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NHS

The PocketBook

A tool for the assesment of the acutely ill adult.

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This booklet follows the A to E assessment system utilised within the ALERT™ course. It is a quick and easy-to-use reference guide that will increase knowledge and confidence. Helping nursing staff to quickly identify abnormal vital signs and act promptly to restore normality to patients.

Name

Ward/Department

ACKNOWLEDGEMENTS

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Foreword

Recent publications have highlighted the importance of effective early management of acutely ill patients in ensuring better outcomes (NCEPOD, 2005). This supports previous literature that highlighted the need for 'breaking down barriers between specialities and professions to focus on the needs of patients' (DOH '00, '01, '05).

Quality of care can be improved where there is effective early recognition of critical illness and where management of the acutely ill patient includes, prompt delivery of fluids and oxygen therapy. Acute Trusts continue to develop a variety of strategies based upon Critical Care Outreach teams, or similar, to ensure that ward staff are supported in delivery of care activities for those patients deemed 'at risk' and whose level of care is increasing. The development of track and trigger systems like EWS systems (Early Warning Scoring) will prove to be of value to ward-based nurses and other healthcare professionals in identifying those at risk; However their success will only prove effective by the timely actions from all involved in the care process.

With an ever changing workforce we recognise that education is a key component to supporting staff, hence this booklet is intended to complement all the education and training opportunities being offered to staff by Trusts and developing 'Outreach' services.

The aim of all the education programmes linked to the Critical Care agenda is:

- Early recognition of physiological deterioration
- Prompt treatment to prevent spiralling decline into acute illness

This booklet follows the assessment system, A to E utilised within the ALERT™ course (Acute Life threatening Events Recognition & Treatment). It provides information that is clear and concise to serve as a quick and informative day-to-day guide; The key message being that any abnormal vital signs should be reported and acted upon promptly to restore normality and prevent deterioration.

We hope that by referring to this booklet it will help increase personal knowledge and confidence in identifying patients' status and deliver simple effective measures that meet their needs when delivering care.

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A Airway

A1 How to determine that the patient's airway is clear.

- LOOK at the patient.
- LISTEN for respiration.
- FEEL for the patient's vital signs.

Spend time assessing your patient's airway and ask:

- Can the patient talk clearly?
- Can the patient cough and swallow?

If the answer is yes to both of these questions the patient's airway is clear and protected.
If the answer is no to one or both the patient is at risk of airway obstruction or compromise.

A2 Causes of airway obstruction:

1. Position of head and neck in an unconscious/drowsy patient.
2. Secretions / Foreign body / Inhaled object (hard boiled sweet, lump of food, tongue).
3. Swelling of the airways (burns, anaphylaxis, trauma).
4. Blocked tracheostomy tube due to;

- Thick/copious secretions.
- Occluded/stuck speaking valve.
- Poor positioning of tracheostomy (against tracheal wall).

The obstruction may be partial or full. Partial obstruction will cause the patients breathing to be difficult and probably noisy. In full obstruction the chest and abdomen may still be moving in an attempt to breathe but no air will be moving in or out of the lungs.
Unconsciousness will occur very quickly.

A3 Taking care of the airway.

If there is a problem with the patient's airway **CALL FOR HELP** and ensure the following actions are taken.

- Use airway opening manoeuvres such as 'head tilt, chin lift' especially for a patient who is becoming drowsy / unconscious.
- Ensure the patient is in the best position for maintaining an open airway, e.g. upright if the patient is still conscious and able to cough or recovery position if the patient is drowsy / unconscious.
- Administer high flow oxygen (see page 33).
- Consider abdominal thrusts if complete obstruction with a foreign body is suspected.
- Use suction if needed to remove oropharyngeal secretions.
- Use airway adjuncts if needed (e.g. guedal airway).

IF THE PATIENT HAS A TRACHEOSTOMY:

- Use suction to clear the lumen of the tube, (noting that the catheter should pass all the way down the tube easily).
- If an inner tube with speaking valve is in place remove it, (speaking valves can become clogged with secretions).
- Replace with a clean inner tube, (if the tracheostomy is double lumen).
- Ensure the tracheostomy tube is aligned centrally.
- Renew any filters/HME devices within the oxygen system (filters may become clogged with secretions or moisture).
- Ensure the tubing supplying oxygen is free from any obstruction (tubing may become full of secretions or water).
- Consider changing the tracheostomy tube if the obstruction cannot be relieved.
- Remember to ensure the patient with a tracheostomy receives humidification to prevent drying and clogging of the tube.

Ensure help has arrived and that decisions are taken about how to continue protecting the airway and that the reason for the problem is investigated.

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B Breathing

B1 How to determine that the patient's breathing is normal.

- LOOK at the patient.
- LISTEN to the patient's breathing.
- FEEL for the patient's vital signs.

Assessing breathing is about more than just counting respirations. It should also involve looking at the patients' general condition and take account of pre-existing respiratory problems. Simple observations are vital in assessing respiratory status.

Spend time counting and assessing your patient's breathing and ask:

- Is this a normal rate? (9 – 14 breaths per minute).
- Is this a normal pattern of breathing? (Equal and symmetrical movement of chest wall).
- Is the breathing gentle? (no use of accessory muscles, or flaring of nostrils or pursing of lips).
- Is the patient's breathing quiet, if not what noise is he making? (wheeze, stridor, bubbling).
- Is the patient calm and relaxed but alert? (No agitation, restlessness or drowsiness)?
- Can the patient speak in full sentences?
- Are the patients' mucous membranes pink?
- Can the patient cough and expectorate? (Note the colour amount and stickiness of secretions).

If the answer to all the questions is YES then the patient is breathing normally.

If the answer to any of the questions is NO then the patient is having some difficulty breathing.

Answering these initial questions will provide a very good indication of how well the patient is breathing.

Other assessments of breathing include:

- Listening to the patient's chest with a stethoscope.
- Peak flow.
- Pulse Oximetry.
- Arterial Blood Gases (see Section E1 page 29)

B2 Causes of breathing difficulties.

- Airway problems (see section A)
- Asthma
- Severe chest infection
- Acid Base disorders
- Hypovolaemia
- Neurological problems
- Pulmonary Oedema
- COPD

B3 Caring for someone who has difficulty breathing.

If there is a problem with the patients breathing **CALL FOR HELP** and ensure the following actions are taken.

- Give high flow oxygen to achieve prescribed percentage and to achieve SpO2 90% or above. Supplemental oxygen is vital to maintain adequate oxygen levels in the tissues and organs when a patient is experiencing breathing difficulties.
- Optimise the patient's position. Sit them up in a well-supported position. This allows more lung area to take part in gas exchange.
- Encourage the patient to breathe deeply, cough and expectorate. This may mobilise secretions and allow more oxygenated air to reach the alveoli.
- Assess the patient's pain level and treat appropriately. Pain can prevent adequate breathing and coughing.

CONTINUED OVERLEAF

- Consider nebulisers as prescribed.
- Stay with the patient to reassure, continue observing and ensure that oxygen is being given.
- Consider using a bag/valve/mask device to assist breathing.
- Assess the patient's Circulation. (See Section C4 page 15)

Ensure help has arrived and that decisions are taken about how to continue supporting the breathing and that the reason for the problem is investigated!

NB. It is important to note that some patients with severe pre-existing COPD cannot tolerate very high levels of oxgyen and that their ability to breathe may be compromised. This can be difficult to judge but the need to maintain adequate oxygen levels is paramount. When administering oxygen it is vital to observe respiratory rate and pattern closely. An arterial blood gas (ABG) sample should be obtained promptly whilst oxygen is being delivered and parameters agreed for further therapy.

B4 Other assessment tools for breathing.

PEAK FLOW

The patient blowing out into a peak flow meter following a deep inspiration assesses peak flow. The normal adult peak flow reading is 400 – 650L/min. If the peak flow reading is less than average and is reducing, this suggests that the patient is losing the ability to take deep breaths and the volume of air able to move in and out of the lungs is lessening. This may be due to fatigue, increasing bronchospasm or musculoskeletal problems.

PULSE OXIMETRY

Pulse oximetry is simply a non-invasive method of assessing the oxygenated haemoglobin and pulse rate by measuring the absorption of differing wavelengths of light across a pulsatile arterial bed.

When using a pulse oximeter several factors need to be considered to ensure an accurate reading.

- Choice of an appropriate probe. An earlobe probe may be more appropriate in a restless or agitated patient or to prevent movement artifact or in a patient with peripheral shut down, to ensure the probe is on a pulsatile bed.
- If a finger probe is used care should be taken that it is not applied to a limb with a BP cuff in situ or a high volume IV infusion running.
- It is important that the light source and photo detector are aligned to allow the passage of light through an arterial pulsatile bed.
- The probe site should be changed every four hours or according to manufacturers instructions. Prolonged use of a single site may result in tissue damage due to pressure.
- Additional taping must not be applied to probes as this may result in inaccurate recording or ischaemia to the finger.
- Bright light may interfere with the accuracy of the reading. It may be necessary to cover the limb to exclude light.
- Nail varnish will impede the passage of light so it needs to be removed.
- If the pulse oximeter you are using has a signal bar or waveform, this should move in time with the patients pulse.

TAKING A PULSE OXIMETER RECORDING

- Inform the patient
- Seek consent
- Select the probe
- Apply the probe
- Take the recording
- Set alarm limits if continuous monitoring is used.

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C Circulation

C1 How to determine that the patient has an adequate circulation.

- LOOK at the patient.
- LISTEN to the patient.
- FEEL for the patient's vital signs.

Spend time assessing your patient's circulation and ask:

- Is the radial pulse strong?
- Is the capillary refill time ≤2 seconds?
- Does the saturation monitor 'pick up'?
- Is the urine output greater than 0.5mL/kg/hr?
- Is the systolic blood pressure above 90mmHg? (This may still be very low for certain patients)
- Is the patient's pulse rate lower than the systolic blood pressure?
- Has the patient passed the airway and breathing assessment with no problems?

If the answer to all the above questions is YES then it is likely that the patient has an adequate circulation.

If the answer to any of the questions is NO then the patient is very likely to have some circulation problems.

Answering these initial questions will provide an indication of how adequate the circulation is.

Assessments of circulation include;
- Pulse
- Heart rate
- Blood pressure
- Capillary Refill Time
- Urine output
- Central Venous Pressure Measurement
- Consciousness

C2 Causes of inadequate circulation.

Any condition that causes increased respiratory rate e.g:
- Pneumonia,
- Exacerbation of Asthma

Any condition that causes inability to take oral/ng fluids e.g:
- Swallowing difficulties
- Paralytic ileus
- Vomiting
- Pre-operative 'nil orally' orders
- Sedatives, reducing level of consciousness
- Poor day to day fluid management

Any condition that leads to excessive fluid loss e.g:
- Haemorrhage,
- Diarrhoea, (excessive ileostomy or colostomy activity)
- Vomiting, (excessive NG drainage)
- Burns
- Drains

Any condition that leads to vascular dilation e.g:
- Sepsis
- Spinal injury
- Epidural medication
- Certain drugs

Any condition that leads to fluid movement out of the systemic circulation e.g:
- Electrolyte balance disturbances
- Protein depletion

Any condition that causes failure of the 'pump' (heart) e.g:
- Left ventricular failure
- Congestive Cardiac Failure
- Cor pulmonale
- Dysrythmias

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C3 Caring for someone who has inadequate circulation.

If there is a problem with the patient's circulation **CALL FOR HELP** and ensure that the following actions are taken:

- Ensure Airway and Breathing have been assessed and adequately treated (See sections A and B).
- Having assessed the patient's fluid status accurately, give IV fluids if indicated as prescribed and observe for effect.
- Patients with no history of cardiac failure should have a 500mL fluid bolus as prescribed over 10 minutes. This may need to be repeated to restore vital signs and urine output to normal.
- Patients with a history of cardiac failure or at risk of cardiac failure may still need fluid to restore circulating volume. In this instance a bolus of 200mLs as prescribed should be given and the effect observed (listen to the chest for crepitations after each bolus). This may need to be repeated to restore vital signs and urine output to normal.
- If successive fluid boluses do not restore vital signs to normal the patient will need further assistance (such as CVP monitoring and potential inotropic therapy) to ensure an adequate circulation. Ensure more senior medical help is contacted for urgent attendance.
- It is vital to discover the cause of inadequate circulation and treat this cause immediately and appropriately to prevent further deterioration.

NB. **Call for help early if a patient is showing any signs of inadequate circulation and poor response to prescribed treatments.**

C4 Assessment tools for circulation.

PULSES

WHAT IS A PULSE?

It is the pressure wave in an artery wall following a beat of the heart.

HOW TO EXAMINE PULSES

Pulses can be palpated using finger pressure at various sites i.e. radial, brachial, carotid, femoral, post tibial, dorsalis pedis.

The pulse should be assessed for:
- Presence, Rate, Volume, Regularity, Equity and Symmetry.

Strong bounding pulses can be a sign of:
- Hypertension.
- Increased cardiac output.
- Sepsis.
- Hypoxia.
- Hypercapnia.

Weak thready pulses can be a sign of:
- Decreased cardiac output.
- Low blood pressure.
- Peripheral vascular disease.

The pulse can provide a lot of simple or vital information about a patient's circulation. It can indicate not only how the heart is functioning, but also forms an essential tool to assess the peripheral circulation.

HOW TO ASSESS PERIPHERAL CIRCULATION

By FEELING peripheral pulses you will be able to identify if any of the above apply. In addition cardiovascular collapse often includes cool and pale digits or limbs, by examining patient's limbs you will be able to

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decide if anything is wrong. Practice ASSESSING patients peripheries, you will be able to determine if the patient is:

- Hot.
- Cool.
- Pale.
- Flushed or has cyanosed extremities.

CAPILLARY REFILL TIME (CRT)

TIP TO ASSESS PERIPHERAL CIRCULATION QUICKLY!

To help you assess peripheral circulation accurately, apply pressure to a patient's fingertip on a level with their heart for 5 seconds, then release that pressure and count the number of seconds it takes the circulation to return. Normally this should be ≤ 2 seconds. This is called capillary refill time (CRT).

HEART RATE (HR)

- Normal rate 60 –100 beats / minute.
- Bradycardia <50 beats / minute.
- Tachycardia >110 beats / minute.

Bradycardia can be caused by:

- Increased vagal tone.
- Raised intracranial pressure.
- Previous cardiac problems, i.e. Myocardial Infarction and heart block.
- Chemical influences, e.g. beta blockers.

Tachycardia can be caused by:

- Pyrexia.
- Pain.
- Anxiety.
- Hypovolaemia.
- Sepsis.
- Chemical influences.

At high rates the heart chambers are unable to fill effectively, this causes the patient to become hypotensive and if this state is left to continue the patient is potentially at risk of cardiac arrest or even death.

HEART RHYTHM

The natural conduction system of the heart may be affected by critical illness and as such you may need to check for further information by examining the patient's:

- Pulse.
- Blood pressure.
- Blood results, i.e. potassium and magnesium, which can both cause abnormalities.
- Heart apex beat that can be listened to between the 4th and 5th intercostals space, with a stethoscope to assess rhythm.
- ECG.

NB. **All patients are individuals and should be examined as such. It may be normal for some patients to have a low or high heart rate or an abnormal cardiac rhythm and further examination of the cardiovascular system may be needed to reveal abnormalities.**

BLOOD PRESSURE (BP)

WHAT IS BLOOD PRESSURE?

Blood pressure is a product of the patient's cardiac output and systemic vascular resistance (SVR). Consequently, a fall in BP can only result from a fall in cardiac output, a fall in SVR or a fall in both.

BP = cardiac output x systemic vascular resistance.

- Cardiac output measures the amount of blood ejected from the left ventricle/minute.
- Systemic vascular resistance is caused by the vessel walls constricting or dilating, which alters blood pressure.

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HOW TO MEASURE BLOOD PRESSURE

- Non-invasively with a stethoscope and sphygmomanometer.
- Automatic non-invasive blood pressure monitor (NIBP).
- Invasively via an arterial monitoring system, normally within a critical care environment.

HOW DOES NIBP WORK?

This machine listens for vibrations caused by the flow of blood within the vessel. When the cuff inflates it stops the blood flowing in the vessel. As the cuff deflates the module listens for the returning flow. This is then displayed as a result in numerical form. The machine can usually be programmed for either one off readings, or a timed frequency from 5 minutes upward to 4 hourly. In practice NIBP is often inaccurate in the presence of very high, very low or irregular rhythms.

HOW DOES INVASIVE MONITORING WORK?

An arterial catheter is placed within a systemic artery (i.e. radial, brachial, femoral) to facilitate continuous accurate data that records beat by beat changes in blood pressure, through a digital figure and monitored arterial waveform.

This form of monitoring occurs within Intensive Care and High Dependency Units to obtain accurate data about blood pressure in a patient who is haemodynamically unstable.

CENTRAL VENOUS PRESSURE (CVP)

WHAT IS CENTRAL VENOUS PRESSURE?

CVP is measured following insertion of a line usually into either the subclavian or internal jugular vein, which is advanced along the vein until its' tip is near the right atrium. CVP is therefore reflective of the pressure in the right atrium. The 'normal' CVP is approx. 5-15cm H2O (3-10 mmHg), although considerable variations exist for individuals and is also dependent on the zero point. In recording central venous pressure, it is often not the one off measurement that is important but the trend of subsequent measurements. Are they going up or down?

NB. To convert pressure readings from mmHg (used in electronic CVP pressure monitoring), to cm H2O (used with CVP manometer) or visa versa use the following formulas:

mm Hg x 1.36 = cm H2O

cm H2O ∏ 1.36 = mm Hg

WHAT DOES CVP TELL US?

- It gives us an indication of the blood volume in the patient, and if the patient needs fluid replacement or fluid reduction.
- It tells us if the heart is working well, by indicating right ventricular function.
- Helps us recognise early signs of patients in congestive cardiac failure (CCF).
- Reflects response to treatments.

CAUSES OF HIGH CVP READINGS

- Congestive cardiac failure.
- Overload of fluid.
- High pressures in the chest cavity.
- High pressures around the heart (cardiac tamponade).

CAUSES OF LOW CVP READINGS

- Not enough fluid, or fluid loss.
- Dilatation of blood vessels due to drugs or sepsis.
- Shock, except cardiogenic shock when the CVP will be high.

For further information on Central Lines see Section E4 page 35-37

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RENAL ASSESSMENT

It is important to assess renal function, which provides information on whether there is adequate perfusion of the kidneys and the production of satisfactory amounts of urine is therefore a useful sign of adequate circulation.

WHAT SHOULD NORMAL URINE BE LIKE?

- Normal urine output should be at least 0.5mL for every kg in weight per hour.
- Approximately 1000 - 2000mL urine produced in 24 hours (dependent upon weight).
- The urine should be clear and a light yellow in colour.

THE EFFECTS OF RENAL FAILURE

The kidneys are vital for maintaining fluid balance and homeostasis (automatic regulation of the body's processes). A disruption of their function will cause a very ill patient and may manifest itself thus:

- Fluid overload leading to pulmonary oedema, cardiac failure, oedema.
- Hyperkalemia (with the possibility of cardiac instability).
- Acidosis.
- Confusion and coma (due to a build up of toxins).
- Nausea, vomiting, diarrhoea.
- Cardiac arrest and possible death.

WHAT TO DO IF THE PATIENT HAS A POOR URINE OUTPUT

Too often pre-renal failure goes untreated and inevitably leads to complications. In some cases it could result in a long period in Critical Care, or dialysis and strict diet controls for the rest of the patient's life.

Remember:

- To check catheter patency, if one is present.
- Treating pre renal failure can be as easy as ensuring the patient receives adequate fluids, intravenous or oral.
- It is also vital that observations are recorded accurately and acted upon promptly.
- If the patient is adequately hydrated but remains hypotensive then they will need reviewing. They may require a central venous line, CVP readings and even inotropic support to elevate the blood pressure and allow renal perfusion to be restored.

THE CAUSES OF RENAL HYPOPERFUSION

Low blood pressure (hypotension) is a major cause of renal hypoperfusion and is easily detectable by undertaking regular blood pressure readings, also pulses and measuring urine output are valuable indicators too.

THE SIGNS OF HYPOTENSION

- Low blood pressure.
- Weak pulses.
- Low urine output.

All the above indicate a low cardiac output.

THE SIGNS OF HYPOVOLEMIA

- Low urine output with dark concentrated urine.
- Low blood pressure.
- Fast pulses.
- Low central venous pressure readings.

NB. **Prolonged low blood pressures can be extremely dangerous for your patients' well being, report them and correct them promptly. In reality any older patient will have less renal reserve, add this to an acute illness and you have a potential problem!**

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FLUID BALANCE

WHY ARE FLUID BALANCE CHARTS NEEDED?

They are a vital tool to allow assessment of the amount of fluid going into the patient and the amount coming out, and they can highlight the problems of renal failure. Fluid balance should be recorded regularly and accurately.

- Too much fluid in and not enough out is a 'Positive balance'.
- Too much out and not enough in is a 'Negative balance'.
- The same amount in and out is an 'Equal balance'.

This is hard to achieve.

THE EFFECTS OF FLUID IMBALANCE

Too positive leads to the patient being overloaded and can cause pulmonary oedema.

LOOK to see if the patient is displaying clinical signs. These may be:
- The patient looking and feeling unwell.
- Persistent breathlessness, with rapid shallow breaths.
- Persistent cough.
- Sputum is white and frothy, sometimes tinged pink.
- Vasoconstriction and tachycardia.
- Limb oedema.
- DO NOT FORGET to review the patient's charts. Are there changes? What is the fluid balance status?

LISTEN to the patient:
- Crepitations are heard on auscultation of the chest, initially at the bases. Later crepitations can be heard throughout the lungs.

FEEL the pulse,
- Is it bounding and fast?
- Do limbs feel swollen and 'pit' when pressure is applied?

Too negative and patients become dehydrated and hypovolemic.

LOOK again and examine the patient for tell tale signs:
- Here again the patient will look and feel unwell.
- Review the patient's fluid balance charts these will give vital information on any potential problems. Is urine output reducing? Don't forget to assess:
  - Colour of the urine.
  - Hourly amount.
  - Cumulative balance. All these are indications the patient may require more fluid intake.
- Review other charts. Is there a trend in increasing pulse rate? Is blood pressure decreasing? Is there reduction in central venous pressure measurement?

LISTEN to the patient, are they complaining of thirst?

FEEL the pulse.
- Is it weak, and fast?
- Is there poor skin elasticity?

OTHER FACTORS THAT MAY AFFECT ACCURATE FLUID BALANCE

- Blood and blood product transfusions should be added on the chart, the amount of fluid they contain is usually stated on the bag.
- Incontinence, vomiting, diarrhoea.

TIP If you are required to record strict fluid balance records it is useful to know that 1kg equals 1 litre.

- Insensible loss, e.g. sweat is generally immeasurable.
- Wound drainage.
- Blood loss in theatre.

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HOW TO MAINTAIN RENAL STATUS

- Be aware of potential for renal failure in your patient, be aware of known chronic renal failure, or old age.
- Ensure you keep accurate fluid balance records.
- Monitor fluid balance of the patient, hourly, daily etc.
- Report and treat hypotension with fluids promptly.
- Will an inotropic drug be required to maintain a normal blood pressure?
- Observe quantity and quality of the urine. Do you need to do this hourly?
- Monitor blood results e.g. Urea, Creatinine, Potassium, and Sodium.
- Monitor vital signs. Are there indications of hypotension or hypoperfusion?
- LOOK at your patient. Are they drowsy or restless?

NB. **Quickly reacting to any of the above signs may prevent your patient deteriorating or requiring Critical Care. If in doubt about your findings seek further advice and CALL FOR HELP!**

POINTS TO REMEMBER!

1. LOOK, LISTEN and FEEL for the patient's vital signs.
2. Do you need to call for help?
3. Assess pulse, blood pressure, central venous pressure and urine output.
4. Do you need to call for help?
5. Check blood results for abnormalities especially potassium, magnesium and sodium.
6. Seek further support from specifically trained staff e.g. Parent team, Intensive Care, Outreach.

For more information on Renal Failure, see Section E6 page 45.

D Disability

D1 What to do if consciousness deteriorates.

- Start with the principles of assessment ABC and keep the patient safe.
- If the airway, breathing and circulation are adequate the patient should be positioned in the lateral recovery position.
- Decreased conscious level is often seen in acute illness. It may be due to primary cerebral problems or secondary to other systemic conditions.

HOW TO ASSESS CONSCIOUS LEVELS

A rapid way to do the assessment of consciousness is to follow the AVPU scale (described in ALERT™ training), and by assessing pupil size.

A ALERT
V RESPONDS TO VOICE
P RESPONDS TO PAIN
U UNRESPONSIVE

However, using the Glasgow Coma Score (GCS) is still the most accurate tool for establishing the functioning ability of the cerebral cortex, which is responsible for many important functions including consciousness. It provides a common language to communicate symptoms and changes, and avoids subjective comments and opinions.

The Glasgow Coma Score chart is on page 26.

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GLASGOW COMA SCORE (GCS) CHART

OBSERVATION	RESPONSE	SCORE
Eye Opening	Spontaneous	4
	To speech	3
	To pain	2
	Nil	1
Best Motor Response	Obeys commands	6
	Localises to pain	5
	Withdraws to pain	4
	Abnormal flexion	3
	Extensor response	2
	Nil	1
Best Verbal Response	Orientated	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	Nil	1

HOW TO ASSESS PUPIL REACTION

To assess pupil size, shape, and reaction to light, a bright light is shone into each eye to assess each response to light. This should produce constriction of both pupils, known as the consensual light reflex. Responses are recorded as brisk, sluggish or fixed. Blown pupils are large and usually unreactive and can signify pre morbidity. Apparently 1 in 5 people have unequal pupils.

Also assess for normal upper eyelid movement, ocular (eyeball) movements and focusing. Pupil size is recorded in millimetres. Normal is 2-6mm.

HOW TO RECORD CONSCIOUS LEVELS

Chart the scores in numerical form and as a series of directly joined up dots on the GCS chart. This will help to illustrate changes. A score of 8 or less is regarded, as coma and comprimising of the air will occur.

NB. If GCS score is <9 seek, immediate expert help and consider the need for endotrachael intubation.

GCS may be misleading in cases such as: - high cervical injury; brain stem lesions; hypoxia; haemodynamically shocked; fitting; post ictal. Record all other vital signs alongside GCS to gain the fullest picture of events. Findings should be documented as precise descriptions of behaviour, rather than simply assigning a number.

D2 Some causes of reduced consciousness.

- Cerebral infarction/ infection
- Cerebral neoplasm
- Drugs
- Head injury
- Hepatic encephalopathy
- Hypercapnia
- Hypoglycaemia
- Hypo/hyperthermia
- Hyponatraemia
- Hypotension
- Hypothyroidism
- Hypoxaemia
- Intracranial haemorrhage
- Seizures

THE PROBLEMS OF DECREASED CONSCIOUS LEVELS

These are associated with potentially life threatening complications. They may lead to airway obstruction, loss of cough and gag reflexes, increased risk of aspiration, skin damage, and corneal ulceration.

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WHAT SHOULD BE INVESTIGATED?

● **Airway, Breathing and Circulation**
Assess Airway, Breathing and Circulation and treat as appropriate.

● **Blood Glucose Levels**

Blood glucose measurement is one of the easiest and most useful early tests in assessing acutely ill patients (especially with diminished conscious levels). By undertaking a simple 'finger prick' test you are able to determine a patients blood glucose status almost immediately.

On measuring the blood glucose, if the level is found to be below 3mmol/L (or higher than 10mmol/L) inform the Clinician immediately. Unless contraindicated, for hypoglycaemic conditions 25 - 50mL of 50% glucose solution should be administered as a bolus intravenously.

NB. Seek expert medical advice if in doubt. Ensure safe and competent practice is maintained at all times when undertaking these procedures.

● **Drugs**
Check the patient's prescription chart for any recently administered drugs that may have caused the diminished conscious level, e.g. sedatives, analgesia, anaesthetic agents.

For further information on neurological assessment
see Section E5 page 42.

E Additional Information

E1 Arterial Blood Gases

Arterial Blood Gases (ABGs) are a useful measure of the patient's respiratory status and include an assessment of the body's acid base balance.

ABGs measure the gases of respiration, the oxygen in PaO2 and the carbon dioxide (waste gases) of PaCO2. They are a useful measure of the patient's respiratory status and include an assessment of the body's acid base balance. Acids and Bases are kept in close balance within a narrow band, if too high or too low they can cause cell death.

NORMAL VALUES:

pH	7.35 – 7.45
pCO2	4 – 6 Kpa (35 – 45 mmHg)
pO2	10 – 12 (75 – 100 mmHg)
HCO3	22 – 26 mmol/L
Base Excess	-2 to +2

The sample of blood is taken directly from an artery, by a person who has received extra training. The most common sites are the radial or femoral arteries.

Blood gas syringes contain a small amount of heparin to prevent the sample clotting in the analyser.

TIP When sending an 'ABG' is to include the patient's temperature. Why temperature? The main problem is the oxygen carrying potential of blood is altered dependant on the body temperature. This information may need to be factored into the result.

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EQUIPMENT NEEDED

- A syringe containing a small amount of heparin. Some hospitals now have pre-filled syringes.
- Gloves
- Cotton wool/Gauze swabs
- Alcohol wipe
- Ice for transportation of sample
- Label for syringe and completed specimen form.

NB. Do not forget that air should be expelled from the collected sample so that it does not affect the results.

Knowing how much oxygen the patient is on when the sample is taken will help as a guide to what is happening, what the status of the patient is and what else we can do for this patient.

POST SAMPLE CARE

- Direct pressure should be applied to the puncture site for 3–5 minutes until bleeding has stopped.
- Ensure the sample is sent immediately to the laboratory for analysis (the sample should be transported on ice).
- If a repeat blood gas analysis is to be taken a different site should be used.

WHAT IS pH?

This is a scale of measuring acid and alkaline (Bases.) 1 to 7 is considered acid, 7 is neutral, 7 to 14 alkaline. The bloods' normal pH should be 7.35 to 7.45. Any deviation from this needs reporting.

A pH of less than 7.35 is classed as an acidosis. The cause of this acidosis can be respiratory or metabolic. In profound hypotension metabolic acidosis can occur due to many causes. In hypotension (low BP) it can simply mean that the blood is not being delivered to the tissues and thus not delivering adequate amounts of oxygen. If this continues then normal cell respiration cannot take place.

METABOLIC ACIDOSIS

In profound hypotension when blood pressure is very low, for whatever reason, the cells begin to use Anaerobic respiration to provide energy in the absence of oxygen. They break down other compounds and extract oxygen from them. This is problematic and can only be sustained for a short time. This leads to a build up of another acid called Lactic acid. This again makes the blood more acidic (lactic acidosis).

Lactic acid is the substance that causes muscle aches and pains following exercise.

RESPIRATORY ACIDOSIS

In respiratory problems carbon dioxide is not expelled from the lungs and builds up. Carbon dioxide in solution is acid and if it is not removed it builds-up making the blood more acidic.

If the blood becomes too acidic it can prove disastrous:

The large amounts of potassium that is stored within each cell can begin to seep into the blood, thus making the heart unstable.
This can lead to:-

- Renal failure.
- Multi-Organ failure.
- Impaired Cardiac function.

There is more to the Arterial blood gas than meets the eye!

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E2 Oxygen Flow Rates & Therapy

LOW FLOW OXYGEN

1. Nasal Cannulae.
2. Simple facemask. Entrains air from the atmosphere, which mixes with the oxygen. Although prescribed oxygen is delivered in litres, the percentage of oxygen taken by the patient depends on the size of breath the patient takes (tidal volume).

Advantages:

- Patient comfort.

Disadvantages:

- No delivery of a fixed concentration of oxygen.
- Nasal cannulae can cause nasal ulceration.

Recommendations:

- Humidify oxygen via simple facemask if patient requires increased humidity, to ease expectoration and maintain mucous membranes.
- Ensure oxygen tubing is not too long as it may cause retention of carbon dioxide from expiration. Manufacturers' tubing is supplied at an optimal therapeutic length to prevent this problem.

HIGH FLOW OXYGEN

1. Venturi masks. Provide accurate oxygen percentages between 24% - 60%. Oxygen enters through a narrow jet opening that increases the speed of the flow. Room air is entrained through the ports in the mask and mixes with the oxygen. Oxygen concentration is altered by the size of the jet. The larger the jet opening, the more air is entrained and consequently the oxygen concentration is lower.
2. Non re-breathing masks. These oxygen masks have a reservoir bag attached to the base of the mask. The reservoir contains the oxygen, which is inhaled through a one-way valve. As the patient inhales the exhalation valve closes to prevent entrainment of room air. This enables approx. 90-100% oxygen to be delivered. In expiration the exhalation ports open and the valve between the mask and the oxygen reservoir closes to prevent the bag filling with exhaled carbon dioxide.

Advantages:

- Provides high flows of oxygen. Patients with large breaths or tidal volumes require high flow oxygen. If the flow rate is not greater than the patients' tidal volume the correct oxygen concentration will not be delivered.

Q: Is a patient on high flow oxygen with normal gases well?

A: No, normal values that require high flow oxygen of over 60% is a good indicator of respiratory failure – they need attention quick!

NB. **It is important to note that some patient with severe pre-existing COPD cannot tolerate very high levels of oxygen and that their ability to breath may be compromised. This can be difficult to judge but the need to maintain adequate oxygen levels is paramount. When administering oxygen REMEMBER it is a prescribed drug, and must be provided according to medical instructions. It is vital to observe respiratory rate and patterns closely in all patients.**

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E3 Blood results in the acutely ill patient.

WHY LOOK AT BLOOD RESULTS?

As well as assessing observation charts and the urine output you can look for clues in the blood results about the patients condition: (Please chart your own hospital's 'normal' blood values in the back of this book).

- Urea is a by-product of protein metabolism and is excreted via the kidney. It is a good indicator of renal function.

TIP A raised Urea and a normal Creatinine is a good sign of dehydration

- Creatinine is also a good clue to renal health and is also a by-product of protein metabolism
- Potassium is always good to keep an eye on, as it is responsible for the heart's stability as well as many other functions. Patients on diuretics can lose a lot of potassium. Any abnormal low or high results should be reported and corrected, if it is not it can spell danger.
- Sodium helps maintain fluid balance throughout the body and can be an indication of hypo or hypervolaemia.
- Phosphate this is important if the patient is at risk of respiratory failure. Reduced levels can cause diaphragmatic weakness.
- Haemoglobin (Hb) is another value you know well. The haemoglobin is vital as it carries the oxygen for delivery to the cells throughout the body. So a low Hb will mean that the oxygen carrying ability of the blood will be very much reduced.
- White cell count if this is raised or profoundly low, is often a good indicator of infection.
- Albumin helps to maintain intravascular volume by maintaining colloid osmotic pressure. If albumin is reduced fluid moves from the vascular compartment to the tissues, creating peripheral oedema.

E4 Cental Venous Pressure.

WHAT IS A CENTRAL LINE?

It is an intravenous catheter that is placed into a great vein.

WHY DO WE USE CENTRAL LINES?

- To measure the central venous pressure.
- To deliver large volumes of fluids and/or blood products.
- To deliver drugs (some drugs are irritant to small veins), and parentral nutrition.
- To deliver inotropic drugs.
- Access for blood sampling when venepuncture is difficult.

HOW MANY LUMENS DO THEY HAVE?

They can be single or multi-lumen. Each lumen is labelled:

- Distal – this terminates at the tip of the catheter. This lumen is the lumen you attach the CVP manometer to, and is often brown in colour.
- Medial – found in the middle portion of the catheter there could be two or more of these, and are used to attach infusions to.
- Proximal – this is found nearest to the entry site, again is used to attach infusions to.

WHERE ARE THEY INSERTED?

- Internal/external jugular veins.
- Sub-clavian veins.
- Infrequently the femoral veins, however this is not favoured as it is a long way from the heart and the site may become more readily infected. It may be used for quick access in very shocked patients and in emergency situations.

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PREPARING THE PATIENT

Tell the patient what is happening and why.

- A sterile technique must be maintained throughout the whole process of equipment preparation and line insertion.
- The patient is usually positioned with the head of the bed down in a supine position, to prevent air embolus.
- Easy access to the chosen site of insertion should be ensured.

Q: Are there any potential complications of an insitu Central Line?

A: YES. If the cannula dislodges or the tubing becomes loose, the patient will bleed a lot.

Other possible complications are:

- Infection.
- Blood clots.
- Back flow of blood.
- Air embolus.

CARE OF THE LINE

- LOOK at it. Check all connections and the site at least once per shift, more if working a long day or night.
- IMMEDIATELY report any signs of inflammation or infection (redness or pus) seen at the entry site in the skin.
- Maintain a closed circuit.
- Use a 'no touch' technique during line or site contact.
- IMMEDIATELY report & label any blocked lumen, signs of clotting or bleeding from the line site.
- Document your findings.

COMPLICATIONS FOLLOWING INSERTION

- Pneumothorax / haemothorax.
- Arterial puncture / haemotoma.
- Air embolus.
- Puncture of the heart leading to cardiac tamponade.
- Cardiac arrhythmias

MEASURING CENTRAL VENOUS PRESSURE USING A MANOMETER

Place the patient in a recumbent or semi-recumbent position (45° or lower and well supported). It is vital that the patient is in the same position every time the CVP measurement is taken to maintain consistency of recording.

Once the manometer is set up use the bar to establish the position of the right atrium, if the patient is recumbent it is relatively easy. This is located at the point between the 4th intercostal space (4th rib space down from the clavicle), and the mid-axillary line (an imaginary line from the middle of the armpit straight down the patients side). Where these two points cross should be the approximate position of the right atrium, use a surgical marker to indicate this position for future readings.

Place the zero of the scale on the manometer with fluid from the flush bag, usually saline or dextrose.

TIP Do not fill it too much and wet the filter at the top, if it does get wet it can be an infection risk!

Stop any fluids running into the central line while you are doing a reading. Be careful to ensure the fluids are not vital drugs such as dobutamine and dopamine (inotropic drugs) **SEEK ADVICE.**

Close the 3-way tap from the flush bag and open it from the manometer to the patient. Watch as the fluid moves down the manometer scale and you will notice that the fluid will fluctuate (bounce) as it travels down the tubing, this will coincide with the patients breathing. The number you need to record is when these fluctuations have stopped and the level settles. Try and make your reading at the end of expiration (the fluid level will fall on inspiration, and rise with expiration).

NB. Readings are taken from the base of the meniscus of fluid. Once you have that measurement you can re-establish the fluids running on the central line and make your patient comfortable. Document your findings on the appropriate charts. Any measurements varying greatly from previous readings should be relayed promptly to a senior nurse.

For further information on central lines please refer to the Trusts 'Central Venous Catheter Information Pack'.

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CHEST DRAIN MANAGEMENT

HOW DOES A CHEST DRAIN WORK?

A chest drain allows air and excess fluid to escape from the pleural cavity while preventing any reflux. Chest drain bottles must always be kept lower than the patient's chest to prevent water being sucked into the chest. This is due to the decrease in pressure inside the pleural cavity during inspiration, causing air to be sucked up the tube usually to height of about 10-20cm.

Patients must be taught the basics of managing their chest drain bottles. This will encourage them to mobilise.

THINGS TO LOOK OUT FOR

- Fluid level and type of fluid within the chest drain bottle. This should be recorded regularly.
- Fluid swing. There should always be a 'swing' of fluid in the tube of the chest drainage bottle.
- Bubble/air leak. If the chest drain is in situ for the treatment of a pneumothorax then there should be visible bubbling in the chest drain until the pneumothorax has resolved.
- Pain and discomfort. Chest drain tubes can be extremely painful and cause discomfort especially if they are not secured correctly and are accidentally pulled.
- Infection. The longer a chest drain is in situ the more likely the risk of infection around the site of insertion. If left unchecked it can translocate into the pleural cavity and cause an empyema.
- Respiratory function. Continuous assessment of a patient's respiratory function is essential to avoid complications.

NB. Do not clamp chest drains when mobilising or moving patients as this may cause a tension pneumothorax. Clamp only briefly when changing bottles. Do not milk chest drain tubing unless the chest drain appears blocked. Milking the tubes causes an increase in intrathoracic pressure and may cause further pneumothoraces, tension pneumothorax and decrease in cardiac output.

CARE BUNDLES

WHAT IS A CARE BUNDLE?

These are tools for delivering improved quality of care to patients. A care bundle is a collection of interventions aimed at improving outcomes and safety for patients based on the best evidence available. It makes it easier to do the right thing for the patients by assisting staff to identify evidence based best practice. Each bundle consists of a number of elements relevant to the condition or process that is being 'bundled'.

Each element is graded according to the quality of evidence to support its use and this varies with each bundle. Each bundle is reviewed regularly.

Critical care networks have promoted the use of care bundles for a number of years. More recently care bundles are being adopted more widely throughout general ward areas as part of the '10 High Impact Changes for Service Improvement' (DOH 2004). The document 'Quality Critical Care - Beyond Comprehensive Critical Care' (DOH 2005) includes the adoption of care bundles as one of its key recommendations for providing a quality service to the acute and critically ill patient.

THE BENEFITS OF CARE BUNDLES

At it's most effective a care bundle can educate the care providers, improve compliance with the best evidence, reduce variation in care for patients, and through regular audit provide clear evidence of improved standards of care that are maintained over time. Care bundles can improve patient experience, service delivery, clinical outcomes and have benefits for staff, e.g. by reducing variation in practice.

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Examples of care bundles

A number of care bundles have been adopted, adapted and developed. These currently include care bundles for:

- Sepsis
- Infection control
- Ventilation
- Tracheostomy care
- Central Venous Catheters

Practice should be audited before implementation to provide a baseline then audited according to an audit calendar. Each audit result is then presented to the relevant service and actions agreed to improve performance.

SEPSIS

Sepsis is often said to be an 'un-recognised problem'. Unfortunately 44,477 deaths occurred in 2003 in the UK due to Severe Sepsis. The impact of this on hospital services is enormous.

WHAT IS SEPSIS?

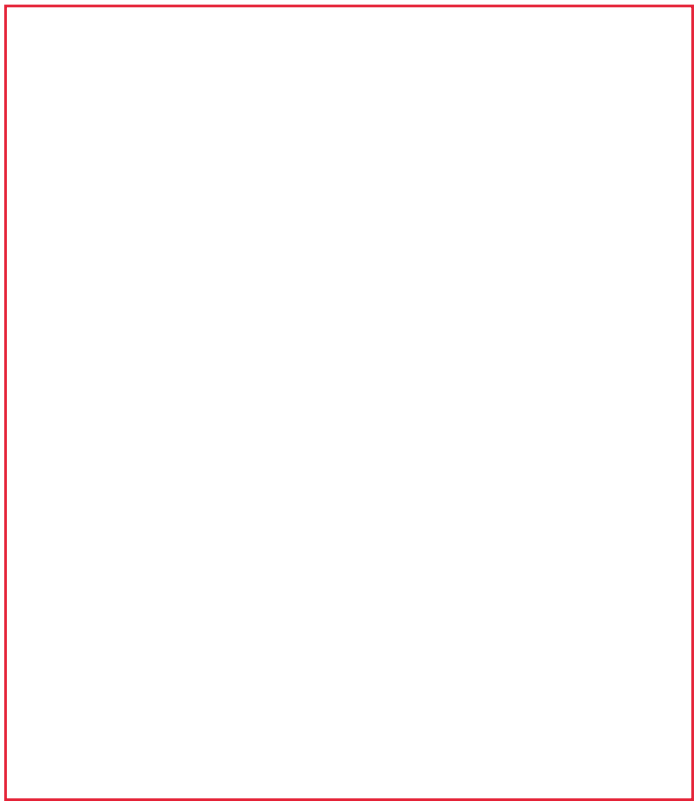
It is organ dysfunction due to infection and can lead to organ failure and death. Untreated it can lead to septic shock which is defined as sepsis with low blood pressure and multiple organ failure and carries a mortality rate of approximately 50%.

WHO DOES IT AFFECT?

Anyone can contract sepsis but certain patient groups are more susceptible, e.g. those with wounds or injuries. Only 1 in 6 cases of septic patients are managed in a critical care setting, hence the need for a hospital-wide approach to the identification and management of patients. The number of people presenting with sepsis is set to increase by approximately 1.5% annually.

RECOGNITION OF SEPSIS

It is important to consider sepsis in any acutely ill patient. Early recognition and treatment are essential. The greater the number of organs involved the higher the 28-day mortality. Any patient presenting with signs of acute illness should have the possibility of sepsis considered.



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E5 Diuretics

These drugs increase the amount of urine passed, but also cause the loss of water and salts (sodium & potassium). They are useful and are used a great deal, but if not used appropriately they can leave your patient at risk of deterioration. As well as losing excess water and helping to control hypertension, they will happily 'dump' vital electrolytes like potassium out of your patient. Do not give diuretics simply to encourage urine flow, only use if there are definite signs of fluid overload.

DISABILITY (NEUROLOGICAL ASSESSMENT)

The GCS was first developed in 1974 in Scotland and is a 15-point scale for assessing the level of consciousness, using three behavioural responses.
These are: - Eye opening (E) Verbal response(V) Motor response (M)

Each response is assessed, given a numerical score and recorded. The GCS score is the total of the three responses. The score is from 15 (fully conscious) to 3 (no responses).

THE RESPONSES

ASSESSING EYE OPENING

SPONTANEOUSLY
Score 4 Patient's eyes are open spontaneously.

TO SPEECH
Score 3 Patient will open their eyes if asked, or if their name is called. Use a normal speaking voice primarily, then louder if necessary to elicit a response.

TO PAIN
Score 2 Eyes only open in response to an applied painful stimulus.

NONE
Score 1 The eyes no not open to speech or pain.

PAINFUL STIMULI

It is good practice to commence with light pressure, which may in turn increase, to elicit a response. There is some debate about applying pain to the peripheries or to apply central pressure (for example applying pressure to the fingers). If peripheral pressure is used, never apply it to the nail bed as this may cause permanent damage. Applying central pressure will always provide the most accurate response. The nurse must decide which is most appropriate, and check for local policies/ guidelines.

Suggested painful stimuli: -

- Supra orbital pressure- feel along the eyebrow towards the nose, just under the orbital rim until a small notch is felt. Applying very little pressure to this point will produce pain, as there is a nerve here.
- Pressure at the jaw margin, just in front of the ear lobe.

(NB These tests should be avoided if facial fractures are suspected)

- Trapezius muscle pinch- pinch/twist approximately 5cms of the trapezius muscle (where the neck meets the shoulder) between the thumb and forefinger.

ASSESSING VERBAL RESPONSES

ORIENTATED
Score 5 Must be orientated to time, place and person.

CONFUSED
Score 4 Able to converse and may appear to be orientated, but is unable to answer questions about time, place and person.
Use open-ended questions wherever possible.

INAPPROPRIATE WORDS
Score 3 May answer in one or a few words, making little sense. Swearing is usually considered inappropriate.

INCOMPREHENSIBLE SOUNDS
Score 2 Sounds and unrecognisable words are uttered. Moans and groans may be their response to speech or pain.

NONE
Score 1 No words or noises in response to speech or pain.

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ASSESSING MOTOR RESPONSES

OBEYS COMMANDS
Score 6 Always make the command so that the response is from above the neck, one that is obvious and cannot be mistaken as a reflex. Good examples are: show teeth, stick tongue out, open eyes wide. Poor examples are: close eyes, blink.

LOCALISES TO PAIN
Score 5 Apply pain if commands are not obeyed, using the examples outlined above. If the stimulus is applied as above, the response will be obvious. An example of localising to pain is if the patient tries to remove an uncomfortable NG tube.

WITHDRAWS FROM PAIN
Score 4

ABNORMAL FLEXION TO PAIN
Score 3 There is no localisation, but a purposeless general flexion in the limbs to the painful stimulus. There may be adduction, rotation and rigidity, hand clenched, thumb grasped in the hand.

ABNORMAL EXTENSION TO PAIN
Score 2 If there is no flexion or purposeful response there may be extension in any of the limbs. Sometimes there is a degree of internal rotation, adduction, rigid extension; thumb is in the clenched fist.

NO RESPONSE
Score 1

NB. Asking a patient to squeeze your hand can be misleading. This is because there may be a primitive grasp response to touching the palm of the patients' hand.

E6 The Kidney and Renal Function

THE FUNCTIONS OF THE KIDNEY

- Waste removal
- Maintenance of fluid balance
- Acid base balance
- Electrolyte balance
- Renin production (hormone which increases blood pressure)
- Erythropoietin production (hormone which stimulates erythrocyte production – RED BLOOD CELLS)

As you can see from the above list the kidney is a busy little organ. When it fails the consequences can be catastrophic.

SOME INTERESTING FACTS!

- The kidneys are highly vascular, the blood is provided via a large artery that feeds off the aorta.
- Each kidney contains about 1,000,000 nephrons.
- They require a large supply of oxygen.
- Increasing age affects their efficiency.
- Sudden acute illness can stop them working (known as renal failure).

SOME TERMS!

Anuria:	0 to 100 mL of urine in 24 hours.
Oliguria:	100 to 400 mL of urine in 24 hours.
Polyuria:	1200 to 1500 mL of urine in 24 hours.
Hypoperfusion:	Low blood flow.
Hypotension:	Low blood pressure.
Hypovolaemia:	Low circulating fluid volumes.

RENAL FAILURE

Renal failure can be acute or chronic. It can be classified as:
- Pre renal
- Intra renal
- Post renal

NB. It is interesting to note that up to 5% of in-patients may suffer from some form of renal failure.

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PRE-RENAL FAILURE:

This is due to renal hypoperfusion (low blood flow to the kidney) and is usually caused by failure of another system of the body. In order for filtering to take place within the nephrons the kidneys require a decent blood pressure. Hypotension results in poor blood flowing to the kidneys, thus filtering is poor. If left untreated renal failure will increase due to increasing periods of hypotension that lead to ischaemia.

Causes of pre renal failure:
- Hypovolaemia
- Low cardiac output e.g. following a heart attack
- Acute sepsis e.g. peritonitis, meningitis

INTRA-RENAL FAILURE:

These conditions often affect the body of the kidney itself. Examples of these conditions are:
- Kidney infections
- Inflammations e.g. glomerulonephritis
- Drugs e.g. gentamicin
- Poisons
- Necrosis and ischaemia from uncorrected pre renal failure leading to intra renal damage.

POST-RENAL FAILURE:

Caused by obstruction in the ureters, bladder and/or urethra. Simply removing the obstruction reverses it. Some of the causes could be:
- Enlarged prostate gland
- Bladder stones
- Tumours

THE STAGES OF RENAL FAILURE

1. Oliguric phase;
- Occurs within two days of the insult
- Urine output will decrease and may last up to 10 days

If this condition continues then the outlook for full recovery is poor.

2. Polyuric phase;
- After 10 days if some recovery is likely then the renal cells begin to regenerate and mature.

After this phase normal renal function can return. However if the patient is very ill or hypoperfusion continues and leads to pre renal failure, anuria maybe witnessed.

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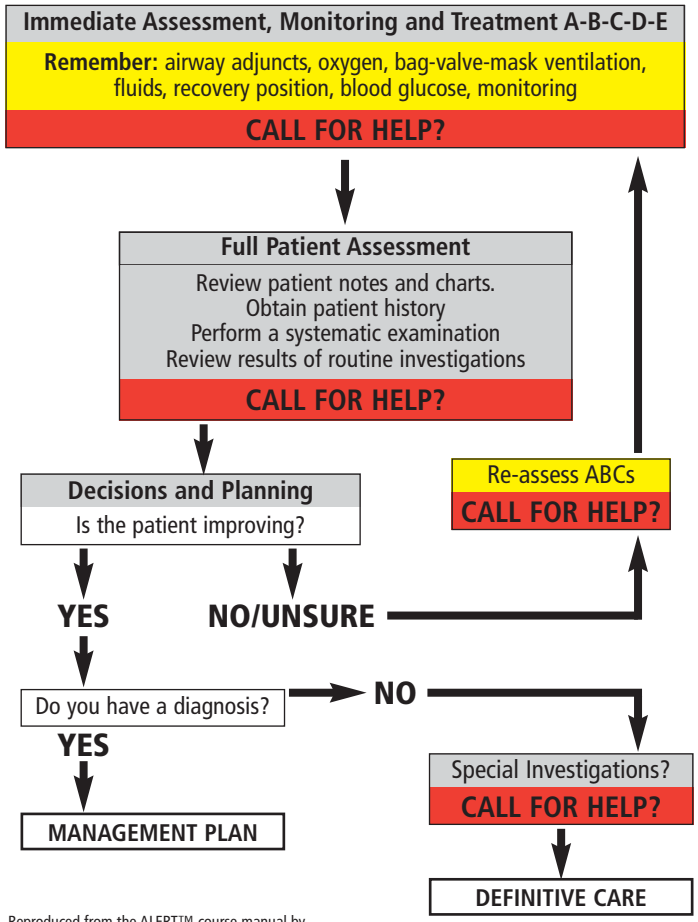
E7 Weight Conversion Table

St	lb	Kg	St	lb	Kg	St	lb	Kg
5	0	31.7	9	8	60.8	14	2	89.8
5	2	32.7	9	10	61.7	14	4	89.8
5	4	33.6	9	12	62.6	14	6	91.6
5	6	34.5	10	0	63.5	14	8	92.5
5	8	35.4	10	2	64.4	14	10	93.4
5	10	36.3	10	4	65.3	14	12	94.3
5	12	37.2	10	6	66.2	15	0	95.3
6	0	38.1	10	8	67.1	15	2	96.2
6	2	39.0	10	10	68.0	15	4	97.1
6	4	39.9	10	12	68.9	15	6	98.0
6	6	40.8	11	0	69.9	15	8	98.9
6	8	41.7	11	2	70.8	15	10	99.8
6	10	42.6	11	4	71.7	15	12	100.7
6	12	43.5	11	6	72.6	16	0	101.6
7	0	44.5	11	8	73.5	16	2	102.5
7	2	45.4	11	10	74.4	16	4	103.4
7	4	46.3	11	12	75.3	16	6	104.3
7	6	47.2	12	0	76.2	16	8	105.2
7	8	48.1	12	2	77.1	16	10	106.1
7	10	49.0	12	4	78.0	16	12	107.0
7	12	49.9	12	6	78.9	17	0	108.0
8	0	50.8	12	8	79.8	17	2	108.9
8	2	51.7	12	10	80.7	17	4	109.8
8	4	52.6	12	12	81.6	17	6	110.7
8	6	53.5	13	0	82.6	17	8	111.6
8	8	54.4	13	2	83.4	17	10	112.5
8	10	55.3	13	4	84.4	17	12	113.4
8	12	56.2	13	6	85.3	18	0	114.3
9	0	57.0	13	8	86.2	18	2	115.2
9	2	57.8	13	10	87.1	18	4	116.1
9	4	59.0	13	12	88.0	18	6	117.0
9	6	59.9	14	0	88.9	18	8	117.9

E8 ALERT™ Plan of Assessment

(Acute Life-Threatening Events-Recognition and Treatment)



Reproduced from the ALERT™ course manual by
Dr Gary Smith, school of Post graduate Medicine, Portsmouth

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E9 Classification of Patients' Levels of Care

LEVEL 0
Patients whose needs can be met through normal ward care in an acute hospital.

LEVEL 1
Patients at risk of their condition deteriorating, or those recently located from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team.

LEVEL 2
Patients requiring more detailed observation or intervention including support for a single failing organ system or post-operative care and those 'stepping down' from higher levels of care.

LEVEL 3
Patients requiring advanced respiratory support alone or basic respiratory support together with support of at least two organ systems. This level includes all complex patients requiring support for multi-organ failure.

DOH, Comprehensive Critical Care, 2000

E10 Blood Values

(Own Trusts' values to be inserted)

Hb (Haemoglobin)	WCC (White cell count)
Platelets	Haematocrit
Sodium	Potassium
Urea	Creatinine
Bilirubin	Gamma GT
Total Protein	Albumin
ALK Phos	ALT
AST	CK
LDH	Troponin
Magnesium	Phosphate
Glucose	Amylase
Calcium	Fibrinogen
INR	APTT

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E11 Recommended Reading

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NOTES

NOTES

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For further information contact
Lancashire and South Cumbria Critical Care Network

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