



University of
BRISTOL

MB ChB Programme

Breathlessness block
GP teacher guide,
Effective Consulting, Year 2

Academic Year 2018-2019



Introduction and link to course and teaching information
Clinical Contact, Primary Care in Teaching Block Two, Year 2 2018-19

Dear GP tutor,

Thank you for teaching Year 2 students in 2018-19 and welcome to this session guide for the Breathlessness block.

All the main information on the course is available in the year 2 18-19 GP handbook so please refer to this for information on how key dates, how the course is structured including assessment, your role, expectations of your students and teaching tips such as giving feedback. This is available here:

<https://www.bristol.ac.uk/media-library/sites/primaryhealthcare/documents/teaching/handbooks/Year%202%20Effective%20Consulting%20Primary%20Care%20Teacher%20Guide%202018-19.pdf>

This also contains information on the support that is available for students, however I am always happy to discuss any student you have concerns about.

This session guide outlines the learning outcomes for the students' time with you, key information about teaching history and examination, and a menu of options for other activities you can do with your students. Students will come to you during the *second* week of their Case Based Learning cycles. Students alternate between clinical contact in Primary Care with sessions in Secondary care for each Case Based block, so if they are with you for the Breathlessness block, they will be in the hospital setting for the next case. A table of dates with the topic for the session is on page 4.

Please bring in 2 patients with conditions relevant to the symptoms the students are learning about to help students learn how to talk with and examine patients to find out what is wrong with them, apply their understanding of anatomy and physiology, and practice making diagnoses. It is *particularly* important that you run through a systematic examination with your students as they have little other chance to practice. Communication, history and examination skills will be assessed by an OSCE examination in May 2019.

If you have 6 students, you may find it easier to divide the group. Some GP teachers use an additional room and allow 3 students to spend time talking to one patient, while they run through the examination on another patient with the other 3 students, then swop over.

I am always happy to be contacted if you wish to discuss any aspect of the course and welcome your comments, feedback and suggestions. With all best wishes for teaching in the year ahead.

Dr Jessica Buchan

GMC Outcomes for Graduates

The GMC have updated guidance on what they expect newly qualified doctors to be able to know and do. The outcomes have been aligned to Good medical practice and are categorised as professional values and behaviours, including professional and ethical responsibilities and patient safety; professional skills including communication and interpersonal skills and diagnosis; and professional knowledge. Please be familiar with this document:

https://www.gmc-uk.org/-/media/documents/dc11326-outcomes-for-graduates-2018_pdf-75040796.pdf

The outcomes of particular relevance to teaching in Clinical Contact in Year 2 are; 2d, e, j & u. 5a, b & d. 6a. 7b & h. 10a. 11a, b, c & d. 12. 13. 14a, b, c & d. 20. 22b & c. 23a, c, d, & e. 24d & e. 25a

Structure of the Effective Consulting Day and Key Dates

The ILOs for each EC day covered in this session plan cover the whole EC day, which is delivered to varying degrees by lecture, EC lab and clinical contact. If the students are with you for the morning, they will have a lecture and practice specific consulting skills in a tutorial group with actors in the afternoon, if you have students in the afternoon, they will have already had a lecture and practised consultation skills. This means that if you have afternoon students you may notice that they are better prepared, but if you have morning students, they benefit from having their learning “primed” by meeting real patients prior to their small group tutorial in the afternoon.

Clinical contact alternates for each student in each CBL “case” between primary and secondary care. We try and align the teaching across settings much as possible.

In both primary and secondary care students should:

- Have a brief tutorial (to orientate the students to the task)
- Meet patients to practise focused gathering of information from history and examination and consider clinical reasoning.
- Present back the patients they’ve met
- Be helped to consider the patient perspective, impact of the illness or problem on patient lives, and to consider what support and future needs patients have.
- Be starting to consider variations in presentation, differential diagnosis and what they might do next.
- Get feedback on any observed history and examination, and on their clinical reasoning and presentation skills
- Debrief in the group (usually without the patient present) to ask questions and consolidate learning.

Dates	Case Based learning symptom	Key learning goals in clinical contact	Types of patients
Thursday 31st January 2019	Chest pain	Causes of chest pain and differentiating them. Cardiovascular examination Safety netting	At least one patient with current or previous chest pain e.g. Angina and one patient suitable for cardiovascular examination (either with CVS signs e.g. murmur, or without signs but relevant history and happy to be examined e.g. someone with a risk factor for cardiovascular disease e.g. hypertension).
Thursday 14th February 2019	Breathlessness	Causes of breathlessness Respiratory examination Using peak flow meters and inhalers Addressing smoking	At least one patient with current or previous breathlessness e.g. COPD or heart failure, and one patient suitable for respiratory examination (with or without chest signs)
Thursday 28th February 2019	Abdominal symptoms	Causes of abdominal pain, change in bowel habit and blood loss from the GI tract. Asking sensitive questions	At least one patient with current or previous significant abdominal symptoms and one patient suitable for abdominal examination (with or without abdominal signs)
Thursday 14th March 2019	Low mood	Assessing mood in clinical practice	2 patients with history of mood disorder
Thursday 28th March 2019	Joint pain including back pain	Clinical presentation and assessment of joint pain (including back pain)	Patients with arthritis, or joint pathology or replacement. Patient suitable for examination.
Thursday 9th May 2019	Urinary symptoms and thirst	Clinical presentation and assessment of diabetes and renal pathology	Patients with diabetes, chronic renal disease, dialysis.
Thursday 23rd May 2019	Headache	Clinical presentation and assessment of patients with headaches. Cranial nerve examination.	Patients with recurrent headaches e.g. migraines or previous significant headache e.g. Temporal arteritis, Subarachnoid haemorrhage, stroke/raised ICP. Any patient for examination or patient with abnormality of cranial nerves.
May 29 th /30 th	OSCE EXAM		
Thursday 13th June 2019	Collapse	Assessment of patient with history of collapse. Neurological examination	Ideally patient with previous collapse (fit or faint) from any cause including seizure.

Framing teaching the medical history and examination in the “Clerking Consultation” & COGConnect

Medical students do not yet “consult” with patients as such, as they are still learning how to. Instead, on the Effective Consulting course we talk about the “*clerking consultation*” they “*clerk*” patients for training purposes in part to learn about medicine from the patient's narrative—what happened, what symptoms the patient experienced and what the outcome was. In this way student doctors build up a bank of illness scripts. We know the more exposure student doctors get to patients, the more experience they build up, so we are very grateful you help provide this experience. They also practice speaking to patients to learn *how* to talk to patients and assess problems—in other words they are learning *how* to consult. Therefore, here in Bristol we call the process the *clerking consultation*, as we want to emphasise the active hands on practice students get in consulting. You can help this process by spending some time directly observing the students speaking to patients, and by listening to them presenting summaries back to you. Where you have observed, please give feedback not only on the content of the clerking, but on the process. It's also particularly helpful to students learning if you get them to commit to what they think is going on and what they might want to do next—to start student “*thinking like a doctor*”.

In MB21 in Bristol we have taught the medical students to think about all aspects of consulting with patients, we call this systematic approach COGConnect. This describes the different stages of consulting with patients that we want students to consider whenever they meet patients. We would be grateful if you could highlight these stages in your feedback.

Preparation: It has been emphasised to students that any clinical encounter begins with preparation. A doctor will prepare to see their next patient by reading the notes, a referral letter, perhaps looking at the medication screen. Doctors also prepare themselves to see the next patient perhaps they have just had a difficult consultation or need to finish a task before calling in the next person.

You can help students think about this stage when they prepare to see the patient you are bringing in.

Example questions to discuss with students to consider preparation:

As a GP, when you find out the next person on the telephone or waiting to see you is breathless...how do you prepare? What do you need to do or know before you phone the patient or call them in? What information is particularly useful and why?

Preparing the students for meeting the patients today: Discuss any brief information you want the students to know before they see the patient. Briefly recap main causes of breathlessness and the respiratory history and examination—what information will they want to find out from the patient? Do they have any questions?

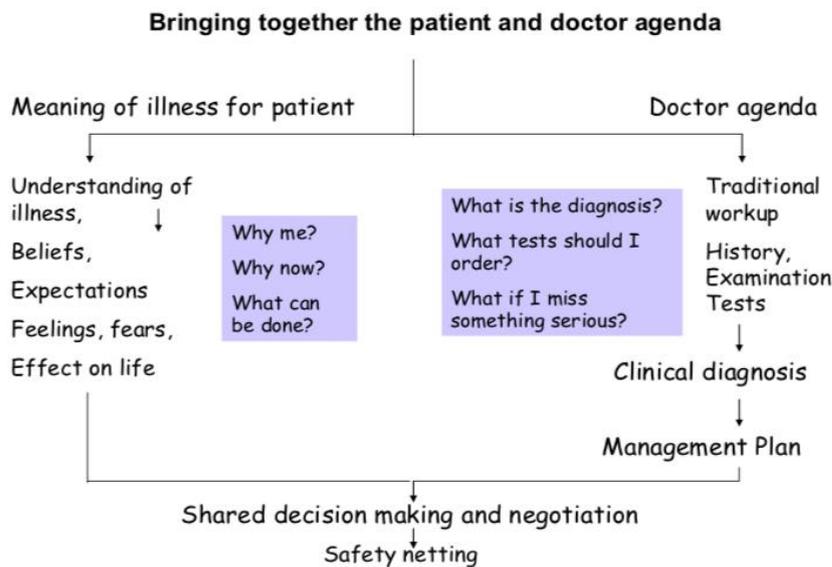
Preparing the patient: Please prime the patient as to where to start their story and what to focus on. For example, if the patients have multiple problems you may need to tell the patient that the students are particularly interested in when they were admitted to hospital with breathlessness. You may also want to say how much information to give, for example “Please don't tell them straight away that you have COPD, just start by saying what symptoms you had and how you felt. They will ask you some questions and try and work out what might have happened to you.”

Opening: All the students should be familiar with introducing themselves to the patient, checking the patients details and asking permission to talk to/examine the patient. Remind them to do so if

they do not do this automatically. They should make sure the patient is comfortable, knows what is going to happen e.g. how long it should take, and start with open questions and attentive listening.

Gathering: We teach students to “gather information” around a presenting problem. The medical history is an essential, structured *part* of gathering information that students need to learn and learn how to adapt for different situations. We emphasise that the medical history is one part of broader assessment of patients' problems including information from the notes, observation of the patient’s presentation and non-verbal communication, examination findings, and results from investigations, and where appropriate, from third parties. We also want to emphasise that gathering is partly about *how* to find out information (the *process* which includes listening skills and how to phrase questions) as well *what* they find out (the *content*—which is forms the medical history).

Patients often come with a problem or problem list (which is not necessarily a symptom) and we want students to be able to form a holistic assessment of the situation. The GMC’s outcomes for graduates does require that newly qualified doctors can “elicit and accurately record a patient’s medical history, including family and social history (Outcome 11a)” but of note is that graduates should be able to “work collaboratively with patients, their relatives, carers or other advocates to make clinical judgements and decisions *based on a holistic assessment of the patient and their needs, priorities and concerns, and appreciating the importance of the links between pathophysiological, psychological, spiritual, religious, social and cultural factors for each individual (Outcome 14)*”



When students learn to gather a comprehensive assessment of the patient through systematic history and examination, they need to continue to consider the patients understanding, beliefs, fears, expectation and impact of the problem on their lives. Sometimes as they learn a “list” of questions to ask they can start to be so focused on remembering *what* to ask, they forget to respond to patient cues, for example a patient might respond to a question about smoking with the information that their Dad died from smoking related disease and the student ignores that to move on to asking about alcohol intake. Remind them to acknowledge what they are hearing and seeing. This is where you can help by spending some of the time observing the students talking to patients

and giving feedback and helping the other students observe and give effective feedback to their peers.

Key consultation skills to practice

- Attentive listening, picking up cues
- Open and closed questions
 - Open questions tend to begin with ‘What, where, when and how?’
 - Closed questions tend to start with ‘Have you, did you, could you?...’
 - Questions starting with ‘Why’ are difficult for patients, better to say; ‘What made you think that?’ rather than ‘Why did you think that?’
- Jargon free language
- ICEIE – ideas, concerns, expectations, impact of the problem, and emotions. It is very important to understand where the patient is coming from, what they are worried about, what they need, and how the problem is affecting them.
- Clarification - what did the patient mean by saying ‘couldn’t breathe’?
- Summarising – This helps you to review the information you have already gathered, and the patient can tell you whether you understood correctly and what information is still missing.
- Acknowledgement: *‘I am sorry to hear that’, ‘That must have been difficult for you’*

Formulating: What do I think so far, and what next?

Students may find it helpful to keep these questions in mind while talking to patients, and systematically consider them when they feel they have come to the end of the information gathering stage. You can ask your students:

1. Can you summarise what you have been told so far?
2. Does it tell a story from beginning to end?
3. Is the story unique to the individual and their situation?
4. Can you tell what the probable diagnosis is (main problem)?
5. And what is less likely (differential diagnosis)?
6. What is the worst thing it could be (What you must not miss, red flags)?
7. Do you know what the patient thinks is wrong? And what they worry about?

Here is an example for a patient that experienced breathlessness

GP	Students
“What is your diagnosis at this point?” A mind map might help	Students brainstorm possible diagnoses
How can you differentiate between these diagnoses?	Students ask questions about symptoms, and if breathlessness constant or intermittent, triggers, and associated symptoms
What do the symptoms sound like? What can we rule out at this point?	Rule out acute causes of breathlessness
What other questions could you ask to differentiate?	Smoking history, PND, orthopnoea, oedema
What have you learned from asking those questions?	Heart failure is less likely
What is more likely/less likely	COPD is more likely
Would you like to ask more questions about that (COPD)?	Students ask about breathlessness and impact (could use MRC scale)
What does that tell us about the diagnosis?	

Explaining

Are there any elements that the students could practise explaining to a patient or each other? E.g. how to use an inhaler or peak flow meter.

Activating

The students have been introduced to activating patients. By activation we mean empowering and motivating people to manage their own health. Different people need different interventions to feel more able to manage their health & wellbeing. You can read more here:

<https://www.kingsfund.org.uk/publications/supporting-people-manage-their-health>

When students meet patients with you, you can help them think about this by discussing areas of the patient's lifestyle or how they manage their condition that are ripe for intervention e.g. encouraging regular exercise, stopping smoking or motivating patients to adhere to a treatment regime.

Planning

Try asking the students "If you had met this patient when they had just developed this symptom (e.g. breathlessness) what would you do next?" Help them consider a wide range of options e.g. reassurance, further investigations, treatment, referral...

Doing

Some consultations have a procedure as part of them. In Primary care this might be a minor surgical procedure, or doing a joint injection, also taking a smear, doing an ECG, giving a flu jab. Over their training students will learn an increasing number of practical procedures.

Closing

Closing a clinical encounter needs specific skills. Students should be encouraged to help the patient summarise, ask any further questions, and make sure the patient is clear on what will happen next including follow up, getting results, hearing about a referral. They can practise safety netting for example in a patient with stable angina.

Integrating

This is the stage after the patient has left the room. Both doctors and patients "integrate". For the doctor this is where they write up the notes, make a call to a colleague or write a referral letter, or look something up. Students can be helped to assess their learning needs at the end of the session.

Breathlessness session guide for Thursday 14th February 2019
Primary Care Clinical Contact, Year Two 2018-19

Intended Learning Outcomes:

- Compare and contrast common causes of breathlessness, and describe the key features of serious causes of breathlessness
- Describe how to gather a well- rounded impression of a patient presenting with breathlessness
- Describe how to gather an accurate smoking history and activate patients for smoking cessation
- Describe the basic steps in the routine examination of the respiratory system, and identify the main physical signs of respiratory disease
- Be able to instruct patients in the use of a peak flow meter and compare results to normal values
- Discuss investigations in patients presenting with breathlessness
- Be able to explain to patients how to use a metered dose inhaler (MDI) with and without a spacer device

Resources:

Hippocrates, the Bristol Medical School website, has section on the respiratory system. Don't miss the respiratory examination video. <http://www.bristol.ac.uk/medical-school/hippocrates/medsurg/respiratory/> accessed 15.12.18. There is also a tutorial on breath sounds and on looking at chest x-rays.

Suitable patients for the Breathlessness block:

- Patients with chronic or recurrent conditions causing breathlessness; asthma, COPD (tie in with case) otherwise any patient with history of chronic breathlessness; bronchiectasis, heart failure, cystic fibrosis, fibrosing alveolitis, lung cancer.
- Also, patients with a previous episode of breathlessness e.g. pneumonia, pulmonary embolism, pneumothorax, panic attacks, consider cardiac causes too.
- For examination, any patient with relevant history but no current chest signs e.g. asthma
- Patients with respiratory signs for examination—fibrosis, COPD, heart failure, also scars from previous thoracotomy or structural abnormalities of the chest wall

Chest pain session activities:

Introductory tutorial (30 minutes)

1. Assess learning needs; discuss the students' learning during their breathlessness CBL case and what they feel confident in and what they want to practise.
2. Prepare for the session; brainstorm causes of breathlessness (acute and chronic), the underlying pathology and how to assess and differentiate between causes. Identify specific history and associated features of asthma, COPD, heart failure and lung cancer distinguish from other causes of breathlessness e.g. infective causes or anxiety.

Recap an overview of the medical history (overview is in year 2 18-19 GP handbook at the following link, wef page 56:

<https://www.bristol.ac.uk/media-library/sites/primaryhealthcare/documents/teaching/handbooks/Year%202%20Effective%20Consulting%20Primary%20Care%20Teacher%20Guide%202018-19.pdf>

3. Brief students on the first patient.

Patient one (30 minutes)

4. Patient One Arrives. Brief information on the patient you are going to see together. Allocate one student to practice gathering information (you might want to allocate one student to take over 1/2 way so that 2 students get a turn). The other students should be given observation tasks. One could look at content of the history (anything missed?), one could look at body language and non-verbal communication, and one could look at process e.g. active listening, building rapport with the patient. When the student/s have finished talking to the patient help them summarise what they have heard—can they tell the patients story?

BREAK—offer students a snack and drink and toilet break. (10 minutes)

5. Preparation for examination teaching. (10 minutes) Discuss with students how much examination practice have they had and what they would like to learn? Ask them to describe the respiratory examination.

Patient two (30 minutes)

6. Patient Two Arrives. Brief information on the patient you are going to see together. Introduce the patient to the students and briefly recap any medical information (but do not take a detailed history) Explain you want to show the students how to start to examine a patient. Demonstrate first talking through the steps and involve the students. Include verbal consent, making the patient comfortable and a systematic examination starting at the hands and moving to the chest. Allocate 1 student to have a go or ask different students to do different parts of the examination—for example all students could have a go at auscultation. **Please make sure students practise asking the patient to use a peak flow meter as part of the examination.**
7. Debrief, questions and identify further learning needs and resources.

Other options: Looking at different inhalers, practice instructing each other on inhaler use and peak flow measurement, looking through respiratory medication in the BNF, talking through further investigations or discuss how you approach emergency presentations of breathlessness.

Tutorial notes (available to students via OneNote) Please note these are designed to be quick reference notes so are brief and **do not** replace core textbooks.

When you are assessing someone with breathlessness it is important to decide if the patient is acutely breathless or this is chronic or intermittent. Some of the causes may overlap (particularly an acute exacerbation of a chronic condition) but the management will be different as some causes of acute breathlessness are an emergency. You will learn about acute breathlessness in your case-based learning and lectures. You are more likely to meet a patient with a chronic respiratory condition in your clinical contact sessions, but the patient may have had episodes of acute dyspnoea in the past.

Causes of breathlessness:

Anatomical method: Think about the anatomy of the thorax from superficial to deep and the structures in the thorax that cause breathlessness (you have had a lecture on this!) Consider the pathology that you are aware of in these structures and how pathology in the different structures cause breathlessness and different presentations.

Surgical Sieve Method: there are different mnemonics for this; for example, VITAMIN C:

1. **V**ascular
2. **I**nfective
3. **T**raumatic
4. **A**utoimmune
5. **M**etabolic
6. **I**diopathic / Iatrogenic
7. **N**eoplastic
8. **C**ongenital

Can you think of a pathology in each of these categories that might cause breathlessness and how?

Acute breathlessness:

Acute dyspnoea is new onset or abruptly breathlessness over 2 weeks. It can be caused by life-threatening conditions such as a large pulmonary embolism. Clinical evaluation and monitoring should be combined with investigations such as chest x-ray, assessing acid-base status e.g. arterial blood gases and ECG. The following suggest serious causes;

- Respiratory rate of more than 30 breaths per minute.
- Tachycardia greater than 130 beats per minute.
- Systolic blood pressure less than 90mmHg, or diastolic blood pressure less than 60mmHg (unless this is normal for them).
- Severe hypoxaemia--Oxygen saturation less than 92%, or central cyanosis (if no history of chronic hypoxia).
- Hypercapnia
- Altered level of consciousness (exhaustion or reduced GCS).
- High temperature (especially if more than 38.5°C).

A few causes (by no means an exhaustive list) include:

Upper airway obstruction e.g. inhaled foreign body/anaphylaxis/epiglottitis

Infective: Infection (especially infective exacerbations of asthma or COPD) are the commonest reason for an acute presentation of breathlessness but tend to come on over days not suddenly.

Cardiac: Cardiac tamponade, arrhythmias, acute coronary syndrome. Pulmonary oedema can also occur or worsen in a short time frame.

Acute asthma—acute or subacute worsening of symptoms e.g. cough, wheeze, chest tightness with decreased objective pulmonary function compared to baseline e.g. peak expiratory flow rate and FEV1

Pneumothorax: Causes unilateral, sudden onset pleuritic pain and breathlessness. There may be reduced breath sounds and hyperresonance on percussion of the chest.

Pulmonary embolism: This is underdiagnosed. Patients may present with breathlessness, tachypnoea, and pleuritic chest pain, or there may be signs of a DVT. Patients may also be tachycardiac, have haemoptysis, or hypotension/syncope. Clinical assessment and chest x-ray in isolation lack sensitivity and specificity and a clinical decision tool such as the [Wells Score](#) is advised as well. Arterial blood gases can show subtle oxygenation changes compared to pulse oximetry and CT pulmonary angiography is the gold standard investigation.

<https://www.nice.org.uk/guidance/cg144/resources/twolevel-wells-score-templates-for-deep-vein-thrombosis-and-pulmonary-embolism-msword-186721165>

<https://cks.nice.org.uk/pulmonary-embolism#!diagnosis>

Anxiety: Triggered by worries or a stressful situation and associated with feelings of panic, sweating, dizziness and hyperventilation.

Intermittent or chronic breathlessness

Chronic dyspnoea is defined as lasting 2 weeks or more. A combination of clinical assessment (history, examination and pulse oximetry) should be combined with pulmonary function tests, bloods (especially FBC) ECG, Chest x-ray. Degree of breathlessness should be assessed. It's not always straightforward to make the diagnosis as pathologies can co-exist, and early COPD and cardiac failure may initially have no clinical signs initially and normal chest x-ray. A list of causes is in your textbook Macleod's clinical diagnosis available online through the library.

Asthma

<https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-quick-reference-guide-2016/>

Asthma is a clinical diagnosis, tests increase probability, but no test is diagnostic. There is presence of more than one of the following *variable* symptoms; breathlessness, wheeze, cough, or chest tightness.

You should do a structured clinical assessment from history/examination, previous records:

- Symptoms are recurrent, episodic and commonly diurnal (worse at night or in the early morning) and can be triggered by cold, exercise, viruses, or allergens—ask about triggers.
- There is absence of symptoms that would support an alternative diagnosis.
- There may be personal/family history of atopy.

- There may be recorded episode of wheeze, or recorded variable PEF₁ or FEV₁

Also ask about medication (NSAIDs or betablockers may trigger symptoms). Consider occupational asthma in adult-onset asthma that is worse at work.

Tests:

- Variable peak expiratory flow test readings can support a diagnosis of asthma, guidelines recommend doing this when other tests are inconclusive, but it is easy to do and helps the patient with self-monitoring (which is then useful for patient held asthma action plans in the management of asthma). The patient measures their peak flow am & pm for 2-4 weeks and an average taken of the highest and lowest readings, >20% variability is a positive result (but may not pick up variability if asthma is not active. Other tests include; fractional Exhaled nitric oxide (FeNO) (variable availability in primary care)
- Spirometry
- Bronchodilator reversibility testing

COPD

The following is based on <https://goldcopd.org/wp-content/uploads/2016/12/wms-GOLD-2017-Pocket-Guide.pdf>

Who describe Chronic Obstructive Pulmonary Disease (COPD) as “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” There is a mix of small airways obstruction (narrowing of airways, scarring and hypersecretion), and breakdown of the alveoli (emphysema) so there is less surface area for gas transfer. This results in reduced airflow. **Smoking** is the commonest risk factor (95% due to smoking).

COPD should be considered in any patient who has **dyspnoea, chronic cough (may be dry) or sputum production**, and/or a history of exposure to risk factors for the disease. Dyspnoea tends to progress with time, is persistent and usually worsens with exercise. **Wheeze** is often present. Patients tend to get **recurrent chest infections** (“winter bronchitis”). Patients tend to be older, but it should be considered in all smokers >35 who have at least one symptom, younger patients and those living in an area of high prevalence should be screened for alpha-1-antitrypsin deficiency. Check for **red flags**: acutely breathless, haemoptysis, hoarse voice, chest pain, rapid weight loss which would indicate lung cancer and a “2 week wait” referral.

On examination patients may have;

- Hyperinflated chest
- Use of accessory muscles
- Poor chest expansion (with reduced crico-sternal distance)
- Hyper resonant chest with reduced cardiac dullness
- Pursing of lips on expiration
- Cyanosis
- Peripheral oedema and raised JVP
- Cachexia

Spirometry is required to make the diagnosis; the presence of a post-bronchodilator FEV₁/FVC < 0.70 confirms the presence of persistent airflow limitation. Chest x-ray to exclude other diagnoses. Blood tests e.g. FBC (looking for anaemia which can worsen SOB, & polycythaemia). BMI.

FEV₁ is the volume of air the patient can exhale in the first second of forced expiration

FVC is the total volume of air the patient can forcibly exhale in one breath

FEV₁/FVC is the ratio of FEV₁ to FVC expressed as a percentage

Classification of COPD	FEV ₁ /FVC	FEV ₁
Mild	<0.7	>80%
Moderate	<0.7	≥50-79%
Severe	<0.7	≥30-49%
Very severe	<0.7	<30%

COPD management includes **smoking cessation** to prevent worsening, treating infections promptly and symptom management, pulmonary rehabilitation to improve exercise capacity and influenza and pneumococcal vaccination. Degree of breathlessness should be measured using a scale like the MRC dyspnoea scale, but it is recognised that the impact on patients is more than dyspnoea so also use the COPD assessment test (CAT) --example in guideline link above.

Smoking

It is essential to get a comprehensive smoking history and encourage patients to stop—it is one of the most important things they can do for their health. Find out:

- Quantity per day and for how long. Record smoking in “pack/years”
- Type e.g. pipe/cigarettes/rolling tobacco/e-cigarettes
- How they feel about their smoking and whether they want to quit
- Offer help to quit and information about the benefits of stopping.

<https://patient.info/health/quit-smoking-cessation/benefits-of-stopping-smoking>

Respiratory Examination:

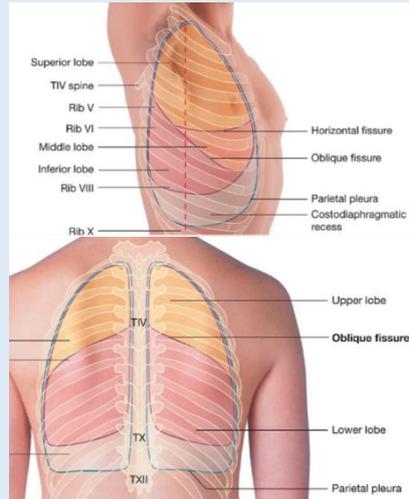


It might help to visualise the different parts of the examination by drawing a stickman on a flipchart and discussing what you would examine and what you would expect to find. This helps you anticipate what signs you expect to find with a given history.

Setting up for examination	Washes hands, introduces self, explains procedure & gains consent. Positions patient with trunk at 45° makes sure comfortable. Adequately exposes chest and arms. Cover females until removal is appropriate.
General examination	Look to see if comfortable or obviously dyspnoeic. A breathless patient may use accessory muscles of respiration and lean forward using their arms to brace the chest to help get air in. Is the patient using supplemental oxygen? Count respiratory rate—breaths in 15 seconds x4. Normal is 12-15 at rest (15-20 in some patients e.g. anxiety) Comment on any relevant findings. Vital signs (if acutely breathless or infection suspected).
Hands and nails	Check pulse. Look for clubbing, tar staining and cyanosis. CO ₂ retention flap: Hold out arms with wrists extended and look for coarse flapping tremor.

	<p>Clubbing: Here there is loss of the angle between the nail and the nail bed. You do not need to put two fingernails together if they are obviously not clubbed.</p> <p>Thoracic: causes of clubbing include: Bronchial carcinoma, chronic lung Suppuration (empyema/abscess, bronchiectasis, cystic fibrosis) fibrosing alveolitis</p>
<p>Eyes</p>	<p>Tumour pressing on the sympathetic nerves to the eye causes Horner's syndrome—a unilateral pupil constriction and ptosis Check for anaemia</p>
<p>Face/Mouth/Neck</p>	<p>Central cyanosis—check under tongue. Pursed lip breathing on expiration. A dusky appearance and swelling of the face and neck can be caused by a mediastinal tumour pressing on the SVC. JVP can be raised in Cor Pulmonale* or SVC obstruction and acutely raised in tension pneumothorax and PE. Tracheal deviation can be assessed with one finger (gently and with warning) advanced into the sternal notch Examine the lymph glands by standing behind the patient (easier to do when examining the posterior chest).</p>
<p>EXAMINATION SEQUENCE</p>	<p>Examine anterior chest then get patient to sit forwards to examine the posterior chest.</p>
<p>Inspection</p>	<p>Shape of chest and movements of chest wall. A barrel shaped chest indicates hyperinflation from chronic airway obstruction. You may see scars on the chest wall. Is there any intercostal recession indicating forced rapid inspiration seen in acute infection and asthma?</p>
<p>Palpation</p>	<p>Apex beat: lowest, most lateral position of cardiac impulse. Should be 5th intercostal space, mid-clavicular line. Mediastinal masses may displace the apex, the apex beat may be absent in large pleural effusion or pneumothorax. Hyperinflation may make it difficult to feel (and hear). Feel for right ventricular heave (palm left anterior chest with a straight arm—see video) Check for expansion—cup your hands (fingers spread) around the patient's upper anterior chest pressing finger tips into the mid axillary line, pull your hands slightly together and raise your thumbs off the chest wall, as the patient breathes in you can see how much each of your thumbs move and if there is an asymmetry. Repeat on the lower anterior chest wall and on the back.</p>
<p>Percussion</p>	<p>Produces a hollow resonance, it produces a dull thud without resonance over fluid and consolidation. Apply middle finger of your non-dominant hand along an intercostal space and tap it with the flexed index or middle finger of your dominant hand. Percuss down the chest comparing left with right, avoid the scapula so move out as you move down. Hyperresonance can be hard to assess but accompanied by absent breath sounds indicates pneumothorax.</p>

Auscultation



Compare left to right starting with the bell of the stethoscope over the apex. Work your way down. Think about the surface anatomy of the lungs as you listen.

Listen to the lateral chest in the mid axillary line.

Note if the breath sounds are soft and muffled, or absent, or loud and harsh. Note asymmetry (if they are different side to side) and if there are any added sounds (wheeze, crackles and rubs)

If you hear crackles, ask the patient to cough. Decide if they are fine or coarse and if they change with the breath.

Vocal resonance: Breath sounds can reveal consolidation (bronchial breath sounds) air or fluid in the pleura (absent breath sounds) this can be confirmed by asking the patient to generate laryngeal sounds on purpose (Ask the patient to say “99” and move the stethoscope in the same places you auscultate).

Lower limb

Check for swelling indicative of DVT. Pitting oedema.

Investigations

Check Peak expiratory flow rate
Look at Chest X-ray—if available (secondary care)

Closing

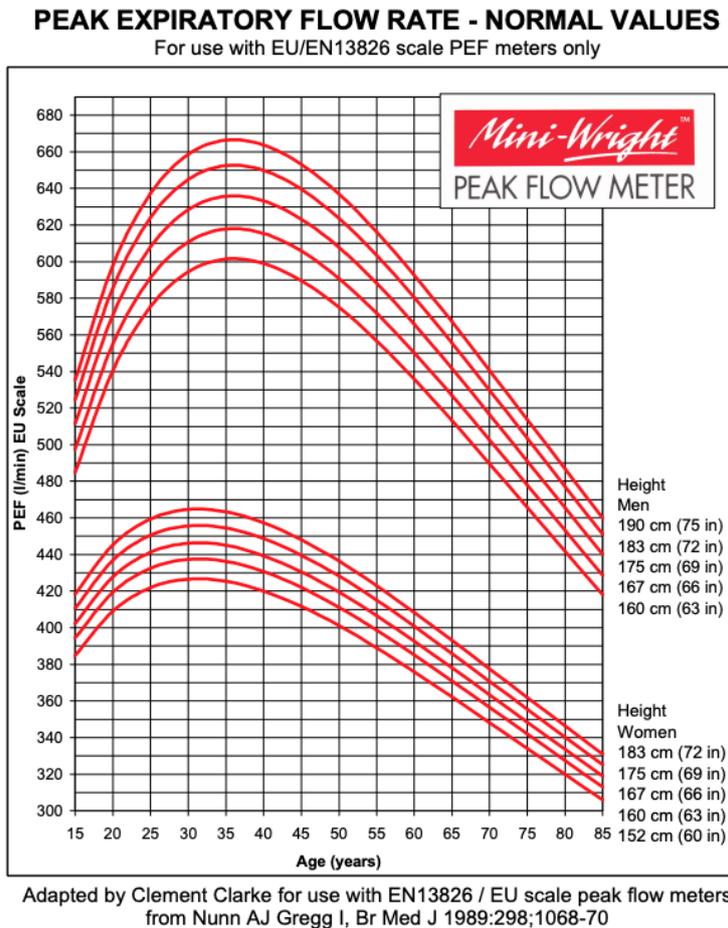
Cover patient/help them dress or get off couch if required, thank patient. Explain any findings to patient. Wash hands.

How to measure peak flow

Part of an OSCE station filmed by Imperial college medical student explaining how to measure peak expiratory flow (PEF). https://www.youtube.com/watch?v=GYHwA_5NxUw

Asthma UK video on peak flow is here:

<https://youtu.be/8tYutVUswH4>



How to use an inhaler

A video demonstrating the correct use of a metered dose inhaler (MDI).

<https://www.youtube.com/watch?v=fHYTz-ZoRLw>

Use of an inhaler with a spacer

A video demonstrating the use of a spacer device with a metered dose inhaler. Rinsing the mouth after inhaling steroid using this method is important to minimise gastrointestinal absorption and to reduce the risk of oral candidiasis (thrush).

<https://www.nationalasthma.org.au/living-with-asthma/how-to-videos/how-to-use-a-standard-mdi-and-spacer>

Case-Based Learning Cases in Breathlessness.

A 26-year-old female is brought in by ambulance due to breathlessness and chest tightness that has come on over the last eight hours. She has a non-productive cough. She does not have any pleuritic chest pain. She has not experienced any fevers or rigors. She has recently started work in a bakery. She has used her “reliever” blue inhaler multiple times without any noticeable effect) She lives with her wife and neither of them smoke, they only drink alcohol at parties. She is taking over the counter ibuprofen for a sprained ankle.

Her 66-year-old grandfather has severe chronic obstructive pulmonary disease (COPD), he has to stop for breath after walking for a few minutes on level ground around his bungalow.

A rapid A to E to assessment (primary survey) revealed:

Airway Patent airway, but unable to speak in full sentences

Breathing 30 breaths per minute SaO₂ 88% Bilateral air entry and expiratory wheezes Using accessory muscles of ventilation Sat forward in the tripod position

Circulation Capillary refill time less than two seconds Pulse 120 beats per minute Blood pressure 146/92 mmHg

Disability Alert Pupils equal and reactive to light and accommodation BM-test 6.0 mmol/l

Exposure Temperature 35.0°C No rash, erythema or urticaria of skin

Her peak expiratory flow was found to be 40% of her predicted value. Urgent treatment was commenced in accordance with the British Thoracic Society (BTS) guidelines and blood samples were obtained –FBC & U&Es normal. Arterial blood gases showed:

Arterial blood gas (ABG)
pH 7.50 (7.35-7.45)
Po ₂ 9.0 (11-13 kPa)
Pco ₂ 4.0 (4.7-6.0 kPa)
Bicarbonate 22 (24-30 mmol/l)
COHb 0.1 (0.0-1.5%)
MetHB 0.8 (0.0-1.5%)

The intensive care outreach team were fast-bleeped. They administered an intravenous fluid challenge, ketamine and suxamethonium before securing the patient’s airway by endotracheal intubation (see appendix 4). The patient was transferred to the intensive care unit and her work of breathing was taking over by a ventilator (invasive positive pressure ventilation IPPV). A chest radiograph was obtained to exclude a pneumothorax or lobar collapse due to mucus plugging and to check the position of the endotracheal tube (ET).

Over the next 48 hours her condition improved, and she was weaned from the ventilator and then spent three days on a respiratory ward. She was reviewed by the asthma specialist team who checked her inhaler technique, advised her against using non-steroidal anti-inflammatory drugs (NSAIDs), prescribed a five-day course of oral prednisolone, a budesonide inhaler and a salmeterol inhaler (inhaled via a spacer device) (see appendix 5). A detailed discharge summary letter was sent to her general practitioner within 24 hours and an outpatient appointment with the asthma specialist nurses for one-week post discharge.

Questions for facilitators:

- What is the differential diagnosis for the combination breathlessness and wheeze?
- What is pleuritic chest pain? What is the differential diagnosis for pleuritic pain?
- What is a rigor? What is the underlying pathophysiology?
- Could her condition be related to her occupation?
- What are the similarities and differences between asthma and chronic obstructive pulmonary disease?
- What is the difference between wheeze and stridor?
- Which are the accessory muscles of breathing?
- How does the tripod position help a patient that is breathless? What is the significance of FIO₂ 0.21?
- Types of respiratory failure & types of acid-base disturbance seen in arterial blood gases
- What is your estimated predicted peak expiratory flow (PEF)? (Use the chart)
- What factors determine airways resistance?
- How do (1) salbutamol (2) ipratropium (3) prednisolone and (4) magnesium sulphate exert their therapeutic effects?
- According to the British National Formulary (BNF) what are the commonest side effects of salbutamol?
- What determines the work of breathing?
- What is the significance of central cyanosis?
- What is the relationship between the arterial partial pressure of carbon dioxide, alveolar ventilation and the rate of production of carbon dioxide by metabolism?
- Why did the intensive care outreach team administer a fluid challenge?
- What is the advantage of using ketamine at a general anaesthetic in this scenario?
- What is the mechanism of action of suxamethonium? Why is it required for endotracheal intubation?
- What are the commonest side effects of suxmethonium?
- What is the most likely explanation for the hypokalaemia (low plasma concentration of potassium) seen in the arterial blood gas at 4.20pm?
- How does intermittent positive pressure ventilation (IPPV) differ from negative pressure ventilation using an iron lung?
- According to the British National Formulary (BNF) when are non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (a) contraindicated and when should they be used with caution?
- What are the typical appearances of a (1) pneumothorax and (2) lobar collapse on a chest radiograph?
- What life-threatening complication is likely if a patient with a simple pneumothorax is put on intermittent positive pressure ventilation?
- What does an endotracheal tube look like on a chest radiograph?
- Which class of drug does budesonide belong to?
- What is meant by safety netting in clinical practice? Can you identify examples in this case?
- What type of micro-organism causes thrush?

Lectures and practicals:

Lecture 1: Overview of shortness of breath. Pathophysiology, including: Reduced availability of oxygen – reduced barometric pressure, Upper airway obstruction resulting in stridor, Lower airway obstruction resulting in wheeze, Ventilation:perfusion mismatch including pneumothorax, Heart failure and cardiac tamponade, Iron deficiency anaemia (and other anaemias); chronic haemorrhage

leading to anaemia, Carbon monoxide poisoning, Cyanide poisoning. Type I vs Type II respiratory failure; causes and arterial blood gas results. Symptoms and signs of hypoxia and hypercapnia

Lecture 2: Common disorders of the bronchi and bronchioles. Pathology and typical clinical features of: Acute and chronic bronchitis/COPD, Bronchiectasis, Bronchial carcinoma, Asthma

Lecture 3: Common disorders of the lung parenchyma. Pathology and typical clinical features of: Pneumonia, infarct secondary to PE, Pulmonary oedema secondary to LVF, Pneumoconiosis and fibrosis (including Cystic Fibrosis), Extrinsic allergic alveolitis, Emphysema, Pulmonary metastases. Interpret a vitalograph to differentiate between obstructive and restrictive lung diseases.

Lecture 4: Pathophysiology of heart failure. Chronic congestive heart failure (CCF) and common symptoms, difference between right and left ventricular failure, causes e.g. coronary artery disease, ventricular hypertrophy (hypertension or aortic valve disease), ventricular dilatation (mitral valve insufficiency) etc. Pathophysiological responses to CCF and correlate them with the typical signs found on examination. Complications and prognostic significance of CCF. Investigations; chest X-ray, echocardiogram and assay of B-Type natriuretic peptide (BNP). Pharmacological principles of treatment using the Frank-Starling curve i.e. (1) reduce cardiac work, (2) reduce the excessive plasma volume and cardiac dilatation and (3) improve myocardial contractility. Causes of high output cardiac failure.

Lecture 5: Haematological and biochemical investigations of breathlessness. FBC, D-dimer, U&E Bone profile, ABG, Troponin, B-natriuretic peptide, Carboxyhaemoglobin, Methaemoglobin

Lecture 6: Common pathogens responsible for community-acquired, aspiration and hospital-acquired pneumonia. Signs, symptoms and complications of common respiratory infections. Investigation e.g. culture of blood and sputum, antigen and immunoglobulin measurements. Signs, symptoms and investigations of tuberculosis.

Lecture 7: Bacterial endocarditis as a rare but important cause of heart failure. Investigation and principles of treatment of bacterial endocarditis. Risk of IV drug use.

Lecture 8: Diseases of the pleura. Pleural effusion, Empyema, Pleural plaque, Mesothelioma, Pneumothorax

Lecture 9: Causes of Type II respiratory failure. Pathology and clinical signs and symptoms of: Brainstem stroke, Opiate overdose, Guillain-Barre syndrome, Myasthenic crisis, Kyphoscoliosis, Circumferential burns of the thorax, Transection of the spinal cord above levels C3,4,5, Respiratory fatigue in life-threatening asthma

Lecture 10: Public Health – Health promotion and improvement including approaches and strategies, ethics of interventions. Describe behaviour change models. Role of behaviour change (including brief interventions), empowerment and social change in health improvement and role of medical practitioners.

Cross-disciplinary Session 1: Critical evaluation of a qualitative research paper on asthma. Describe the main qualitative methods used in health research. Locate checklists to critically appraise published qualitative studies. Critically assess qualitative papers published in social science and medical journals

Cross-disciplinary Workshop 2: A diagnostic and pharmacological approach to breathlessness, acute community acquired pneumonia, TB, COPD and asthma.

Practicals: Respiratory simulations and blood gas analysis. Applied Anatomy and Imaging Practical.