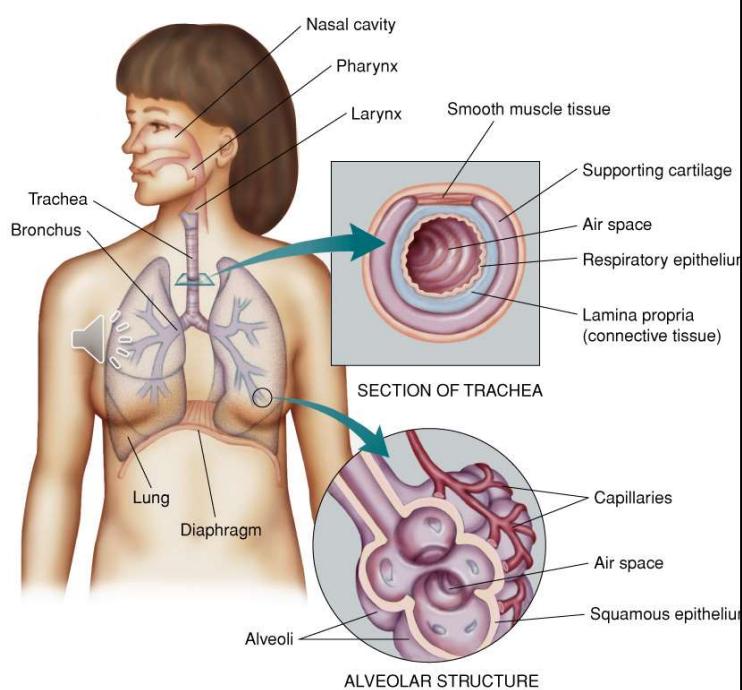


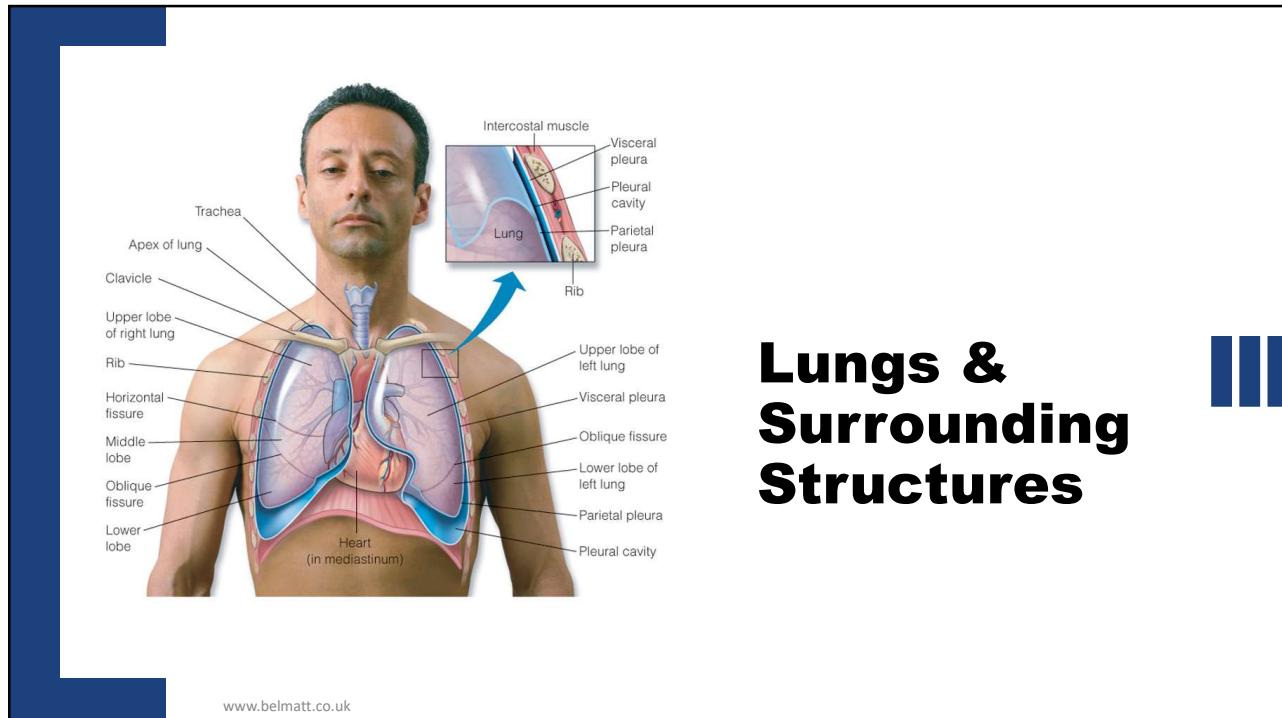
Respiratory presentations in Primary Care

JAA

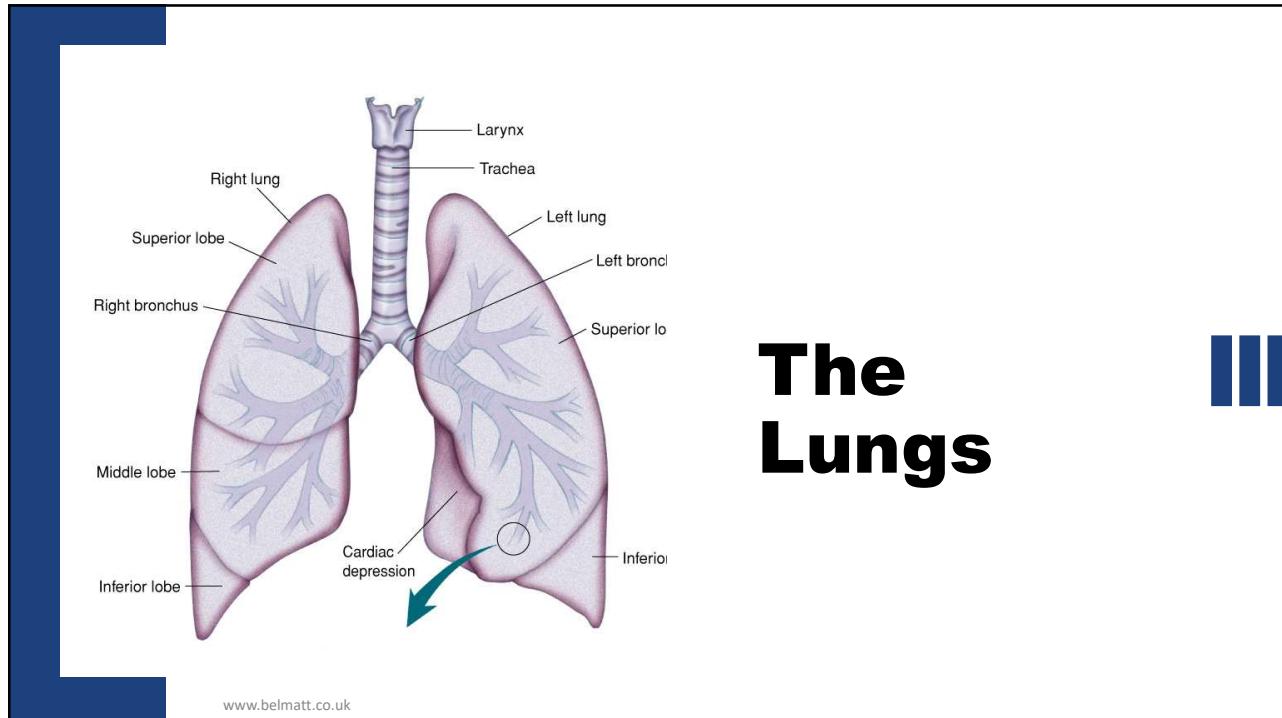
Respiratory System

- Study the anatomy that you see in this diagram and consider what could go wrong.
- Think of normal and abnormal findings





Lungs & Surrounding Structures



The Lungs

History Taking in a respiratory condition- consider these areas

- Presenting Complaint
- The history of Presenting Complaint
- Past Medical History, Surgical History and Gynae/sexual History (if relevant)
- JAMITHREADSCMH
- Allergies : Drugs, Food, Other. Consider latex
- Medication History
- Immunisations



Auscultation- you can always call these ‘added sounds’ or think of these

• Stridor

- High pitched, “crowning”
- Upper airway restriction

Crackles (Rales)

- Fine, “crackling”
- Fluid in smaller airways, alveoli

• Wheezing

- “Whistling”
- Usually more pronounced on exhalation
- Generalized: narrowing, spasm of the smaller airways
- Localized: foreign body aspiration

Rhonchi

- Coarse, “rumbling”
- Fluid, mucus in larger airways



Common near patient tests



Pulse oximetry

Why is this important. What factors can affect readings.
Is it relevant in patient with smoke inhalation. Why?



Peak Flow Meter

Why?
When should it be done?
How?
Are paeds and adults the same?

Spirometry-the Gold standard

What is the relevance of spirometry?
How does it help in asthma and COPD?
What is the relevance of FEV1,FVC,VC?



Scenario

- A 67yr old female presents complaining of a troublesome cough for past few weeks. Chest X ray is normal. She is apyrexial.
- What other history would you obtain from this patient?
- Which investigations would you consider?
- What is your differential diagnosis?
- What treatment would you consider?

Types of cough

- Acute <3weeks
 - Sudden onset, brief episodes, self limiting
 - Viral infection
- Subacute – 3-8 weeks
- Chronic
 - Prolonged period of more than 3 weeks
 - Asthma, chronic bronchitis, bronchiectasis ,heart failure, bronchogenic cancer, sarcoidosis & ACE inhibitors.
 - Non asthma oesoniphilic bronchitis – inflammation of bronchi driven by oesoniphils.
 - GORD

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Causes of cough

C – COPD

O – OEDEMA

U – Upper airway cough syndrome

G – GORD

H – Hypertension medication

I – Infections or irritants

N – Non asthmatic oesoniphilic bronchitis

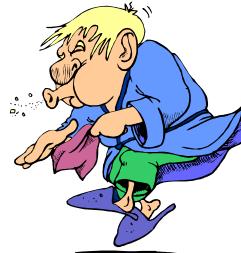
G - GORD

<https://www.youtube.com/watch?v=zf7mPgRCZf8>

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Coughs can be described as:

- Productive Wheezy
- Dry Hacking
- Barking
- Brassy
- Hoarse
- Croupy



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Coughs can be described as:

- Productive Wheezy
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- Brassy
- Hoarse
- Croupy



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Acute cough

- Acute cough is defined as one lasting less than 3 weeks.
- Acute cough is the commonest new presentation in primary care and is most commonly associated with viral upper respiratory tract infection.
- In the absence of significant co-morbidity, an acute cough is normally benign and self-limiting.
- It is the commonest symptom associated with acute exacerbations and hospitalisations with asthma and COPD.
- The cost of acute cough to the UK economy in 2017 was considered to be £1 billion in lost productivity and healthcare costs!!

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Chronic cough

- is defined as one lasting more than 8 weeks.
- It is reported by 10–20% of adults, commoner in females and obese.
- Cough accounts for 10% of respiratory referrals to secondary care.
- Most patients present with a dry or minimally productive cough.
- The presence of significant sputum production usually indicates primary lung pathology eg COPD
- In chronic cough a heightened cough reflex is the primary abnormality.

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Causes of Chronic Cough

Condition	History	Physical findings
Nasopharyngitis	Acute onset, low grade fever, rhinorrhoea, cough	Red swollen nasal mucosa, pharynx mildly red
COPD exacerbation	Worsening dyspnoea, increased wheeze and cough, smoker	Purulent sputum, fever, increased HR and resps
Pertussis	Persistent hacking cough, inspiratory whoop, vomiting	Fever absent, coryza
Pneumonia	Cough, dyspnoea, pleuritic chest pain, sputum prodn, fever	Fever, tachycardia, tachypnoea, insp crackles, percussion dull, , asynchronous breathing
Viral URTI	Cough, nasal congestion, sore throat, fever, myalgia	Fever, pharyngitis, enlarged anterior cervical nodes, normal TMs, normal chest
Bronchiolitis	Grunting, sneezing, cough, anoxia, exposure to passive smoke	Fever, wheeze, prolonged exp. Phase, tachypnoea



COVID19 COUGH

- COVID 19 – Post COVID cough
 - Sensory neuropathic cough
 - Cough initiated by a sudden sensory disturbance e.g. dripping sensation, dry patch
 - Cough out of proportion to mucus
-
- Watch utube video
<https://www.youtube.com/watch?v=MWxbFiiQPi0>

COVID19 Cough

How is it different from a wet or dry cough. What are the causes of each?



Types of Coughs

<https://www.youtube.com/watch?v=nbCbOis-mwo>



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Other Causes of Cough

Condition	History	Physical findings
Post Nasal Drainage	Cough, sore throat	Mucoid secretions, normal chest exam
Asthma	Dry hacking cough especially at night	End expiratory wheeze, prolonged expiratory phase
GORD	Worse at night, heart burn, Hx of oesophagitis, smoker, alcohol abuse, overweight, cough after lying down	Normal chest and abdo exam. Possible epigastric pain on palpation
Chronic bronchitis	Cough, mild dyspnoea, Hx COPD, smoker,	Rasping cough, normal breath sounds or rhonchi that clear with coughing, resonant to dull chest, possible wheeze

Managing acute cough

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General Advice for Acute Cough

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Be aware that people with an acute cough may be at higher risk of complications if they:



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Case scenario

- Mrs James is a 26 year old lady who has telephoned you for some advice as her daughter 'Ella' 18mths old has a barking cough'
- What key questions do you need to elicit?

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Further Information re Ella



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Pertussis



Department of Health, Public Health England and NHS England Joint Letter (2013). Continuation of temporary programme for pertussis vaccination for pregnant women.[internet] accessed 15 May 2014 <https://www.gov.uk/government/publications/whooping-cough-vaccination-programme-for-pregnant-women-extension-to-2014>
Department of Health (2013) Immunisation against infectious diseases: Pertussis Chapter, TSO Publishing, Crown Copyright. <http://immunisation.dh.gov.uk/green-book-chapters/>
NHS Choices (2014). Whooping cough in pregnancy programme [internet] accessed 15 May 2014. <http://www.nhs.uk/conditions/pregnancy-and-baby/pages/whooping-cough-vaccination-pregnant.aspx>

Baby with pertussis



www.

Treatment

Pertussis Infectious Period

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Sputum

- Amount
 - Copious
- Colour
 - Black, brown, green, red, rusty yellow, greyish
- Consistency
 - Thin, thick, viscous, tenacious, frothy, mucoid, mucopurulent.
- Time of day
- Odour (foetid)
- Presence of matter e.g. blood

<https://www.youtube.com/watch?v=ldrOIMXdeD4>

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Sputum

- ↑ amount of sputum ⇒ infection or inflammation
- Thick green or brown ⇒ pneumonia or infection
- Yellow or gray ⇒ allergic or inflammatory response
- Haemoptysis ⇒ tuberculosis , carcinoma or TRAUMA
- Pink, frothy - severe often acute pulmonary oedema/MI

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Green Sputum

- Nearly always a sign of infection
- Why is sputum green?
- White blood cells contain a protein, **myeloperoxidase**
- Only present in white blood cells
- As more white blood cells accumulate in sputum in response to bacteria
- Their green colour becomes more obvious

Sputum-colour

- Rusty can be a sign of pneumococcal Pneumonia
 - Rusty sputum is defined as “a reddish-brown, blood-stained expectoration”
 - Internal micro-bleedings
 - Foamy and Pink tinged-pulmonary oedema
- Coughing up brown sputum is a common sign of smoking. It's due to **resin** sticking to the viscous texture of the sputum and being ejected by body.
- BROWN sputum nearly always sign of infection



Dyspnoea

- Assessment tools:
- Modified Borg scale
 - Uses 0-10 grading scale
- American Thoracic Society SOB Scale
 - uses descriptive terms as well as numeric grading scale
 - MRC scale useful in UK
- UCSD SOB questionnaire
- ROTH scale is unreliable
- **Description**
 - SOB during activities of daily living
 - Asthmatic – tightness in the chest
 - CHF – sensation of suffocating
 - COPD – complain of increased effort to breath

System	Cause of Dyspnoea
Respiratory	Asthma, COPD, pulmonary fibrosis, pleural effusion
Cardiac	CHF, pericardial effusion
Haematological	Severe anaemia, carbon monoxide poisoning
Neurological	Space occupying lesion, increased intracranial pressure, stroke/cva
Metabolic	Uraemia, hepatic coma, thyrotoxicosis, myxoedema
Mechanical Factors	Chest wall deformities, diaphragmatic paralysis, hepatosplenomegaly

Common Presentations in Primary Care

Case Scenario

- Susan, a 21yr old university student complains of a runny nose and headache. No lymphadenopathy. No abnormal physical signs. Concerned as she has exams in one week in June.
- What is the likely diagnosis?
- What advice would you give her about the likely course of her problem.
- What possible complications could occur.
- Are any vaccinations advised?

Histamines

First chemical mediator to be released in immune and inflammatory response.

Antihistamines

Other anti histamines

Brand name: Benadryl or Dphenhydramine
Classification Pharmacologic: H1 antagonist
Classification Therapeutic: allergy, cold and cough remedies, antihistamines, antitussive.
Action: Antagonizes the effects of histamine at H1 receptor sites; does not bind to or inactivate histamine.
Significant CNS depressant and anticholinergic properties.

High incidence of drowsiness
Well absorbed after oral administration
Acts within 15 minutes and lasts for 8 to 12 hours
Available in combination drugs
Decongestants
Analgesics
Allergy
Cold remedies



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Additional Medication for coughs

Anticholinergic

- E.g. Ipatropium
- Short acting
- Reduces excessive rhinorrhoea
- Need to be used 3-4 times a day

Leukotriene Antagonist

- E.g montelucast
- Third line treatment in allergic rhinitis good for asthma add on also
- Antagonise leukotrienes produced by mast cells and stabilise them stopping release of histamine
- Once daily –new step up use in asthma guidelines instead of combo inhalers



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Nasal Sprays eg Sinex



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The Common Cold



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Influenza and other respiratory viruses

- Influenza is a viral infection that can affect the upper or lower respiratory tract.
- Three distinct forms of influenza virus have been identified: A, B(2 types) and C with type A the most common and causes the most serious illness.
- The influenza virus is a highly transmissible respiratory pathogen.
- Because the organism has a high tendency for genetic mutation, new variants of the virus are constantly arising in different places around the world. Serious pandemics (spread of infection across a large region) of influenza are seen every 30-40 years as a result of this change eg swine flu H1N1.
- Consider atypical viruses eg SARS MERS and Covid 19



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Symptoms of influenza infection:



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CURB criteria

Characteristic	Positive variable	Points
Confusion	Disoriented to person, place or time	1
Uremia	BUN > 20 mg / dL	1
Respiratory rate	> 30 breaths / min	1
Blood pressure	Systolic < 90 mm Hg or Diastolic < 60 mm Hg	1
Age	> 65 years	1

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RED FLAGS in respiratory disease

- Cyanosis?
- Pallor
- Sweating?
- Level of consciousness
- Confused?
- Chest pain? radiation- jaw?
- Respiratory rate/BP, pulse
- Blood in sputum ??
- Oxygen saturation
- Unexplained weight loss
- Cough- productive?
- Othopnoea
- Swollen ankles
- Persistent hoarseness
- Smoking history
- PMH eg. COPD
- Medication
- Allergy
- Social Hx.

Mrs Parsons

- Diagnosed with community acquired pneumonia
- Admitted to hospital
- IV antibiotics, fluids , rest

Local services: what is available
Early discharge planning!

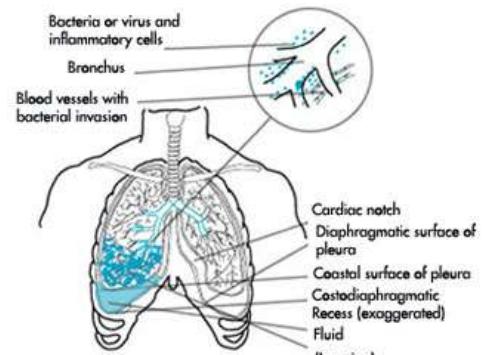
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Pneumonia: what is it



Pneumonia

- The alveoli become inflamed and fill with liquid/matter
- Gas exchange is impaired and the body becomes starved for oxygen



Pneumonia

At Risk Patients



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Classification of Pneumonia

Anatomical

Lobar
Bronchial

Organism

Bacterial
Viral incl COVID
Fungal

Where?

Hospital-Acquired
Community
acquired

Other

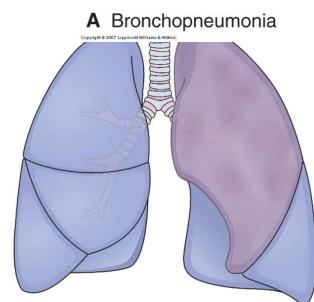
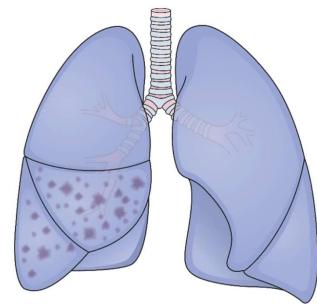
Legionnaires
Aspiration
Ventilator-associated
SARS MERS



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- Bronchopneumonia
 - patchy inflammation
 - involves alveoli of more than 1 lobe
 - usually in basilar parts
- Lobar pneumonia
 - consolidation of an entire lobe
 - almost always caused by *S. pneumoniae*



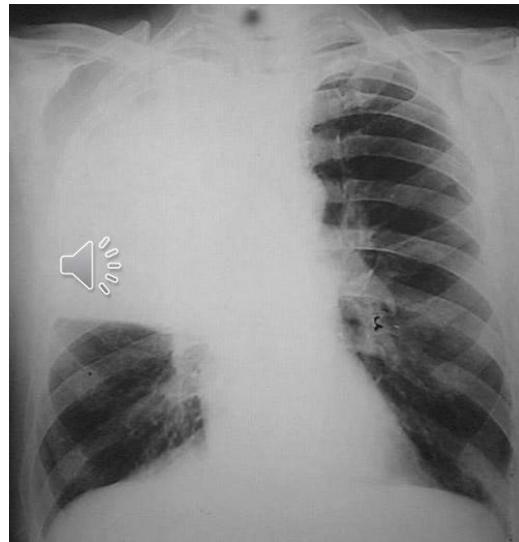
A Bronchopneumonia

B Lobar pneumonia

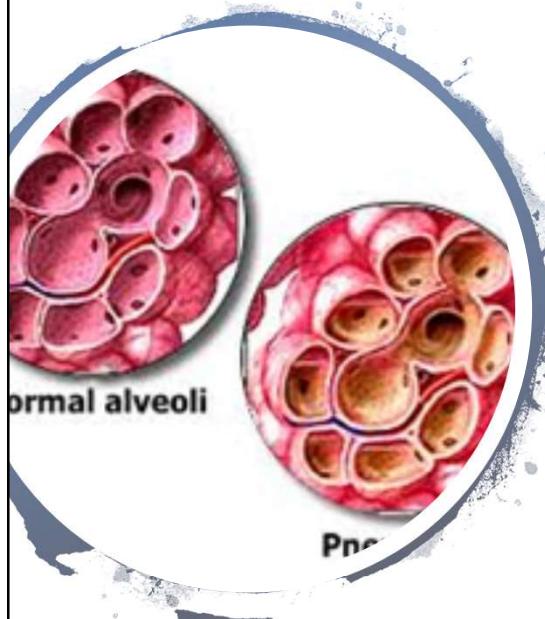


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- Lobular pneumonia affects a lobe of the lungs (see x-ray), and bronchial pneumonia can affect patches throughout both lungs.



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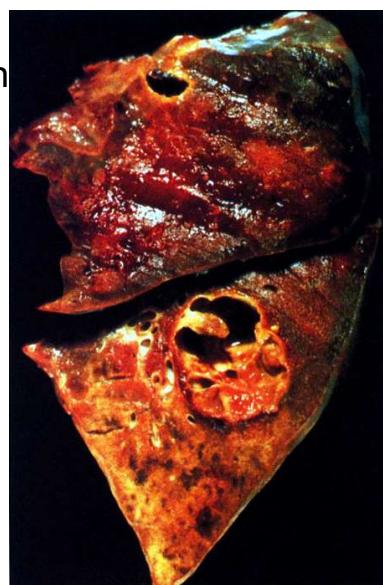
Potential complication:

- Lung abscess
- Pleurisy
- Empyema
- Septicaemia or IPD
- Death-especially if pt has co-morbidities

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Lung Abscess

- Purulent inflammation with tissue necrosis & liquefaction
- There can be several types of bacteria with anaerobic and aerobic presentations
- Most commonly due to aspiration of gastric contents
- Foul-smelling sputum



Physical examination:Findings

- Fever
- Increased Respiration : Note rate, depth, rhythm
- tachycardia
- Increased Fremitus
- Rales, crackles- or added sounds
- Bronchial sounds rather than vesicular sounds
- Pleuritic chest pain and/or pleurisy
- Hypoxia
- Oxygen Saturation level changed
- Confusion/rigors
- Rusty coloured sputum

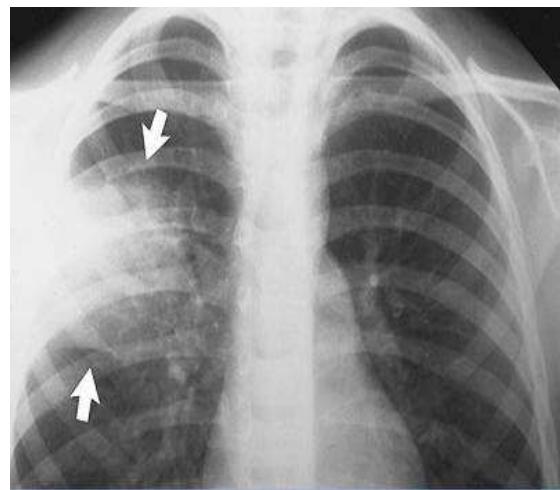


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Investigations

- Patient has pneumonia in the right lung (note – white mass = fluid)
- Lungs should appear black on an x-ray
- Which lobe??



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Community Acquired Pneumonia

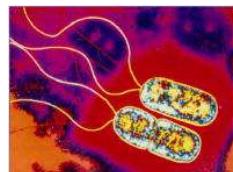
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Hospital Acquired Pneumonia

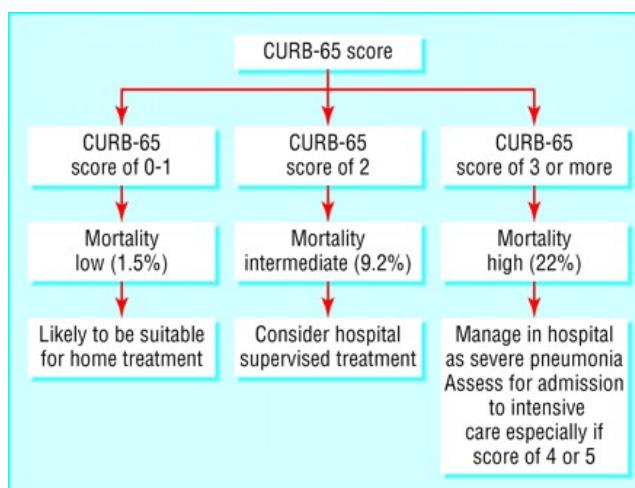
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Causative Organism



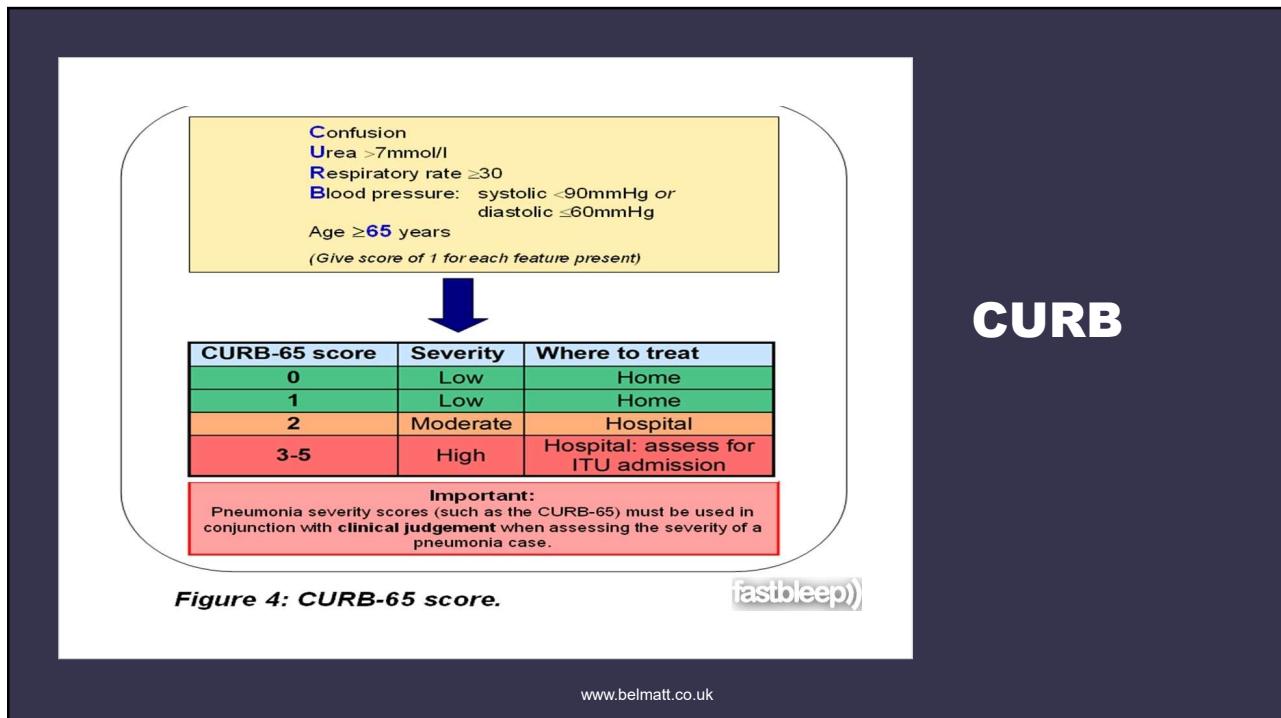
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Assessing Risk



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CURB



Treatment

- Determine severity; Pneumonia severity index tool
- Chest X-ray
- Check for leukopenia, leukocytosis
- Sputum cultures
- Antibiotic therapy
- Monitor SpO₂ levels
- Hydration
- Anti-pyretics
- Breathing exercises

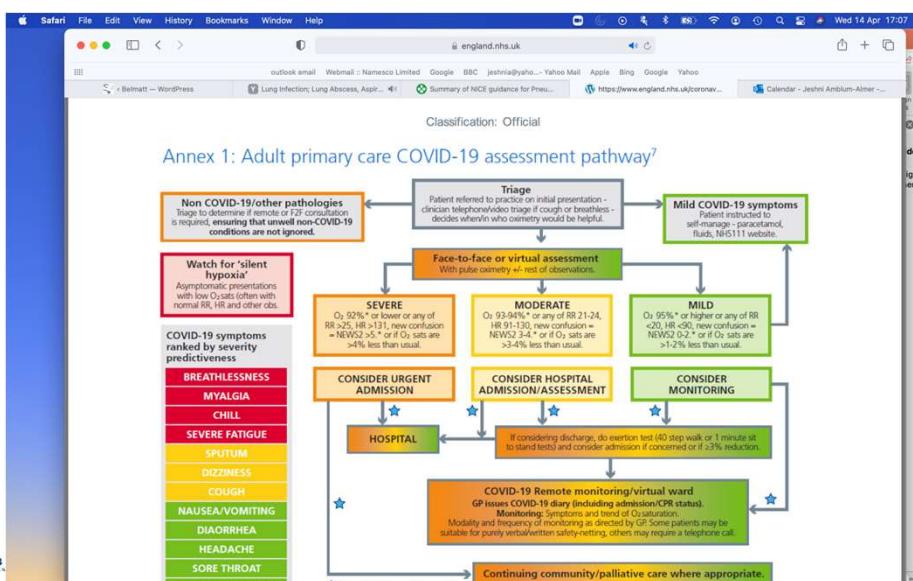


Vaccinate



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COVID19 TREATMENT PATHWAY



SYMPTOMS IN SEVERE COVID19

- Use the following signs and symptoms to help identify people with COVID-19 with the most severe illness: severe shortness of breath at rest or difficulty breathing
- reduced oxygen saturation levels measured by pulse oximetry (see the [recommendation on pulse oximetry levels that indicate serious illness](#))
- coughing up blood
- blue lips or face
- feeling cold and clammy with pale or mottled skin
- collapse or fainting (syncope)
- new confusion
- becoming difficult to rouse
- reduced urine output.



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COVID19 AND COUGH

A screenshot of a web browser window. The address bar shows 'nice.org.uk'. The page content is about the Summary of NICE guidance for Pneumonia (antimicrobial prescribing) - SPS - Specialist Pharmacy Service. It includes a heading 'Practical info: treatments for managing cough in people 18 years and over' and a table with three rows of information.

Practical info: treatments for managing cough in people 18 years and over

Treatment	Dosage
Initial management: use simple non-drug measures, for example, taking honey	A teaspoon of honey
First choice, only if cough is distressing: codeine linctus (15 mg/5 ml) or codeine phosphate tablets (15 mg, 30 mg)	15 mg to 30 mg every 4 hours as required, up to 4 doses in 24 hours If necessary, increase dose to a maximum of 30 mg to 60 mg four times a day (maximum 240 mg in 24 hours)
Second choice, only if cough is distressing: morphine sulfate oral solution (10 mg/5 ml)	2.5 mg to 5 mg when required every 4 hours Increase up to 5 mg to 10 mg every 4 hours as required If the person is already taking regular morphine increase the regular dose by a third

ANXIETY AND COVID19

The screenshot shows a web browser window with the URL <https://www.nice.org.uk/guidance/ng19/resources/fully-accessible-version-of-the-guideline-pdf-pdf-9078468301>. The page title is "Summary of NICE guidance for Pneumonia (antimicrobial prescribing) – SPS - Specialist Pharmacy Service – The first stop for...". The main content is titled "Practical info: treatments for managing anxiety, delirium and agitation in people 18 years and over". A table lists treatments and their dosages:

Treatment	Dosage
Anxiety or agitation and able to swallow: lorazepam tablets	Lorazepam 0.5 mg to 1 mg four times a day as required (maximum 4 mg in 24 hours) Reduce the dose to 0.25 mg to 0.5 mg in older people or those who are debilitated (maximum 2 mg in 24 hours) Oral tablets can be used sublingually (off-label use)
Anxiety or agitation and unable to swallow: midazolam injection	Midazolam 2.5 mg to 5 mg by subcutaneous injection every 2 to 4 hours as required If needed frequently (more than twice daily), a subcutaneous infusion via a syringe driver may be considered (if available) starting with midazolam 10 mg over 24 hours Reduce dosage to 5 mg over 24 hours if estimated glomerular filtration rate is less than 30 ml per minute
Delirium and able to swallow: haloperidol tablets	Haloperidol 0.5 mg to 1 mg at night and every 2 hours when required. Increase dose in 0.5 mg to 1 mg increments as required (maximum 10 mg daily, or 5 mg daily in older people) The same dose of haloperidol may be administered by subcutaneous injection as required rather than orally, or as a subcutaneous infusion of 2.5 mg to 10 mg over 24 hours Consider a higher starting dose (1.5 mg to 3 mg) if the person is severely distressed or causing immediate danger to others Consider adding a benzodiazepine such as lorazepam or midazolam if the person remains agitated (see dosages above)
Delirium and unable to swallow	Levomepromazine 12.5 mg to 25 mg as a subcutaneous injection as a starting dose and then hourly as required (use 6.25 mg to 12.5 mg in older people) Maintain with a subcutaneous infusion of 50 mg to 200 mg over 24 hours,

Pulse Oximetry and NEWS2 tool

When pulse oximetry is available, use oxygen saturation levels below 94% for adults (or below 88% for adults with known type 2 respiratory failure) and below 91% for children in room air at rest to identify people who are seriously ill

The NEWS2 tool may be used in adults in addition to clinical judgment to assess a person's risk of deterioration. Note that use of NEWS2 is not advised in children or pregnant women. Although the NEWS2 tool is not validated for predicting the risk of clinical deterioration in prehospital settings, it may be a helpful adjunct to clinical judgement in adults. A face-to-face consultation should not be arranged solely to calculate a NEWS2 score.

NEWS2 TOOL

Score of more than 5 – consider sepsis

2 points for patients on supplemental oxygen

AVPU is now ACVPU – disorientation, confusion or new altered mental state signifies potential deterioration

<https://www.youtube.com/watch?v=uJHhqTbS1xg&t=3s>

See NICE quality statements on Sepsis below:

<https://www.nice.org.uk/guidance/qs161/chapter/Quality-statement-2-Senior-review-and-antibiotic-treatment>

CASE STUDY



Pulmonary Embolism (PE)

- A disorder of perfusion
- Combination of factors increase probability of occurrence
 - Hypercoagulability
 - Platelet aggregation
 - Deep vein stasis
- Embolus usually originates in lower extremities or pelvis

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Background



VTE risk 2017 eIFH



History

- Acute onset of dyspnoea
- Cough
- Mild to severe chest pain
- Haemoptysis
- History of DVT
- Recent surgery
- Oral contraceptive use
- Smoker
- Risk eg malignancy

Physical Findings


Restlessness/agitation
Fever
Tachycardia
Tachypnoea
Diminished breath sounds
Crackles/Wheeze/Rub

Diagnostic investigations



In patients presenting with signs or symptoms of PE, carry out the following to exclude other causes:

an assessment of their general medical history
a physical examination and a chest X-ray
Check for anti trypsin deficiency



If PE suspected use the two-level PE Wells score



also check
<https://www.nice.org.uk/guidance/cg144>

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 more than 3 days/surgery in previous 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment/treated in the past 6 months/palliative)	1
Clinical probability simplified scores	
PE likely	More than 4
PE unlikely	4 or less

^a Adapted with permission from Wells PS et al. (2000) Derivation of a simple clinical model to categorize patients' probability of pulmonary embolism: increasing the model's utility with the SimpliRED D-dimer. Thrombosis and Haemostasis 83: 416–20

Investigations

Offer all patients with **unprovoked DVT or PE**, who are not known to have cancer :

- physical examination (guided by patient's full history) **and**
- chest X-ray **and**
- blood tests (full blood count, serum calcium and liver function tests) **and**
- urinalysis

Patient information: self-management

Information and advice

- Anticoagulant information booklet
- Anticoagulant alert card
- Heparins of animal origin may be of concern to some patients

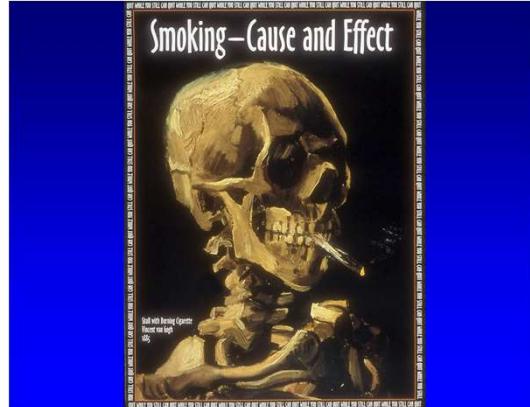
Self monitoring of INR

- Do not routinely offer to PE or DVT patients

• <https://www.nice.org.uk/guidance/NG158> for guidance

Case Study

- Dermot, a 57yr old male is admitted with increasing dyspnoea, non productive cough which has become worse. He is housebound because of breathlessness. He smokes 20-30 cigarettes a day. He is on a thiazide diuretic for his hypertension.
- Differential diagnosis
- What advice would you give him?
- What other tests would you consider?



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COPD Definition

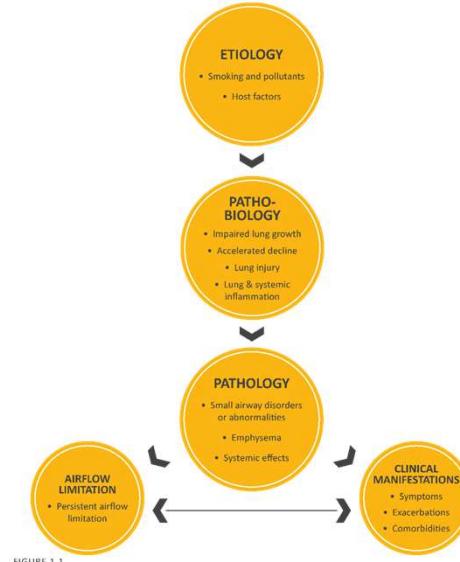
- Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.



© 2019 Global Initiative for Chronic Obstructive Lung Disease



Etiology, pathobiology & pathology of COPD leading to airflow limitation & clinical manifestations



Definition and Overview

OVERALL KEY POINTS (1 of 2):

- ▶ Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.
- ▶ The most common respiratory symptoms include dyspnea, cough and/or sputum production. These symptoms may be under-reported by patients.
- ▶ The main risk factor for COPD is tobacco smoking but other environmental exposures such as biomass fuel exposure and air pollution may contribute.



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Definition and Overview

OVERALL KEY POINTS (2 of 2):

- ▶ Besides exposures, host factors predispose individuals to develop COPD. These include genetic abnormalities, abnormal lung development and accelerated aging.
- ▶ COPD may be punctuated by periods of acute worsening of respiratory symptoms, called exacerbations.
- ▶ In most patients, COPD is associated with significant concomitant chronic diseases, which increase its morbidity and mortality.



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Factors that influence disease progression

- ▶ Genetic factors
- ▶ Age and gender
- ▶ Lung growth and development
- ▶ Exposure to particles
- ▶ Socioeconomic status
- ▶ Asthma & airway hyper-reactivity
- ▶ Chronic bronchitis
- ▶ Infections



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Diagnosis and Initial Assessment

OVERALL KEY POINTS (1 of 2):

- ▶ COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease.
- ▶ Spirometry is required to make the diagnosis; the presence of a post-bronchodilator FEV₁/FVC < 0.70 confirms the presence of persistent airflow limitation.
- ▶ The goals of COPD assessment are to determine the level of airflow limitation, the impact of disease on the patient's health status, and the risk of future events (such as exacerbations, hospital admissions, or death), in order to guide therapy.



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Diagnosis and Initial Assessment

► PATHWAYS TO THE DIAGNOSIS OF COPD ►

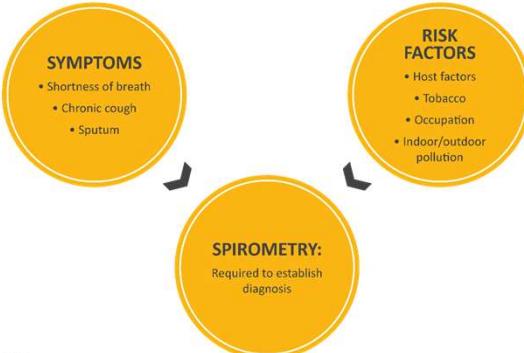


FIGURE 2.1



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Diagnosis and Initial Assessment

► KEY INDICATORS FOR CONSIDERING A DIAGNOSIS OF COPD

Consider COPD, and perform spirometry, if any of these indicators are present in an individual over age 40. These indicators are not diagnostic themselves, but the presence of multiple key indicators increases the probability of a diagnosis of COPD. Spirometry is required to establish a diagnosis of COPD.

Dyspnea that is:	Progressive over time. Characteristically worse with exercise. Persistent.
Chronic Cough:	May be intermittent and may be unproductive. Recurrent wheeze.
Chronic Sputum Production:	Any pattern of chronic sputum production may indicate COPD.
Recurrent Lower Respiratory Tract Infections	
History of Risk Factors:	Host factors (such as genetic factors, congenital/developmental abnormalities etc.). Tobacco smoke (including popular local preparations). Smoke from home cooking and heating fuels. Occupational dusts, vapors, fumes, gases and other chemicals.
Family History of COPD and/or Childhood Factors:	For example low birthweight, childhood respiratory infections etc.

TABLE 2.1

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Diagnosis and Initial Assessment

► Symptoms of COPD

- Chronic and progressive dyspnea
- Cough
- Sputum production
- Wheezing and chest tightness
- Others – including fatigue, weight loss, anorexia, syncope, rib fractures, ankle swelling, depression, anxiety.



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Diagnosis and Initial Assessment

► OTHER CAUSES OF CHRONIC COUGH

INTRATHORACIC

- Asthma
- Lung Cancer
- Tuberculosis
- Bronchiectasis
- Left Heart Failure
- Interstitial Lung Disease
- Cystic Fibrosis
- Idiopathic Cough

EXTRATHORACIC

- Chronic Allergic Rhinitis
- Post Nasal Drip Syndrome (PNDS)
- Upper Airway Cough Syndrome (UACS)
- Gastroesophageal Reflux
- Medication (e.g. ACE Inhibitors)

TABLE 2.2



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Medical History

- Patient's exposure to risk factors
- Past medical history
- Family history of COPD or other chronic respiratory disease.
- Pattern of symptom development
- History of exacerbations or previous hospitalizations for respiratory disorder
- Presence of comorbidities
- Impact of disease on patient's life
- Social and family support available to the patient.
- Possibilities for reducing risk factors, especially smoking cessation.



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Diagnosis and Initial Assessment

► CONSIDERATIONS IN PERFORMING SPIROMETRY

PREPARATION

- Spirometers need calibration on a regular basis.
- Spirometers should produce hard copy or have a digital display of the expiratory curve to permit detection of technical errors or have an automatic prompt to identify an unsatisfactory test and the reason for it.
- The supervisor of the test needs training in optimal technique and quality performance.
- Maximal patient effort in performing the test is required to avoid underestimation of values and hence errors in diagnosis and management.

BRONCHODILATION

- Possible dosage protocols are 400 mcg short-acting beta₂-agonist, 160 mcg short-acting anticholinergic, or the two combined.^a FEV₁ should be measured 10–15 minutes after a short-acting beta₂-agonist is given, or 30–45 minutes after a short-acting anticholinergic or a combination of both classes of drugs.

PERFORMANCE

- Spirometry should be performed using techniques that meet published standards.^b
- The expiratory volume/time traces should be smooth and free from irregularities. The pause between inspiration and expiration should be < 1 second.
- The recording should go on long enough for a volume plateau to be reached, which may take more than 15 seconds in severe disease.
- Both FVC and FEV₁ should be the largest value obtained from any of three technically satisfactory curves and the FVC and FEV₁ values in these three curves should vary by no more than 5% or 150 ml, whichever is greater.
- The FEV₁/FVC ratio should be taken from the technically acceptable curve with the largest sum of FVC and FEV₁.

EVALUATION

- Spirometry measurements are evaluated by comparison of the results with appropriate reference values based on age, height, sex, and race.
- The presence of a postbronchodilator FEV₁/FVC < 0.70 confirms the presence of airflow limitation.

^a Pellegrino et al. Eur Respir J 2005; 26(5): 948–68;

^b Miller et al. Eur Respir J 2005; 26(2): 319–38.

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Modified MRC dyspnea scale

► MODIFIED MRC DYSPNEA SCALE^a

PLEASE TICK IN THE BOX THAT APPLIES TO YOU | ONE BOX ONLY | Grades 0 - 4

mMRC Grade 0.	I only get breathless with strenuous exercise.	<input type="checkbox"/>
mMRC Grade 1.	I get short of breath when hurrying on the level or walking up a slight hill.	<input type="checkbox"/>
mMRC Grade 2.	I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level.	<input type="checkbox"/>
mMRC Grade 3.	I stop for breath after walking about 100 meters or after a few minutes on the level.	<input type="checkbox"/>
mMRC Grade 4.	I am too breathless to leave the house or I am breathless when dressing or undressing.	<input type="checkbox"/>

^a Fletcher CM. BMJ 1960; 2: 1662.

TABLE 2.5



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Assessment of Exacerbation Risk

- ▶ COPD exacerbations are defined as an acute worsening of respiratory symptoms that result in additional therapy.
- ▶ Classified as:
 - **Mild** (treated with SABDs only)
 - **Moderate** (treated with SABDs plus antibiotics and/or oral corticosteroids) or
 - **Severe** (patient requires hospitalization or visits the emergency room). Severe exacerbations may also be associated with acute respiratory failure.
- ▶ Blood eosinophil count may also predict exacerbation rates (in patients treated with LABA without ICS).



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► DIFFERENTIAL DIAGNOSIS OF COPD

DIAGNOSIS	SUGGESTIVE FEATURES
COPD	Onset in mid-life. Symptoms slowly progressive. History of tobacco smoking or exposure to other types of smoke.
Asthma	Onset early in life (often childhood). Symptoms vary widely from day to day. Symptoms worse at night/early morning. Allergy, rhinitis, and/or eczema also present. Family history of asthma. Obesity coexistence.
Congestive Heart Failure	Chest X-ray shows dilated heart, pulmonary edema. Pulmonary function tests indicate volume restriction, not airflow limitation.
Bronchiectasis	Large volume of purulent sputum. Commonly associated with bacterial infection. Chest X-ray/CT shows bronchial dilation, bronchial wall thickening.
Tuberculosis	Onset all ages. Chest X-ray shows lung infiltrate. Microbiological confirmation. High local prevalence of tuberculosis.
Obliterative Bronchiolitis	Onset at younger age, nonsmokers. May have history of rheumatoid arthritis or acute fume exposure. Seen after lung or bone marrow transplantation. CT on expiration shows hypodense areas.
Diffuse Panbronchiolitis	Predominantly seen in patients of Asian descent. Most patients are male and nonsmokers. Almost all have chronic sinusitis. Chest X-ray & HRCT show diffuse small centrilobular nodular opacities & hyperinflation.

These features tend to be characteristic of the respective diseases, but are not mandatory. For example, a person who has never smoked may develop COPD (especially in the developing world where other risk factors may be more important than cigarette smoking); asthma may develop in adult and even in elderly patients.

TABLE 2.7

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Prevention & Maintenance Therapy

OVERALL KEY POINTS (1 of 3):

- ▶ Smoking cessation is key. Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence rates. Legislative smoking bans and counselling, delivered by healthcare professionals improve quit rates.
- ▶ The effectiveness and safety of e-cigarettes as a smoking cessation aid is uncertain at present.
- ▶ Pharmacologic therapy can reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance.
- ▶ Each pharmacologic treatment regimen should be individualized and guided by the severity of symptoms, risk of exacerbations, side-effects, comorbidities, drug availability and cost, and the patient's response, preference and ability to use various drug delivery devices.



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Prevention & Maintenance Therapy

OVERALL KEY POINTS (2 of 3):

- ▶ Inhaler technique needs to be assessed regularly.
- ▶ Influenza vaccination decreases the incidence of lower respiratory tract infections.
- ▶ Pneumococcal vaccination decreases lower respiratory tract infections.
- ▶ Pulmonary rehabilitation improves symptoms, quality of life, and physical and emotional participation in everyday activities.
- ▶ In patients with severe resting chronic hypoxemia, long-term oxygen therapy improves survival.



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Smoking Cessation

- ▶ Smoking cessation has the greatest capacity to influence the natural history of COPD.
- ▶ If effective resources and time are dedicated to smoking cessation, long-term quit success rates of up to 25% can be achieved.

► BRIEF STRATEGIES TO HELP THE PATIENT WILLING TO QUIT ►

• ASK:	Systematically identify all tobacco users at every visit. <i>Implement an office-wide system that ensures that, for EVERY patient at EVERY clinic visit, tobacco-use status is queried and documented.</i>
• ADVISE:	Strongly urge all tobacco users to quit. <i>In a clear, strong, and personalized manner, urge every tobacco user to quit.</i>
• ASSESS:	Determine willingness and rationale of patient's desire to make a quit attempt. <i>Ask every tobacco user if he or she is willing to make a quit attempt at this time (e.g., within the next 30 days).</i>
• ASSIST:	Aid the patient in quitting. <i>Help the patient with a quit plan; provide practical counseling; provide intra-treatment social support; help the patient obtain extra-treatment social support; recommend use of approved pharmacotherapy except in special circumstances; provide supplementary materials.</i>
• ARRANGE:	Schedule follow-up contact. <i>Schedule follow-up contact, either in person or via telephone.</i>

TABLE 3.1

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Vaccination

- ▶ Influenza vaccination can reduce serious illness (such as lower respiratory tract infections requiring hospitalization) and death in COPD patients.
- ▶ Pneumococcal vaccinations, PCV13 and PPSV23, are recommended for all patients ≥ 65 years of age.

► VACCINATION FOR STABLE COPD ►

- Influenza vaccination reduces serious illness and death in COPD patients (**EvidenceB**).
- The 23-valent pneumococcal polysaccharide vaccine (PPSV23) has been shown to reduce the incidence of community - acquired pneumonia in COPD patients aged < 65 years with an FEV₁ $< 40\%$ predicted and in those with comorbidities (**Evidence B**).
- In the general population of adults ≥ 65 years the 13-valent conjugated pneumococcal vaccine (PCV13) has demonstrated significant efficacy in reducing bacteremia & serious invasive pneumococcal disease (**Evidence B**).

TABLE 3.2

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Pharmacological therapy

▶ COMMONLY USED MAINTENANCE MEDICATIONS IN COPD*

Generic Drug Name	Inhaler Type	Nebulizer	Oral	Injection	Duration Of Action
BETA₂-AGONISTS					
<i>SHORT-ACTING (SABA)</i>					
Fenoterol	MDI	✓	pill, syrup		4-6 hours
Levalbuterol	MDI	✓			6-8 hours
Salbutamol (albuterol)	MDI & DPI	✓	pill, syrup, extended release tablet	✓	4-6 hours 12 hours (ext. release)
Terbutaline	DPI		pill	✓	4-6 hours
<i>LONG-ACTING (LABA)</i>					
Arformoterol		✓			12 hours
Formoterol	DPI	✓			12 hours
Indacaterol	DPI				24 hours
Olodaterol	SMI				24 hours
Salmeterol	MDI & DPI				12 hours
ANTICHOLINERGICS					
<i>SHORT-ACTING (SAMA)</i>					
Ipratropium bromide	MDI	✓			6-8 hours
Oxitropium bromide	MDI				7-9 hours
<i>LONG-ACTING (LAMA)</i>					
Aclidinium bromide	DPI, MDI				12 hours
Glycopyrronium bromide	DPI		solution	✓	12-24 hours
Tiotropium	DMI, SMI				24 hours
Umeclidinium	DPI				24 hours

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Pharmacological therapy

COMBINATION SHORT-ACTING BETA₂-AGONIST PLUS ANTICHOLINERGIC IN ONE DEVICE (SABA/SAMA)

Fenoterol/ipratropium	SMI	✓			6-8 hours
Salbutamol/ipratropium	SMI, MDI	✓			6-8 hours

COMBINATION LONG-ACTING BETA₂-AGONIST PLUS ANTICHOLINERGIC IN ONE DEVICE (LABA/LAMA)

Formoterol/aclidinium	DPI				12 hours
Formoterol/glycopyrronium	MDI				12 hours
Indacaterol/glycopyrronium	DPI				12-24 hours
Vilanterol/umeclidinium	DPI				24 hours
Olodaterol/tiotropium	SMI				24 hours

METHYLXANTHINES

Aminophylline			solution	✓	Variable, up to 24 hours
Theophylline (SR)			pill	✓	Variable, up to 24 hours

COMBINATION OF LONG-ACTING BETA₂-AGONIST PLUS CORTICOSTEROIDS IN ONE DEVICE (LABA/ICS)

Formoterol/bclometasone	MDI				
Formoterol/budesonide	MDI, DPI				
Formoterol/mometasone	MDI				
Salmeterol/fluticasone	MDI, DPI				
Vilanterol/fluticasone furoate	DPI				

TRIPLE COMBINATION IN ONE DEVICE (LABA/LAMA/ICS)

Fluticasone/umeclidinium/vilanterol	DPI				
Bclometasone/formoterol/glycopyrronium	MDI				

PHOSPHODIESTERASE-4 INHIBITORS

Roflumilast			pill		
-------------	--	--	------	--	--

MUCOLYTIC AGENTS

Erdosteine			pill		
------------	--	--	------	--	--

*Not all formulations are available in all countries. In some countries other formulations and dosages may be available.

MDI = metered dose inhaler; DPI = dry powder inhaler; SMI = soft mist inhaler.

TABLE 3.3

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Pharmacological therapy

► BRONCHODILATORS IN STABLE COPD ►

- Inhaled bronchodilators in COPD are central to symptom management and commonly given on a regular basis to prevent or reduce symptoms (**Evidence A**).
- Regular and as-needed use of SABA or SAMA improves FEV₁ and symptoms (**Evidence A**).
- Combinations of SABA and SAMA are superior compared to either medication alone in improving FEV₁ and symptoms (**Evidence A**).
- LABAs and LAMAs significantly improve lung function, dyspnea, health status, and reduce exacerbation rates (**Evidence A**).
- LAMAs have a greater effect on exacerbation reduction compared with LABAs (**Evidence A**) and decrease hospitalizations (**Evidence B**).
- Combination treatment with a LABA and LAMA increases FEV₁ and reduces symptoms compared to monotherapy (**Evidence A**).
- Combination treatment with a LABA/LAMA reduces exacerbations compared to monotherapy (**Evidence B**).
- Tiotropium improves the effectiveness of pulmonary rehabilitation in increasing exercise performance (**Evidence B**).
- Theophylline exerts a small bronchodilator effect in stable COPD (**Evidence A**) and that is associated with modest symptomatic benefits (**Evidence B**).

TABLE 3.4

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Management of stable COPD

OVERALL KEY POINTS:

- The management strategy for stable COPD should be predominantly based on the individualized assessment of symptoms and future risk of exacerbations.
- All individuals who smoke should be strongly encouraged and supported to quit.
- The main treatment goals are reduction of symptoms and future risk of exacerbations.
- Management strategies are not limited to pharmacologic treatments, and should be complemented by appropriate non-pharmacologic interventions.



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Management of Stable COPD

- Once COPD has been diagnosed, effective management should be based on an individualized assessment to reduce both current symptoms and future risks of exacerbations.

► GOALS FOR TREATMENT OF STABLE COPD

- | | | |
|---|--|--|
| <ul style="list-style-type: none">• Relieve Symptoms• Improve Exercise Tolerance• Improve Health Status <p style="text-align: center;">and</p> <ul style="list-style-type: none">• Prevent Disease Progression• Prevent and Treat Exacerbations• Reduce Mortality | 
REDUCE SYMPTOMS | 
REDUCE RISK |
|---|--|--|

TABLE 4.1

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Management of stable COPD

► TREATING TOBACCO USE AND DEPENDENCE: A CLINICAL PRACTICE GUIDELINE — MAJOR FINDINGS & RECOMMENDATIONS

- Tobacco dependence is a chronic condition that warrants repeated treatment until long-term or permanent abstinence is achieved.
- Effective treatments for tobacco dependence exist and all tobacco users should be offered these treatments.
- Clinicians and health care delivery systems must operationalize the consistent identification, documentation, and treatment of every tobacco user at every visit.
- Brief smoking cessation counseling is effective and every tobacco user should be offered such advice at every contact with health care providers.
- There is a strong dose-response relation between the intensity of tobacco dependence counseling and its effectiveness.
- Three types of counseling have been found to be especially effective: practical counseling, social support of family and friends as part of treatment, and social support arranged outside of treatment.
- First-line pharmacotherapies for tobacco dependence — varenicline, bupropion sustained release, nicotine gum, nicotine inhaler, nicotine nasal spray, and nicotine patch—are effective and at least one of these medications should be prescribed in the absence of contraindications.
- Financial incentive programs for smoking cessation may facilitate smoking cessation.
- Tobacco dependence treatments are cost effective interventions.

TABLE 4.2

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Management of Stable COPD

- ▶ Identification and reduction of exposure to risk factors is important in the treatment and prevention of COPD.
- ▶ Cigarette smoking is the most commonly encountered and easily identifiable risk factor for COPD, and smoking cessation should be continually encouraged for all individuals who smoke.
- ▶ Reduction of total personal exposure to occupational dusts, fumes, and gases, and to indoor and outdoor air pollutants, should also be addressed.

► IDENTIFY & REDUCE RISK FACTOR EXPOSURE

- Smoking cessation interventions should be actively pursued in all COPD patients (**Evidence A**).
- Efficient ventilation, non-polluting cooking stoves and similar interventions should be recommended (**Evidence B**).
- Clinicians should advise patients to avoid continued exposures to potential irritants, if possible (**Evidence D**).



TABLE 4.3

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Treatment of Stable COPD

Pharmacological treatment

- ▶ Pharmacological therapies can reduce symptoms, and the risk and severity of exacerbations, as well as improve health status and exercise tolerance.
- ▶ Most of the drugs are inhaled so proper inhaler technique is of high relevance.

► KEY POINTS FOR INHALATION OF DRUGS

- The choice of inhaler device has to be individually tailored and will depend on access, cost, prescriber, and most importantly, patient's ability and preference.
- It is essential to provide instructions and to demonstrate the proper inhalation technique when prescribing a device, to ensure that inhaler technique is adequate and re-check at each visit that patients continue to use their inhaler correctly.
- Inhaler technique (and adherence to therapy) should be assessed before concluding that the current therapy requires modification.

TABLE 4.4



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Treatment of Stable COPD

Pharmacological treatment

► KEY POINTS FOR THE USE OF BRONCHODILATORS

- LABAs and LAMAs are preferred over short-acting agents except for patients with only occasional dyspnea. (Evidence A).
- Patients may be started on single long-acting bronchodilator therapy or dual long-acting bronchodilator therapy. In patients with persistent dyspnea on one bronchodilator treatment should be escalated to two (Evidence A).
- Inhaled bronchodilators are recommended over oral bronchodilators (Evidence A).
- Theophylline is not recommended unless other long-term treatment bronchodilators are unavailable or unaffordable (Evidence B).

TABLE 4.5



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Treatment of Stable COPD

Pharmacological treatment

► KEY POINTS FOR THE USE OF ANTI-INFLAMMATORY AGENTS

- Long-term monotherapy with ICS is not recommended (Evidence A).
- Long-term treatment with ICS may be considered in association with LABAs for patients with a history of exacerbations despite appropriate treatment with long-acting bronchodilators (Evidence A).
- Long-term therapy with oral corticosteroids is not recommended (Evidence A).
- In patients with exacerbations despite LABA/ICS or LABA/LAMA/ICS, chronic bronchitis and severe to very severe airflow obstruction, the addition of a PDE4 inhibitor can be considered (Evidence B).
- In former smokers with exacerbations despite appropriate therapy, macrolides, in particular azithromycin, can be considered (Evidence B).
- Statin therapy is not recommended for prevention of exacerbations (Evidence A).
- Antioxidant mucolytics are recommended only in selected patients (Evidence A).

TABLE 4.6



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Treatment of stable COPD

Pharmacological treatment

► KEY POINTS FOR THE USE OF OTHER PHARMACOLOGICAL TREATMENTS

- Patients with severe hereditary alpha-1 antitrypsin deficiency and established emphysema may be candidates for alpha-1 antitrypsin augmentation therapy (**Evidence B**).
- Antitussives cannot be recommended (**Evidence C**).
- Drugs approved for primary pulmonary hypertension are not recommended for patients with a pulmonary hypertension secondary to COPD (**Evidence B**).
- Low-dose long acting oral and parenteral opioids may be considered for treating dyspnea in COPD patients with severe disease (**Evidence B**).

TABLE 4.7



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Treatment of stable COPD

- Following implementation of therapy, patients should be reassessed for attainment of treatment goals and identification of any barriers for successful treatment (**Figure 4.2**).
- Following review of the patient response to treatment initiation, adjustments in pharmacological treatment may be needed.

► MANAGEMENT CYCLE

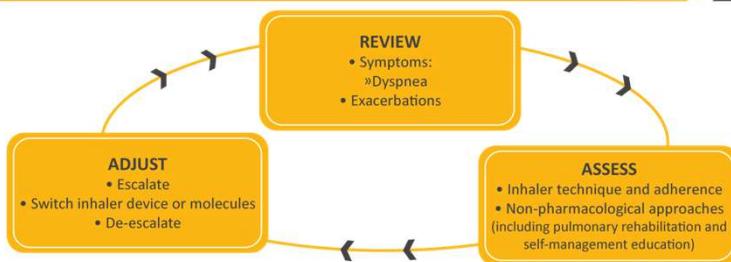


FIGURE 4.2

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FOLLOW-UP PHARMACOLOGICAL TREATMENT

1. IF RESPONSE TO INITIAL TREATMENT IS APPROPRIATE, MAINTAIN IT.
2. IF NOT:
 - ✓ Consider the predominant treatable trait to target (dyspnea or exacerbations)
 - Use exacerbation pathway if both exacerbations and dyspnea need to be targeted
 - ✓ Place patient in box corresponding to current treatment & follow indications
 - ✓ Assess response, adjust and review
 - ✓ These recommendations do not depend on the ABCD assessment at diagnosis

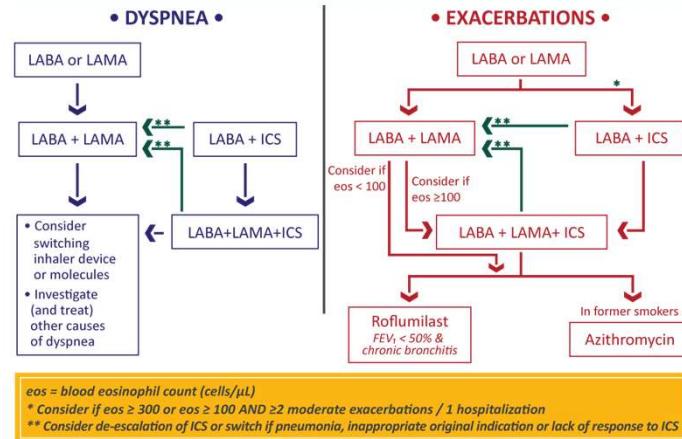


FIGURE 4.3

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FOLLOW-UP pharmacological treatment

Dyspnea

- For patients with persistent breathlessness or exercise limitation on long acting bronchodilator monotherapy, the use of two bronchodilators is recommended.
 - If the addition of a second long acting bronchodilator does not improve symptoms, we suggest the treatment could be stepped down again to monotherapy. Switching inhaler device or molecules can also be considered.



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FOLLOW-UP pharmacological treatment

Dyspnea

- ▶ For patients with persistent breathlessness or exercise limitation on LABA/ICS treatment, LAMA can be added to escalate to triple therapy.
 - Alternatively, switching from LABA/ICS to LABA/LAMA should be considered if the original indication for ICS was inappropriate (e.g., an ICS was used to treat symptoms in the absence of a history of exacerbations), or there has been a lack of response to ICS treatment, or if ICS side effects warrant discontinuation.
- ▶ At all stages, dyspnea due to other causes (not COPD) should be investigated and treated appropriately. Inhaler technique and adherence should be considered as causes of inadequate treatment response.



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FOLLOW-UP pharmacological treatment

Exacerbations

- ▶ For patients with persistent exacerbations on **long acting bronchodilator** monotherapy, escalation to either LABA/LAMA or LABA/ICS is recommended. LABA/ICS may be preferred for patients with a history or findings suggestive of asthma.
- ▶ Blood eosinophil counts may identify patients with a greater likelihood of a beneficial response to ICS.
- ▶ For patients with one exacerbation per year, a peripheral blood level ≥ 300 eosinophils/ μL identifies patients more likely to respond to LABA/ICS treatment.^{13,14}
- ▶ For patients with ≥ 2 moderate exacerbations per year or at least one severe exacerbation requiring hospitalization in the prior year, LABA/ICS treatment can be considered at blood eosinophil counts ≥ 100 cells/ μL , as ICS effects are more pronounced in patients with greater exacerbation frequency and/or severity.



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FOLLOW-UP pharmacological treatment

Exacerbations

- ▶ If patients treated with **LABA/LAMA/ICS** who still have exacerbations the following options may be considered:
 - **Add roflumilast.** This may be considered in patients with an $FEV_1 < 50\%$ predicted and chronic bronchitis, particularly if they have experienced at least one hospitalization for an exacerbation in the previous year.
 - **Add a macrolide.** The best available evidence exists for the use of azithromycin, especially in those who are not current smokers. Consideration to the development of resistant organisms should be factored into decision-making.
 - **Stopping ICS.** This can be considered if there are adverse effects (such as pneumonia) or a reported lack of efficacy. However, a blood eosinophil count ≥ 300 cells / μL identifies patients with the greatest likelihood of experiencing more exacerbations after ICS withdrawal and who subsequently should be followed closely for relapse of exacerbations.



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Non-Pharmacological Treatment

- ▶ Education and self-management
- ▶ Physical activity
- ▶ Pulmonary rehabilitation programs
- ▶ Exercise training
- ▶ Self-management education
- ▶ End of life and palliative care
- ▶ Nutritional support
- ▶ Vaccination
- ▶ Oxygen therapy



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Non-pharmacological treatment

► PRESCRIPTION OF SUPPLEMENTAL OXYGEN TO COPD PATIENTS

Arterial hypoxemia defined as:
 $\text{PaO}_2 < 55 \text{ mmHg}$ (8 kPa) or $\text{SaO}_2 < 88\%$
or
 $\text{PaO}_2 > 55 \text{ but} < 60 \text{ mmHg}$ ($> 7.3 \text{ kPa}$ but $< 8 \text{ kPa}$)
with right heart failure or erythrocytosis

Prescribe supplemental oxygen and titrate to keep $\text{SaO}_2 \geq 90\%$

Recheck in 60 to 90 days to assess:
» If supplemental oxygen is still indicated
» If prescribed supplemental oxygen is effective



FIGURE 4.4

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Monitoring and Follow-up

Monitoring disease progression and development of complications and/or comorbidities

- **Measurements.** Decline in FEV_1 can be tracked by spirometry performed at least once a year.
- **Symptoms.** At each visit, information on symptoms since the last visit should be collected, including cough and sputum, breathlessness, fatigue, activity limitation, and sleep disturbances.
- **Exacerbations.** The frequency, severity, type and likely causes of all exacerbations should be monitored.
- **Imaging.** If there is a clear worsening of symptoms, imaging may be indicated.
- **Smoking status.** At each visit, the current smoking status and smoke exposure should be determined followed by appropriate action.



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Management of Exacerbations

OVERALL KEY POINTS (1 of 3):

- ▶ An exacerbation of COPD is defined as an acute worsening of respiratory symptoms that results in additional therapy.
- ▶ Exacerbations of COPD can be precipitated by several factors. The most common causes are respiratory tract infections.
- ▶ The goal for treatment of COPD exacerbations is to minimize the negative impact of the current exacerbation and to prevent subsequent events.
- ▶ Short-acting inhaled beta₂-agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an acute exacerbation.



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Management of Exacerbations

OVERALL KEY POINTS (2 of 3):

- ▶ Maintenance therapy with long-acting bronchodilators should be initiated as soon as possible before hospital discharge.
- ▶ Systemic corticosteroids can improve lung function (FEV₁), oxygenation and shorten recovery time and hospitalization duration. Duration of therapy should not be more than 5-7 days.
- ▶ Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5-7 days.
- ▶ Methylxanthines are not recommended due to increased side effect profiles.



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Treatment COPD



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- 
- The burden of COPD is high and may be rising although stats variabler
 - COPD is a multicomponent disease with inflammation at its core
 - It is important to treat the underlying inflammation, which is present even in the early stages of the disease
 - Patients on combined inhalers eg combination of salmeterol and fluticasone propionate (SFC) and tiotropium bromide (TIO have significantly improved lung function and quality of life, and a significant reduction in exacerbations compared with components or placebo
 - Exacerbations are common. Patients with previous exacerbations are more likely to have more. Presence of cough and sputum production are associated with more exacerbations
 - Antibiotics are useful to treat exacerbations in patients with mild to moderate COPD-consider self management plans with home therapy
 - Prednisone 40 mg daily for 5 days is enough
 - Use of β -blockers in patients with HF, even non selective are well tolerated and may be associated with improved survival

1. Murray CJ et al. *Lancet* 1997; 349: 207-10. 2. Agusti AGN et al. *Eur Respir J* 2005; 99: 100-10. 3. Hogg JC et al. *New Eng J Med* 2004; 350: 2645-2653. 4. Barnes PJ et al. *Am J Respir Crit Care Med* 2006; 173: 736-743. 5. Calverley PMA et al. *New Eng J Med* 2007; 356: 775-789.

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Key recommendations

For primary care

- If a patient has a **co-diagnosis of asthma and COPD**, ensure the rationale is **documented**.
- Use **Read codes/recording systems** consistently.
- At **annual review**, ask the patient about **breathlessness** and **tobacco use**, assess **quality of life**, and record **exacerbations**.

For respiratory specialists

- **Communicate results to GPs using agreed terminology** to avoid duplication.
- Work with **primary care health professionals** to develop **respiratory symptom assessment processes** for COPD that are applicable **regionally**.

For system managers

- Work with **providers** of PR to ensure that **PR referral** takes place and that there is suitable **resource** to deliver it.
- Work with local and primary care specialists to select and use **metrics to drive continuous improvement**.



Other Considerations

Check if patient has had a CXR in past 6 months
Screen for anxiety and depression





Useful quality improvement

Spirometry

The Association for Respiratory Technology and Physiology (ARTP) with the Institute for Clinical Science and Technology have developed a programme of training and certification in spirometry.

<http://www.clinicalscience.org.uk/course/artp-spirometry-e-learning-full/>

The screenshot shows two web pages side-by-side. The left page is titled 'ARTP Spirometry E-Learning (Full)' and features a logo of a person with a stethoscope. It includes sections for 'HOME', 'CURRICULUM', 'EVENTS', 'FACULTY', and a prominent purple button labeled 'SEE THIS COURSE'. The right page is titled 'Quality Assured Diagnostic Spirometry' and features a logo for 'PCC'. It includes sections for 'TOPICS & RESOURCES', 'CONTACT US', 'NOTICE ALERTS', and a 'MORE...' link. Both pages contain detailed text and small images related to spirometry training and certification.

The Primary Care Commissioning (PCC) have produced a guide to performing quality assured diagnostic spirometry.

<https://www.pcc-cic.org.uk/article/quality-assured-diagnostic-spirometry>



Useful quality improvement

Treating patient effectively

The British Thoracic Society have produced guidelines for home oxygen use in adults.

[https://www.brit-thoracic.org.uk/document-library/clinical-information/oxygen/home-oxygen-guideline-\(adults\)/bts-guidelines-for-home-oxygen-use-in-adults/](https://www.brit-thoracic.org.uk/document-library/clinical-information/oxygen/home-oxygen-guideline-(adults)/bts-guidelines-for-home-oxygen-use-in-adults/)

The British Lung Foundation (BLF) has a range of patient stories to help health care professionals understand how to better treat COPD patients

<https://www.blf.org.uk/your-stories/copd-affects-every-part-of-my-daily-living>

The screenshot shows two web pages. The left page is for the 'BTS Guidelines for Home Oxygen Use in Adults' and features the 'Thorax' logo. It includes sections for 'BTS Guidelines for Home Oxygen Use in Adults', 'British Thoracic Society', and 'BTS Home Oxygen Guideline Group'. The right page is for 'COPD affects every part of my daily life' and features the 'British Lung Foundation' logo. It includes a video player showing a man talking about his experiences with COPD, with the caption 'In this powerful film, Chris talks about his experiences of living with COPD.'

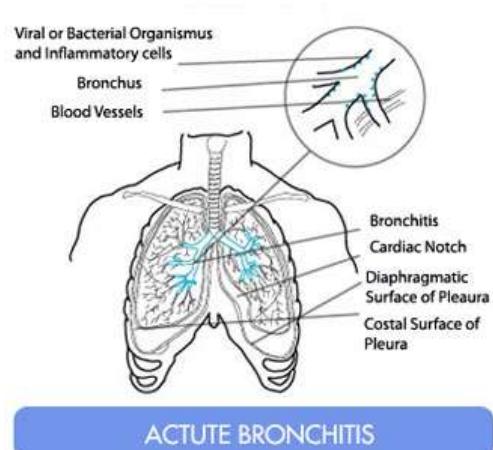


Bronchitis

- An infection of the bronchi

2 types:

Acute – caused by a bacteria or virus



ACTUTE BRONCHITIS

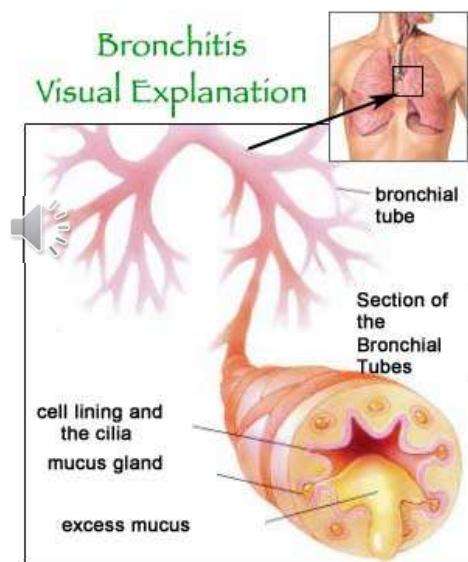


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Bronchitis

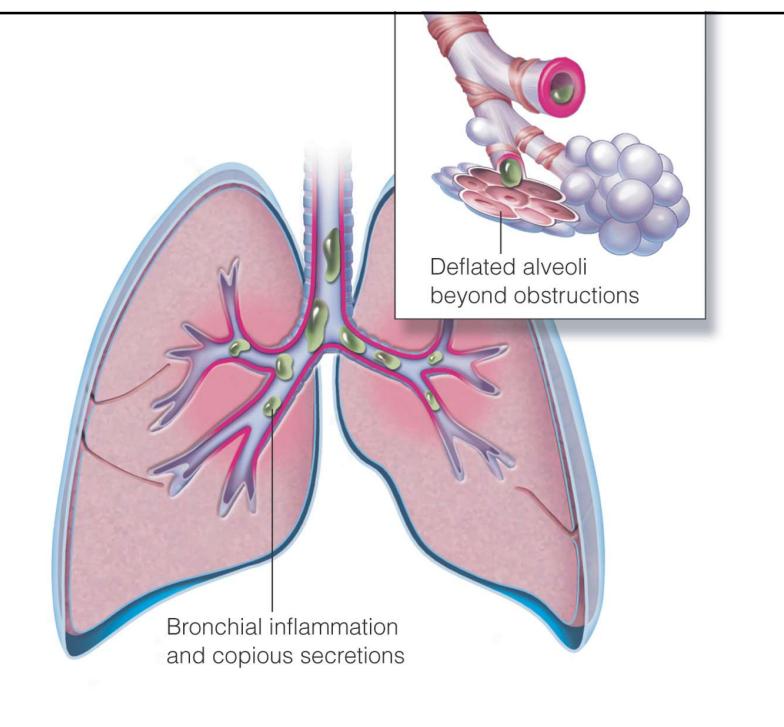
Chronic – long term

- usually caused by an irritant – ie smoking
- cilia become damaged and can't clear debris
- treatment – quit smoking



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Chronic Bronchitis



Respiratory scenario

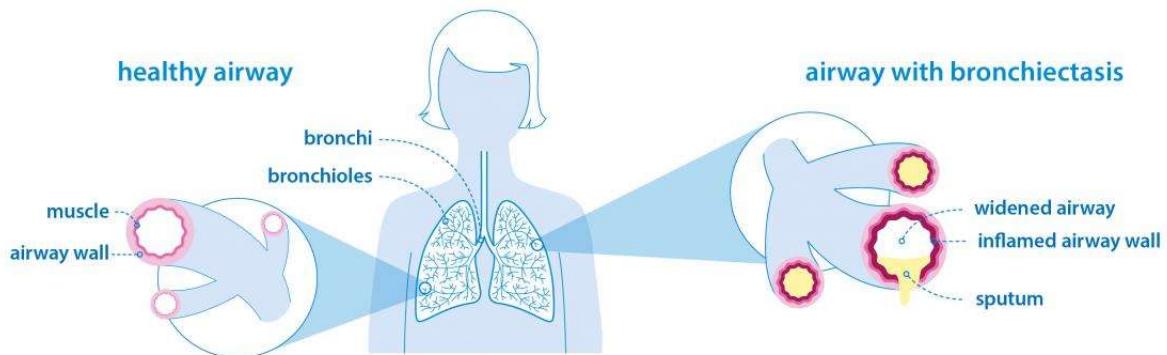
Bronchiectasis can be a result of COPD

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Bronchiectasis

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Bronchiectasis

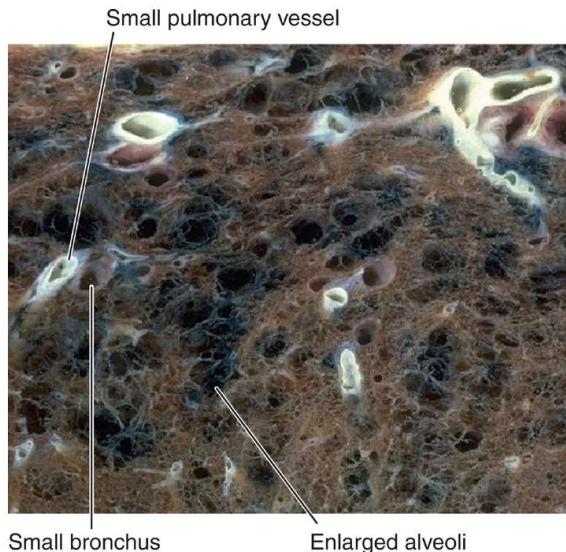


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Management Bronchiectasis

Emphysema

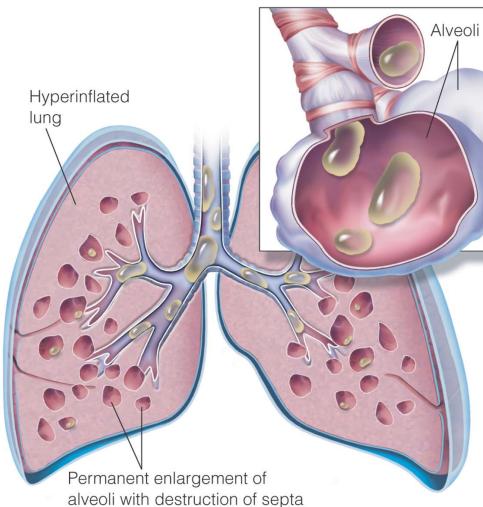
- Destruction of alveolar walls, alveoli merge to form large air spaces
- Loss of surface area affects diffusion
- 90% of cases are smokers



Copyright © 2007 Lippincott Williams & Wilkins.

COPD - Emphysema

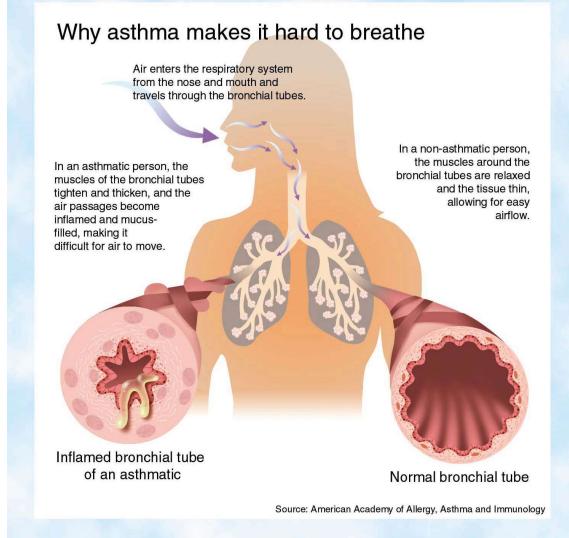
III Emphysema



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II ASTHMA

- Asthma is a chronic respiratory disorder
- Bronchi and bronchioles are affected – bronchiole muscles tighten, mucus is produced – breathing is difficult
- Airway hyper-responsiveness.



Source: American Academy of Allergy, Asthma and Immunology

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Asthma



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Airway disorder characterized by

- Hyper-reactivity to various stimuli - trigger
- Broncho-constriction
- Inflammation

Associated Symptoms

Common symptoms: cough, wheeze,
shortness of breath, tight chest & wheeze

May also have atopic conditions: eczema
and allergic rhinitis

Family History : asthma or atopy

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Risk factors/triggers for asthma symptoms

- Exposure to allergens eg. ?
- Smoking
- Gender(more common in males in childhood)
- Occupational irritants
- Viral infections
- Exercise
- Cold air
- Strong Emotional expressions eg. Laughing
- Certain drugs eg. Aspirin, beta blockers
- Lower socio-economic groups
- Animals/pets
- House dust mite

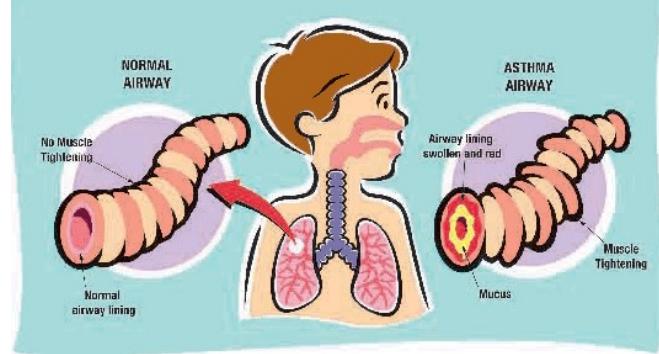
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Aim of asthma Management

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Symptoms

- Chest tightness
- Wheezing
- Night-time cough
- Restricted breathing



Causes

- Generally it is thought that asthma is familial and related to atopy
- TRIGGERS – include pollen, dust, smoke, pets, exercise
- Hot and windy weather

Normal bronchiole



Asthmatic bronchiole



Treatments and Tests

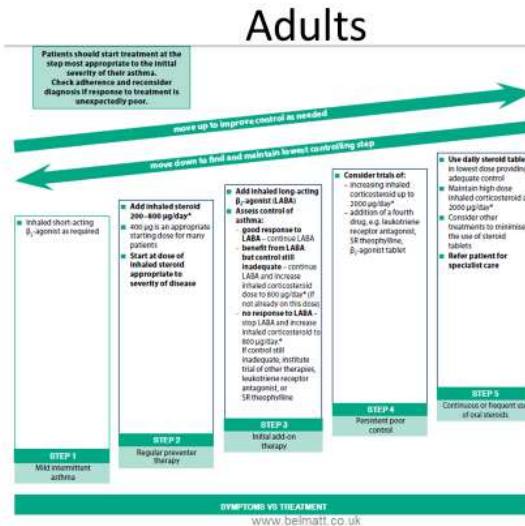
<https://www.nice.org.uk/guidance/ng80/resources/algorithm-a-initial-clinical-assessment-for-adults-young-people-and-children-with-suspected-asthma-pdf-4656176749>

<https://www.nice.org.uk/guidance/ng80/resource/s/algorithm-c-objective-tests-for-asthma-in-adults-aged-17-and-over-pdf-4656176751>

<https://www.nice.org.uk/guidance/ng80/resources/algorithm-e-pharmacological-treatment-of-chronic-asthma-in-children-and-young-people-aged-5-to-16-pdf-4656176753>

<https://www.nice.org.uk/guidance/ng80/resources/algorithm-f-pharmacological-treatment-of-chronic-asthma-in-adults-aged-17-and-over-pdf-4656176754>

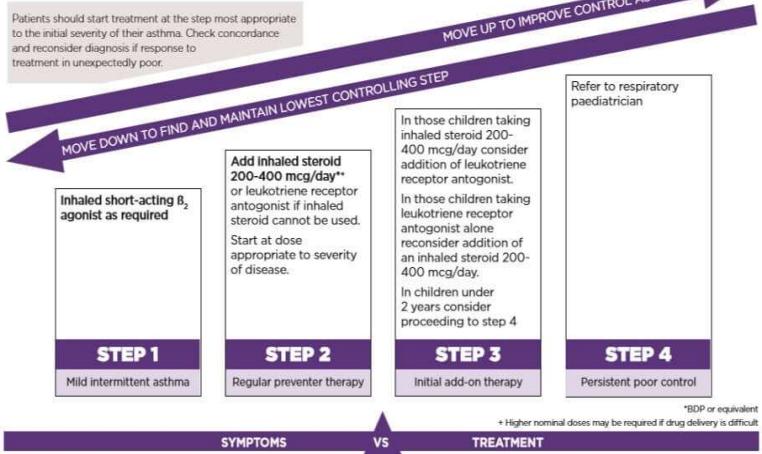
Adult asthma template



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Child

Figure 1: Algorithm for management of asthma in under 5s



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Beta2 Agonist



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Preventers -ICS

- LONG-TERM preventers—corticosteroid to control spasms and reduce long term inflammation and scarring in the bronchioles (eg – QVAR, Pulmicort, Becloforte, Clenil)
- Patients with severe asthma may take medications such as Prednisolone –also for acute exacerbations
- Also biologics with ‘Brittle asthma’ or hard to control asthma
- Also dual consider therapy...

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Which steroid inhaler??

- BDP (Clenil modulite)and budesonide are approximately equivalent in clinical practice
- Fluticasone provides equal clinical activity to BDP and budesonide at half the dosage
- Qvar* - 200-300mcg (not suitable for children)
- Fostair – over the age of 18
- Budesonide- symbicort can be used in adults and children over the age of 6
- Mometasone- not to be used in children
- Combination inhalers eg Seretide, Symbicort



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High dose Steroid inhaler

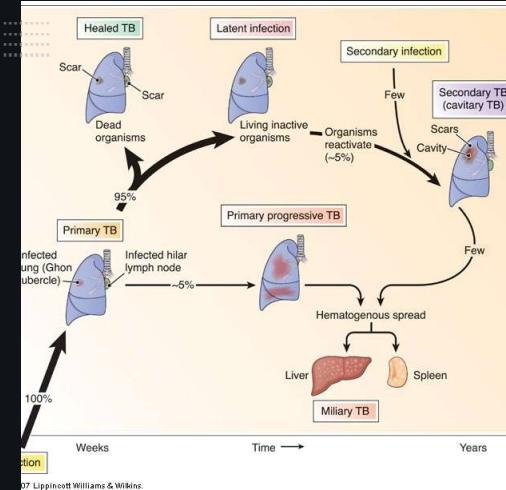
Tuberculosis (TB)

- Tuberculosis is caused by the bacteria from the Mycobacterium tuberculosis complex and it is believed that an infectious person will infect an average of 10-15 people every year (Department of Health (DH), 2004)

- Common symptoms-
 - Prolonged cough – dry or productive
 - Fever
 - Weight loss
 - Night sweats
 - Dyspnoea
 - Chest pain
 - Lethargy
 - Loss of appetite
 - Haemoptysis
- Diagnostic tests
 - sputum sampling x 3 early morning (requests acid fast bacilli testing) ; Chest x-ray. Infection control
- Six month course consisting of two months rifampicin, isoniazid, pyrazinamide and ethambutol (initial phase) and a further 4 months rifampicin and isoniazid (continuing phase)

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Pathogenesis



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TB in the UK

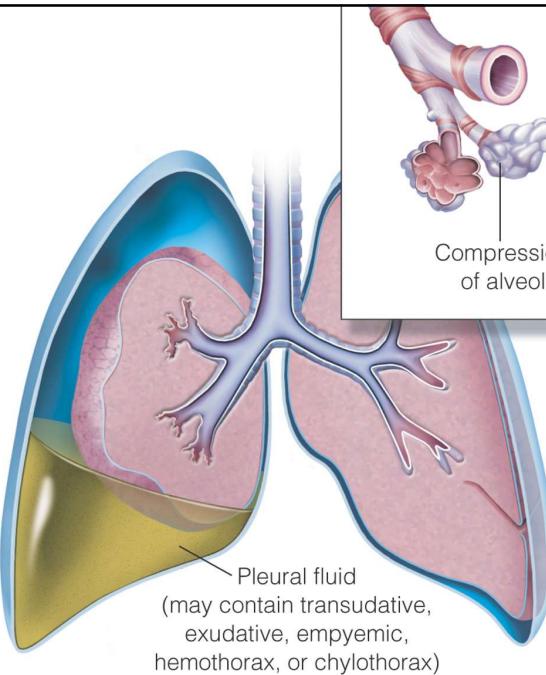
New cases of tuberculosis (TB) in England have fallen to the lowest levels since records began in 1960.

The new data published by Public Health England (PHE) comes ahead of World TB Day on Sunday March 24 2019.

Following action by PHE, the NHS and others, there was a 44% drop in new diagnoses from the peak in 2011 to 2018 (from 8,280 to 4,672), with an 8.4% fall in diagnoses between 2017 and 2018 alone.

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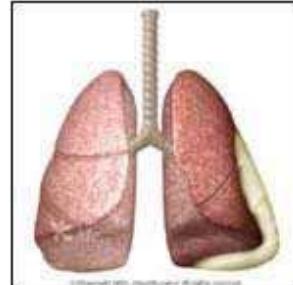
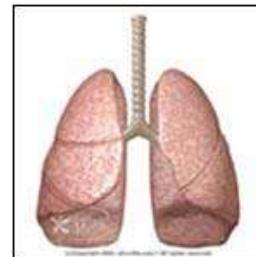
Pleural Effusion



Pleural Effusion

- Due to exudates or transudates
- Expansion is reduced
- Percussion is dull
- Vesicular breath sounds with reduced intensity
- Apex and trachea may be displaced if effusion is large.
- Diaphragmatic excursion can detect this without X ray

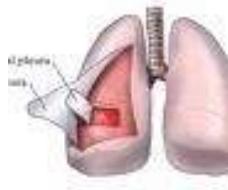
PLEURISY



PLEURISY

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- Pleurisy refers to the inflammation (irritation, swelling, stickiness) of the pleura.
- Pleurisy is not a disease, but a symptom of another condition (e.g. virus or bacterial infection).

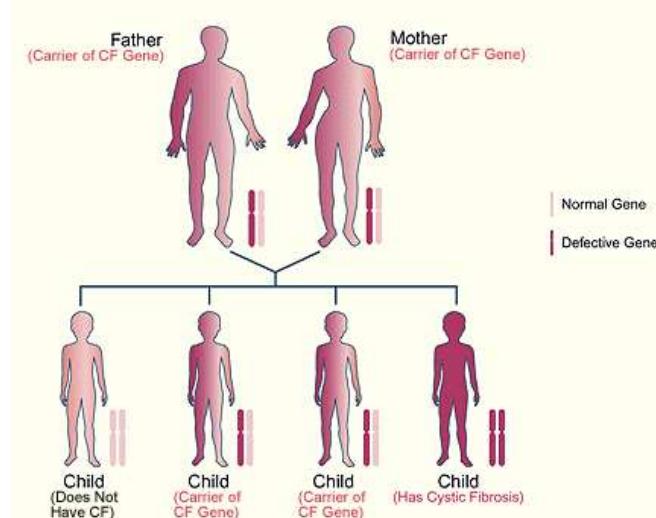


Presentation of Pleurisy

- Sharp, sudden and intermittent chest pain with related dyspnea
 - Possibly referred to shoulder
 - May ↑ or ↓ with respiration
- Pleural "friction rub" may be audible"
- May have effusion or be dry
- Inflammation of pleura caused by a friction rub
 - layers of pleura rubbing together
- Commonly associated with other respiratory disease
- Consider the rub you may hear -?cardiac or pleural?
 - Fifth level

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CYSTIC FIBROSIS

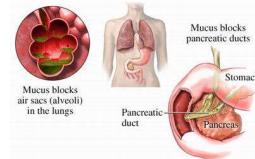
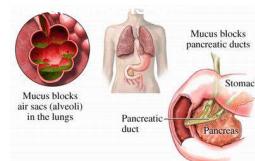


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<https://www.nice.org.uk/guidance/ng78/chapter/cystic-fibrosis>

Treatments

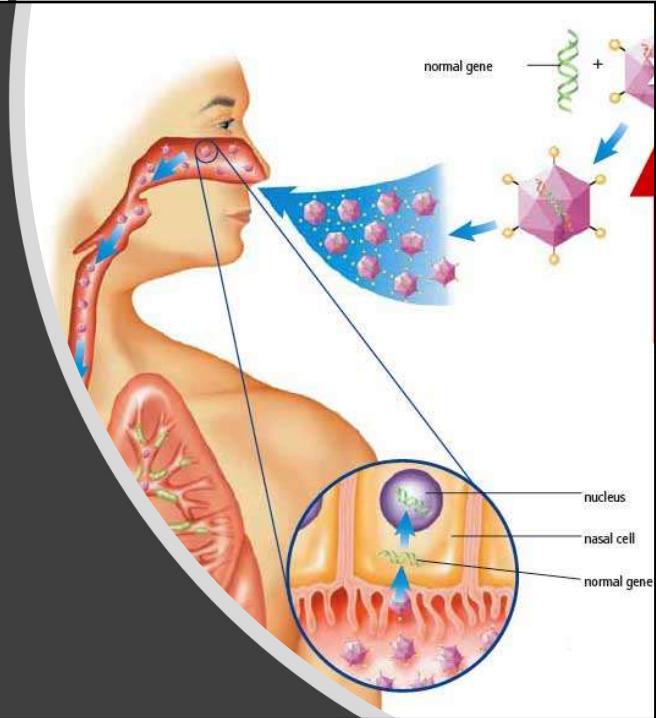
- There is no cure – life expectancy is usually low – early 30s but is improving
- Medicines are used to thin the mucus
- Antibiotics are given for infections
- New inhaled treatments for CF



CYSTIC FIBROSIS

- New treatments include gene therapy
- An inhaler is used to spray healthy versions of the abnormal gene – the healthy genes can then make proper mucus

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Normal Lung vs. Cancerous Lung

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Lung Neoplasms



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Red Flags Overview for respiratory problems

- Altered mental status or confusion
- Absent signs of ventilation- quiet chest
- Audible stridor or wheezing
- Able to speak in short phrases only
- Sustained Tachycardia
- Pallor / Diaphoresis
- Accessory muscle use /
Retraction/tracheal tug

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Identifying those patients with RTIs who are likely to be at risk of developing complications



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Summary



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**Any
questions?**



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CONTACT INFO



+00 123 4545 457
+00 123 4576 457



support@belmatt.co.uk
support@belmatt.co.uk



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An address is a collection
of information