcoidosis *(but remember that ACE should not be used t diagnose sarcoidosis. ACE levels are nonspecific but can be used to follow the course of the disease.)*

    - Abnormalities in liver function tests are seen in 30% of patients
    - Pulmonary function test may show a restrictive pattern
    - Calcium levels *(Hypercalcaemia can occur due to increased circulation of vitamin D produced by macrophages)*
- Definitive diagnosis is by biopsy of suspected tissue which shows noncaseating granulomas. This can be from skin, lymph nodes, conjunctiva or lung.

Treatment
Generally in the setting of organ impairment, a trial of steroids may be used. There are certain scenarios in which steroids should be used but are beyond what will be asked in PLAB.

Q-37

A 17 year old boy with a history of asthma suddenly develops chest pain and increasing breathlessness during a game of football. He has reduced breath sounds on the right side. His oxygen saturation is 94% on air. What is the SINGLE most appropriate investigation?

A. ECG
B. Chest X-ray
C. CT chest
D. Exercise challenge
E. D-dimer

ANSWER:
Chest X-ray

EXPLANATION:
Do not forget that acute severe asthma may have an underlying pneumothorax.

Dyspnoea and chest pain in a young man are features of primary spontaneous pneumothorax.

A standard erect CXRs in inspiration are recommended for the initial diagnosis of pneumothorax.

Q-38

A 74 year old man who has been a smoker since he was 20 has recently been diagnosed with small cell lung cancer. What is the SINGLE most likely serum electrolyte picture that confirms the presence of syndrome of inappropriate antidiuretic hormone secretion (SIADH)?

A. High serum Na, low serum osmolality, high urine osmolarity
B. Low serum Na, low serum osmolality, high urine osmolarity
C. Low serum Na, high serum osmolality, high urine osmolarity
D. High serum Na, low serum osmolality, low urine osmolarity
E. High serum Na, high serum osmolality, low urine osmolarity

ANSWER:
Low serum Na, low serum osmolality, high urine osmolarity

EXPLANATION:

SIADH

The diagnosis requires concentrated urine (Na+ > 20mmol/L and osmolality > 100mosmol/kg) in the presence of hyponatraemia (plasma Na+ < 125mmol/L) and low plasma osmolality (< 260mosmol/kg), in the absence of hypovolaemia, oedema, or diuretics.

One of the causes is small cell lung cancer

Treatment

Treat the cause and restrict fluid. Consider salt ± loop diuretic if severe. Demeclocycline is used rarely. Vasopressin receptor antagonists ('vaptans') are an emerging class of drug used in SIADH and other types of hyponatraemia.

Q-39

A 24 year old male is admitted with acute exacerbation of asthma. He is treated intiated with 100% oxygen. He continues to deteriorate. What is the SINGLE most appropriate next step in management?

A. Salbutamol nebulized with oxygen
B. IV magnesium sulphate
C. IV salbutamol
D. IM adrenaline
E. IV adrenaline

ANSWER:

Salbutamol nebulized with oxygen

EXPLANATION:

The next step is to give salbutamol nebulisers.

Magnesium sulphate is also used in management of acute exacerbation but it is used further down the line.

Q-40

A 50 year old woman presents to Accident & Emergency with the complaint of shortness of breath and a dry cough which started a day ago. This was preceded by four days of experiencing flu-like symptoms. Further questioning reveals that she recently attended a conference in the United States for five days where she stayed in the hotel that was provided for attendees. A chest X-ray was done which shows pulmonary infiltrates.

The patient's vitals are noted as follows:
Temperature 39.1 C
Respiratory rate 21 breaths per minute
Blood pressure 100/57 mmHg
Heart rate 90 beats/minute

Blood tests were done and the results are as follows:
Haemoglobin 139 g/L (130-180 g/L)
White cell count 2.34 x 10^9/L (4-11 x 10^9/L)
Sodium 126 mmol/L (135-145 mmol/L)
Potassium 4.1 mmol/L (3.5-5.0 mmol/L)
Urea 3.9 mmol/L (2.5-6.7 mmol/L)

What is the SINGLE best treatment option for this patient?

A. Clarithromycin
B. Amoxicillin
C. Ceftriaxone
D. Co-trimoxazole
E. Co-amoxiclav

ANSWER:
Clarithromycin

EXPLANATION:
This patient's history of staying in a hotel is very suggestive of a legionella infection. Other clues towards legionella seen here are the hyponatraemia and the lymphocytopenia.

It is worth remembering that Legionella infections have specific blood results:
- *Hyponatraemia*
- *Lymphocytopenia*
- *Hypoalbuminaemia*
- *Elevated liver enzymes*

Treatment of legionella depends on the severity of the infection as well as local antibiotic policy. Macrolides, fluoroquinolones or tetracyclines can be used. If a macrolide is used, clarithromycin or azithromycin is usually the choice.

Q-41

A 54 year old patient 7 days after a total hip replacement presents with acute onset breathlessness, and chest pain. On examination, an elevated jugular venous pressure was observed. Her right calf looks swollen. Her pulse rate is 95 bpm and respiratory rate is 24/min. Which SINGLE investigations will be most helpful in leading to a diagnosis?

A. Chest X-ray
B. CT pulmonary angiogram (CTPA)
C. V/Q scan
D. D-Dimer
E. Doppler ultrasound of legs

ANSWER:
CT pulmonary angiogram (CTPA)

EXPLANATION:
Please see Q-10

Q-42

A 65 year old known case of hepatocellular carcinoma with lung and bone metastasis presents with shortness of breath, gastric reflux and bloatedness. The symptoms have been on going for the past week. He is on the palliative care register and takes regular morphine for the pain. A recent DEXA scan shows his bones to be osteoporotic. On examination, there are crackles in the base of the left lung. He has a temperature of 38.1 C. A chest X-ray was performed which shows basal consolidations on the left lung. What is the SINGLE most appropriate medication to administer?

A. Intravenous proton pump inhibitor
B. Alendronate
C. Intravenous antibiotics
D. Analgesia
E. Oral ranitidine

ANSWER:
Intravenous antibiotics

EXPLANATION:
In reality, he would be started on all of them. But for the purpose of PLAB, if you were to choose among the answers provided, IV antibiotics would be most important one to start as this patient has pneumonia and this should be treated first.

Q-43

A 19 year old man has a history of exercise induced asthma which has previously been controlled using a salbutamol inhaler as required. He is taking beclomethasone inhaler regularly but he now gets asthma attacks with exercise. What is the SINGLe most appropriate action?

A. Add on tiotropium
B. Take regular salbutamol and add on budesonide inhaler
C. Add on sodium cromoglicate
D. Take beclomethasone inhaler before exercise
E. Increase inhaled steroid

ANSWER:
Add on sodium cromoglicate

EXPLANATION:
Sodium cromoglycate can be added for exercise-induced asthma.

Exercise-induced asthma
Exercise-induced asthma although following the stepwise approach has a slight difference in management.

For most patients, exercise-induced asthma is an illustration of poorly controlled asthma and regular treatment including inhaled corticosteroids should therefore be reviewed. If exercise is a specific problem in patients already taking inhaled corticosteroids who are otherwise well controlled, consider adding either:

- leukotriene receptor antagonist
- a long-acting beta 2 agonist
- an oral beta 2 agonist
- theophylline

An inhaled short-acting beta2 agonists used immediately before exercise is the drug of choice.

Asthma
Asthma is characterised by paroxysmal and reversible obstruction of the airways.

Management of stable asthma in adults:
The management of stable asthma is now well established with a stepwise approach. The new 2016 BTS/SIGN guidelines for asthma has dropped the steps however it is stil useful to remember it in steps for the purpose of the exam.

Step 1
Inhaled short-acting B2 agonist as required

Step 2
Add inhaled steroid at 200-800 mcg/day. 400 mcg/day is a appropriate starting dose for many patients

Step 3
Add inhaled long-acting B2 agonist (LABA)

Then assess control of asthma:
- If good response to LABA, then continue current management
- If benefit from LABA but control still inadequate then continue LABA and increase inhaled corticosteroid dose to 800 micrograms/day
- If no response to LABA, stop LABA and increase inhaled corticosteroid to 800 micrograms/day. And If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

Step 4
Consider trials of:
- increasing inhaled steroid up to 2000 mcg/day
- adition of a fourth drug e.g. Leukotriene receptor antagonist, SR theophylline, B2 agonist tablet

Step 5
- Use daily steroid tablets

Referral to a respiratory physician would be normal at Step 4-5 depending on expertise.

If you find this stepwise approach too complicated to memorize. Then just memorize it
in a very simplified way as stated below:
Step 1 →Inhaled short-acting B2 agonist
Step 2 → Add inhaled steroid

Step 3 → Add inhaled long-acting B2 agonist (LABA)
Step 4 → increasing inhaled steroid to max dose
Step 5 → Add daily steroid tablets

Note:
NICE now recommends omalizumab as an option for treating severe persistent confirmed allergic IgE-mediated asthma as an add-on to optimised standard therapy in people aged 6 years and older who need continuous or frequent treatment with corticosteroids. However, this is so new that it is unlikely to be asked in PLAB.

Q-44

A 33 year old man has a temperature of 38.5 C, productive cough and chest pain on the right side on inspiration. He has a blood pressure of 100/60 mmHg and a pulse rate of 108 beats/minute. He appears slightly short of breath and has an oxygen saturation of 94% on room air. What is the SINGLE most likely organism causing the patient's symptoms?

A. Gram +ve cocci
B. Coagulase +ve cocci
C. Gram +ve Bacilli
D. Acid-Fast Bacilli
E. Gram –ve cocci

ANSWER:
Gram +ve cocci

EXPLANATION:
Streptococcu pneumoniae (pneumococcus) is the most common cause of community-acquired pneumonia. It is a gram +ve cocci

Q-45

A 48 year old farmer presents with malaise, dry cough, chest tightness and shortness of breath. The shortness of breath and cough started only a few hours ago. On auscultation, a wheeze is heard throughout the chest. He has a temperature of 39.2 C, a pulse of 96 beats/minute, a blood pressure oef 110/70 mmHg and a respiratory rate of 29 breaths/minute. His chest X-ray shows diffuse micronodular interstitial shadowing. What is the SINGLE most appropriate diagnosis?

A. Pulmonary embolism
B. Churg-Strauss syndrome
C. Cryptogenic organizing pneumnia
D. Extrinsic allergic alveolitis
E. Progressive massive fibrosis

ANSWER:
Extrinsic allergic alveolitis

EXPLANATION:

The signs and symptoms fit extrinsic allergic alveolitis. The occupation as a farmer is also another hint.

Chest X ray: in the acute form may be normal in some or show diffuse micronodular interstitial shadowing like in this case.

Extrinsic allergic alveolitis
In extrinsic allergic alveolitis there is diffuse, granulomatous inflammation of the lung parenchyma and airways in people who have been sensitised by repeated inhalation of organic antigens in dusts (eg, from dairy or grain products, animal dander and protein and water reservoir vapourisers)

One of the specific risk factors is occupations including farmers, cattle workers, ventilation system workers, vets, people working with grain and flour, those whose job involves working with chemicals

There are 3 forms of extrinsic allergic alveolitis:
1. Acute
2. Subacute
3. Chronic

The most commonly asked form in PLAB is the acute form and so we would only discuss the acute form of extrinsic allergic alveolitis

Acute form
- Symptoms usually start 4-8 hours after exposure to the sensitising antigen and resolve quickly, usually within days.
- There is a flu-like illness with fever, chest tightness, dry cough and dyspnoea. Associated symptoms include malaise, chills, headache, generalised aches and pains. Wheeze is sometimes present.
- Signs include fever, tachypnoea and bibasal fine inspiratory crackles

Q-46

A 26 year old smoker has a history of wheezing, chest tightness and breathlessness at night and early morning. Her past medical history includes eczema. What is the SINGLE most likely diagnosis?

A. COPD
B. Asthma
C. Pneumoconiosis
D. Bronchiectasis
E. Chronic bronchitis

ANSWER:
Asthma

EXPLANATION:
Please see Q-1

Q-47

A 22 year old man presents with episodes of dyspnoea, starting suddenly. This usually occurs when he is in a crowded area like a lift. When he is breathless, he also notices tingling around his mouth and he feels light-headed. These episodes usually go away after a while. An arterial sample was taken for blood gases during one of the episodes. What is the SINGLE most likely result of the arterial blood gas (ABG)?

Normal Values:
Pa02 > 10 kPa
PaCO2 4.7–6 kPa
pH 7.35 - 7.45

Bicarbonate (HCO3-) 22-26 mmol/L

A. Pa02 = 8.1 kPa, PaCO2 = 2.6 kPa, pH = 7.55, HCO3- = 26 mmol/l
B. Pa02 = 13.6 kPa, PaCO2 = 2.5 kPa, pH = 7.56, HCO3- = 13 mmol/l
C. Pa02 = 13.5 kPa, PaCO2 = 6.3 kPa, pH = 7.28, HCO3- = 24 mmol/l
D. Pa02 = 8.3 kPa, PaCO2 = 6.4 kPa, pH = 7.27, HCO3- = 24 mmol/l
E. Pa02 = 13.1 kPa, PaCO2 = 2.7 kPa, pH = 7.57, HCO3- = 25 mmol/l

ANSWER:
Pa02 = 13.1 kPa, PaCO2 = 2.7 kPa, pH = 7.57, HCO3- = 25 mmol/l

EXPLANATION:
To understand this question, we have to go back to basics.

First, is the patient hypoxic?
- the Pa02 >10 kPa is normal

Second, is the patient acidaemic (pH <7.35) or alkalaemic (pH >7.45)

Third, what is the respiratory component: What has happened to the PaCO2?
- PaCO2 > 6.0 kPa suggests a respiratory acidosis (or respiratory compensation for a metabolic alkalosis)
- PaCO2 < 4.7 kPa suggests a respiratory alkalosis (or respiratory compensation for a metabolic acidosis)

Fourth, what is the metabolic component: What is the bicarbonate level/base excess?
- bicarbonate < 22 mmol/l suggests a metabolic acidosis (or renal compensation for a respiratory alkalosis)
- bicarbonate > 26 mmol/l suggests a metabolic alkalosis (or renal compensation for a respiratory acidosis)

This patient is suffering from panic attacks.

If your answer was A or D, you need to remember that panic attacks usually result in hyperventilation thus PaO2 is usually normal (Pa02 > 10 kPa).

If your answer was C, you need to remember that hyperventilation which is seen in panic attacks usually result in respiratory alkalosis (pH >7.45).

If your answer was B, you need to remember that there would be no metabolic compensation as panic attacks resolves rapidly.

Panic attacks key points
- result in hyperventilation which causes a respiratory alkalosis
- There would be no metabolic compensation as panic attack resolves rapidly.
- We would not expect any metabolic compensation as it takes the kidneys days to conserve acid.
- PaO2 would be normal.

Q-48

A 33 year old man is referred for an X-ray as he complains of a persistent cough, chest pain and excessive purulent sputum. He has a history of recurrent chest infections. On examination, drumstick-shaped fingers were noted. What is the SINGLE most likely diagnosis?

A. Fibrosing alveolitis
B. Mesothelioma
C. Bronchiectasis
D. Pulmonary tuberculosis
E. Bacterial endocarditis

ANSWER:
Bronchiectasis

EXPLANATION:
The persistent cough and excessive purulent sputum are symptoms of bronchiectasis. Finger clubbing is not a specific sign but has been seen in bronchiectasis although not very frequently.

The most probable diagnosis among the others is bronchiectasis.

Occasionally, the question would include chest-x ray findings which show tramlines. This would give a more specific picture pointing towards bronchiectasis.

Only a high-resolution computed tomography (HRCT) chest would give you the diagnosis of bronchiectasis.

Q-49

A 63 year old man has advanced COPD. He is currently unable to mobilise the way he used to a few months ago. He is on relaxation therapy for his panic and anxiety and is on chronic oxygen therapy for his breathlessness however, he still complains of being unable to breathe. What is the SINGLE most appropriate agent to assist with his breathlessness?

A. Antibiotics
B. Subcutaneous hyoscine
C. Morphine
D. Promethazine
E. Nebulised normal saline

ANSWER:
Nebulized normal saline

EXPLANATION:
Regular nebulised normal saline has been shown to help to loosen tenacious secretions which may reduce breathlessness.

This is a very important stem to remember and possibly can be written in many different ways with different answers. If the options included "Prednisolone" then that would be preferred over nebulised normal saline as it is frequently prescribed as part of the management for patients with acute COPD.

Q-50

A 2 year old girl presents with a 4 day history of fever which started with a cough. She has a respiratory rate of 45 breaths/minute, oxygen saturation of 94% and a temperature of 38.9 C. There are crepitations at the left base on auscultation of the lung fields. Urine dipstick was found to be negative. What is the SINGLE investigation most likely to lead to diagnosis?

A. Blood culture and sensitivity
B. Erythrocyte sedimentation rate (ESR)
C. Chest X-ray
D. Urine for Culture and sensitivity
E. Cerebrospinal fluid analysis

ANSWER:
Chest X-ray

EXPLANATION:
This is an extremely straight forward question. The features are consistent with respiratory rate infection (possibly pneumonia) for which a chest X-ray is the investigation of choice.

Q-51

A 60 year old lady is on treatment for ischaemic heart disease, hypertension and hyperlipidaemia. During the night, she complains of wheezing and shortness of breath. What is the SINGLE most likely medication that is responsible for her symptoms?

A. Amlodipine
B. Atenolol
C. Ramipril
D. Simvastatin
E. Bendroflumethiazide

ANSWER:
Atenolol

EXPLANATION:
Symptoms of asthma may present after taking aspirin, NSAIDs or beta-blockers. Atenolol is the only beta blocker on the list.

Q-52

A 22 year old, tall thin man comes to the Emergency Department with difficulty breathing and chest pain. It developed 2 hours ago while he was driving. The onset was sudden and without any history of trauma. He has no cardiac or pulmonary problems in the past. His oxygen saturation is 92% on air and his respiratory rate is 26 breaths/minute. What is the SINGLE most appropriate investigation?

A. Cardiac enzymes
B. Chest X-ray
C. Computerised tomography scan of his chest
D. Electrocardiogram (ECG)
E. Ventilation/perfusion scan (V/Q scan)

ANSWER:
Chest X-ray

EXPLANATION:
Tall thin young men are particularly prone to develop pneumothorax. Sudden pain and breathlessness in this young man are highly suggestive for pneumothorax. A standard erect CXR in inspiration is recommended for the initial diagnosis of pneumothorax.

Q-53

A morbidly obese 60 year old man has a right hemicolectomy for a tumour of the caecum 4 days ago. He suddenly becomes breathless, dizzy and describes chest discomfort. The chest discomfort worsens when he takes a deep breath. On examination, he has good air entry on both lungs. His oxygen saturation is 90% on room air and he has a pulse rate of 110 beats/minute. A chest X-ray was performed and was reported as normal. An ECG shows sinus tachycardia. What is the SINGLE most likely diagnosis?

A. Pneumonia
B. Pulmonary embolism
C. Pneumothorax
D. Aortic dissection
E. Cardiac tamponade

ANSWER:
Pulmonary embolism

EXPLANATION:
The diagnosis here is pulmonary embolism. Although hypoxia and chest

discomfort are words used to describe a pulmonary embolism, chest infection, or a pneumothorax, the findings of a worsening pain when taking a deep breath (pleuritic pain) and a normal chest X-ray finding points towards a diagnosis of pulmonary embolism. Examination of the chest may be normal in patients with pulmonary embolism. ECG changes such as SQ3T3 pattern are uncommon in pulmonary embolism (often they may show sinus tachycardia or right heart strain). A CT pulmonary angiogram (CTPA) would confirm the diagnosis.

Other risk factors in this stem that should point you towards the diagnosis of pulmonary embolism are:

- He is likely bedridden for the past few days since the major surgery
- He has a high BMI

Q-54

A 34 year old woman with a smoking history has had an uneventful laparascopic cholecystectomy 18 hours ago. She is now complaining of shortness of breath. She has a pulse rate of 108 bpm and a temperature of 37.8 C. There are signs of reduced air entry at the right base. Chest X-ray shows no obvious abnormality. What is the SINGLE most appropriate next step?

A. Unfractionated heparin
B. IV Ceftriaxone
C. PO Chlorpheniramine
D. Chest physiotherapy
E. D-dimers

ANSWER:
Chest physiotherapy

EXPLANATION:
The four most likely common causes of post-operative breathlessness are:
- Infection/atelectasis
- Pulmonary embolism
- Left ventricular failure (LVF) (fluid overload)
- Exacerbation of underlying lung disease such as COPD

The time of the surgery in this question helps us with the diagnosis. As this is an early complication (hours rather than days), it is likely to be either atelectasis or pulmonary embolism. But since there are no other factors pointing towards a pulmonary embolism and there is a smoking history, the more likely diagnosis here would be atelectasis.
Basal atelectasis is commoner in smokers and following abdominal or trans-thoracic procedures.

Note that a D-dimer level is unhelpful, as it will be raised by many different intra- and post-operative mechanisms. So D-dimers in this scenario would not help you differentiate pulmonary embolism from atelectasis. CRP and WCC are also largely unhelpful, as these are frequently raised post-operatively.

Chest physio will help if the cause is atelectasis.

Atelectasis is the collapse or closure of a lung resulting in reduced or absent gas
exchange

Management of atelectasis
Adequate analgesia to encourage expectoration, nebulized saline, chest physiotherapy, deep breathing and coughing, postural drainage, incentive spirometry. If lung does not re-inflate, consider bronchoscopy to suction out secretions

Pneumonia may happen in about 3 days if atelectasis is not resolved. If this happens, fever will persist and Chest x-ray will show infiltrates.

Q-55

A 39 year old chronic smoker attends the outpatient department with complaints of persistent cough and copious amount of purulent sputum. He has recurrent chronic chest infections in the past. Finger clubbing is noted in examination and inspiratory crackles are heard on auscultation. A chest X-ray was done and results were normal. What is the SINGLE most likely diagnosis?

A. Emphysema
B. Rheumatoid arthritis
C. Bronchiectasis
D. Lung cancer
E. Sarcoidosis

ANSWER:
Bronchiectasis

EXPLANATION:
The history of smoking here is irrelevant as smoking does not appear to be an independent risk factor but smoking cessation is important as part of the management if the patient does smoke.

The persistent cough and copious amount of purulent sputum are symptoms of bronchiectasis. Measles is a childhood viral infection that is one of the aetiologies of bronchiectasis. Finger clubbing is not a specific sign but has been seen in bronchiectasis although not very frequently. Inspiratory crepitations and a chest-x ray that shows tramlines give a more specific picture pointing towards bronchiectasis. Although these are not diagnostic, the most probable diagnosis among the others is bronchiectasis. Only a high-resolution computed tomography (HRCT) chest would give you the diagnosis of bronchiectasis.

Q-56

An 8 year old boy diagnosed with asthma is on salbutamol inhaler and beclomethasone inhaler. He takes his beclomethasone inhaler everyday as prescribed and does not miss any doses. However, he wakes up at night with wheezing and having shortness of breath. He uses around 6 times of his salbutamol inhaler a week. He occasionally finds exercise difficult because he becomes very short of breath. What is the SINGLE most appropriate management?

A. Add inhaled long-acting B2 agonist (LABA)
B. Increase inhaled corticosteroid dose
C. Aminophylline
D. Add oral prednisolone
E. Add theophylline

ANSWER:
Add inhaled long-acting B2 agonist (LABA)

EXPLANATION:
The third step management for asthma differs between NICE and BTS/SIGN guidelines. In general, we can add on LABA or montelukast. As montelukast is not available here, LABA would be the most suitable option.

Q-57

A 10 year old boy who takes regular dose inhaled steroids for his long standing asthma has been advised to use bronchodilators to control his acute attacks. His parents are unsure when he should use his bronchodilator. What is the SINGLE msot appropriate investigation to perform?

A. Chest X-ray
B. Pulmonary function test
C. Peak flow rate diary
D. Pulse oximetry
E. Blood test to look for eosinophila

ANSWER:
Peak flow rate diary

EXPLANATION:
Peak flow rate diary for asthmatics would usually show diurnal variation. This is because symptoms of asthma often worsen at night. This peak flow diary shows when the bronchoconstriction remains worse and with the results, we can guide the patient on the the best times to use bronchodilators which is usually prior to those times.

Q-58

A 21 year old man has exercise induced asthma and is using a salbutamol inhaler as required and beclomethasone inhaler 400 mcg/day. He complains of wheeze and shortness of breath during exercise despite using salbutamol inhaler just before exercise. What is the SINGLE most appropriate action?

A. Add on tiotropium
B. Take regular salbutamol and add on budesonide inhaler
C. Add on oral steroid
D. Add on sodium cromoglycate
E. Increase inhaled steroid

ANSWER:
Add on sodium cromoglycate

EXPLANATION:
Sodium cromoglycate can be added for exercise-induced asthma.

Q-59

A 28 year old female who has returned from the USA to the UK presents to Accident & Emergency with shortness of breath and a cough beginning 3 days after her return to the United Kingdom. Her cough initially contained blood but is now dry. Her only significant history is that she is on the combined oral contraceptive pill. What is the SINGLE most likely diagnosis for this woman's symptoms?

A. Community acquired pneumonia
B. Pulmonary embolism
C. Pulmonary tuberculosis
D. Lymphoma
E. Lung cancer

ANSWER:
Pulmonary embolism

EXPLANATION:
In PLAB 1, when the examiners want you to choose pulmonary embolism, they will mention:
1. History of prolonged immobility (such as airplane travel)
2. Risk factor for PE (COCP, surgery, obesity, etc.)
3. Patient experiencing shortness of breath

PULMONARY EMBOLISM

Risk factors (in order of importance):
- Surgery
- Pregnancy (including the postnatal period)
- Lower limb injury
- Malignancy
- Reduced mobility
- Previous VTE (venous thromboembolism)

Signs and symptoms:
Remember that these are non-specific
Symptoms include:
- Dyspnoea.
- Pleuritic chest pain or retrosternal chest pain.
- Cough and haemoptysis.

Signs include:
- Tachypnoea, tachycardia.
- Hypoxia, which may cause anxiety, restlessness, agitation and impaired consciousness.
- Pyrexia.
- Elevated jugular venous pressure.
- Gallop heart rhythm, a widely split second heart sound, tricuspid regurgitant murmur.

- Pleural rub.
- Systemic hypotension and cardiogenic shock.

All you need to remember in terms of diagnosis and management for the PLAB 1 exam is that CTPA is the gold standard for diagnosis of pulmonary embolism and that immediate administration of LMWH (low molecular weight heparin) or fondaparinux must be given once the PE is suspected (even prior to CTPA).

Q-60

A 55 year old woman with a persistent cough and history of smoking develops left sided chest pain exacerbated by deep breathing. She has a temperature of 38.2 C and basal crackles are heard on auscultation. What is the SINGLE most likely diagnosis?

A. Dissecting aneurysm
B. Pericarditis
C. Pneumonia
D. Pneumothorax
E. Pulmonary embolism

ANSWER:
Pneumonia

EXPLANATION:
These are typical signs and symptoms of pneumonia. Pleuritic pain can occur with pneumonia. Crackles can be heard in patients with pneumonia.

Symptoms of cough, purulent sputum which may be blood-stained or rust-coloured, breathlessness, fever, malaise are usually how pneumonia presents.

Q-61

A 32 year old previously healthy woman has developed pain and swelling on both knees and ankles with a nodular rash over her shins. She describes feeling more fatigue over the past few weeks with a mild grade fever. As part of the investigation a chest X-ray was performed. What is the SINGLE most likely appearance on the chest x-ray?

A. Apical granuloma
B. Bilateral hilar lymphadenopathy
C. Lobar consolidation
D. Pleural effusion
E. Reticular shadowing in the bases

ANSWER:
Bilateral hilar lymphadenopathy

EXPLANATION:
A very commonly asked topic on PLAB → Sarcoidosis

The questions would usually provide 2 out of the 3 important clinical features of Lofgren syndrome and ask for the third feature. Lofgren syndrome includes:

1. Erythema nodosum
2. Arthritis
3. Bilateral hilar lymphadenopathy.

Thus if you see any 2 of the 3 features stated above, the first thought should be Lofgren (a distinct sarcoid syndrome)

The fatigue and fever will distract you from the answer. But it is worth remembering that sarcoidosis also presents with fatigue and fever.

Q-62

A 15 year old boy presents to the Emergency Department with a sudden onset of chest pain and increasing shortness of breath during a beach volleyball game. He has a medical history of asthma and is on a beta-2 agonist inhaler. On examination, there is no cyanosis but there are reduced breath sounds on the left side. Which of the following is the SINGLE most appropriate investigation?

A. D-dimer
B. CT chest
C. Chest x-ray
D. Peak flow meter
E. Spirometry

ANSWER:
Chest x-ray

EXPLANATION:
This is a diagnosis of spontaneous pneumothorax. Key clues for PLAB 1: young male playing a sport develops sudden shortness of breath. There usually would be clues "decreased breath sounds on one side". Sometimes they may say a "tall" man or an "athlete", as these would be the common presenters of spontaneous pneumothorax.

Primary spontaneous pneumothoraces occur most commonly in tall thin men aged between 20 and 40.

Cigarette is a major risk factor for pneumothorax. The mechanism is unclear; a smokinginduced influx of inflammatory cells may both break down elastic lung fibres (causing bulla formation) and cause small airways obstruction (increasing alveolar pressure and the likelihood of interstitial air leak)

Chest X-ray is the diagnostic test in most cases, revealing a visible lung edge and absent lung markings peripherally.

If patient is cyanosed, dyspneic, underlying lung disease – perform arterial blood gas

Q-63

A 24 year old male is admitted with acute severe asthma. He is treated initiated with 100% oxygen, nebulized salbutamol, and IV hydrocortisone. Ipratropium bromide was added to nebulizers. Despite the initial treatment there has been no improvement. What is the SINGLE most appropriate next step in management?

A. IV aminophylline
B. IV magnesium sulphate
C. IV salbutamol
D. IM adrenaline
E. IV adrenaline

ANSWER:
IV magnesium sulphate

EXPLANATION:
Next step would be IV magnesium sulphate

Q-64

A 64 year old man who was previously exposed to asbestos for 35 years while working as a builder has chest pain and shortness of breath. The diagnosis of mesothelioma has been made. His shortness of breath has been worsening over the last couple of days. A recent chest x-ray shows bilateral pleural effusion. What is the SINGLE most appropriate management?

A. Indwelling pleural drain
B. Physiotherapy
C. Radiation therapy
D. Pneumonectomy
E. Chemotherapy

ANSWER:
Indwelling pleural drain

EXPLANATION:
This patient's symptoms are due to the pleural effusion secondary to mesothelioma. A long-term indwelling pleural drainage may be useful in this scenario where he has a malignant effusion.

Chemotherapy, radiotherapy and surgery are used in the management for mesothelioma but this patient's major problem is his current shortness of breath which needs to be treated. Palliative radiotherapy provides pain relief in some patients with chest wall pain but is less useful in the treatment of breathlessness. Radiotherapy and surgery can be quite controversial and is unlikely to be the answer in PLAB as it requires a great depth of knowledge.

Q-65

A 59 year old smoker presents to his GP clinic with the complaint of breathlessness. His wife, who has accompaneid him today, reports that the patient had been having difficulty with breathing especially for the past week. His oxygen saturation was 81% on air, his pulse was 90 beats/minute and his blood pressure was recorded at 110/75 mmHg. He was given nebulised salbutamol and thereafter, his oxygen saturation and symptoms improved. Chronic obstructive pulmonary disease (COPD) was suspected and he was asked to come back another time to perform a spirometry. The spirometry performed on this patient showed a decreased FEV1. What other finding can also be observed in a patient with COPD on spirometry?

A. Increased residual volume
B. Normal inspiratory vital capacity
C. Increased tidal volume
D. Normal functioning residual capacity
E. Decreased total lung capacity

ANSWER:
Increased residual volume

EXPLANATION:
The National Institute for Health and Care Excellence (NICE) guidelines state that the criteria for diagnosing COPD on spirometry are as follows:

FEV1 (Forced Expiratory Volume in 1 second) less than 80% of predicted AND a FEV1/FVC (Forced Vital Capacity) less than 70%.

It is important to note that in obstructive lung diseases such as COPD and asthma, volumes are essentially normal but flow rates are impeded.

People with COPD also exhibit a decrease in diffusing capacity of the lung for carbon monoxide (DLCO). In addition, there is an increase in total lung capacity (TLC), an increase in functional residual capacity (FRC), and an increase in residual volume (RV). There is often a decrease in vital capacity (VC).

Note: The reason that this patient was asked to come back another time to perform spirometry is it should only be tested when the patient's condition is stable which is ideally six weeks since the last exacerbation.

Q-66

A 28 year old male is admitted with acute exacerbation of asthma. He has a temperature of 38.1 C and a productive cough. He is treated initiated with 100% oxygen and salbutamol nebulizers. Despite treatment, his oxygen saturation is 88% and respiratory rate is 34 breaths/minute. What is the SINGLE most appropriate next step in management?

A. Hydrocortisone IV
B. IV antibiotics
C. IV salbutamol
D. IM adrenaline
E. IV adrenaline

ANSWER:
Hydrocortisone IV

EXPLANATION:
Hydrocortisone should be given first as this is an acute exacerbation of asthma. The aetiology is probably due to a chest infection which initiated the exacerbation for which we will prescribe antibiotics. But, we need to sort out his shortness of breath first and aim for a saturation of 94-98%.

Q-67

A 33 year old man has mild headache and myalgia for 2 days followed by high fever, chills, rigors and a cough. His cough was initially dry but progressed to be productive. He has just returned from a conference in Greece where he mentions that he swam and used the hot tubs in the hotel. He has a temperature oef 38.1 C and is seen to be dyspnoeic. Chest X-ray shows patchy alveolar infiltrates. What is the SINGLE most likely organism which would have caused his symptoms?

A. Legionella pneumophila
B. Mycoplasma pneumoniae
C. Staphylococcus aureus
D. Streptococcus pneumoniae
E. Klebsiella pneumoniae

ANSWER:
Legionella pneumophila

EXPLANATION:
Legionella pneumophila is the causative organism that causes Legionnaires' disease which is a severe, potentially fatal acute pneumonia acquired by droplet inhalation of water contaminated.

L. pneumophila is found in natural water supplies and soil. It is also found in many recirculation and water supply systems. For the purpose of this exam, look out for hints like traveling, hotel stays, whirlpool spas, hot tubs as often they would put one of these hints in the question, if the examiners would like you to select Legionella pneumophila as the answer.

Q-68

A 68 year old male presents to Accident & Emergency with the complaint of a cough. He said that he first noticed the cough two days ago. He is coughing up about a tablespoon full of purulent sputum a day. He has no other complaints. His past medical history is significant for hypercholesterolaemia for which he takes atorvastatin. He is also on bisoprolol, aspirin, diclofenac, lansoprazole as well as a regular salbutamol inhaler for asthma. He had a severe allergic reaction to amoxicillin a year ago which he was hospitalized for. Upon examination, he appears to be unwell. He is short of breath with a respiratory rate of 22 breaths per minute and his oxygen saturation on room air is 97%. A chest X-ray was done which showed right middle zone consolidation. What is the SINGLE most appropriate antibiotic for this patient?

A. Co-amoxiclav
B. Ciprofloxacin
C. Cefuroxime
D. Clarithromycin
E. Doxycycline

ANSWER:
Doxycycline

EXPLANATION:
The best antibiotic to give this specific patient is doxycycline. Doxycycline can be used in lower respiratory tract infections for patients in whom penicillin is contraindicated. Doxycycline is given as 200 mg PO STAT on the first day and then 100 mg PO OD for the next six days in moderate-to-severe community acquired pneumonia.

Clarithromycin is contraindicated with the use of a stain as clarithromycin is predicted to increase the exposure of the patient to statins which can cause rhabdomyolysis. In real life, the best thing to do would be to pause the statin (or decrease the dose) for the duration of the antibiotic therapy with the macrolide and then re-commence the statin once the seven days of the antibiotic therapy has been given but since the stem does not have this option, the safest drug to give in this patient is doxycycline. In additin to being contraindicated with statins, it also needs to be used in caution with salbutamol as it can cause hypokalaemia.

Co-amoxiclave is amoxicillin and clavulanic acid. You should not give a penicillin based drug in a penicillin allergic patient.

Ciprofloxacin is rarely given in community acquired pneumonias except in rare occasions of atypical pneumonias.

Cephalosporins such as cefuroxime should not be used in patients with a hypersensitivity to penicillin because around 10% percentage of patietns who are allergic to penicillin are also allergic to cephalosporins.

Antibiotic policies differ between Trusts. Always check your local antibiotic policy before prescribing antibiotics.

Q-69

A 59 year old man with a medical history of chronic obstructive pulmonary disease presents to the Emergency Department with breathlessness. He finds it extremely difficult to breathe while in the supine position and has to sit up in bed or in a chair at night due to his severe dysponoea. His respiratory rate is 30 breaths/minute and his heart rate is 110 beats/minute. His oxygen saturation on presentation was 89%. An arterial blood gas test was done for him and he was commenced on 100% oxygen however, he is still dyspnoeic. The results of his arterial blood gas are as follows:

pH 7.20
PaO2 11.6 kPa
PaCO2 9.8 kPa

What is the SINGLE most appropriate initial action?

A. Administer 24% oxygen
B. Intravenous bicarbonate
C. Continue 100% oxygen
D. Bronchodilators
E. Non-invasive positive-pressure ventilation (NIPVV)

ANSWER:
Administer 24% oxygen

EXPLANATION:
This patient is experiencing an exacerbation of COPD. Giving oxygen would be the first action.

The history of COPD alone should prompt you to pick 24% oxygen instead of 100% oxygen. This is because 100% oxygen will abolish the hypoxic drive and worsen hypercapnia. 24-28% oxygen significantly increases haemoglobin saturation, without risking further underventilation and a rising pCO2, which can cause coma and death. Remember that low-concentration oxygen (of 24-28%) is used in patients with chronic obstructive pulmonary disease (COPD) or any other conditions causing underventilation and CO2 retention.

The aim of (controlled) oxygen therapy is to raise the PaO2 without worsening the acidosis. Therefore, give oxygen at no more than 28% (via venturi mask, 4 L/minute) or no more than 2 L/minute (via nasal prongs) and aim for oxygen saturation 88-92% for patients with a history of COPD until arterial blood gases (ABGs) have been checked. Titrate up the percentage of oxygen administrered with serial ABG sampling until SaO2 of 88-92%. If SpO2 is more than 92%, then reduce the inhaled oxygen concentration.

Remember, for COPD patients, you should be aiming for an SaO2 of 88-92%, (compared with 94-98% for most acutely ill patients NOT at risk of hypercapnic respiratory failure).

What mask to use?
Use a 28% Venturi mask

What about non-invasive ventilation (NIV)?
NIV should be used if PaO2 is falling in spite of treatment. We do not see that in this stem as only one ABG has been reported.

Q-70

A 68 year old man presented to his GP with the complaint of a persistent cough. He says that he had been suffering with the cough for about two months. Further questioning reveals 4.5 kilograms of unintentional weight loss. The patient denies a fever, dyspnoea, sore throat, rhinorrhoea or chest pain but admits that he did cough up a few droplets of blood a few times. His past medical history is significant for chronic obstructive pulmonary disease (COPD). The patient has smoked a pack of cigarettes daily for thirty years but quit five years ago. On general inspection, the patient is noted to be thin with distinct pallor. Examination of the chest reveals no focal wheezes or crackles. There was no lymphadenopathy to be found.

His vitals are as follows:
Blood pressure 140/82 mmHg
Heart rte 80 beats/minute
Respiratory rate 17 breaths/minute
Oxygen saturation on room air 98%

A chest X-ray was done and showed a right perihilar mass.

What is the SINGLE most approprite investigation in this scenario to confirm the diagnosis?

A. Sputum cytology
B Thorascopy
C. Bone scan
D. Bronchoscopy
E. Repeat chest X-ray in 6 weeks

ANSWER:
Bronchoscopy

EXPLANATION:
This patient's history is very suggestive of lung carcinoma. The single most appropriate investigation to consider at this stage would be a bronchoscopy. A bronchoscopy is suitable for central tumours and would be able to provide histological and cytological specimens.

A thorascopy is mainly used for biopsies of pleural lesions and drainage of pleural effusions which is of no use here.

While a sputum cytology can be done, it is not the correct option because it is not routinely used. In the context of possible lung carcinoma, sputum cytology should only be performed in patients who are unfit for bronchoscopy or biopsy. The specificity is high but the sensitivity is low.

A bone scan should be ordered when a patient with estabilished cancer presents with recent and new onset bone pain, pathological fractures or if alkaline phosphatase or serum calcium is seen to be elevated.

Repeting the chest X-ray would yield no further diagnostic information. It would only be useful in patients with suspected pneumonia where we would like to ensure that the initial consolidation seen is no longer present at 6 weeks.

Q-71

A 54 year old male chronic smoker presents with progressive dyspnoea. He complains of cough, wheeze and about a tablespoon full of mucopurulent sputum which he has been coughing out daily for the past 15 months. Spirometry was performed which showed an FEV1/FVC of 2.4/3.7. He was given inhaled salbutamol and spirometry was repeated. His FEV1/FVC after inhaled salbutamol was 2.5/3.8. What is the SINGLE most likely diagnosis?

A. Chronic bronchitis
B. Asthma
C. Bronchiectasis
D. Lung fibrosis
E. Sarcoidosis

ANSWER:
Chronic bronchitis

EXPLANATION:
He has clear signs of chronic bronchitis. The spirometry is important to perform as it shows that there is irreversible airflow obstruction on spirometry. A FEV/FVC < 0.7 postbronchodilator points towards the direction of COPD. The minimal bronchodilator reversibility (< 5%) helps diagnose COPD and it is also useful if there is diagnostic uncertainty for example, if the patient is thought to have both COPD and asthma.

Chronic bronchitis
- Defined as a productive cough that lasts for three months or more per year for at least two years

Note that COPD is now the preferred term for patients with airflow obstruction who were previously diagnosed as having chronic bronchitis or emphysema

Presentation
- Cough accompanied by sputum production
- Dyspnoea
- Low-grade fever *(but patients are most commonly afebrile)*
- Wheezing

Aetiology
- Smoking

Investigations
- Pulmonary function test
  - o Decreased FEV1 and FEV1/FVC ratio
  - o FEV1/FVC < 0.7 (post-bronchodilator)
- Chest X-ray
  - o *is not required for diagnosis but is important to rule out other diagnoses that are being considered e.g. lung cancer, bronchiectasis*
  - o Hyperinflated lung fields
  - o Attenuation of peripheral vasculature
  - o Flattened diaphragms

Remember diagnosis of COPD → is based on the history of smoking and progressive
dyspnoea, with evidence of irreversible airflow obstruction on spirometry

Q-72

A 16 year old boy who attends boarding school feels unwell. He developed a dry cough fr the last few days. On examination, there are target lesions seen on the back of his hands. A chest X-ry was performed and it shows bilateral consolidations. What is the SINGLE most likely causative organism?

A. Staphylococcus aureus
B. Legionella
C. Mycoplasma pneumoniae
D. Klebsiella
E. Streptococcus pneumoniae

ANSWER:
Mycoplasma pneumoniae

EXPLANATION:
The diagnosis here is an atypical pneumonia. Mycoplasma pneumoniae is one of those that cause an atypical pneumonia that presents with dry cough. The target lesions are known as erythema multiforme.

Mycoplasma pneumoniae
Mycoplasma pneumoniae is a cause of atypical pneumonia which often affects young adults.

Features
- the disease typically has a prolonged and gradual onset
- flu-like symptoms classically precede a dry cough
- bilateral consolidation on x-ray

Note: Occasionally, PLAB may also give a presentation of erythema multiforme along with the atypical pneumonia symptoms. Erythema multiforme is one of the features of infection with mycoplasma pneumoniae.

Q-73

A 58 year old man who used to work in the shipyard industry was having chronic cough and shortness of breath for several months. He was given salbutamol inhalers and intravenous antibiotics and admitted to the ward. A computed tomography was performed which showed patchy infiltrates, pleural thickening and pleural effusion. He died 3 days later after which this case was referred to the coroner. What is the SINGLE most likely reason for the referral to the coroner?

A. Incorrect diagnosis and management
B. Inpatient death in the wards
C. Death likely due to industrial disease
D. Cancer research purposes
E. Death by natural causes

ANSWER:
Death likely due to industrial disease

EXPLANATION:
This patient's symptoms were due to the pleural effusion secondary to mesothelioma. Mesothelioma is classed as an industrial disease. In England and Wales, all deaths from mesothelioma must be referred to the local coroner's office. The coroner will then decide if a post-mortem examination is required and will hold an inquest. An inquest is a legal investigation to establish the circumstances surrounding a person's death. An inquest is needed because mesothelioma is an occupational disease and one needs to determine whether the death was due to mesothelioma or some other cause.

Q-74

A 68 year old man with advanced non-small cell lung carcinoma diagnosed nine months ago on biopsy presents with the complaints of dyspnoea and sub-sternal chest pain. An X-ray was done and showed a large left hilar mass. He is currently undergoing radiotherapy for his condition and he was relatively well for about two months until he developed thoracic back pain radiating around both sides of his chest. Additional scans showed metastases to T5, T6 and T7 with a mass compressing his spinal cord. The patient is currently on 260 mg of sustained release morphine every 12 hurs and he describes his pain control as adequate. Some other symptoms that he suffers from include anorexia, weight loss of about 15 kilograms over the past five months and generalised weakness. He is unable to carry out his daily activities and finds it difficult to do household chores. His wife died five years ago and he has one son who currently lives overseas. Upon further questioning, the patient has no written advanced directive but on several occasions, he has told his general practitioner that he wants nothing more done as far as his treatment is concerned. The patient is a devout Catholic and has expressed concerns over receiving his proper last rites. What is the SINGLE next best step in the management of this patient?

A. Refer to psychiatrist
B. Refer to dietitian
C. Refer to palliative care nurse
D. Refer for spiritual support
E. Refer to social worker

ANSWER:
Refer to palliative care nurse

EXPLANATION:
This question is testing your understanding of end of life care. End of life care is basically support for patients who are in the last stages of their life due to a terminal illness. In this scenario, it is obvious that this patient has terminal cancer. While a written advance directive is important and he should be counseled on this, it is not the next best step in this scenario. You do not need a referral to a psychiatrist for an advanced directive – any heatlhcare professional can counsel a patient on advanced directives and do not attempt resuscitation (DNAR) orders. The patient is experiencing weight loss and tiredness and while diet is an important part of end of life care, referring him to a dietitian would not be the next best step in this case either. While there is a role for spiritual support

and social care under end of life care, the most important team that needs to manage him is a palliative care team who will provide relief from pain and offer support until death. The palliative care nurses are very well trained to oversee the care of patients at the end of life. Some of them would even do home visits to ensure that patien'ts care is at an optimal level.

Q-75

A 70 year old man admits to asbestos exposure 20 years ago. He was a heavy smoker but quit smoking 3 years ago. He has noted weight loss and hoarseness of voice. Which is the SINGLE most likely type of cancer associated with the risk factors and symptoms present?

A. Basal cell carcinoma
B. Bronchial carcinoma
C. Oesophageal carcinoma
D. Nasopharyngeal carcinoma
E. Oral carcinoma

ANSWER:
Bronchial carcinoma

EXPLANATION:
Approximately 95% of all primary lung tumours are bronchial carcinomas.

Primary bronchial cancers are classified as follows:
- small-cell lung cancers (SCLCs)
- non-small-cell lung cancers (NSCLCs)

Adenocarcinoma accounts for 39% of NSCLCs and is the most common bronchial carcinoma associated with asbestos and is more common in non-smokers, compared with other cell types.

It is also important to note that hoarseness can also be a feature of lung cancer.

Q-76

A 14 year old girl with asthma is having frequent night coughs and mild exercise-induced wheezing. She is compliant with her asthma medication of inhaled corticosteroid and short-acting bronchodilator as required. Her inhaler technique is good. What is the SINGLE most appropriate next step in management?

A. Add leukotriene receptor antagonist
B. Add oral theophylline
C. Add an additional short acting bronchodilator
D. Increase dose of inhaled corticosteroid
E. Add regular oral corticosteroids

ANSWER:
Add leukotriene receptor antagonist

EXPLANATION:
The third step management for asthma differs between NICE and BTS/SIGN guidelines. In general, we can add on LABA or leukotriene receptor antagonist (montelukast). As LABA is not available as an option and the patient is above 12, it would be appropriate to add leukotriene receptor antagonist as per NICE 2017 guidelines.

Q-77

A 61 year old man has suddenly become vey short of breath. In the last hour, he has had a CT-guideed biopsy of a mass in the right lung. His temperture is 36.5 C, heart rate is 120 bpm, BP 90/60 mmHg, and SaO2 78% on 15 L oxygen. He looks cyanosed, his trachea is deviated towards the left, and breath sounds are much louder over the left hemi-thorax. Which is the SINGLE most appropriate course of action?

A. Arterial blood gas
B. Urgent chest X-ray
C. Insertion of a cannula into the right second intercostal space
D. Insertion of a cannula into the left second intercostal space
E. Insertion of a chest drain

ANSWER:
Insertion of a cannula into the right second intercostal space

EXPLANATION:
This man has rapidly developed the signs of a pneumothorax. Having just had a needle inserted into his chest, this is almost certainly an iatrogenic pneumothorax. The deviation of the trachea suggests that it is under tension and so needs urgent reversal. This is done by introducing a cannula into the pleural space, usually in the second anterior intercostal space mid-clavicular line. Air should be removed until the patient is no longer compromised and then an intercostal tube can be inserted into the pleural space.

The other less appropriate answers:

Investigations like ABG and chest X-ray → should be deferred as this is a serious situation that would lead to cardiorespiratory arrest unless addressed.

Insertion of a chest drain → will be needed but not until the air has been removed.

Insertion of a cannula into the left second intercostal space → Clearly a wrong answer as the trachea is deviated towards the left. This means that the tension pneumothorax is on the right.

Q-78

A 56 year old man complains of increased volume of sputum with specks of blood and chest pain. He has a history of recurrent chronic chest infections and deep vein thrombosis which happened 3 years ago. Finger clubbing was noted on examination. A chest X-ray shows tramlines but is otherwise normal. What is the SINGLE most likely diagnosis?

A. Pulmonary embolism
B. Bronchial carcinoma
C. Bronchiectasis
D. Pulmonary tuberculosis
E. Chronic sinusitis

ANSWER:
Bronchiectasis

EXPLANATION:
The increased volume of sputum with specks of blood and chest pain are symptoms of bronchiectasis. Finger clubbing is not a specific sign but has been seen in bronchiectasis although not very frequently. A chest-x ray that shows tramlines give a more specific picture pointing towards bronchiectasis. Although these are not diagnostic, the most probable diagnosis among the others is bronchiectasis. Only a high-resolution computed tomography (HRCT) chest would give you the diagnosis of bronchiectasis.

It is very rare that the question writers would attempt to trick you. But this is one of the questions that may be misleading as they give a history of DVT which is irrelevant for bronchiectasis.

Q-79

A 50 year old man has had hoarseness of voice and a left drooping eyelid for the past 2 months. He also has diminished sweating on same side of face. Finger clubbing is noted on examination. He smokes 20 cigarettes a day for the last 30 years. What is the SINGLE most likely diagnosis?

A. Laryngeal carcinoma
B. Thyroid carcinoma
C. Carcinoma of right bronchus
D. Mesothelioma
E. Pancoast tumour

ANSWER:
Pancoast tumour

EXPLANATION:
A pancoast tumour is a tumour of the pulmonary apex. The hoarseness of voice is due to compression of the recurrent laryngeal nerve. An ipsilateral invasion of the cervical sympathetic plexus leading to Horner's syndrome (miosis, enophthalmos, ptosis). The history of smoking and finger clubbing gives a clue towards a bronchogenic neoplasm.

Pancoast's Syndrome
Classically caused by an apical (superior pulmonary sulcus) malignant neoplasm of the lung. The neoplasm is usually bronchogenic in origin (most commonly squamous cell carcinoma, sometimes adenocarcinoma and large-cell carcinoma).

Presentation
This syndrome results from the invasion of a number of structures and tissues around the thoracic inlet and may be characterised by:
- An ipsilateral invasion of the cervical sympathetic plexus leading to Horner's syndrome
  (miosis, enophthalmos, ptosis)
- Ipsilateral reflex sympathetic dystrophy may occur.
- Shoulder and arm pain (brachial plexus invasion C8-T2) leading to wasting of the intrinsic hand muscles and paraesthesiae in the medial side of the arm.
- Less commonly, unilateral recurrent laryngeal nerve palsy producing unilateral vocal cord paralysis (hoarse voice ± bovine cough)
- There may be arm oedema secondary to the compression of blood vessels.

Q-80

A 24 year old man presents with acute respiratory distress after being stabbed in the back. The trachea is not deviated, but he has engorged neck veins and reduced air entry on his right chest. He has a blood pressure of 80/50 mmHg, a pulse of 135 beats/minute, and a respiratory rate of 35 breaths/minute. What is the SINGLE most likely diagnosis?

A. Tension pneumothorax
B. Cardiac tamponade
C. Simple pneumothorax
D. Haemothorax
E. Pleural effusion

ANSWER:
Tension pneumothorax

EXPLANATION:
The patient has signs of a tension pneumothorax and requires urgent needle compression.

Some might argue here this is a haemothorax. The stem states that the neck veins are engorged. In haemothorax there is no distension of neck veins or raised jugular venous pressure due to the hypovolaemic state. Engorged neck veins indicate that the pressure within the right ventricle is high. This is seen in both cardiac tamponade and tension pneumothorax. It is not seen in simple pneumothorax, pleural effusion and haemothorax.

Another reason against haemothorax is that it would be very unlikely that a stab wound in the back would involve the heart (which is in the anterior mediastinum) AND the right lung.

The decisiion between cardiac tamponade and tension pneumothorax is a difficult one.

Do not be confused by the trachea's lack of deviation – in real life this is actually not a very sensitive sign! The patient is hypotensive, tachycardic, tachypnoeic and very unwell. Reduced entry on his right chest indicates that this is the side of the tension pneumothorax (presuming he was stabbed on the right side)

It is important to remember Beck's triad for cardiac tamponade. The patient has both hypotension and engorged neck veins, but the heart sounds have not been commented on (which are usually muffled).

Q-81

A 35 year old man presents with progressive breathlessness and a non-productive cough. He has been more lethargic over the past few months. He has a history of polyarthralgia with painful red lumps appearing on his shins. They are cherry sized and are about 20 or more in number. His chest X-ray shwos bilateral hilar lymphadenopathy. What is the SINGLE most likely diagnosis?

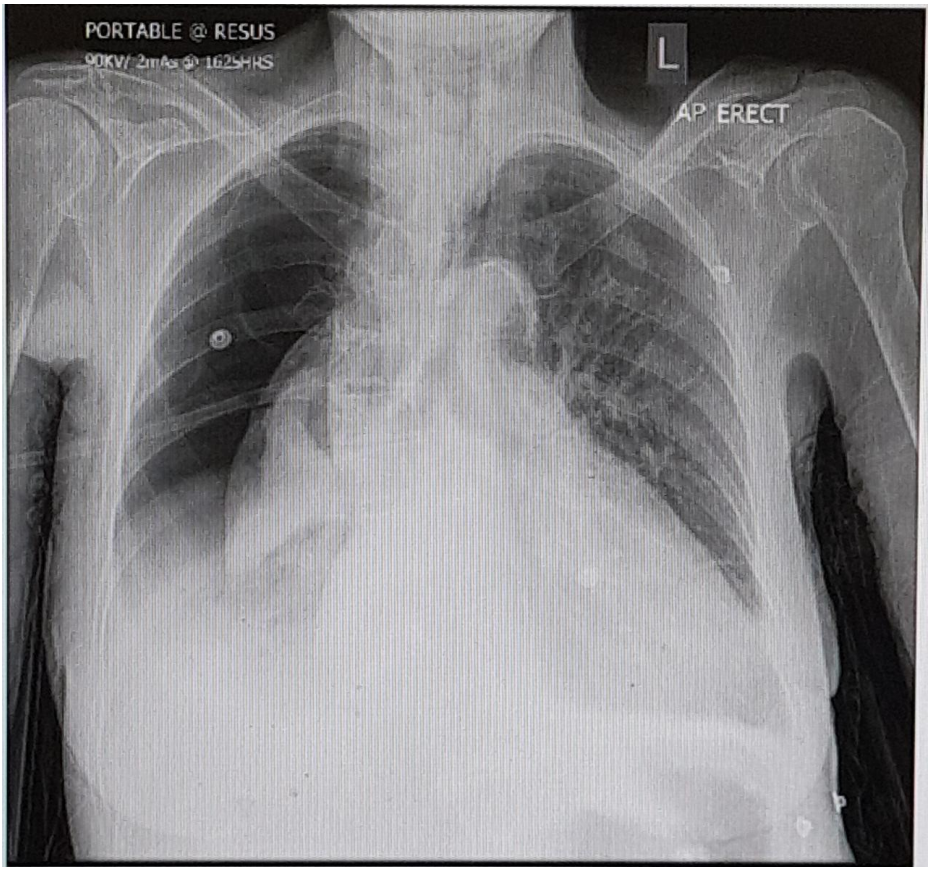
A. Bronchial asthma
B Cystic fibrosis
C. Sarcoidosis
D. Bronchiectasis
E. Pneumonia

ANSWER:
Sarcoidosis

EXPLANATION:
Please see Q-36

Q-82

A 79 year old lady is brought in by ambulance to the Emergency Department with shortness of breath that worsened dramatically overnight. She has been feeling unwell for the past two weeks with a cough and slight shortness of breath of which her general practitioner has prescribed her amoxicillin seven days ago. The ambulance crew tells you that she initially had saturations of 70% before being started on oxygen. She is not known to have COPD but has been a heavy smoker for the past 50 years of her life. On examination, she is seen to be struggling to breathe. Her respiratory rate is 26 breaths/minute, heart rate is 105 beats/minute and blood pressure is 110/70 mmHg. A chest X-ray was performed which is shown below:



What is the SINGLE most likely diagnosis?

A. Lower respiratory tract infection
B. Haemothorax
C. Flail chest
D. Chronic Obstructive Pulmonary Disease
E. Spontaneous pneumothorax

ANSWER:
Spontaneous pneumothorax

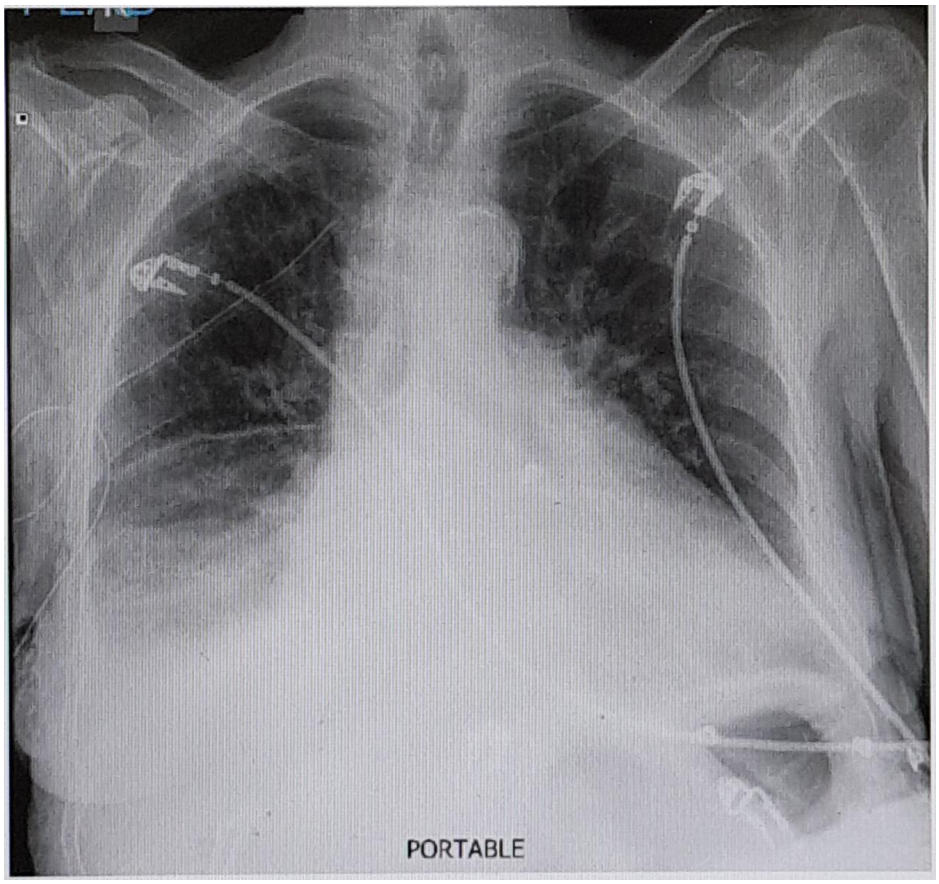
EXPLANATION:
The chest X-ray clearly shows a right pneumothorax with right lung collapse and mediastinal shift to the left.

The right lung is completely compressed and the trachea is pushed to the left. It is obvious that there are no lung markings on the right field. You will not be asked complicated X-rays in the exam, but life threatening X-rays like this where it is easy to spot should not be missed in the exam and also in practice.

An urgent chest drain would be required to alleviate her symptoms and to prevent worsening of the mediastinal shift.

Although she is likely to be an undiagnosed COPD patient given the history of her smoking, the more important diagnosis at the moment is the right pneumothorax. The undiagnosed COPD that this patient has is likely the cause of her secondary spontaneous pneumothorax.

Remember, if it is clinically clear that you have a patient with tension pneumothorax, do not request an X-ray just yet, treat the patient!



This chest X-ray is taken after the chest drain insertion showing the right sided intercostal drain in situ with good reexpansion of the right lung with no evidence of residual pneumothorax. If you look carefully, a consolication is seen on the right lower lobe which could account for her symptoms of a lower respiratory tract infection.

Q-83

A 25 year old tall rugby player comes to the Emergency Department complaining of chest pain and shortness of breath that developed earlier in the day. He was hit in the chest by a player of the opponent team during a rugby match. He has no significant medical history. The triage nurse takes his observations and notices that his oxygen saturations are 89% on air, respiratory rate is 26 breaths/minute, heart rate is 100 beats/minute. You have been called to look at him. What is the SINGLE most appropriate initial action?

A. Insert a needle in the 2nd intercostal space at the mid-clavicular line
B. Insert a needle in the 5th intercostal space at the mid-axillary line
C. Inform anaesthetist
D. Start cardiopulmonary resuscitation
E. Administer oxygen

ANSWER:
Administer oxygen

EXPLANATION:
The patient is likely having difficulty breathing from a pneumothorax. Administration of oxygen would always be your first step in a desaturating patient.

Q-84

A 55 year old man presents with increasing breathlessness, noisy breathing and a history of hoarseness of voice. He has a chronic cough that is productive. He has noticed his symptoms worsening over the past 3 weeks . He smokes 15 cigarettes a day for the past 25 years. His spirometry results show the following:

- **FEV1 60% predicted**
- **FEV1/FVC ratio 0.67 post bronchodilation**

What is the SINGLE most likely diagnosis?

A. Chronic obstructive pulmonary disease (COPD)
B. Asthma
C. Congestive heart failure
D. Tracheal compression
E. Pulmonary fibrosis

ANSWER:
Chronic obstructive pulmonary disease (COPD)

EXPLANATION:
Remember that diagnosis of COPD is based on the history of smoking and progressive dyspnoea, with evidence of irreversible airflow obstruction on spirometry which this patient ticks all of them.

Tracheal compression is not correct. Tracheal compression refers to any pressure on the trachea sufficient to cause displacement. This is usually in the context of an enlarging thyroid mass. The reason many people mistakenly pick tracheal compression is because they assume compression of the recurrent laryngeal nerve could explain the hoarseness of voice however, it fits one symptom but not the remaining ones. COPD has a much better fit in this scenario.

The spirometry findings for the diagnosis of COPD is very important and worth remembering. The presence of airflow obstruction should be confirmed by performing post-bronchodilator spirometry. Airflow obstruction is defined as

- FEV1 < 80% predicted
- and FEV1/FVC < 0.7

Q-85

A 60 year olf man presents to his general practitioner with the primary complaint of shortness of breath. He complains that he has been having increasing shortness of breath for the past seven months and that his symptoms have escalated to such a stage that he is now unable to walk the length of his hallway at home without becoming breathless. Further questioning reveals that the patient is also suffering frm a dry cough that has been present for the past five months. His past medical history is significant for hypertension, diagnosed when he was 55 years of age, which he takes ramipril for. The patient says that he is compliant with his medication. The patient says that he has worked in a warehouse for the past 30 years and specifically mentions that he has not been exposed to asbestos. Upon examination, the patient appears unwell and gaunt. Finger clubbing is noted and fine inspiratory crackles can be appreciated bilaterally upon auscultation of his lungs. His vitals are as follows:

Blood pressure 145/86 mmHg
Temperature 36.8 C
Respiratory rate 89% on room air

A lung function test was subsequently carried out and the results are as follows:

FEV1 60% of predicted
FVC 40% of predicted
FEV1/FVC ratio 0.8

What is the SINGLE most likely diagnosis for the patient?

A. Asthma
B. Bronchiectasis
C. Pulmonary oedema
D. Pulmonary fibrosis
E. Chronic obstructive pulmonary disease (COPD)

ANSWER:
Pulmonary fibrosis

EXPLANATION:
This is a very straightforward question but it does test your knowledge of lung function testing thoroughly. The pulmonary indices indicate a restrictive lung disease. The only choice that is a restrictive lung disease is pulmonary fibrosis. Asthma, bronchiectasis, pulmonary oedema and chronic obstructive pulmonary disease are all obstructive lung diseases.

PULMONARY FUNCTION TEST
Terms:

Total lung Capacity (TLC) – this is the amount of air in the lungs after maximal inspiration

Residual Volume (RV) – this is the amount of air that remains in the lungs after maximal expiration

Vital Capacity (VC) – this is the amount of air that is pushed out of the lungs after maximal expiration

Forced Expiratory Volume in 1 second (FEV1) – this is the amount of air that is pushed out of the lungs in one second during maximal expiration

Forced Vital Capacity (FVC) – this is the amount of air that is pushed out of the lungs after forced maximal expiration

The following table illustrates the three main values that you need to know for the exam and how each pulmonary index differs between obstructive and restrictive processes

	Obstructive	**Restrictive**
FEV1	↓ Less than 80% of predicted	↓ Less than 80% of predicted
FVC	N More than 80% of predicted	↓ Less than 80% of predicted
FEV1/FVC	↓ Less than 0.7	N 0.7-0.8 OR ↑ More than 0.8

Obstructive lung diseases
These are diseases such as asthma, cystic fibrosis and bronchiectasis. They cause airway resistance to expiratory flow and so result in obstructed airways. When expiratory flow is obstructed, the patient will struggle to breathe air out and thus FEV1 will decrease. Because FEV1 is the numerator of the FEV1/FVC ratio, any obstructive disease will also cause a decrease in the FEV1/FVC ratio.

Restrictive lung diseases
These are diseases such as pulmonary fibrosis or interstitial lung disease. They may also be caused by obesity, chest or spine deformities and neuromuscular disorders. Restrictive lung diseases restrict lung expansion and cause a decrease in the amount of air that the lung can hold i.e., a decrease in the vital capacity of the lung. This results in a decreased FVC. Because the pathology of restrictive lung diseases also causes a decrease in lung elasticity, it also becomes harder for the lungs to force out air. This causes a decrease in the FEV1. Because both the FEV1 and FVC decrease in restrictive lung disease, the FEV1/FVC ratio remains the same.

Q-86

A 55 year old man attends the Accidents & Emergency with complaints of a productive cough for the past 14 days. He feels unwell and complains of mild shortness of breath. His observations show that he has a temperature of 38.9 C, a respiratory rate of 25 breaths/minute, heart rate of 90 beats/minute, and a blood pressure of 110/80 mmHg. A chest X-ray shows right lower lung consolidation. His blood results are unremarkable. The triage note states that he has a severe allergic reaction involving anaphylaxis to penicillin in the past. What is the SINGLE msot appropriate management?

A. Admit for intravenous co-amoxiclav
B. Admit for intravenous clarithromycin
C. Discharge with oral cefuroxime
D. Discharge with oral clarithromycin
E. Discharge with oral amoxicillin

ANSWER:
Discharge with oral clarithromycin

EXPLANATION:
Amoxicillin and co-amoxiclav are a class of penicillins and should not be given to penicillin allergic patients. Cefuroxime (and all cephalosporins) has a cross reactivity of around 10% to penicillins. This means 1 in 10 patients with a penicillin allergy, would develop the allergy if taking a cephalosporin. These options can be crossed out almost immediately with the history of a severe penicillin allergy.

The next step is to calculate the CURB-65 score to assess the need for hospital admission. The CURB-65 is a clinical prediction rule that helps predict mortality in patients with community-acquired pneumonia. It consists of 5 risk factors – each scoring one point:

- Confusion of new onset (AMTS of 8 or less)
- Blood urea nitrogen (BUN) > 19 mg/dL (> 7 mmol/L)
- Respiratory rate ≥ 4- breaths/minute
- Systolic BP < 90 mmHg or Diastolic BP ≤ 60 mmHg
- Age ≥ 65

The choice of antibiotic to prescribe depends on the severity of the illness. The patient scores 0 on his CURB-65 score and thus can be managed at home.

If CURB-65 score = 0

- Prescribe amoxicillin
- If penicillin allergy, prescribe doxycycline or clarithromycin *(other macrolides like erythromycin can also be used)*

If CURB-65 score = 1 or 2

- Dual therapy with amoxicillin and clarithromycin or monotherapy with doxycycline
- *Hospital admission can also be considered for patients who score 2 on their CURB-65 score*

If CURB-65 score = 3

- Arrange hospital admission usually for IV antibiotics

Q-87

A 37 year old woman presents to the Emergency Department with shortness of breath and coughing with blood stained sputum. She flew from Thailand to United Kingdom 3 days ago. She denies any fever. Her oxygen saturation is 92% on room air. She has a heart rate of 105 beats/minute, respiratory rate of 25 breaths/minute and a blood pressure of 120/90 mmHg. What is the SINGLE most appropriate investigation?

A. D-dimer
B. Ventilation perfusion scan
C. Computerised tomography pulmonary angiogram
D. Chest X-ray
E. Ultrasound of lower limb

ANSWER:
Computerised tomography pulmonary angiogram

EXPLANATION:
CTPA is the answer here as it is the best test among the other options which provide a definitive diagnosis of pulmonary embolism.

Q-88

A 48 year old man was admitted with cough and dyspnoea. He has a long history of smoking. He has noticed some recent weight loss. A chest X-ray was performed and showed consolidation on the lower left lobe. He was started on antibiotics and is due for discharge. What is the SINGLE most appropriate follw up investigations to perform after discharge?

A. Bronchoscopy
B. Chest X-ray
C. Sputum culture
D. Computed tomography (CT)
E. Magnetic resonance imaging (MRI)

ANSWER:
Chest X-ray

EXPLANATION:
A chest X-ray should be performed after he recovers. As he is a smoker and has lost significant weight, lung malignancy should be part of the differential. The first chest X-ray shows consolidation of the left lower lobe which is consistent with pneumonia. A repeat chest X-ray would be required to assess malignancy as the consolidation of the left lower lobe could have hindered a proper assessment of lung carcinoma.

Q-89

A 27 year old man who is a known asthmatic presents to the Emergency Department with shortness of breath. He has a respiratory rate of 25 breath/minute and a heart rate of 110 beats/minute. He has bilateral wheeze heard on auscultation. He looks drowsy, agitated and has poor respiratory effort. Which of the following is a criteria for life threatening asthma?

A. Altered mental status with drowsiness
B. Respiratory rate > 24 breaths per minute
C. PEF between 33-50%
D. Heart rate more than 90 beats per minute
E. Bilateral audible wheezes

ANSWER:
Altered mental state with drowsiness

EXPLANATION:
Life threatening asthma has the following features

- PEF < 33% best or predicted
- SpO2 < 92%
- PaO2 < 8 kPa
- Normal PaCO2 (4.6-6.0 kPa)
- Silent chest
- Cyanosis
- Poor respiratory effort
- Arrhythmia
- Exhaustion
- Altered conscious level
- Hypotension

Q-90

A 28 year old male is admitted with acute exacerbation of asthma. He is treated initated with 100% oxygen, salbutamol nebulizers and hydrocortisone 100 mg IV. Despite treatment, his oxygen saturation is 89% and respiratory rate is 30 breaths/minute. What is the SINGLE most appropriate next step in management?

A. Prednisolone 40 mg orally
B. Add in ipratropium 0.5 mg to nebulizers
C. Intramuscular adrenaline
D. Intramuscular salbutamol
E. Stop administration of oxygen

ANSWER:
Add in ipratropium 0.5 mg to nebulizers

EXPLANATION:
Salbutamol and hydrocortisone have been given rightly so since it is an acute exacerbation of asthma. Ipratropium nebulizers should be added next as it will improve symptoms. The aetiology is probably due to a chest infection which initiated the exacerbation for which we will prescribe antibiotics. But, we need to sort out his shortness of breath first and for a saturation of 94-98%.