

CLINICAL AND ASSESSMENT SKILLS
FOR
PHARMACIST INDEPENDENT PRESCRIBERS



CORE CLINICAL SKILLS FOR PATIENTS
WITH MULTIMORBIDITIES MODULE
2015

Introduction

This programme has been developed between the Clinical Skills Centre, University of Dundee and NHS Education for Scotland to support the development of Core Clinical Assessment Skills for Pharmacist Independent Prescribers.

Participants are expected to complete the pre-course on-line materials prior to attending the two day workshop practical sessions. These materials will include a “Basic ECG Assessment” on line tutorial and an “Understanding Common Blood” tests on line tutorial. Practitioners will then attend a two day session focusing on practice of the core skills of:

- General physical examination of the hands, face, eyes and mouth
- Assessment of vital signs – temperature, respiratory rate, pulse and blood pressure
- Basic examination of the respiratory system, including peak expiratory flow rate
- Emergency assessment of eye and ear conditions
- Consolidation of on-line and F2F learning through simulated scenarios on Day 2

The course will also include an OSCE at a later date to assess practitioners and provide feedback on performance. This is a requirement of attendance and successful completion of the programme.

Aims and Learning Outcomes

Module Aim:

The Aim is to provide basic clinical assessment skills required to monitor and assess prescription of medicines in patients with Long Term Conditions (LTC)

Module Learning Outcomes:

Section 1: General Examination – Hands, face, mouth and eyes

1. Recognise the process of carrying out a general physical examination (K)
2. Demonstrate the process of carrying out a general physical examination (O)
3. Discuss the benefits of carrying out a general physical examination and the main findings (K)
4. Discuss when it would/would not be appropriate to carry out a full general physical examination (K)

Section 2: Assessing and recording, Temperature, Pulse, Respiratory Rate and Blood Pressure

1. Summarise the underlying anatomy and physiology of vital signs assessment (K)
2. List the recognised normal parameters for vital signs in adults and children (K)
3. Discuss common factors influencing the accuracy of vital signs assessment (K)
4. Demonstrate safe and accurate assessment of body temperature using an electronic (Tympanic) thermometer (O)
5. Demonstrate safe and accurate assessment of pulse, blood pressure and respiration (O)

6. Accurately record the findings of vital signs assessment in the patient's notes/ EWS charts (O)
7. Discuss the physiological, emotional and physical factors which can effect vital signs (K)

Section 3: Examination of the Chest and Peak Expiratory Flow Rate

1. Discuss the process of carrying out an assessment of the respiratory system and breath sounds (K)
2. Demonstrate the process of assessment of breath sounds and chest auscultation (O)
3. Discuss the importance of the assessment of breath sounds and implications of the more common abnormalities e.g. wheeze in asthma (K)
4. Demonstrate the correct use and implications of Peak Expiratory Flow in respiratory assessment (O)

Section 4: Examination of Eyes and Ears

1. Summarise the underlying anatomy and physiology of a) the eye and b) the ear (K)
2. Demonstrate safe examination of a) the eye and b) the ear (O)
3. Discuss when it is appropriate to refer to other agencies in conditions of a) the eye and b) the ear (K)

Section 5: Basic ECG Assessment

1. Identify the links between physiological changes in the pulse and what is seen on a 12 Lead ECG (K)
2. Understand the Electrical Conduction System of the heart and how this is demonstrated on an ECG (K)
3. Demonstrate a structured approach to assessing an ECG rhythm strip (O)

Section 6: Understanding Basic Blood Results

1. List the common blood tests carried out on people with long term conditions (K)
2. Discuss normal and abnormal results of common blood tests (K)
3. Demonstrate an understanding of common abnormalities related to specific conditions (O)

(O) = Assessed by OSCE station. (K) = Assessed by Online Knowledge Assessment.

Training Days Programme

Day 1

10.00	Registration
1015	Welcome, introduction to the workshop
10.30	General Examination – Hands, Face, Mouth & Eyes
11.00	Assessing & Recording Vital Signs
12.00	Examination of Ears
13.00	Lunch
14.00	Examination of Eyes
15.00	Examination of Chest and PEFR
16.00	Feedback and Evaluation

Day 2

10.00	Registration
10.15	Welcome back
10.30	Review of practise in workplace
11.15	Revisit of Skills i. Vital signs ii. General examination iii. Chest examination
12.00	Revisit of Skills i. Examination of eyes ii. Examination of ears
13.00	Lunch
14.00	Outpatient Clinic (to include using skills learnt online and in F2F teaching)
16.00	Feedback and Evaluation

General Examination – Hands, face, mouth and eyes

- 1. Recognise the process of carrying out a general physical examination
- 2. Demonstrate the process of carrying out a general physical examination
- 3. Discuss the benefits of carrying out a general physical examination and the main findings
- 4. Discuss when it would/would not be appropriate to carry out a general physical examination

It is envisaged that relevant general examination will become integral to the patient encounter. Whenever clients are to be examined or a history taken it is imperative that their privacy is maintained which might be difficult in a community setting. General examination is easily carried out with the person sitting in a chair and does not require the use of specific clinical equipment. However, general physical examination should be carried out in a warm, well-lit environment where subtle abnormalities of skin colour can be detected e.g. mild jaundice is easier to see in natural, than artificial light.



Activity: Think about some recent examples of when it would have been appropriate for you to have carried out a general examination of clients coming to you for advice or guidance and if appropriate, what modifications you might need to make in your current workplace:

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Whenever you carry out a physical examination you should follow the sequence of:

- Inspection (Look)
- Palpation (Feel)
- Auscultation (Listen)

The first step is to stand back and look at the patient looking for any obvious abnormalities. Is the client well or unwell; in pain or comfortable? Do they need immediate resuscitation? Does the client look undernourished, well nourished, or obese?

Examine the client's hands

You should greet the client in a friendly and professional manner by introducing yourself and shaking hands. This can give you a number of vital clues as to the client's current state of health. For example it gives you an idea of the client's strength of grip – remember not to grasp too tightly as the client may have painful hands or joints due to arthritis. Table 1 below lists some of the findings that examination of the hands might reveal. You should also note the shape of the hands, size, skin condition, scars, pigmentation, colour and any wasting.

Next look at the patient's nails noting the colour particularly looking for:

- Pallor (pale or colourless tinge to the skin) often associated with cold skin
- Cyanosis (a blue/grey tinge to the skin or mucus membranes caused by hypoxia)
- Clubbing (when the ends of the fingers become engorged and swollen due to problems with microcirculation).
- Deformity of fingers e.g. Dupuytren's Contracture – a condition which affects the tendons of the last two fingers



Figure 1: Pallor of the ends of the ring and little fingers



Figure 2: Cyanosis of the tips of the fingers



Figure 3: Finger Clubbing

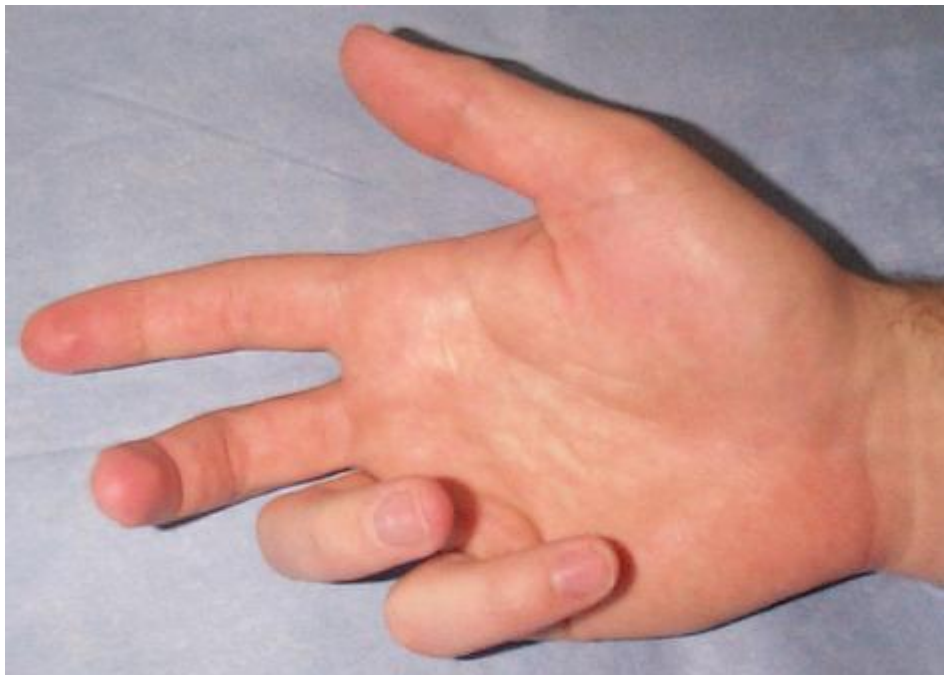


Figure 4: Classic example of Dupuytren's Contracture

Face

Look for any central cyanosis or signs of anaemia. Look for any facial weakness or drooping and for asymmetry of the facial features. Look for any obvious deformity.

Mouth

Look for signs of anaemia in the mucus membranes or tongue, general dental health or infection e.g. thrush. Check if patient is under the care of a dentist as part of routine dental care is to assess for signs of oral cancer etc.

Eyes

Look at the eyes for signs of jaundice, cyanosis, pallor, or redness.

The general examination is an ideal opportunity to detect serious illness e.g. a dry mouth and tongue can indicate dehydration or infection.



Figure 5: Cyanosis of the lips and tip of nose



Figure 6: Patient demonstrating signs of Jaundice

[illegible]

Assessing and recording, temperature, pulse, respiratory rate and blood pressure

- Summarise the underlying anatomy and physiology of vital signs assessment
- List the recognised normal parameters for vital signs in adults and children
- Discuss common factors influencing the accuracy of vital signs assessment
- Demonstrate safe and accurate assessment of body temperature using an electronic (Tympanic) thermometer
- Demonstrate safe and accurate assessment of pulse, blood pressure and respiration
- Accurately record the findings of vital signs assessment in the patient's notes/ EWS charts
- Discuss the physiological, emotional and physical factors which can effect vital signs.

Assessing vital signs

It is envisaged under the Prescribing for Excellence Guidance Pharmacists will be expected to assess vital signs as part of the Patient Encounter. The accurate assessment, monitoring and recording of vital signs – temperature, pulse and respiration, not only gives an insight into the function of the specific organs, but also demonstrates body systems function as a whole. Vital signs assessment is used for a variety of reasons such as:

- The establishment of baseline measurements on admission to hospital.
- Observation of trends over a period of time.
- The identification of specific physiological problems or pathology.
- Monitoring the effectiveness of treatment/interventions/medication.
- Assessment of specific complaints from patients.

It is important to note that when conducting an assessment of vital signs that a single abnormal result (unless extremely abnormal) is usually less valuable than a series of abnormal measurements. It is more useful to observe for a trend and deviations from the patients 'normal' measurements, the recognized normal range or previous measurements.

Measuring body temperature

Body temperature is the balance between heat production and heat loss. Optimal function is optimal within a narrow temperature range usually between 36° C and 38° C. In a normal adult the temperature range is dependent on a number of factors such as:

- Age
- Physical activity
- Hydration status
- State of health, including the presence of infection
- Time of day (Circadian influences)
- Menstrual cycle

Body temperature varies over each 24 hour period, being lowest at night and highest in early evening. As a solid object, the body follows the same laws of physics as any other as far as it gains heat in warm surroundings and loses heat in colder surroundings. However, unlike inanimate objects the body has the ability to regulate heat loss and heat gain via convection, conduction and radiation. Physiologically temperature is controlled through peripheral (shell) receptors in the skin and central (core) receptors in the hypothalamus. Receptors are also located in the spinal cord, lungs and gut.

See Figure 7 for examples of temperature regulation mechanisms.

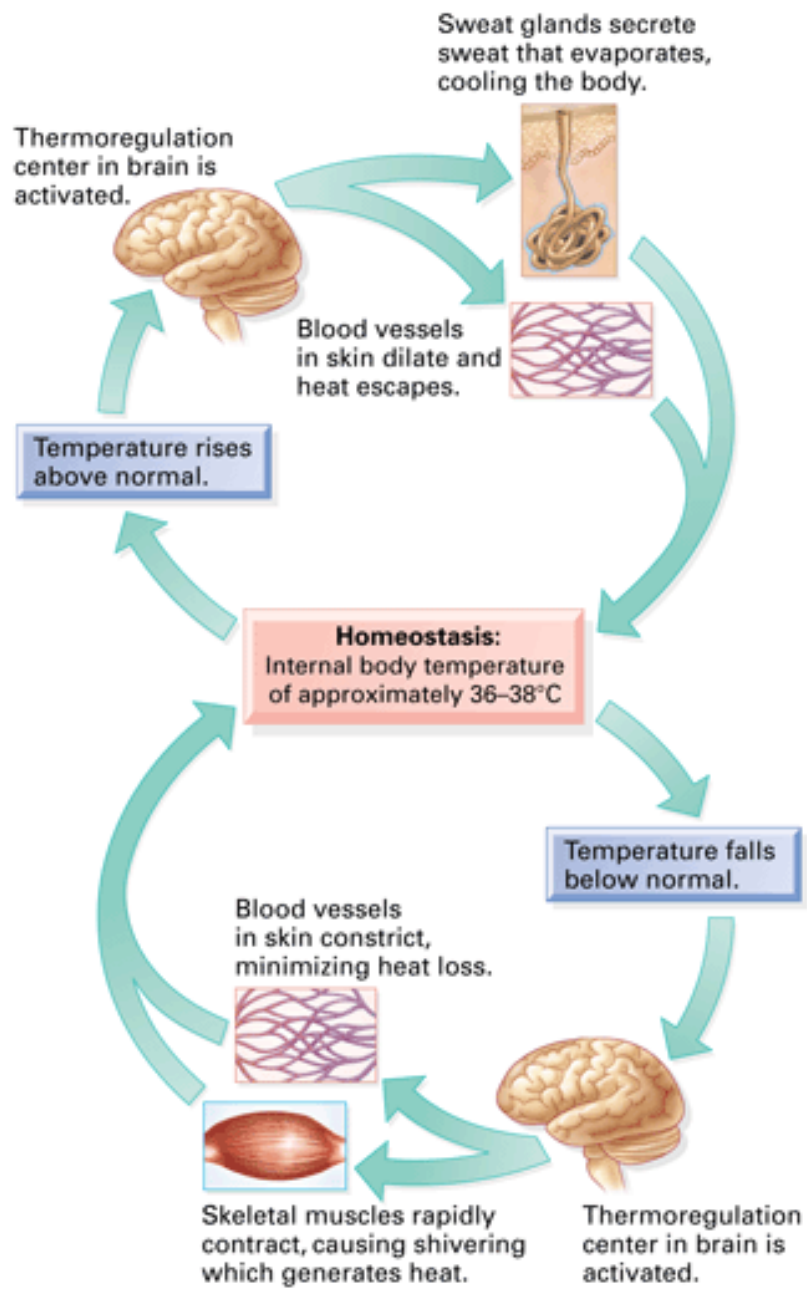
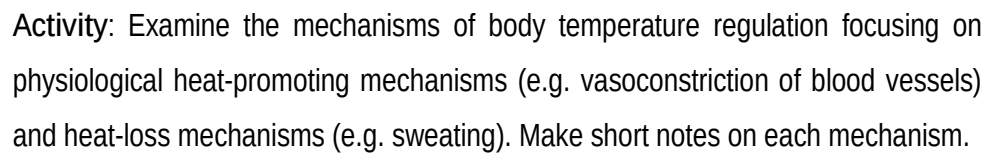


Figure 7: Temperature regulation mechanisms

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Assessing body temperature in clinical practice:

Body temperature is routinely measured in the outer ear as it gives a result which is close to the body's core temperature range: 36.3°C – 37.3°C. This core temperature however, is not a constant value and can range from 36°C to 38°C in normal adults. Eating and drinking will also effect the readings from an oral temperature recording so ensure at least 10 minutes has elapsed between eating/drinking and temperature recording.

Equipment used in clinical practice:

The main types of clinical thermometer in use are the tympanic or disposable.

Tympanic thermometers

This is now the most common type of thermometer in clinical use and works by measuring core temperature at the tympanic membrane which shares its blood supply with the hypothalamus. The probe has an otoscope-like speculum to which a disposable cover is applied. This is gently inserted into the outer ear and a button pressed to start the recording. Within 2-3 seconds a digital display shows the temperature and an audible alarm indicates that temperature has been recorded. Probe covers are ejected into clinical waste.

Disposable thermometer

This consists of a thin strip of plastic impregnated with chemical dots at one end. These dots change colour from orange to blue to indicate the temperature reading. When used to record an oral temperature the dots can be placed either way up, but when used in the axilla, the dots must face the chest wall. The thermometer should be disposed of in the clinical waste once it has been used.



Activity: Think about some of the situations that you might encounter in your own practice and suggest the most appropriate site and type of thermometer to be used, e.g. disposable in patient with possible ear infection

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Procedure for recording body temperature using a Tympanic thermometer:

As the tympanic is the most common clinical thermometer in use the following procedure describes the process for using this particular piece of equipment. In clinical practice however you should familiarize yourself with the equipment in use.

Equipment required:

Tympanic thermometer and disposable probe covers

Patient's notes or TPR Chart

Table 1: Recording Temperature

Steps	Rationale
Introduction and patient identity check	It is important that you have the patient's full details if you are to pass on important information
Explain procedure to patient and gain consent	The patient must be comfortable and aware of what you are about to do
Document which ear you use to record the temperature	This will ensure that the same one is used in subsequent readings
Remove the thermometer from the base unit and ensure that the lens is clean and not cracked	Any dirt or cracks can effect the proper working of the thermometer
Place a disposable cover probe onto the probe tip, ensuring manufacturer's instructions are followed	
Check that the thermometer is set to 'TYMPANIC' and then gently insert the probe into the outer ear canal and ensure a snug fit	DO NOT force the probe any further than the outer ear canal
Press and release the 'SCAN' button	
Remove probe from ear as soon as the thermometer reads 'DONE', usually indicated by and audible bleep	
Read and note the temperature display	
Press the 'RELEASE/EJECT' button and discard the probe cover	
Replace the thermometer in the base unit	

Measuring the Pulse

A pulse can be described as 'the rhythmic expansion of an artery felt with the finger' (Dorland's Pocket Medical Dictionary) and is felt where an artery runs close to the skin surface commonly near a bone.

When examining a patient's pulse it is normal practice to note the rate, rhythm, volume and character. The pulses used most frequently are:

1. The radial pulse which is felt in the wrist lateral of the tendon of the flexor carpi radialis muscle.
2. The brachial artery is felt in the brachial fossa medial to the biceps tendon.
3. The carotid pulse is felt in the neck between the larynx and the sternocleidomastoid muscle.

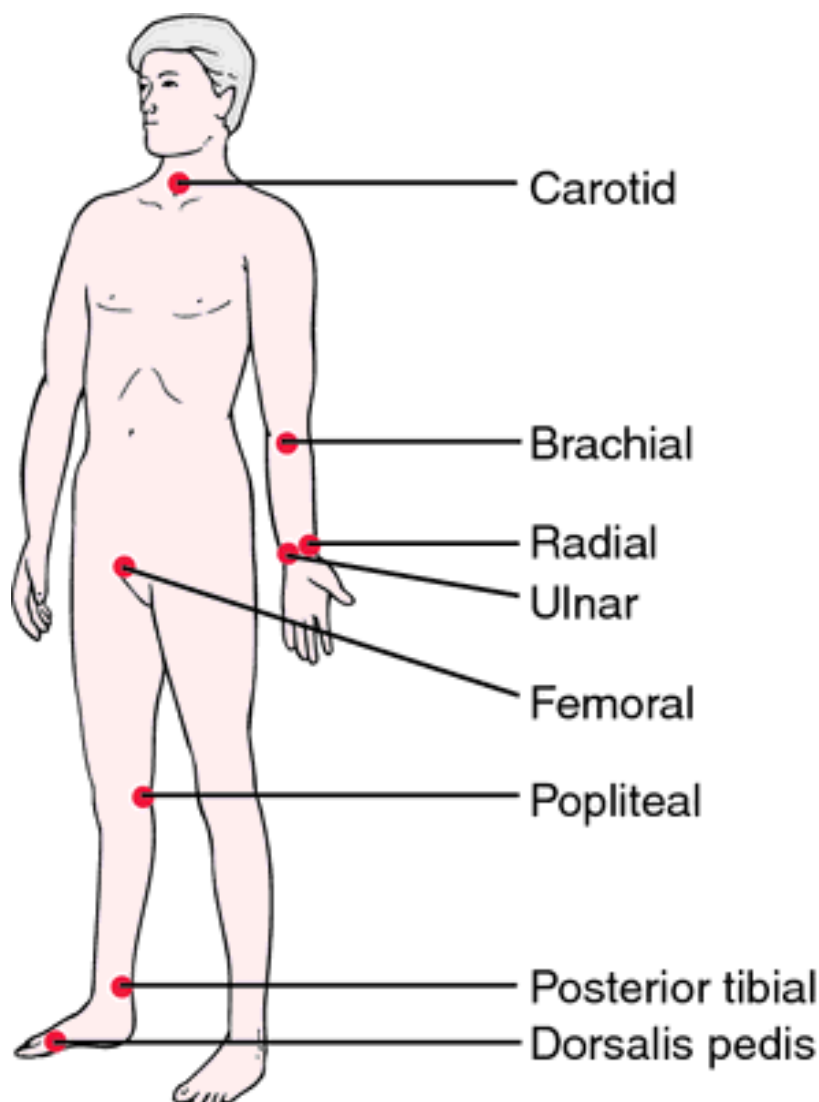


Figure 10: Major Pulse Points

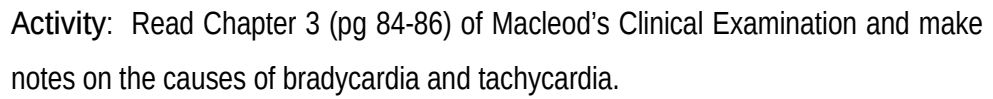
In adults the normal resting pulse rate is 60-80 beats per minute (b.p.m) and 80-200 b.p.m in a child and is often referred to as sinus rhythm as it originates in the sino-atrial node. Although sinus rhythm is described as regular the heart speeds up during inspiration and slows towards the beginning of expiration. This is most obvious in children, adolescents and athletes.

Volume and character:

The volume, sometimes referred to as the strength of the pulse is described as the 'movement imparted to the finger applied gently to the pulse' and the character is the waveform felt through the fingers. Both volume and character are best noted in the larger arteries such as the carotid.

Pulse rate:

A pulse rate of <60 b.p.m is referred to as bradycardia and one >100 b.p.m as a tachycardia. The pulse rate is most commonly recorded by palpating the radial pulse. Some text books will recommend that the rate is counted for 15 seconds and then multiplied by four to give the rate per minute. This is acceptable if the pulse rate is obviously regular and has good volume and character, however 15 seconds is not a long time to assess the pulse fully and so until you become more practiced and proficient it is recommended that you count the pulse for at least 30 seconds and double, or ideally measure the pulse for 1 minute.

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Pulse rhythm:

A normal pulse should have a regular beat with the same time lapse between each beat. Irregularities can occur as isolated incidents or can be long standing and indicate cardiac problems. There are numerous arrhythmias which can be responsible for alterations to the pulse rhythm and these are described in any of the core texts to which you should refer for further information (see reading list/references).

Measuring the pulse:

The pulse is normally measured by palpating the radial, brachial and carotid pulses in this order. The radial pulse will give a good indication of the rate and rhythm, the brachial pulse character and the carotid pulse volume.

The pulse can also be recorded using an electronic sphygmomanometer (Dynamap) but this can only give a reading of the rate and not the volume, rhythm and character so should be avoided for routine examinations.

Procedure for recording the radial pulse:

Table 2: Procedure for Measuring and Recording the Pulse

Steps	Rationale
Introduction and patient identity check	It is important that you have the patient's full details if you are to pass on important information
Explain procedure to patient and gain consent	The patient must be comfortable and aware of what you are about to do
Place your index and middle fingers along the radial artery at the patient's wrist and press gently	
Count the pulse for 15 – 60 seconds	See previous notes
Record pulse rate and note any abnormalities found	

Assessing Respiratory Function

When assessing respiratory function there are 3 stages to be followed, they are:

1. inspection (Look)
2. palpation (Feel)
3. auscultation (Listen)

These skills will be taught at core level with percussion and auscultation to the level of identifying normal and abnormal sounds developed in other content specific modules. This section of the workbook will focus on the first stage of a respiratory examination – inspection.

The inspection of a patient's respiratory function involves determining the rate, rhythm and quality of their respirations. An adult's normal respiratory rate is usually about 12 to 20 breaths per minute with an even, coordinated and regular pattern. There may also be the occasional sigh and the ratio of inspiration to expiration is about 1:2. In an adult a respiratory rate of more than 20 breaths per minute is referred to as Tachypnoea, less than 10 breaths per minute as Bradypnoea.

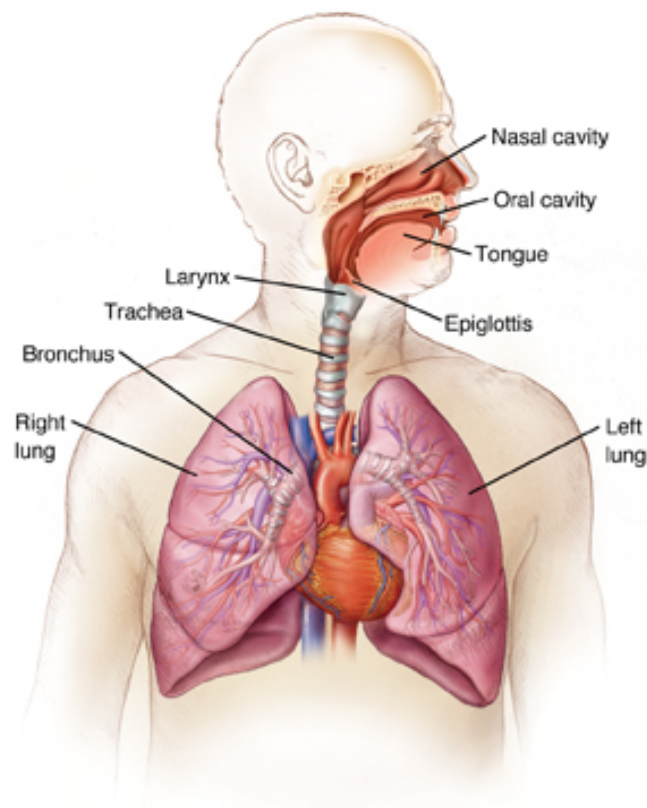


Figure 11: The anatomy of the respiratory system

Adult males, children and infants tend to use abdominal or diaphragmatic breathing whilst most adult females tend to use intercostal or chest breathing.

Being able to identify normal and abnormal respiratory patterns will come with experience and clinical practice however the focus of this section is on recording the patient's respiratory rate.

Recording a patient's respirations:

When an individual is aware that the respiratory rate is being observed it is very difficult not to alter the breathing pattern, therefore it is good clinical practice to follow the pulse rate with assessment of respiration.

Equipment:

Watch with second hand, patient's notes/TPR chart.

Procedure:

Table 3: Recording Respiratory Rate

Steps	Rationale
Introduction and patient identity check	It is important that you have the patient's full details if you are to pass on important information
Explain procedure to patient and gain consent	The patient must be comfortable and aware of what you are about to do
Without changing position of hand after recording the pulse, observe one complete breath cycle i.e. inspiration and expiration	It is very difficult not to change one's respiratory rate if aware someone is counting it. If the patient thinks you are still recording the pulse they are less likely to change the respiratory rate
After this one cycle, start to count the cycles, if regular count for 30 seconds and multiply by two. If irregular after 30 seconds count for a full minute	See previous notes
Record respiratory rate and note any abnormalities found	

Blood Pressure

Introduction

Adequate blood pressure is essential to maintain the blood supply and function of vital organs. High blood pressure is usually asymptomatic but leads to long-term complications, low blood pressure can cause dizziness, air hunger or collapse.

What is normal blood pressure?

'Normal' or 'acceptable' blood pressure varies with age, state of health and clinical situation. At birth, a typical blood pressure is 80/50 mmHg. It rises steadily throughout childhood, so that in a young adult it might be 120/80 mmHg.

As we get older, blood pressure continues to rise and a rule of thumb is that normal systolic pressure is age in years + 100. Blood pressure is lower in late pregnancy and during sleep.

From this, you can see that a systolic pressure of 160mmHg for an elderly man or 90 mmHg for a pregnant woman may be quite normal. To judge whether any particular reading is too high or too low, we must compare the reading with the 'normal' for that patient.

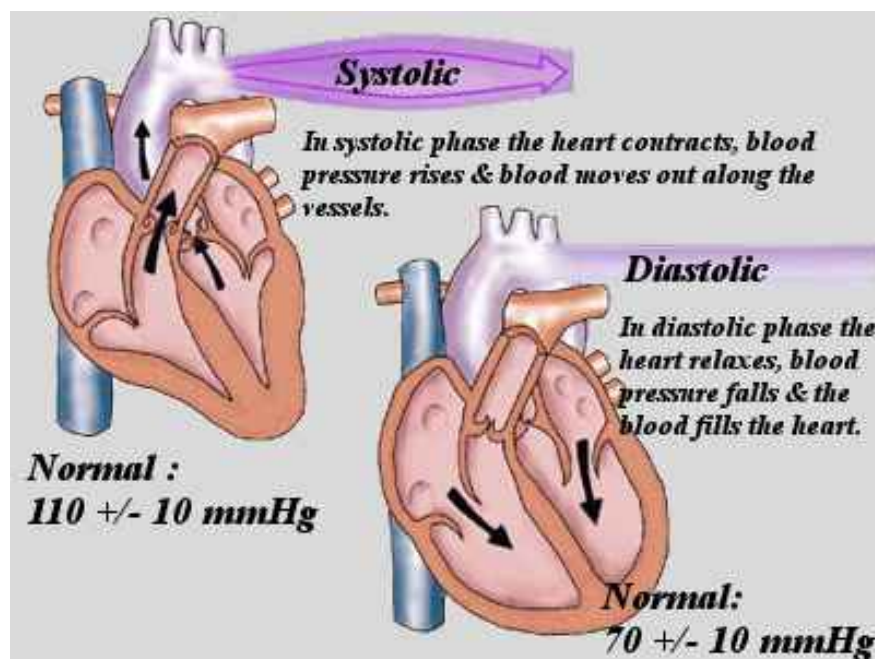


Figure 12: Systole and Diastole

Table 4: The procedure for recording blood pressure manually

Wash Hands/Use Gel	
Introduction and identification check	Check patients name band if worn
Explanation to patient:	Particularly that there may be discomfort when inflating the cuff Also that the measurement may be taken more than once
Consent to proceed with examination	
Patient should be sitting on a chair or on a bed and have been rested for at least one minute	
The arm should be horizontal and supported at the level of mid-sternum	
Position of cuff	Upper arm Bladder over brachial artery
Estimate systolic pressure by palpating artery and inflating cuff	
Place Stethoscope over brachial artery using diaphragm	
Inflate cuff to 30mmHg above estimated systolic pressure	
Reduce pressure at 2-3mmHg/sec	
Auscultate systolic (clear tapping sound starts) and diastolic sounds (sounds disappear)	
Record blood pressure in patient's notes or on hospital TPR Chart as directed	

The sounds heard while measuring blood pressure in this way are called the Korotkoff sounds, and undergo 5 phases:

1. initial 'tapping' sound (cuff pressure = systolic pressure)
2. sounds increase in intensity
3. sounds at maximum intensity
4. sounds become muffled
5. sounds disappear

Most inaccuracies result from the use of the wrong size of cuff. A narrow cuff wrapped round a fat arm will give an abnormally high reading, and vice versa. The World Health Organisation recommends a 14cm cuff for use in adults. Smaller cuffs for infants and children are available. In occasional patients, the reading obtained from one arm can be different from that obtained from the other arm. NICE/BHS advice is to use a large cuff when the upper arm circumference > 33cm

NICE/BHS advice for measurement of BP in patients with an irregular pulse (e.g. AF)

Because automated devices may not measure blood pressure accurately if there is pulse irregularity (for example, due to atrial fibrillation), palpate the radial or brachial pulse before measuring blood pressure. If pulse irregularity is present, measure blood pressure manually using direct auscultation over the brachial artery.



Activity: List five (5) indications and rationale for recording the blood pressure

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- 2.....
- 3.....
- 4.....
- 5.....



Activity: What considerations should be given to the sphygmomanometer, the cuff, and control valve before starting to record blood pressure?

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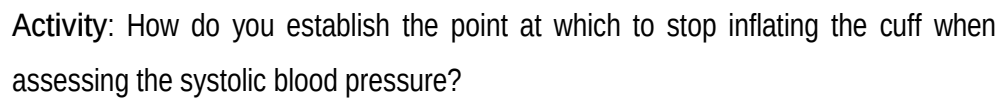
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NOTES – TPR and BP

New Courses Version 1

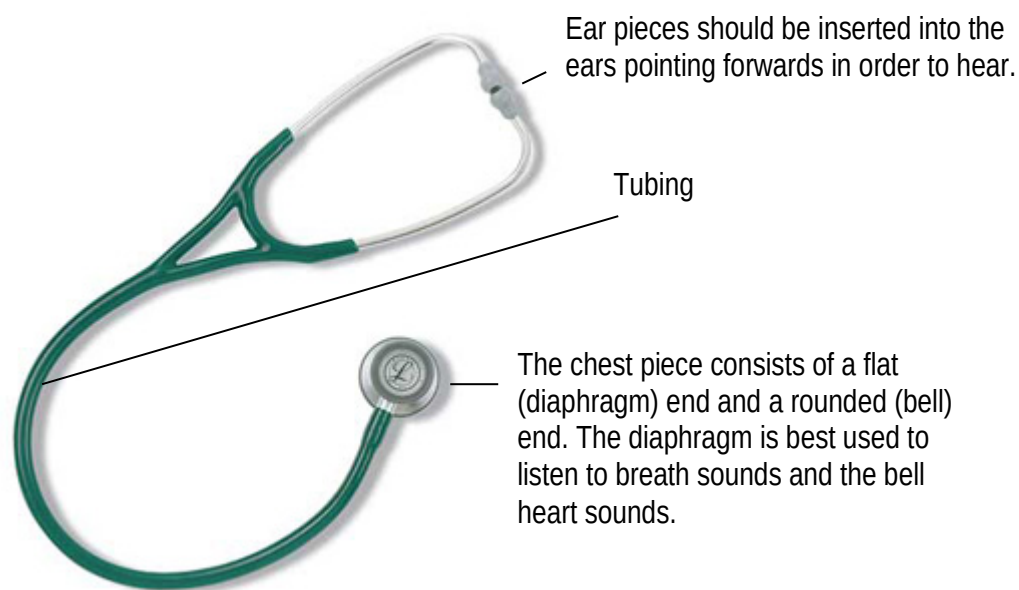
Examination of the Chest and Peak Expiratory Flow Rate:

- Discuss the process of carrying out an assessment of the respiratory system and breath sounds
- Demonstrate the process of assessment of breath sounds
- Discuss the importance of the assessment of breath sounds and implications of the more common abnormalities e.g. wheeze in asthma
- Demonstrate the correct use and implications of Peak Expiratory Flow in respiratory assessment

Examination of Respiratory System

Before carrying out an assessment of the clients breath sounds you should ensure that they are sitting comfortably in a chair as upright as possible. Ensuring privacy, ask the patient to remove any clothing to allow you access to the chest.

Stethoscopes



Although there are cheaper alternatives most doctors' use and recommend the Littmann II Stethoscope shown here (cost about £60) and usually a lifetime guarantee – unless someone steals it!

Equipment Needed

- Stethoscope
- Peak Flow Meter

General Considerations

- The patient must be properly undressed and gowned for this examination
- Ideally the patient should be sitting on the end of an exam table
- The examination room must be quiet to perform adequate percussion and auscultation
- Observe the patient for general signs of respiratory disease (finger clubbing, cyanosis, air hunger, posture)
- Try to visualize the underlying anatomy as you examine the patient

Inspection

- Observe the rate, rhythm, depth, and effort of breathing. Note whether the expiratory phase is prolonged
- Listen for obvious abnormal sounds with breathing such as wheezes
- Observe for retractions and use of accessory muscles (sternomastoids, abdominals)
- Observe the chest for asymmetry, deformity, or increased anterior-posterior (AP) diameter
- Confirm that the trachea is near the midline

Palpation

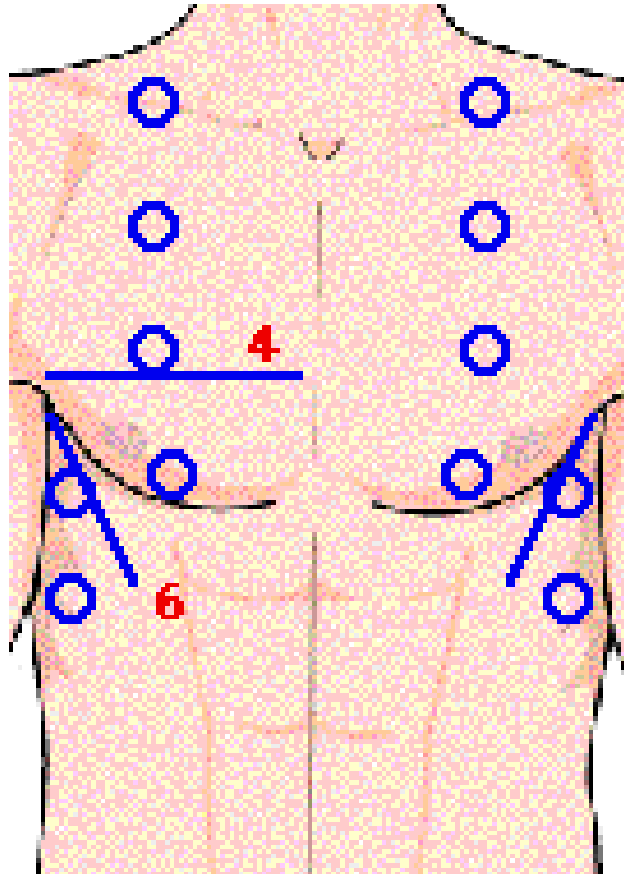
Identify any areas of tenderness or deformity by palpating the ribs and sternum. Assess expansion and symmetry of the chest by placing your hands on the patient's back with thumbs together at the midline, and ask them to breathe deeply.

Auscultation

Use the diaphragm of the stethoscope to auscultate breath sounds.

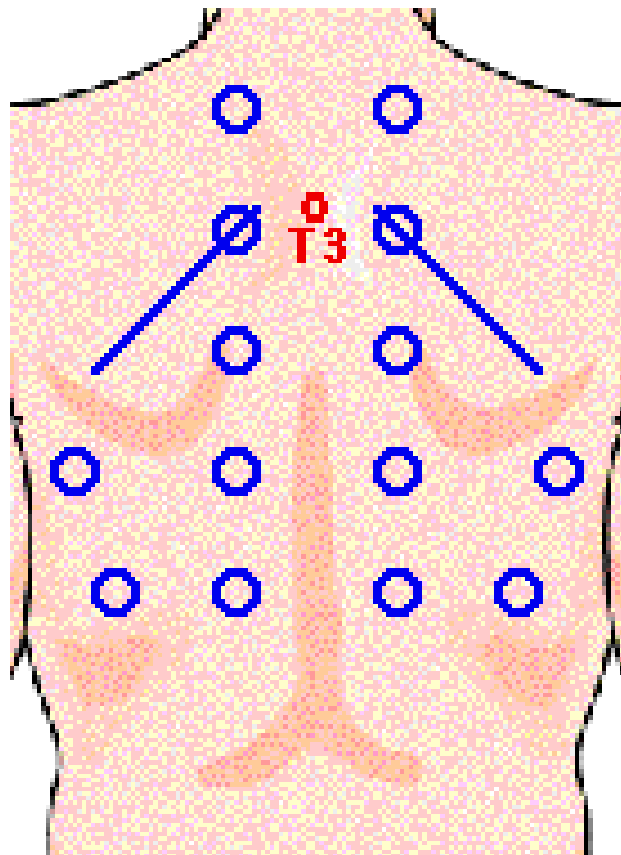
Posterior (Back) Chest

1. Auscultate from side to side and top to bottom using the pattern shown in the illustration. Omit the areas covered by the scapulae.
2. Compare one side to the other looking for asymmetry.
3. Note the location and quality of the sounds you hear.



Anterior (Front) Chest

1. Auscultate from side to side and top to bottom using the pattern shown in the illustration
2. Compare one side to the other looking for asymmetry
3. Note the location and quality of the sounds you hear'



Posterior (Back) chest

Same process as for anterior but remember to listen lower in order to hear sounds in the bases of the lungs.

Interpretation

Breath sounds are produced by turbulent air flow. They are categorized by the size of the airways that transmit them to the chest wall (and your stethoscope). The general rule is the

larger the airway the louder and higher pitched the sound. Vesicular breath sounds are low pitched and normally heard over most lung fields. Tracheal breath sounds are heard over the trachea. Bronchovesicular and bronchial sounds are heard in between. Inspiration is normally longer than expiration (I > E).

Breath sounds are decreased when normal lung is displaced by air (emphysema or pneumothorax) or fluid (pleural effusion). Breath sounds shift from vesicular to bronchial when there is fluid in the lung itself (pneumonia). Extra sounds that originate in the lungs and airways are referred to as "adventitious" and are always abnormal (but not always significant). (See Table 5)

Table 5 - Adventitious (Extra) Lung Sounds	
Crackles	These are high pitched, discontinuous sounds similar to the sound produced by rubbing your hair between your fingers. (Also known as Rales or creps)
Wheezes	These are generally high pitched and "musical" in quality. Stridor is an inspiratory wheeze associated with upper airway obstruction (croup).
Rhonchi	These often have a "snoring" or "gurgling" quality. Any extra sound that is not a crackle or a wheeze is probably a rhonchi.

Peak Flow Monitoring

The peak flow meter measures the patient's maximum ability to exhale, or peak expiratory flow rate (PEFR or PEF). Peak flow readings are higher when patients are well, and lower when the airways are constricted. From changes in recorded values, patients and doctors may determine lung functionality, severity of asthma symptoms, and treatment options.

Measurement of PEFR requires training to correctly use a meter and the normal expected value depends on a patient's sex, age and height. It is classically reduced in restrictive lung disorders such as asthma.

Peak flow meters are inexpensive, hand-held devices used to monitor pulmonary function in patients with asthma. The peak flow roughly correlates with the FEV1.

1. Ask the patient to take a deep breath
2. Then ask them to exhale as fast as they can through the peak flow meter
3. Repeat the measurement 3 times and report the highest reading.

The best of three readings is used as the recorded value of the Peak Expiratory Flow Rate. It may be plotted out on graph paper charts together with a record of symptoms or using peak flow charting software. This allows patients to self-monitor and pass information back to their doctor or nurse.



Activity: On the photos below indicate the placement of the stethoscope to listen to each of the areas of the lung that are required during an assessment of the client's breath sounds





NOTES – Breath Sounds and PEFr

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Examination of Eyes and Ears

The Eyes

General eye examination

The main role of primary healthcare professionals in dealing with eye conditions is to differentiate between minor conditions which are self-limiting and those which are serious and sight-threatening.

Procedure checklist general eye examination:

Task	Rationale
Explain to the patient what you are going to do and ask permission to proceed	
Make sure you examine in good light	
Wash your hands	It is an important aspect of good clinical practice to ensure that your hands are clean.
Ask patient to sit down and look straight ahead	
Gently pull down the lower lid and ask the patient to look upwards and to both left and right	This allows you to examine the conjunctiva.
Check visual acuity and record	See checklist below.
Assess pupils' accommodation and reaction to light	
Record your findings	
Wash your hands	

From Rutter, P, 2005 Symptoms, diagnosis and treatment A guide for Pharmacists and Nurses, Elsevier Churchill Livingstone, Edinburgh.

Visual acuity

This is a measure of central vision and must always be tested carefully as any loss can be serious. Record visual acuity carefully, especially in someone presenting with an eye injury. The aim of this test is to ascertain if there is any change in the person's normal vision. The BNF is an ideal tool for assessing visual acuity, although any book will do. Simply ask the person to look at the text and ask if their vision is normal (wearing glasses if required).

Once you have recorded visual acuity check the pupillary response to light. With the patient sitting, look first at both pupils, assessing whether they are the same size, make a note of this. Then cover the person's right eye with your hand for a few seconds and then remove your hand observing the pupils response to light. Repeat the test by covering the persons left eye

and note the size of the pupils and speed at which they constrict and whether each eye does so at the same rate. Make a note of your findings.

The next step is to assess normal eye movements. Sit face to face with the patient and hold a pen about a foot from them. Ask them to look at the pen and follow it with their eyes keeping their head still. You should then slowly move the pen from side to side, up and down watching the person's eyes moving during the test. Both eyes should move together during the test. Note your finding.

Red Eye

If a case of suspected red eye presents to a pharmacist it is important that the clinician understands the importance of signposting to an optometrist in the event that they are unsure of diagnosis.

In Scotland, community optometrists are able to provide emergency eye examinations to patients free of charge under General Ophthalmic Services (GOS). Many optometrists will have a practice policy on how to deal with these patients when they present, and it is important that you appraise yourself to what local arrangements are.

In addition to this, there are now Independent Prescribing Optometrists working in Primary Care practices who would be able to examine, diagnose and prescribe for many presenting eye conditions. If they are unable to prescribe for whatever reason (eg. beyond the scope of their practice or competency, undiagnosed eye problem or a more serious eye complaint) they have the ability to refer directly to ophthalmology for assessment and treatment. All non IP optometrists still have the ability to examine and diagnose an ocular condition, and therefore they may then request assistance from an IP Pharmacist or optometrist, (or even a GP) for prescribing of topical medications. Again they have the ability for direct referral in the event that it is not possible to reach a satisfactory diagnosis.

For the above reasons, it may not be appropriate for pharmacists to be involved in the examination of patients for ocular complaints but an understanding of common causes of red eyes will help you to signpost appropriately. It is found that often patients are given chloramphenicol eye drops for a multitude of conditions ranging from bacterial conjunctivitis (correct indication for use) to incorrect indications for use such as viral conjunctivitis, allergic

conjunctivitis, corneal ulceration, herpes simplex keratitis, and even sight threatening anterior uveitis. It is therefore important that a correct diagnosis is made prior to administration of ophthalmic drugs within the community, and therefore the partnership between optometry and pharmacy has never needed to be stronger.

Below are listed several ocular examination tests which are required to achieve a diagnosis.

They include:

Vision / Visual acuity (with most recent spectacles where appropriate): This is performed using a Snellen chart (or equivalent). It is not a test that will be readily available to high street pharmacists, and if present, it should be performed at the required distance for the relevant test chart. Some charts are for use at 3m others 6m, and if an electronic chart is used, it can be calibrated for the given working distance.

Anterior eye examination: This should ideally be conducted with a slit-lamp, which is not routinely available to pharmacists. It gives a binocular, magnified view of the patient's anterior eye structures, and facilitates a detailed examination. Examination by the naked eye or with use of a pen torch for illumination is not satisfactory. All optometry practices have this equipment present. The anterior eye examination involves a careful examination of the external eye and adnexa, corneal transparency, conjunctival tissue (palpebral and bulbar), anterior chamber (depth and clarity),

Pupil examination: This is essential in the differential diagnosis process, and abnormal pupillary reflex indicates that a more serious ocular condition may be present.

Intra-ocular pressure: The measurement of IOP is essential if there is any doubt over the presence of anterior angle closure (an acute presentation of one type of glaucoma) or in anterior uveitis. It is a good indicator of the presence of intraocular inflammation, and should only be undertaken by a trained professional.

Posterior eye examination: This may be required in more serious emergency eye complaints, and again should only be undertaken by a suitably trained professional.

Eye injuries, trauma, foreign bodies and things you are unsure about MUST always be referred on for medical opinions as a matter of urgency with the patient seen by an ophthalmologist as soon as possible.

The Ears

Introduction, Identification of Patient & Consent

Before examining the ears it is important to ask the patient if he/she has any ear-related symptoms (including discomfort, pain and discharge), is currently being treated for any ear-related problems or has previously had surgery involving their ears. Any symptoms or other relevant issues identified should be explored through taking a careful history from the patient. Be aware that the patient may have hearing impairment. Therefore explain each step of your examination & ensure that you speak slowly, at the same level & in full vision of the patient. Patients should be instructed to report any discomfort or pain experienced during the examination straight away. Following explanation, and if required demonstration, informed consent should be obtained.

Preparation of the Patient

Patients should be seated comfortably and advised to remain as still as possible during the examination. In the case of young children they are likely to need to be assisted with this by an appropriate adult e.g. the child could sit sideways on their carer's lap, with the carer using one hand to secure the child's hands and another hand to hold the child's head against their chest thus limiting movement.

Any hearing aids should be removed prior to exam

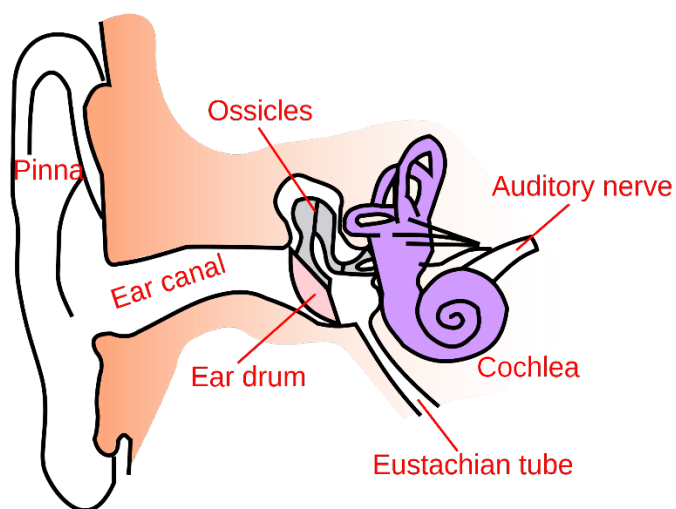
Standard infection control and hygiene procedures should be adhered to according to national and local policy. These must include hand washing before and after examination, covering of any breaks in the skin and appropriate cleaning or disposal of specula after use.



Hearing Aid

Examination

It is advisable to first examine the ear least likely to have a problem before examining the other ear. If at any point the patient experiences undue pain, bleeding or other symptoms during the examination the procedure should be stopped and medical attention considered.



External Ear Examination

Perform a general inspection of the patient's external ear and face. Do you notice a hearing aid or the presence of a cochlear implant? Examination of the skin around, behind and adjacent to the pinna may detect signs of previous surgery or inflammation. (e.g. a post-auricular scar may indicate mastoid surgery). Examination of the pinna includes viewing the top and rear in addition to the ear canal entrance. Do you notice any structural abnormalities or skin lesions?



Cochlear Implant



Post auricular scar

Ear Canal and Tympanic Membrane Examination

The ear canal and tympanic membrane should be examined using an otoscope to provide appropriate magnification and illumination. Make sure your otoscope is working prior to use and that the batteries aren't run down. A dim light will make your examination difficult and incomplete. Use the biggest otoscope speculum that you can fit in to the ear canal. Small earpieces may be easy to use but will reduce the amount that you will see on inspection.

Safety points!

- ✓ Always hold the otoscope in the hand of the same side as the ear you are about to examine.
- ✓ The otoscope should be held in a 'pencil type' grip. The 'pencil type grip' allows the side of your hand to rest on the patient's head - reducing the risk of trauma if the patient suddenly moves (*especially in*

children!)

- ✓ Hold the otoscope with your hand placed near to the eyepiece. This limits the transference of movement from your arm to the tip of the otoscope which could cause discomfort
- ✓ Ensure that the speculum is attached to the otoscope securely and hygienically
- ✓ It is important to position yourself in a stable position to minimize the risk of harming the patient or yourself through loss of balance during the examination
- ✓ The bony part of the ear canal is particularly sensitive and the surrounding skin is vulnerable to trauma.



Carefully and gently manipulate the pinna, pulling it backwards and upwards to encourage 'straightening' of the ear canal. Slowly insert the tip of the speculum (attached to the otoscope) into the ear canal while observing the ear. The Normal Tympanic Membrane (ear drum) should appear pearly grey and concave as shown below:



Viewing through the viewfinder of the otoscope consider the following questions:

- Are there any signs of inflammation?
- Is there an accumulation of wax in the canal? It is usual to find wax in almost all ears however, wax is not normally present in the inner third of the ear canal.
- Can you detect any foreign bodies in the canal?
- Are there any notable abnormalities such as discharge, swelling or bleeding in the ear canal?

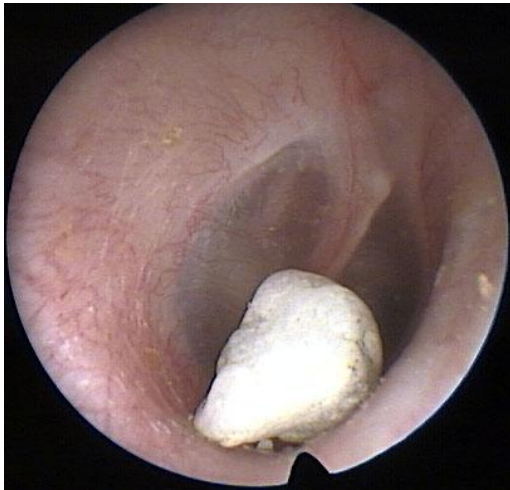
On identifying the tympanic membrane consider the following questions:

- Are there any signs of inflammation around the membrane?
- Is there any swelling or bulging of the membrane?
- Is the membrane intact or can you identify perforation?
- Can you identify any scarring of the membrane?

Abnormal Findings



Ear wax



Foreign bodies in ear canal



Otitis Externa



Acute Otitis Externa

Fluid bubbles behind an intact tympanic membrane may cause 'bulging' of the membrane and are indicative of infection:



Slowly retract the otoscope from the ear. Change the speculum on the otoscope and examine the other ear. Finally document what was seen in both ears, the condition of the tympanic membrane and the external auditory meatus.

Remember to consider your examination findings with those gained from your patient consultation. Patients may present with signs and symptoms such as reduced hearing, redness, swelling, tinnitus, dizziness, earache or weeping ears.

Suggested Reading

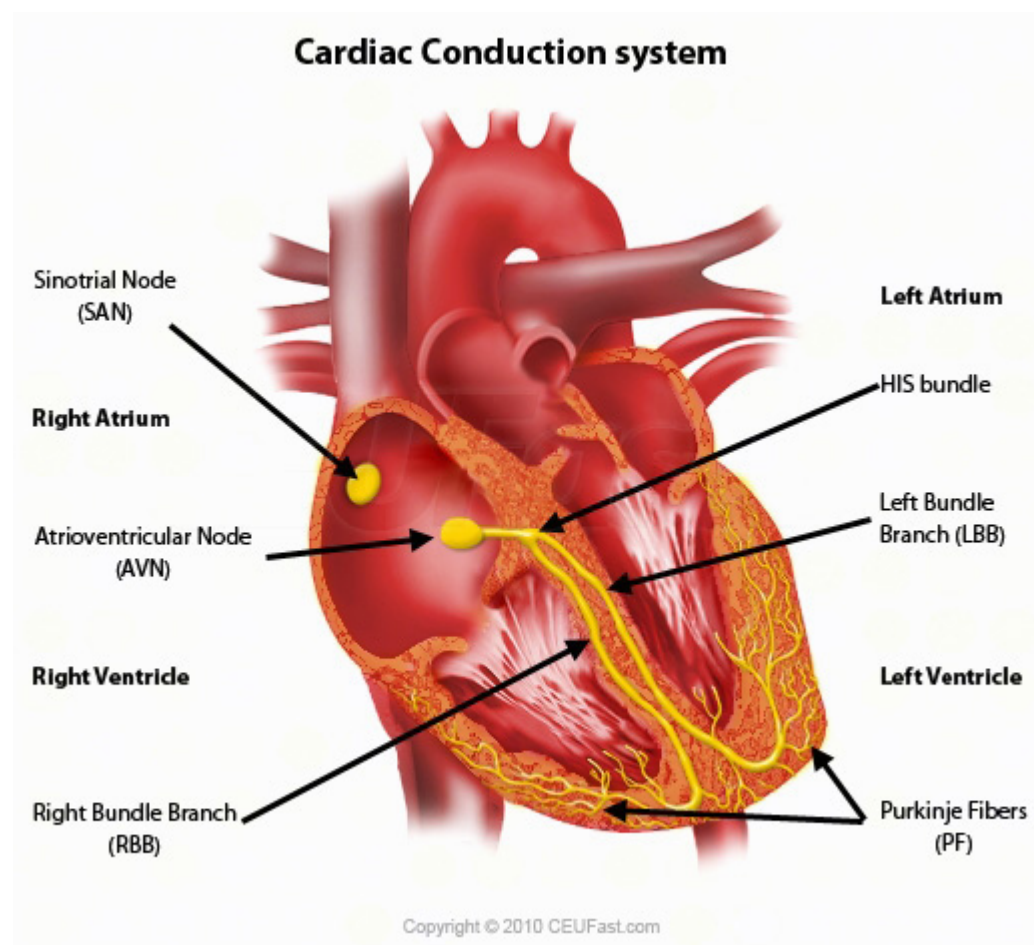
British Society of Audiology 2010 Recommended Procedure Ear examination

Many thanks to Tracy Smith MSc R (Aud) Lead Audiologist, Northern Health, B.C. for sharing her expertise.

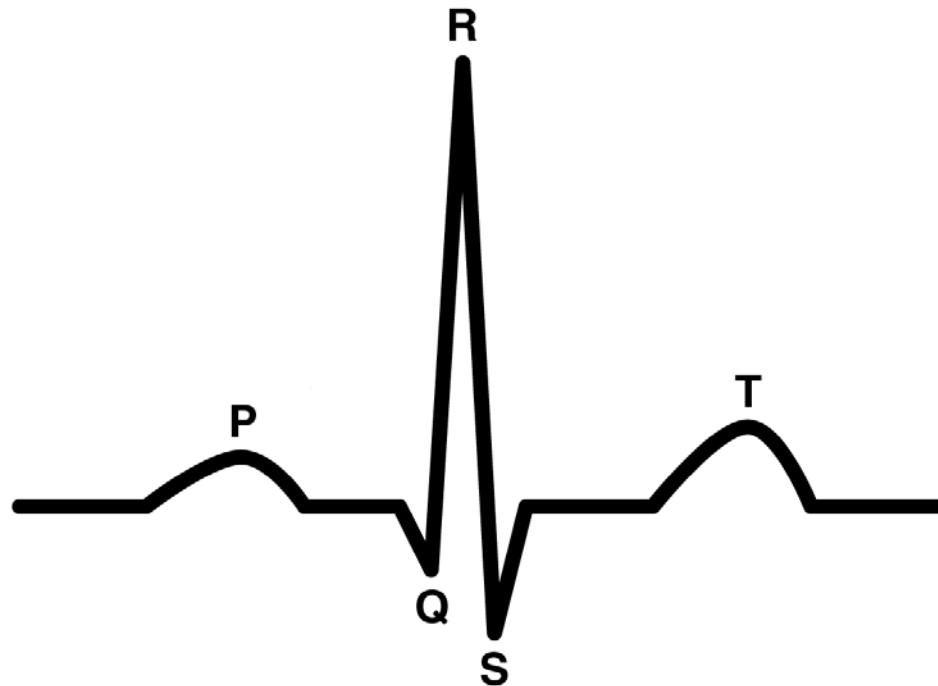
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Basic Electrocardiography (ECG) Assessment

Before thinking about the interpretation of an ECG it is crucial that you have an understanding of the electrical conduction system of the heart. The heart is basically a muscular pump and the contraction of any muscle is associated with electrical changes known as depolarisation. These electrical changes can be detected by electrodes attached to the chest. Although the heart has four chambers (two atria and two ventricles) from an electrical point of view it is considered as having only two as the atria contract together and then the ventricles contract together. The yellow area on the diagram below indicates the wiring diagram of the heart or the conduction system. The electrical discharge system is instigated in a special area of the right atrium known as the 'Sinoatrial node'. The charge then spreads through the atrial muscle fibres and there is a slight delay as it spreads through the 'Atrioventricular node'. After this the charge spreads rapidly through the 'Bundle of His' and then down the septum between the ventricles into the right and left bundle branches.



The travel of the pathway can be shown as a graph on the ECG and is used to identify problems with heart rate and rhythm. The outline below is the shape of a normal ECG.



Agateller for Wikipedia
Public Domain

The P wave is caused by the contraction of the atria, as the ventricular mass is greater this leads to the QRS complex and the T wave is the result of the return of the ventricular mass to its resting state.

Approaching the interpretation of an ECG

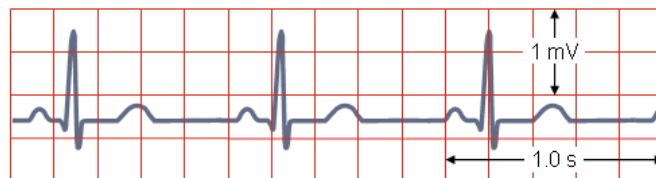
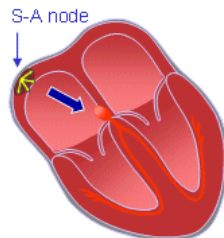
When one is interpreting an ECG it is important to think in the following terms:

1. Are there P waves visible?
2. Do they come before the QRS complex?
3. Is the QRS complex broad or narrow?
4. Are T waves visible?
5. Are the complexes regular or irregular?
6. Is the rate fast or slow?

The normal pulse rate of 60-100 beats per minute in an adult would show as the following on an ECG rhythm strip:

NORMAL SINUS RHYTHM

Impulses originate at S-A node at normal rate

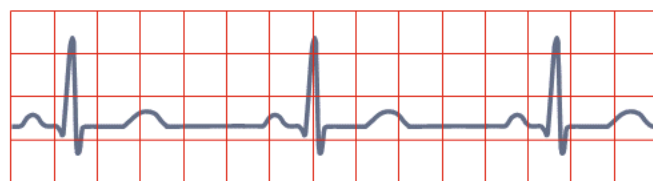
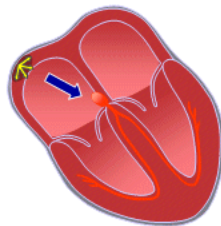


All complexes normal, evenly spaced. Rate 60 – 100/min.

A pulse rate of less than 60 beats per minute is known as Bradycardia and would look like this:

SINUS BRADYCARDIA

Impulses originate at S-A node at slow rate

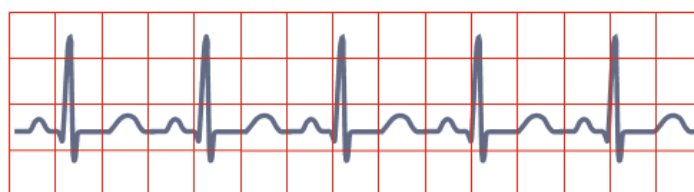
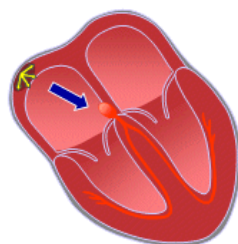


All complexes normal, evenly spaced. Rate < 60/min.

A pulse rate of more than 100 beats per minute is known as Tachycardia and looks like this:

SINUS TACHYCARDIA

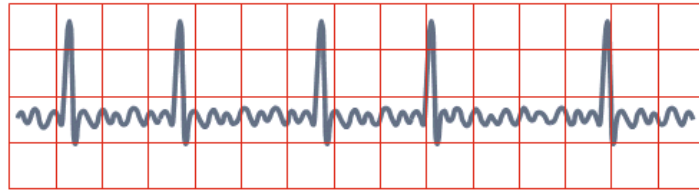
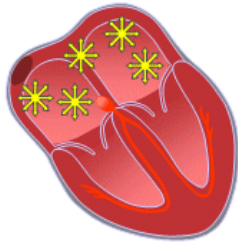
Impulses originate at S-A node at rapid rate



All complexes normal, evenly spaced. Rate >100/min.

ATRIAL FIBRILLATION

Impulses have chaotic, random pathways in atria



Baseline irregular, ventricular response irregular

ECG interpretation beyond the conditions shown above is a complex intervention which requires daily practice and is most often used as a diagnostic tool for example in someone presenting with chest pain or acute myocardial infarction (heart attack). Practitioners who are likely to require these advanced skills would be best speaking to their local Cardiology Department about developing the skills.

Interpreting Common Blood Results

Please note that normal ranges may vary depending on the standard range used in different laboratories and that the following are a guide only. Always check the normal ranges given in your particular area or region.

Haematology tests: these determine specific blood levels:

- WBC 4-11 ($\times 10^9/l$)
- RBC Male: 4.5-5.5 $\times 10^{12}/l$ Female: 4-5 $\times 10^{12}/l$
- Hb Male: 13.5-18g/dl Female: 11.5-16.5g/dl
- Platelets 150-400 ($\times 10^9/l$)
- INR

White blood cell (WBC) count and differential WBC count can be used to diagnose infection and inflammation, and to monitor response to chemotherapy or radiotherapy. There are five major types of WBC: Neutrophils; Lymphocytes; Monocytes; Eosinophils; Basophils.

Red blood cell (RBC) count The RBC count helps to assess the blood's oxygen capacity and diagnose anaemia, protein deficiency and dehydration.

Haemoglobin (Hb) Haemoglobin transports oxygen. It is the main component of RBCs and a good indicator of anaemia.

Platelets Platelets or thrombocytes promote coagulation by providing phospholipids to the intrinsic clotting pathway, helping to form a plug for vascular injuries.

Common blood chemistry tests

Blood chemistry tests help evaluate respiratory and metabolic status. The following tests are covered: urea and electrolytes (sodium, potassium and creatinine); Liver function tests (bilirubin, alkaline phosphatase, albumin, aspartate aminotransferase). Normal ranges are:

- Urea 3.5-8.8mmol/l
- Sodium 135-145mmol/l
- Potassium 3.5-5.0mmol/l
- Creatinine Mild renal impairment: 150-300µmol/l Moderate renal failure: 300-700µmol/l Severe renal failure: 700µmol/l
- Bilirubin <18µmol/l; total bilirubin is 3-20µmol/l; indirect bilirubin is 0-14µmol/l

Urea Urea is a product of amino acid metabolism and is largely excreted by the kidneys.

Raised levels can be an indication of kidney conditions or dehydration.

Sodium (Na⁺) Sodium affects water distribution, maintains osmotic pressure of extracellular fluid, promotes neuromuscular function and maintain acid-base balance and influences chloride and potassium levels.

Potassium (K⁺) Potassium is the major intracellular cation.

Creatinine Creatinine is a nitrogenous metabolic substance in muscle and blood and excreted in the urine. The serum creatinine test provides a sensitive measure of renal damage because renal impairment is virtually the only cause of creatinine elevation.

Bilirubin This is the main pigment in bile and the major product of haemoglobin catabolism. Elevated bilirubin may be indicative of liver disorders.

Cholesterol A steroid alcohol found in animal fats and oils, bile, blood, brain tissue, milk, egg yolk etc. High levels of total serum cholesterol are associated with a high risk for coronary artery disease.

Thyroid stimulating hormone (TSH) Secreted by the anterior pituitary, TSH stimulates an increase in the size, number and activity of thyroid cells, and release of tri-iodothyronine (T3) and thyroxine (T4).

Blood glucose This is used to detect diabetes. Glucose is present in blood for basic fuel, and is stored in the liver and muscles as glycogen. It is derived from carbohydrates in the diet, but in conditions of shortage can be synthesised from fats or proteins.

Normal ranges are: Glucose 4.5-5.6mmol/l

Diagnosis of diabetes mellitus: Symptoms (i.e polyuria, polydipsia and unexplained weight loss PLUS: random venous plasma glucose: ≥ 11.1 mmol/l OR fasting plasma glucose: ≥ 7.0 mmol/l OR 2-hour plasma glucose concentration: ≥ 11.1 mmol/l, 2 hours after 75g anhydrous glucose in an oral glucose tolerance test.

Cholesterol and lipids

- Total serum cholesterol 3.9-7.8mmol/l
- Very low density lipoprotein 0.128-0.645mmol/l
- Low density lipoprotein 0.128-0.645mmol/l
- High density lipoprotein Male: 0.7-2.0mmol/l; female: 0.95-2.15mmol/l
- Total lipids 4.0-10g/l

Thyroid function

- Total serum thyroxine 60-160nmol/l
- Total serum triiodothyronine 1.2-3.1nmol/l
- Free serum thyroxine 13-30pmol/l
- TSH 0.5-5.5mIU/l