RESOURCE MANUAL

NSW HEALTH 2011

Transition to Practice
Emergency Nursing Program

NSW GOVERNMENT | Health

Foreword

The role of emergency nurses requires a broad level of skill and ability to meet the care needs of patients and their families. The Transition to Emergency Nursing Program is designed to support registered nurses new to the practice of emergency nursing. The Emergency Department is a fast-moving environment within which nurses can find themselves faced with a variety of challenges across a day. This program will assist them as they develop their knowledge and skills to meet these often changing care needs within the emergency setting. The program also supports a more consistent approach to transition to emergency nursing and it is anticipated will become the standard for initial entry to practice as an emergency nurse across NSW.

This Resource Manual is the core document for the program and is complemented by both the Participant Workbook and the Facilitator's Manual. Within the Emergency Department participants will be supported by staff to meet the relevant learning objectives during the 3-6 months over which this program extends.

The development of the Transition to Emergency Nursing Program has been a lengthy process which reflects the commitment of emergency nurses to their area of practice and I acknowledge and thank them for their enthusiasm and work in enabling the Program to be developed. I am sure that it will have a positive impact for those nurses new to emergency nursing and to the care of patients.

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The following documents have been instrumental in developing the program:

- Caring Together – The Health Action Plan for NSW (NSW Department of Health, 2009).
- Continuing Competence Framework (Australian Nursing and Midwifery Council, 2009) (http://www.anmc.org.au/).
- *ANCI Competency Standards* (College of Emergency Nursing Association).
- Transition to Practice Nurse Education Program Emergency Nursing (Queensland Department of Health, 2006).
- National Nursing and Nursing Education Task Force Final Report – The National Nursing and Nursing Education Taskforce (N_3ET) (Australian Health Ministers Advisory Council, 2006). Refer http://www.nnnet.gov.au/downloads/n3et_final_report.pdf

The Transition to Emergency Nursing Program has been developed in consultation with Nurse Managers, Clinical Nurse Consultants and Nurse Educators in emergency departments across NSW. NSW Health would like to thank the following members of the Transition to Emergency Nursing Program Reference Group and Working Party, who have been integral to the development and review of this document.

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Resource manual

CONTENTS

1 Introduction to Emergency Nursing

1.1 LEARNING OUTCOMES

At the completion of this module, you will be able to:

- Identify the context of emergency department care within the health care continuum.
- Outline the basic core concepts of triage.
- Recognise the different models of care used within the emergency department.
- Identify the various team members and their role within the emergency department team.
- Apply the elements of duty of care.
- Outline the basic requirements for documentation in the emergency department.

1.2 OVERVIEW OF THE EMERGENCY DEPARTMENT

'The emergency department is the dedicated area in a hospital that is organised and administered to provide a high standard of emergency care to those in the community who perceive the need for or are in need of acute or urgent care including hospital admission' (Australasian College of Emergency Medicine (ACEM), 2001:2).

The emergency department is therefore a core unit of a hospital and the experience of patients attending the emergency department significantly influences the patient journey and the public image of the hospital (Australasian College of Emergency Medicine, 2007). Therefore, it is important for all emergency staff to leave a positive first impression with the patient and their family and friends.

Emergency care is a recognised nursing speciality.

1.3 DESIGN AND FUNCTION OF THE EMERGENCY DEPARTMENT

The function of the emergency department is to:

- Receive
- Triage
- Resuscitate
- Stabilise
- Diagnose and initially treat, and
- Promptly transfer patients.

The major functional areas of the department may be divided broadly into:

- Entrance/reception/triage/waiting.
- Resuscitation area.
- Acute treatment area.
- Consultation area.
- Staff/amenities area.
- Administration area.

Physiological monitoring equipment ideally should be central in resuscitation and acute areas. These should include:

- SpO_2.
- Electrocardiogram (ECG).
- Non-Invasive Blood Pressure (NIBP).
- Temperature.

Overall, the total size and number of treatment areas will be influenced by patient numbers, case mix and activity, and projected populations (ACEM, 2007: 7).

1.4 PATIENT PRESENTATION AND TRIAGE

Patients may be self-presenting or arrive via other pre-hospital means. These may include ambulance, referral by general practitioner, specialist, community nurse, nurse practitioner, and community mental health team. Triage is the first interaction a patient has in the emergency department.

Standardised triage scales are useful in developing strategies to manage emergency department demand. In this context they can also be used to inform clinical service development, clinical risk management and patient safety.

All patients should be triaged through a single point. The aim of triage is to 'sort 'patients in order to provide optimum care consistent with their medical need and to ensure the efficient utilisation of the available resources. All patients are allocated to a category of the Australasian Triage Scale (ATS) (Dept of Health and Ageing 2007). See Table 1 for the Triage Scale.

Table 1

ATS Category	Acuity Level	Treatment Acuity	Performance Indication Threshold
1	Immediately life-threatening	Immediate	100%
2	Imminently life-threatening	<10 mins	80%
3	Potentially life-threatening or important time-critical treatment or severe pain	<30 mins	75%
4	Potentially serious or situational urgency or significant complexity	<60 mins	70%
5	Less urgent	<120 mins	70%

Source: Australian Government Department of Health and Ageing (2007) Emergency triage education kit. Page 6

Triage decision-making is an inherently dynamic process, reflective of the level of urgency, not the complexity of a patient's condition. Decisions are made within a time-sensitive environment, (3-5 minutes) with limited information for patients who generally have an undifferentiated diagnosis. Due to the multifaceted nature of the triage role, nurses are required to possess specialised knowledge as well as experience with a wide range of illness and injuries (Department of Health and Ageing, 2007: 7). Some emergency departments can have patients waiting longer than the expected treatment acuity threshold and if so, should be reassessed.

All patients in the waiting room should be reassessed once the triage time has expired. This second assessment and any further assessments should always be documented in the patient's notes.

Once the patient has been triaged, the patient is then allocated a place for assessment and care.

1.5 PATIENT FLOW

Patient flow is an essential component of the ideal patient journey, particularly for complex high-acuity patients who require timely access to initial care and investigation. The processes of care that occur within the emergency department are often subject to delays that fragment a patient's journey and may not add value to patient care (some of which are out of the control of the emergency department).

To improve the flow of patients through the emergency department, it is essential that the barriers to patient flow and decision making are identified and resolved and that key time points of the patient's journey are defined, time-limited and proactively managed.

1.6 INTEGRATED CARE

Many patients who attend emergency departments require immediate assessment and stabilisation of an acute medical condition, but may have an underlying condition that requires ongoing treatment. These patients will benefit greatly from the early involvement of the specialty team that can treat the underlying condition (NSW Health, 2006: 12-43).

Examples of integrated care models include:

- Psychiatric Emergency Care Centres (PECC).
- Mental Health Liaison Nurses.
- Aged Services Emergency Teams (ASET).

1.7 MODELS OF CARE

Use the following link to view emergency models of care:
www.archi.net.au/e-library/build/moc/implementing_emoc

You can find further information on models of care at:

- http://www.health.nsw.gov.au/nursing/projects/models_of_care.asp
- http://www.health.nsw.gov.au/pubs/2006/models_of_care.html

Complete Activity 1 in the Participant Workbook

1.8 TEAMS

Involving other specialties used within your hospital and health service will improve the patient standard of care and hospital experience, and create a holistic approach to health care in the emergency environment. Speciality teams have proven themselves very effective in reducing mortality and morbidity rates. A good example of this is the Trauma Team.

1.9 DUTY OF CARE

By engaging with a patient as they present to the emergency department, the nurse enters into a health professional – patient relationship. A 'duty' is an obligation that is recognised by law, and the nurse's duty to a patient is to provide the same level or degree of care that would be employed by a nurse practising under similar or the same circumstances. The nurse then has an obligation to try to protect the patient from any foreseeable harm or injury and ensure a reasonable standard of care. This reasonable standard of care may be informed by policies such as the Minimum Standards for Triage and other documents such as the Australian Nursing and Midwifery Council (ANMC) Competency Standards.

Nurses have a responsibility to behave in a reasonable manner. If there is any breach of this responsible approach that results in some type of injury to another, this breach constitutes negligence. Negligence laws vary between states and have recently undergone significant changes. For negligence to be proven, it requires the establishment of all of the following elements:

- Duty to meet the standard of care.
- Breach of the duty to meet the standard of care.
- Breach of that duty which causes foreseeable harm.
- Causing actual harm and injury.
- Causing loss.

1.10 DOCUMENTATION REQUIREMENTS

Good communication with and by staff leads to increased shared information and clear advice. Medical records are a method of communication for healthcare team members and are required to be an integrated, sequential and contemporaneous record of events, where possible. They must be accurate, clear and succinct. It is also expected that the records will be easily accessible and able to be understood.

Any change in a patient's condition should be documented clearly and a senior member of nursing and medical staff notified if the patient is deteriorating, unsafe or there is a significant change in their condition.

Documentation of each interaction between the nurse and the patient and/or significant others is another area of accountability in practice. You may wish to refer to the following in relation to documentation:

- Medical records in hospitals and community care centres policy PD2005_004 http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_004.pdf.

Complete Activity 2 in the Participant Workbook

In the emergency department, you will assess and treat patients and families from all walks of life. It is important to treat these patients with respect, privacy and dignity. You may find the following to be useful resources:

- Respecting Patient Privacy and Dignity: 8 ways to make a difference (http://www.health.nsw.gov.au/pubs/2010/pdf/ct_8ways_booklet.pdf).
- Patient Brochure – Patient Privacy and Dignity (http://www.health.nsw.gov.au/pubs/2010/ct_8ways_brochure.html).
- Same Gender Accommodation Policy (http://www.health.nsw.gov.au/policies/pd/2010/PD2010_005.html).

Key points

1. The aim of triage is to 'sort' patients in order to provide optimum care consistent with their medical need and to ensure the efficient utilisation of the available resources.
2. All patients in the waiting room should be reassessed once the triage time has expired. This second assessment and further assessments should always be documented in the patient's notes.
3. Speciality teams have proven themselves very effective in reducing mortality and morbidity rates.
4. Any change in a patient's condition should be documented clearly and a senior member of nursing and medical staff notified if the patient is deteriorating or unsafe or there is a significant change in condition.

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2 Patient Assessment

2.1 LEARNING OUTCOMES

Emergency nurses provide care for patients of all ages with diverse clinical presentations. To ensure good patient outcomes, it is imperative that clinicians have a systematic approach to assessing the emergency patient.

The learning outcomes for this module have been designed to enable you to gain a greater understanding of the fundamental patient assessment principles. By completing this section, you will be able to:

- Use a systematic approach to perform a primary and secondary survey.
- Identify life-threatening injuries or conditions during a primary survey and initiate appropriate interventions.
- Perform a relevant and appropriate subjective assessment.
- Recognise indicators of urgency called 'red flags' in the patient's history.
- Demonstrate review and re-assessment of clinical findings and management interventions.
- Document assessment findings in the patient's progress notes.
- Discuss barriers to assessment that may be encountered in the emergency department.

2.2 IDENTIFYING THE AT-RISK PATIENT

There are many reasons why changes in clinical signs can be missed, misinterpreted or mismanaged thus leading to delays in seeking appropriate advice, unanticipated admissions to intensive care, increased length of hospital stay, cardiac arrest and/or death.

How the 'at risk' patient is identified and managed ultimately affects the patient's morbidity and mortality. Early detection and appropriate intervention can, in some cases, be the difference between life and death. Between the Flags ~ is a resource available for all staff to educate staff in recognising the deteriorating patient. http://www.health.nsw.gov.au/initiatives/btf/index.asp

To ensure positive patient outcomes, clinicians must be able to identify the at-risk patient, detect deterioration, implement fundamental treatment options, communicate effectively with other members of the healthcare team to escalate appropriately, and confidently use identified early warning systems. By using a systematic approach, life-threatening conditions can be recognised and escalated, and interventions initiated.

Assessment is an ongoing process that involves the collection of objective and subjective data or information (see section 2.3). Assessment starts with obtaining a systematic clinical handover, which introduces the presenting problem or immediate events leading up to the patient's presentation to the emergency department. This is why it is vital to get a handover and equally give a comprehensive and systematic handover to the nurse continuing the patient's care.

This module will help give you the skills required to systematically assess the emergency patient.

Complete Activity 3 in the Participant Workbook

2.3 PATIENT DATA

Data can be objective or subjective, as outlined below.

Objective data

Objective data is patient information that is gathered and provides tangible and measurable information. It includes:

- Respiratory rate.
- SPO_2.
- Pulse rate.
- Blood pressure.
- Capillary refill.
- Pupil size and reaction.
- GCS.
- Fluid balance chart.
- Temperature.

Subjective data

Subjective data, on the other hand, is what you can hear. It is the patient, their family/friends or significant others giving their impression of the patient's illness. It is, in effect, an opinion such as a description of pain, what happened prior to a collapse or an observation of the behaviour.

Subjective data is also gathered from your intuition (sometimes called 'gestalt'). This is your perception based on your existing knowledge or experience. It is very important not to be judgmental in your assessment approach. Acknowledging your intuition will, when combined with sound assessment principles, help you to develop your clinical judgement.

2.4 PRIMARY SURVEY

The objective of a primary survey is to identify **all** life-threatening injuries and conditions and to initiate resuscitation/treatment immediately.

A primary survey **must** be performed on **all** patients that present to the emergency department. It is a rapid, structured assessment that is inclusive of airway, breathing, circulation and disability **(ABCD)**. It identifies the presenting problem, determines the presence and effectiveness of the airway, breathing and circulation and confirms the patient's level of consciousness.

The fundamental tools used when conducting a patient assessment are:

- **Inspection** (look) – The systematic and deliberate observations of a patient to determine normal and abnormal findings, including colour, rate, size, symmetry and location.
- **Auscultation** (listen) – Involves listening to sounds produced by the body such as breath, heart, and bowel sounds, which you can hear using a stethoscope.
- **Palpation** (feel) – The use of touch to establish temperature, pain, size, shape, texture etc. Palpation is used to check for a pulse, the presence of bony tenderness, oedema or even a foreign body.
- **Percussion** – Striking the body with short, sharp strokes to elicit palpable vibrations and characteristic sounds. These characteristic sounds are produced when sound travels over a medium (ie fluid/air), and are referred to as resonance.

Other tools include using your sense of smell to detect abnormal odours.

The essence of a primary survey is outlined in the following tables[1].

[1] Tables have been adapted from Jordan (2000) & Newberry's (2003) focussed assessment.

Table 1: Airway

A Airway. Assessment	Assessment Tips. Do I need to act before progressing?
General Observation	• Is the patient conscious or unconscious? • If a patient's level of consciousness decreases, the potential for airway obstruction increases.
Inspect – **Look**	• Look for: • Foreign bodies, obstruction or partial obstruction, broken or dislodged teeth or dentures. • Injury – traumatic or inhalation. • Bleeding or swelling inside the mouth. • Secretions – blood, vomit, sputum, food, soot. • Soft tissue injury to face or neck, facial fractures, burns. • Singed facial/nasal hairs. • Difficulty swallowing secretions. • Angioedema, which is oedema in the mucosal membrane. • Drooling (precaution: in children, think epiglottitis but do not discount other causes).
Auscultate – **Listen**	• Is air entry clear and equal? • Listen to what your patient is complaining about. • Listen for dysphonia (abnormality in the speaking voice e.g. hoarseness), and for gurgling and ineffective cough.
Palpate – **Feel**	• Feel for: • Expired air. • Chest symmetry (or not) – does the chest rise and fall equally on both sides? • Subcutaneous emphysema, which is a crackling sensation on the upper chest wall due to air trapped under the skin from injury or surgery.

Table 2: Breathing

B Breathing. Assessment	Assessment Tips. Do I need to act before progressing?
General Observation	• Is the patient conscious or unconscious?
Inspect – **Look**	The chest must be fully visualised for examination. Look for: • Spontaneous respirations. • The patient's colour and level of consciousness and the position they have adopted. • Symmetrical rise and fall of the chest. • The rate, rhythm and depth of respirations. • Any accessory muscle use: intercostal/subcostal retractions, abdominal muscle usage, excessive nasal flaring, pursed lips, tracheal tug or tracheal deviation. • Paradoxical movements (opposite to normal respiratory movements). • Central cyanosis (a late sign). • External jugular venous distension (engorged neck veins). • Subtle or excessive injury to the chest wall and upper abdomen. Also note the shape of the chest. Are there any scars, lesions, deformities or bruising? • Excessive salivation or secretions.
Auscultate – **Listen**	Listen for: • Equal breath sounds and degree of air entry. • Airway sounds. • Abnormal breath sounds: • Stridor – an abnormal, high-pitched sound caused by an obstruction in the trachea or larynx (usually heard during inspiration). • Wheeze – a high-pitched sound caused by a flow of air through a narrow airway. • Cough. • Voice quality.
Percuss	• Percuss chest wall for abnormal resonance – dullness is associated with fluid (haemothorax, pneumonia), while hyper-resonance is associated with air (pneumothorax).
Palpate – **Feel**	Feel for: • Chest movement – air flow. • Palpate for symmetry, tenderness/fractures. • Trachea position. • Subcutaneous emphysema, which is a crackling sensation on the upper chest wall due to air trapped under the skin from injury or surgery.

Table 3: Circulation

C Circulation. Assessment	Assessment Tips. Do I need to act before progressing?
Inspect – **Look**	Look for: • Colour – pallor, cyanosis, mottling. • Level of consciousness. • External haemorrhage. • Internal haemorrhage – swelling/distension, discolouration under skin. • External jugular veins (distended or flat neck veins).
Ausculate – **Listen**	• Heart sounds.
Palpate – **Feel**	• Palpate pulses for quality, rate and rhythm, both centrally and peripherally. • Skin temperature, diaphoresis (moisture).
Severe Limb Injury	• Is a limb injury threatening the viability of the limb? Carry out neurovascular observations.

Table 4: Disability

D Disability. (Neurological Assessment)	Assessment Tips. Do I need to act before progressing?
Inspect – **Look**	Look for: • Level of consciousness; restlessness. • Pupil size, equality and reaction to light. • Abnormal posturing, unusual behaviour. • Signs of fracture at base of skull: CSF leak from the nose or the ears, raccoon's eyes (peri-orbital haematomas), battle signs (facial bruising). • Signs of pain: grimacing, facial expression.
Auscultate – **Listen**	• What is your patient complaining of – headache, nausea, vomiting? • Determine a pain score (0-10).
Palpate – **Feel**	• Feel for muscle tone and equality.

2.5 SECONDARY SURVEY

The secondary survey consists of a focused history and a more detailed methodical head-to-toe assessment to identify the patient's injuries and conditions. You can remember the head-to-toe assessment by the letters **EFGHIJK**.

E is for 'Exposure' and 'Environment'

To be able to adequately assess a patient, it is necessary to expose the area to be examined. To facilitate this, it may be necessary to get the patient to change into a gown. Using your assessment skills, note any findings such as pressure areas, unusual odours, rashes, possible evidence of non accidental injuries in children etc, and document accordingly.

F is for 'Formal Set of Vitals and Fluids'

Establish baseline physiological status by assessing the patient's vital signs. Following your assessment determine what bedside monitoring and investigations are required e.g. ECG, cardiac monitors, spirometry, urine for pathology, blood glucose level, intravenous cannulation, blood samples).

G is for 'Gadgets' and 'Gather Pathology'

Assess the patient's pain score and ensure analgesia or appropriate interventions (ie splinting,) are attended. It is also important to reassess the patient's pain score following an intervention and document its effect.

H is for 'History' and 'Head-to-toe'

Take a focused history examining the presenting problems and associate 'red flags' that might identify early indicators or an index of suspicion for an underlying serious problem. You may need to utilise a number of different sources to obtain a comprehensive patient history (eg relatives, carers, ambulance officers, general practitioner, and local pharmacist). Establish the patient's past medical, surgical and social history to elicit co- morbidities.

Good communication using open-ended questions facilitates good history-taking. However sometimes it is necessary to collect this information quickly (eg with a trauma patient). There are various mnemonics that help guide history-taking. One is called **MIST**. Another is **AMPLE**. Both are explained in the tables below.

MIST – a mnemonic for history-taking with trauma patients

M	Mechanism of injury
I	Injuries sustained and/or suspected
S	Signs and symptoms
T	Treatment initiated

AMPLE – a mnemonic for history-taking with other patients

A	Allergies
M	Medications including natural remedies
P	Past medical and surgical history
L	Last meal and drink
E	Events immediately preceding the illness

'**H**' is also for the need to conduct a thorough head-to-toe examination. It involves looking at the patient from head to toe to ensure nothing has been missed. This is covered in detailed in the section 'Head-to toe assessment'

For more information on history-taking and patient assessment, refer to:

- 'Patient assessment' in Newberry, L. (ed) *Sheehy's Emergency Nursing: Principals and practice,* pp84-97 (Sedlak, 2003).
- 'The emergency nursing assessment process – a structured framework for a systematic approach', in *Australasian Emergency Nursing Journal* Vol 12, Issue 4, pp 130-136 (Curtis, Murphy, Hoy, and Lewis).

I is for 'Inspect the Back'

Remember to inspect the entire patient, including their back. Patients have been found to have wounds, lacerations, rashes, and bruising etc when the back is examined.

J is for 'Jot It Down'

Documentation is an essential aspect of assessment and it must be completed without exception. Patient documentation should be contemporaneous ensuring that it is completed as close to the event as possible.

K is 'Kindred'

To reduce patient and relatives anxiety and fear it is important to provide progressive disclosure of information at key points in the patient's journey.

Key points

1. Many patient's presenting to the ED are undifferentiated, which means that they do not have a diagnosis.
2. A structured approach to the assessment of the undifferentiated patient is essential.
3. The first priority is to establish the severity of threat to life or limb and hence the need for medical intervention. This is called a primary survey. This determination is made within seconds of the emergency nurse's encounter with a patient. This may also involve the resuscitation interventions.
4. On completion of the primary survey, a focused assessment should follow, usually directed by presenting signs and symptoms or the mechanism of injury. This is called a secondary survey.
5. If there is a change in the patient's condition a primary survey should be recommenced to establish the presence of an adequate airway, effective breathing, circulation and disability.

6. Any abnormalities identified within the primary survey should be immediately escalated to a medical officer or senior nurse.

2.6 HEAD TO TOE ASSESSMENT

A complete head to toe assessment using a systematic approach is crucial for all patients that present to the emergency department. A secondary survey or a full head-to-toe assessment can determine other injuries or illnesses that can sometimes be missed. The following should provide you with an overview of a secondary survey and alert you to any red flags that may exist.

Always approach a secondary survey in a systematic way.

There are many frameworks that can be utilised when completing a physical examination. They can be head-to-toe, regional areas (e.g. pelvic) or body systems (such as cardiovascular, neurological). You need to decide which framework is more suitable for your patient. For example, if someone presents with chest pain, after the initial primary survey, it will be important to ask relevant history and to examine the patient's cardiovascular system, before commencing a full head-to-toe assessment. As you develop your skills in emergency nursing you will be able to develop your own approach utilising all data available to you. The most important point to consider is that a systematic approach must be utilised to ensure that a thorough examination has occurred and that nothing is missed.

Preparing the Environment

In the practice of physical assessment, structuring your environment and proper patient preparation is crucial in order to obtain as much information as possible. Applying external stressors such as a lack of privacy to a patient undergoing a historical and physical examination will create a situation less conducive the patient providing all the relevant information. This idea of providing an appropriate environment from the beginning is imperative. This may be difficult in the busy Emergency Department, but simple techniques such as pulling curtains will aid the patient in feeling comfortable with you and the environment.

Approaching the Patient

The aim of developing a rapport with a patient is to encourage them to feel comfortable to disclose information pertaining to their current condition. By utilising effective communication you will be able to establish a climate of trust with the patient to aid in disclosure and ultimately perform a complete physical assessment. Remember that this person does not know you, create a warm, respectful environment with each and every patient you care for. To do this you should:

- Introduce yourself by name.
- Tell the patient your role in the ED ("I am an emergency nurse").
- Explain the process of ED and what will be happening to them.
- Explain why you need to ask questions and examine them.
- Ask for permission before touching any patient.
- Always remember to keep your questions open ended, do not pose leading questions.
- Remember your nonverbal communication skills. Maintain eye contact and watch your body posturing. Try to sit and talk with your patient rather than standing over them in a threatening way.
- Create an environment in which the patient feels as though they are able to talk freely about their health condition. Never be judgemental.

A good patient interview and thorough history taking can inform you about a patient's presenting problem in a majority of cases.

General Inspection

When you are performing the primary survey you are observing the patients apparent state of health, signs of distress, skin colour, stature, weight, posture, motor activity and gait, dress, grooming and personal hygiene, odours, facial expression, manner, mood and relationship to surroundings, speech and state of awareness.

Documentation of these initial impressions should be brief and serve as a guide and introduction to your subsequent assessment.

Head-to-Toe Examination

The following outline will discuss how to perform a general head to toe survey and includes "red flags". These red flags should alert you to conditions that require response by senior staff within the emergency department. Remember the basics of physical assessment skills.

The collection of data for body systems physical assessment involves skills such as:

- Inspection.
- Percussion.
- Palpation.
- Auscultation.

Head, Face and Neck

Neurological

A general inspection of the patient should always occur. The head–to–toe systematic review should include a full GSC, pupils and posturing.

- Always obtain a full set of observations. Any abnormal changes in these will alert you to serious neurological deficits.
- Obtain a full history of presenting symptoms and past history.
- Patients that present with any of the following should be flagged to a senior nurse/medical officer:
  - Patient on anticoagulants
  - Contact with infectious diseases
  - Co morbidities: Such as atrial fibrillation, diabetes and hypertension
  - History of drug and alcohol abuse
  - Pregnancy
  - Recent LP or epidural.

Abnormal GCS/AVPU
Tachycardia
Fever
Pain (score + description)
Vomiting
Abnormal respiratory rate and/or rhythm
Any abnormal pupilary response
Hypotension
Photophobia
Haemiplegia (+ onset of symptoms)
Seizure

Head Injury

- If a patient has presented with any trauma to this region, look for lacerations, abrasions, contusions, penetrating objects, external bleeding, ecchymosis, and any deformities.
- Feel for subcutaneous emphysema (air under the skin).
- Airway review is most important. If the airway is compromised look for signs of obstruction. These could be a displaced tongue, pharyngeal swelling, foreign bodies (especially teeth), oedema, hemorrhage and secretions such as vomitus. Always alert senior staff to any airway problems.
- Remember – with any head injuries always maintain adequate C-spine precautions.

Abnormal GCS/AVPU	**Any abnormal pupilary response**
Tachycardia	**Hypotension**
Pain	**Vomiting**
Seizure	**Abnormal respiratory rate and/or rhythm**

Facial injuries

- Look for asymmetry of the face to alert you to facial fractures.
- Ask the patient to clench their teeth (if conscious). This can often determine if the patient has a mandible or maxillary fracture as their bite will not be normal.
- Palpate all areas of the skull (occipital, frontal and temporal regions, zygoma, maxilla and mandible) comparing one side of the face to the other documenting symmetry, abnormal mobility, pain, crepitus and any step deformities. The frontal sinus, an air cell with thin surrounding bone is the most vulnerable to injury in the upper third, the zygomas in the middle third and the mandible in the lower third.
- Look for clear or bloodied discharge from ears or nose to ascertain if there is a CSF leakage. Using a Glucometer, test for glucose in clear fluid from the nose or ears. If there is glucose present, this is CSF and not rhinnorea.

Eye Injuries

Please refer to the "Eye Emergency" booklets that should be found in every Emergency department, or online through the CIAP website http://www.ciap.health.nsw.gov.au. Make yourself familiar with its location and how to search for specific presenting problems.

- Ensure a full history of presenting problems and past medical/surgical history is taken. Document any first aid treatment.
- Ascertain pain score and determine any visual alterations.
- For any acid/alkali burns irrigate eye until pH is normal.
- If in doubt, ask senior ED personnel.

Altered vision	**Pain**
Foreign body	**Chemical injury**

Throat

As the throat is the opening for the airway it is important to identify any airway compromise. It is important to document any immunisation history for children that present with any throat pain as it could alert you to underlying conditions. Patients that present with any of the following should be flagged to a senior nurse/medical officer.

- Cancer: i.e. head or neck/throat cancer.
- Allergies with history of anaphylaxis.

Obstructed airway	**Stridor**
Foreign body	**Altered vital signs**
Fever	**Swelling, difficulty with swallowing**
Allergic reaction	**Throat injury from trauma**

Spinal

All patients that present with a head injury, trauma or altered GCS from unknown pathology should have a hard collar applied until the neck can be cleared either clinically or radiologically by a senior staff member.

Clinical indicators of urgency

- Mechanism of injury.
- Pain.
- Alerted sensation or power to limbs.
- Priaprisim.
- Incontinence.

Chest

Chest pain or chest related conditions such as shortness of breath are one of the most common presentations to the emergency department. The purpose of cardiovascular examination is to assess the function of the heart, its valves, carotid artery and jugular veins in the neck, and the peripheral arterial and venous sections. In general, we are assessing the hearts effectiveness as a pump for the delivery of oxygenated blood to the organs and structures of the body.

Both respiratory and cardiovascular physical assessment requires the prior knowledge of anatomy and physiology, normal structure and function before determining abnormal findings. ***Please review the appropriate chapters in an anatomy and physiology textbook.*** Chest pain can be from cardiac events, disease processes, trauma, musculoskeletal or lung conditions. Respiratory conditions can not only manifest themselves as the primary problem, but can develop from other causes. Hence the importance of a systematic head-to-toe examination. The following table summarises the main causes of chest pain.

Differential Diagnosis of chest pain according to location (Edward 1995, p72)

Location	Differential Diagnosis	
Retrosternal	Myocardial infarction Aortic Dissection Pulmonary Embolus	Oesophageal Pain Mediastinal Lesions Pericardial Pain
Interscapular	Myocardial Ischaemic Pain Gall Bladder Pain	Musculoskeletal Pain Pancreatic Pain
Right Lower Anterior Chest	Gall Bladder Pain Subdiaphragmatic Abscess Gastric or Duodenal Ulcer Acute Myositis	Liver Distention Pneumonia/Pleurisy Pulmonary Embolus Injuries
Epigastric	Myocardial Ischaemic Pain Oesophageal Pain Pancreatic Pain Liver Distension Pneumonia	Pericardial Pain Duodenal/gastric pain Gall Bladder Pain Diaphragmatic Pleurisy
Left Lower Anterior Chest	Intercostal Neuralgia Myositis Splenic Infarction Subdiaphragmatic Abscess Injuries	Pulmonary Embolus Pneumonia/Pleurisy Splenic Flexure Syndrome Precordial Catch Syndrome
Arms	Myocardial Ischaemic Pain Cervical/Dorsal pain	Thoracic Outlet Syndrome
Shoulder	Myocardial Ischaemic Pain Subdiaphragmatic Abscess Cervical Spine Disease Thoracic Outlet Syndrome	Pericarditis Diaphragmatic Pleurisy Acute Musculoskeletal Pain

A health history is imperative for these patients and must include:

- *Biographical and Demographic Information.* Information such as age, gender and socioeconomic status are all information that can point the assessor towards risk factors.
- *Current Health History.* Assessing current health status involves identification of major systems, presenting problems or complaints such as chest pain, shortness of breath or any other symptom/complaint which initially may not appear to be related to the cardiovascular system.
- *Previous Health History.* When obtaining a health history it's important to determine whether the problem is acute or chronic. Previous medical records should be obtained and used where ever possible. Any medical or surgical history should be noted. Examples may include angina, hypertension, renal disease, diabetes, vascular disease and hypercholestraemia.
- *Family History.* A patient's family history may assist the assessor in identifying risk factors that are contributing to their present complaint.
- *Personal and Social History.* The individual's personal and social habits may also point the assessor towards possible risk factors. For example: cigarette smoking, ingestion of legal and/or illegal substances, and low activity levels may provide important information.

It is important to perform a complete assessment of the chest including inspection, palpation, percussion and auscultation.

INSPECTION:

- Inspection will involve observation of the patient's general appearance. Here the main priority is ensuring adequate perfusion and oxygenation to the brain and vital organs. The first observation made is that which may indicate the patient is distressed. This may include the body position of the patient, evidence of pain and shortness of breath.
- The work or effort of breathing and any signs of respiratory distress should be noted and managed.
- Look for signs of cyanosis. **Central:** (serious sign requiring immediate intervention) manifests as a bluish appearance of the mucus membranes, nose and mouth. It is a result of a decrease in oxygen saturation. **Peripheral:** peripheral cyanosis is related to poor cardiovascular function. When hypotension and reduced blood flow states occur, the peripheries (toes and fingers) exhibit a dusky blue colour. This directly relates to poor peripheral circulation.
- Examine extremities: Observation of the extremities should be incorporated into any chest assessment in order to determine adequacy of peripheral circulation. This includes both upper and lower limbs. Abnormalities may include:
  - *Clubbing of the fingers* – enlargement of the distal phalanges which is associated with a chronic hypoxic state, eg: chronic lung diseases (fibrosis, bronchiectasis, cancer) or chronic septal defects of the heart.
  - *Generalised Oedema* – such as upper and lower limb pitting oedema, may indicate right heart dysfunction.
  - *Pulmonary Oedema* may indicate left ventricular dysfunction, as with generalised oedema this is caused by increased capillary hydrostatic pressure, therefore increasing the movement of fluid into the lung interstitial space.
- Finally, inspection of the thoracic cage or anterior chest should include: Observation of any deformity of the thoracic cage such as kyphosis or scoliosis (which may indicate structural abnormalities causing pulmonary dysfunction). Also note chest expansion and symmetry, respiratory rate, signs of respiratory distress or shortness of breath, and use of any accessory muscles to facilitate ventilation.

Palpation

When assessing the chest, a variety of areas need to be palpated. These include:

- ***Arterial pulses*** which are palpated over the entire body. The arteries that should be palpated as part of the cardiovascular assessment include:
  - Radial artery – arms
  - Ulnar artery – arms
  - Brachial artery – arms
  - Dorsalis Pedis artery – legs
  - Popliteal artery – legs
  - Femoral artery – legs
  - Carotid artery – neck
  - Temporal artery – head
- Thorax – Symmetrical expansion of the thorax on inspiration and expiration. Equal hand placement over the posterior surface and anterior surface of the thorax and noting any asymmetrical movement of the hands during inspiration and expiration. This may indicate unequal lung expansion due to a variety of reasons.
- Palpate the trachea for midline positioning particularly in the intubated/ventilated patient. The trachea may be deviated (tracheal deviation) by being pushed or pulled. The trachea is pushed over to the opposite side in a tension pneumothorax, or pulled to the same side as in atelectasis.
- Other findings that may indicate right heart dysfunction include hepatic enlargement caused by increased venous pressures due to the poor pumping ability of the right ventricle. Hepatic enlargement may be identified during the palpation of the abdomen.
- Always perform a blood pressure

Percussion

It is crucial during respiratory assessment to compare one side with the other. For example, when percussing the posterior chest, your first listening point is the top left, the second is the top right. Always compare left to right.

Auscultation

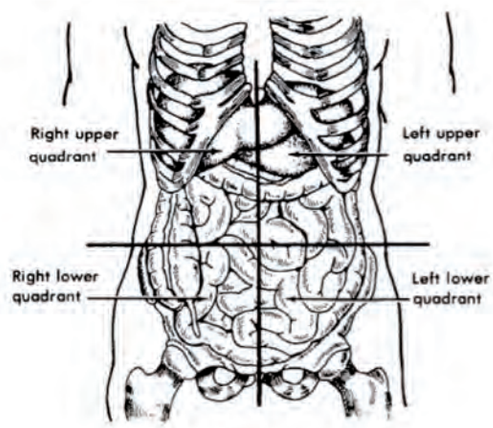
- The skill in respiratory auscultation is recognising the sound produced and knowing where that sound is occurring and why. It is important that you practice listening to lung sounds, comparing what is normal to what is abnormal. Also ask senior emergency department staff to clarify breath sounds. Normal breath sounds can be separated into 4 groups:
  - Tracheal: heard over the trachea in the neck both anteriorly and posteriorly. The sound is very loud and has equal inspiratory/expiratory phases.
  - Bronchial: heard best over the area of the manubrium (top of the sternum). The sound produced is loud but not as loud as the tracheal sounds. Expiratory sounds last longer than inspiratory.
  - Broncho-Vesicular: often heard over the 1st and 2nd to the left and right side of the sternum (anteriorly) and between the scapula (posteriorly). The duration of inspiratory and expiratory sounds are equal.
  - Vesicular: heard over most of both lungs, is soft in sound with inspiratory sounds lasting longer than expiratory.
- You can also auscultate for heart sounds, bruits or murmurs.

- Altered vital signs particularly respiratory rate
- Fever
- Abnormal/absent breath sounds
- Ability to talk in words, sentences
- Work of breathing
- Medications taken
- Onset of symptoms
- Foreign bodies
- Recent travel, recent surgery
- Pregnancy
- Family history
- Marfan's disease
- Recreational drug use
- Co-morbidities including past cardiac/respiratory illness, diabetes.

Abdomen

Abdominal pain is another of the most common causes of presentations to the ED. It can be challenging due to the diversity of clinical signs and symptoms. The abdomen is the largest cavity in the body housing a number of organs and can therefore present several variables.

As with previous systems assessments, the history is an important aspect of abdominal examination and requires prior knowledge of anatomy and physiology, normal structure and function before determining abnormal findings. ***Please review the following diagram.*** Imaginary anatomical lines used to divide the abdomen into 4 quadrants.



Right Upper (RUQ) Small bowel Liver and Gallbladder Pylorus Duodenum Head of Pancreas Hepatic flexure of colon Portions of ascending and transverse colon Right adrenal gland Portion of right kidney	**Left Upper (LUQ)** Small bowel Left lobe of liver Spleen Stomach Body of Pancreas Splenic flexure of colon Portions of transverse and descending colon Left adrenal gland Portion of left kidney
Right Lower (RLQ) Small bowel Cecum and appendix Portion of ascending colon Lower pole of right kidney Right ureter	**Left Lower (LLQ)** Small bowel Sigmoid colon Portion of descending colon Lower pole of left kidney Left ureter

Reference: http://www.free-ed.net/

The term "acute abdomen" pertains to any sudden spontaneous, non-traumatic disorder which manifests itself within the abdomen. "Acute" is recognised as meaning severe and having a short course but with regard to abdominal pain it can mean an onset of minutes to hours but may also have been persisting for days. Rapid assessment, diagnosis and treatment is imperative. Surgical intervention may be required.

Causes of abdominal Pain

- Gastrointestinal.
- Vascular.
- Metabolic.
- Cardiorespiratory.
- Genitourinary.

Causes can categorised into eight "groups":

- GIT.
- Liver, spleen and biliary tract.
- Pancreatic.
- Urinary tract.
- Gynaecological.
- Vascular.
- Peritoneal.
- Retroperitoneal.

Types of abdominal pain

Visceral

- Caused by stretching of the fibers that innervate the walls or capsules of hollow or solid organs. Visceral pain arises from the actual organ.
- Mediated by autonomic nerve fibres (nociceptors).
- Character: Diffuse, poorly localized, ill-defined, intermittent, sensation of gas.
- Typically midline.
- Most common form of pain.
- Accompanied by:
  - Nausea
  - Vomiting
  - Diaphoresis
  - Tachycardia/hypotension
  - Pallor
  - Restlessness
  - Abdominal wall spasms
- Causes: Appendicitis, Pancreatitis, Cholecystitis, Intestinal Obstruction, Period pain to labour pain.

Referred pain

- Perceived at a site distant from affected organs.
- Distant site innervated at the spinal level of affected organs.
- Associated with visceral pain.

Types and locations of abdominal pain

Disorder	Visceral pain	Referred pain
Abdominal aortic aneurysm	Central abdominal and back pain	Back
Appenditis	Periumbilical pain to right lower quadrant pain	Right shoulder pain
Bowel obstruction, small	Epigastric or periumbilical pain	Midback (rare)
Cholecystitus, acute	Middle epigastric pain	Right shoulder/scapula
Diverticulitis	Left lower quadrant pain	
Mesenteric ischemia	Diffuse midabominal pain	
Nephrolithiasis	Groin and back pain	
Pancreatitis, acute	Middle epigastric or periumbilical pain	Back, left flank, and left shoulder
Pelvic inflammatory disease	Lower abdominal pain	
Peptic ulcer disease	Upper abdominal epigastric pain	Back pain

Reference: Bartley (2008) p 38

Parietal (Somatic)

- Caused by direct irritation (inflammation) of the somatically innervated parietal peritoneum. Urine, gastric secretions, pus, bile etc. leads to precisely localised pain.
- Usually described as occurring in one of the four quadrants or in the epigastric or central abdominal area.
- Parietal pain may be due to ulcer perforation, or can develop after visceral pain as in appendicitis when visceral distention progresses to inflammation.
- Patients will lie still, knees up to prevent stimulation of the peritoneum.
- Aggravated by changes in peritoneal tension (palpation, movement, coughing, sneezing).
- More localized to site of underlying disease.

It is important to perform a complete assessment of the abdomen including inspection, palpation, percussion and auscultation. The abdomen is the only section where palpation is performed last. This is because of associated or perceived pain the patient may experience. In any abdominal examination we inspect, auscultate, percuss then palpate.

Inspection

- The acronym, SIGNEL, can be utilised for inspection. Look for:
  S scars
  I intestinal movement
  G generalised swelling
  N nodules
  E enlarged/engorged veins
  L local swelling
- General appearance (jaundice, pale, diaphoretic).
- Position
  - visceral pain sufferers tend to roll around, trying to get comfortable
  - peritonitis sufferers tend to lie still and even knocking the bed can exacerbate the pain.

Auscultation

Auscultation of the abdomen is useful in assessing a variety of abdominal and abdominal vascular abnormalities. These include:

- Bowel Sounds (bowel motility).
- Arterial Stenosis
  - Aorta (abdominal)
  - Renal artery
  - Iliac artery
  - Femoral artery.

The four common types of sounds you will hear on auscultation are:

Sound	Cause
Normal "Chuckle"	Sound indicating peristaltic waves.
No Sounds	Non Mechanical Paralytic ileus Peritonitis – Chemical – Bacterial
High Pitch (Hyperactive)	Dilated bowel Resolving ileus Bowel obstruction (partial)
Tinkling/Metalic Sounds (likened to wind chimes)	Colicky Bowel Obstruction (complete)

When auscultating the abdomen there are several rules which need to be followed.

These include:

- Auscultation of all quadrants.
- Examination of quadrants follows a clockwise or anticlockwise direction.
- Allowing more than 4 minutes to determine the presence of bowel sounds.

If an abnormality is heard, concentrate on listening to this area in more detail to elicit further information. Familiarisation of normal bowel sounds and actively searching for patients which may have an ileus or other obstruction is helpful to practice abdominal auscultation.

Percussion

Percussion of the abdomen is performed to detect a variety of mediums; air, fluid or solid structures. Percussion can assess gaseous distension, fluid (such as ascites) and the position and size of solid structures.

Percussion may be performed independently or in conjunction with palpation. It is best to percuss first, note any abnormalities and return to this area for palpation. The reason for this is that palpation of a painful area may create discomfort to the patient and affect the ongoing finding of the abdominal assessment.

Abdominal areas, which are percussed, include:

1. Liver
2. Spleen
3. Stomach
4. Bladder
5. Lateral surfaces for fluid levels (ascites)

Palpation

There are important considerations when assessing a patient's abdominal pain. Ensure that the patient has had adequate analgesia before commencing any palpation. If the patient is in pain they will become tense and make it impossible for you to perform an adequate abdominal assessment.

- Stand on the right side of the bed.
- Warm your hands.
- Gentle touch.
- Relaxed patient.
- One pillow under head.
- Start in quadrant where least pain is present.
- Perform a light palpation in all 4 quadrants to ascertain pain, then perform deeper palpation.
- Document
  - Localised tenderness
  - Cough tenderness
  - Signs of Peritonism
  - Boardlike rigidity.

Common abdominal presentations

Ectopic Pregnancy (& rupture)

An ectopic pregnancy occurs when the fertilised ovum is implanted anywhere other than the endometrium of the uterus. It could be implanted in

- an ovary
- the abdominal cavity
- or most commonly, one of the fallopian tubes.

It is one of the major causes of maternal death secondary to rupture and haemorrhage. Ectopic pregnancy must be suspected in all females presenting with abdominal pain that are of child bearing age.

Aetiology

- Patient may give a history of being pregnant (6-12 weeks, can vary).
- Pelvic pain (can be mild to severe).
- May have referred pain.
- May have vaginal bleeding.

Treatment

- Immediately alert senior medical and nursing staff to patient's condition.
- Management & treatment of the unstable patient is aimed toward haemodynamic support.
- Administer O_2.
- Large bore cannulas in anticipation of life threatening haemorrhage.
- Volume resuscitation.
- Analgesia.
- Prepare for OT.
- Psychological support.

Appendicitis

Appendicitis occurs when there is an obstruction of the entrance to the appendix leading to decreased blood supply and bacterial invasion. If untreated the appendix can become gangrenous and perforate leading to a localised abscess or generalised peritonitis.

Aetiology

- Most commonly a disease of persons 10-30 years.
- Abdominal pain and/or cramping. Classically starts as generalised then localises to the right iliac fossa.
- Can be associated with nausea, vomiting or diarrhoea.
- On examination patient may be guarding lower abdomen and commonly lying supine with hips and knees flexed as is most comfortable.

Treatment

- NBM.
- IV fluids.
- IVA/B.
- Analgesia.
- +/- NG tube for gastric distention.
- OT.
- If treating conservatively, IVA/B, IV fluids.

Abdominal Aortic Aneurysm: (AAA) rupture/dissection

An aneurysm is an irreversible dilatation of an artery secondary to a localised weakness of the arterial wall. The aneurysm may predispose the artery to thrombosis, distal embolisation or rupture. The majority of aneurysms (80%) occurs in the abdominal aorta but can occur anywhere along the aorta. ***This condition is life threatening requiring immediate intervention.***

Aetiology/Signs and Symptoms

- Most common in people 50-70 years.
- Risk factors including high cholesterol, HT, smoking, diabetes and hereditary factors.
- Severe central back pain, may radiate to legs, groin or lower back.
- Excruciating sub-sternal chest pain.
- Dyspnoea.
- Orthopnoea.
- Diaphoresis.

- Pallor.
- Apprehension.
- Syncope.
- Tachycardia.
- Hypotension.
- Hemi/paraplegia.
- Shock.

Treatment

- High flow O_2.
- 2 large bore cannulas.
- IV Fluid.
- Analgesia/antiemetic.
- If patient has hypovolaemic shock:
  - ABC
  - Volume resuscitation
  - Prepare for OT (cross match)

Pancreatitis

Pancreatitis is an inflammation of the pancreas. It can be acute or chronic. The mechanism is not clear. The two chief causes are gallstones and ETOH. Other causes include hypothermia, trauma and infection. Pancreatitis can range from mild pancreatic oedema to frank necrosis and haemorrhage.

Aetiology/Signs and symptoms

- The disease affects more men than women.
- Severe epigastric pain +/- radiation to the back.
- Nausea.
- Vomiting.
- Sweating.
- Anxiety.
- Fever.
- Mild jaundice.
- +/- hiccups, indigestion, clay coloured stools.

Treatment

- O_2.
- Strictly NBM.
- IV access and commence fluid resuscitation (most important as in pancreatitis there are massive fluid shifts from the intravascular space to the peritoneum resulting in hypovolaemia) use Saline or Hartmanns.
- Analgesia/antiemetic.
- Intravenous antibiotics.
- Close observation.
- NGT.
- IDC.
- Monitor fluid balance.

- **Altered vital signs including fever**
- **Location of pain**
- **Mechanism of injury**
- **Pain score > 5**
- **Pain radiation**
- **Associated symptoms: vomiting, diarrhoea, malaena, haematemesis.**

Limbs

A complete head to toe assessment is not complete without looking at all limbs. There are a number of underlying structures in all our limbs including:

- Skin.
- Vessels.
- Nerves.
- Tendons.
- Muscles.
- Bones.
- Joints.

It is important to document the following:

- Mechanism of injury
  - +/- trauma
  - Inversion/eversion.
- Ability to weight bear.
- Pop/Click/Snap at time of injury.
- Swelling – Immediate/delayed + degree.
- Pain location/severity/night pain.
- Locking/giving way/reluctant to use.
- Previous surgery/injuries.
- Systematic Symptoms – fever.

It is important to look, move and feel when assessing limbs:

- Look for swelling, redness/bruising, deformity and scars. Remember to compare both sides, look under bandages and splints as appropriate.
- Move the limb – hyperextension, abduct, oppose, extend, flexion and rotation.
- Feel for bony tenderness, pulses and increased warmth.
- Don't ever forget to assess the 5 'P' on all limb injuries:
  - Pain
    - Location of pain in relation to injury
    - Intensity of pain
    - Increase of pain indicates can indicate: increased oedema forming secondary nerve compression, lack of blood supply, or soft tissue damage
    - RECORD PAIN SCORE.
  - Pulse
    - Distal to injury site
    - Major peripheral pulse locations
    - Upper – brachial, radial, ulnar
    - Lower – femoral, popliteal, posterior tibialis & dorsalis pedis (10% population congenitally have no dorsalis pedis pulse – Schoen 1986)
    - Compare limbs bilaterally.

- Paresthesia
  - Check sensation distally & proximal to injury site
  - Assess major nerve function
    - Upper – radial, ulnar & median
    - Lower – peroneal & tibial
  - Assessment. Using the eye closed technique, provide light touch bilaterally and note any increase/decrease in sensation, numbness or tingling.
- Pallor
  - Skin colour & temperature
  - Capillary refill – if above < 3 seconds it is abnormal
  - Note location of change
    - Above injury – indicates venous impairment
    - Below injury – indicates arterial impairment
  - Remember to always compare both sides.
- Paralysis
  - Check movement distal to injury. Any paralysis may indicate – peripheral nerve injury, spinal cord injury or brain injury
  - Document the types of movement:
    - Active movement.
    - Passive movement.

Treatment

R.I.C.E. is the most important initial treatment you can provide for all limb injuries. This includes:

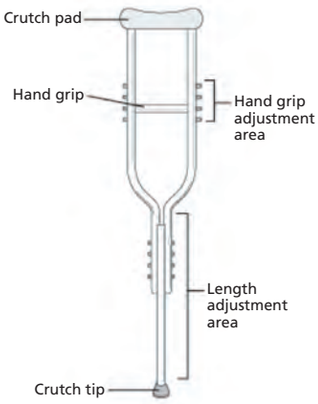
- Rest – prevent further damage.
- Ice – reduce swelling.
- Compression – Swelling & analgesia.
- Elevation –increases vascular return & decreases oedema.

As an emergency nurse you will also need to be able to apply slings and crutches. This will aid the patient by resting the limb, thus preventing further pain. The following diagrams will help you to apply these simple and effective devises. It is important that you practice these techniques. Always ask someone senior to guide you when putting them on a patient for the first time

Slings

There are many different types of slings available. The following is a guide only. Make sure the patient is seated and their elbow is bent at a 90 degree angle. Their hand should be slightly higher than the elbow. Place the long section in the centre of the patient body. Tie the two ends around the neck, and place a safety pin at the elbow to prevent the sling from movement around the arm.

http://www.ncsba.org/risk/ArmSling.jpg



Crutches

Make sure that the crutch pads (top of crutches) are about 2-3 finger lengths below the armpits. Elbows should be flexed about 15-30 degrees. The patient should be using the handgrip for support and not leaning on the crutch pads.

http://www.footphysicians.com/footankleinfo/crutches.htm

- **Ability to weight bear**
- **Uncontrolled haemorrhage**
- **Severe pain**
- **Mechanism of injury**
- **Boney tenderness**
- **Neurovascular compromise**
- **Altered vital signs**
- **Obvious deformity.**

2.7 COMMUNICATION WITH PATIENTS AND RELATIVES

The emergency nurse needs to build a rapport with each patient. Establishing rapport facilitates the communication of information, helps build sufficient trust and familiarity to proceed with the examination and investigations, and improves patient compliance. Effective communication will ensure patients understand their treatment plan and are involved in their care.

The following suggestions will help you to facilitate communication:

- Introduce yourself to both the patient and their relatives/carers. Inform them of your position
- Include the patient in explanations and treatment plans and use language the patient understands
- Encourage patients to ask questions in relation to their care.

2.8 CLINICAL COMMUNICATION

ISBAR (Introduction, situation, background, assessment, recommendation) is an acronym that provides you with a framework of structured communication and has been adopted for use in the health care setting. The ISBAR tool has been adapted where effective communication is critically important. Please refer to ISBAR within your workplace settings.

NSW Ambulance to ED Handover Project

The 'NSW Ambulance to ED Handover Project' was established to develop and implement a handover protocol ensuring the smooth transfer of pre-hospital care into the acute setting. The transfer of accurate and appropriate information or 'handover' between health care professionals is essential to both patient safety and outcomes.

This tool is designed to cater for all handovers including trauma and medical. The protocol is known as **IMIST-AMBO**.

Identificaton

Mechanism/Medical complaint

Injuries/Information relating to the complaint

Signs

Treatment & Trends (includes interventions and response to treatment)

Allergies

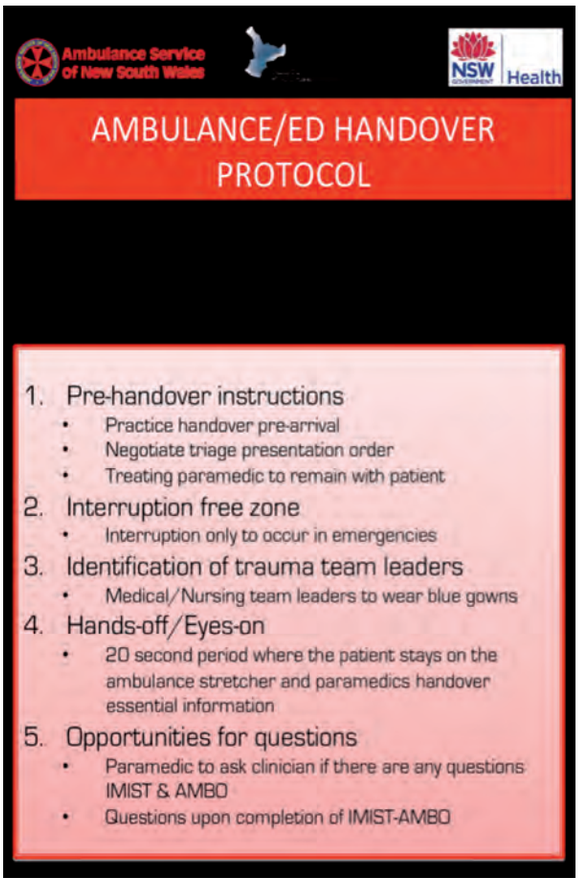
Medications

Background history

Other information

New processes surrounding handover have also been implemented these aim to ensure correct delivery and reception of the information. Essential process changes include:

- Not interrupting handovers.
- Identification of team leaders to the other clinicians.
- Protected time for paramedics to deliver the essentials of the handover.
- Opportunity to ask questions.



Conclusion

Presentations to emergency departments are varied, ranging from the critically ill to patients simply seeking advice. You can help ensure optimal patient outcomes if you strive to achieve excellence in observation, history-taking and patient assessment. In determining the severity of the patient's illness and the need for intervention, information will be relied upon including accurate history and clinical signs.

Understanding pattern recognition, physiology and the importance of clinical/historical indicators of urgency in the undifferentiated patient will enable you to prioritise, trouble shoot and deliver optimal emergency care. This, coupled with reassessment of patients in response to nursing interventions, is the core to the emergency assessment process and consequently, patient safety and satisfaction.

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3 Airway

3.1 LEARNING OUTCOMES

On completing this module, you will be able to competently assess and manage a patient presenting to the emergency department with a compromised airway. In particular, you will be able to:

- Demonstrate the process of airway assessment and recognise signs of a compromised airway.
- List the common causes of airway obstruction.
- Identify common clinical presentations requiring urgent airway assessment and management.
- Perform airway-opening manoeuvres.
- Demonstrate techniques for clearing the airway and inserting airway adjuncts.
- Demonstrate effective bag-valve-mask (BVM) ventilation.
- Identify mechanisms of injury that would indicate cervical spine vulnerability.
- Correctly measure and apply cervical spine immobilisation devices.
- Describe a variety of patients presenting to emergency who may require intubation.
- Assist in intubation[2].

3.2 INTRODUCTION

Airway management is an important first step in the care of all patients, as an obstructed airway ultimately leads to problems with oxygenation. Failure to manage a patient's airway successfully can result in severe adverse outcomes, including brain injury, myocardial injury, airway trauma, and death.

In terms of patient care, cervical spine management is always assessed and managed at the same time as the airway.

Untreated airway obstruction leads to lower blood oxygen levels, hypoxic damage to vital organs, cardiac arrest and/or death.

Airway obstruction can be partial or complete.

When the airway is completely obstructed, there are no breath sounds at the nose or mouth, as air is unable to move past the obstruction.

Partial obstruction of the airway may be demonstrated by subtle signs only, so thorough assessment is important.

What causes airway obstructions?

Upper airway obstructions may be caused by:

- Obstruction of the pharynx by the tongue – caused by sedation, position of the patient's head or the patient being neurologically compromised.
- Vomit, secretions, blood or gastric fluid.
- Tissue swelling from trauma, allergy or infection.

Lower airway obstructions may be caused by:

- Tracheobronchial obstruction – due to secretions, inhaled gastric contents or foreign bodies, pulmonary oedema fluid or bronchospasm (asthma).

Unless you open or clear the airway you will be unable to oxygenate the patient.

[2] Achievement of this learning outcome will be dependant on facility's policy and procedure & participant's role and function

3.3 THE RESPIRATORY SYSTEM

The respiratory system

Read the respiratory chapter of any Anatomy and Physiology textbook to review the normal respiratory anatomy and physiology. (This material will not be covered in this section – it is assumed knowledge as it is taught at undergraduate level, so please familiarise yourself with the content.)

Complete Activity 4 in the Participant Workbook

3.4 AIRWAY ASSESSMENT

Follow these four steps to assess the patient's airway.

Is the patient responsive?

In approaching the patient, firstly assess their responsiveness:

- If the patient is awake and talking appropriately to you, this is a good indication that they are able to maintain their airway.
- If a patient has a decreased level of consciousness, their ability to maintain their airway may be compromised. The patient's tongue may fall posteriorly into the oropharynx and obstruct the airway – this is the most common cause of airway obstruction.
- Generally, a patient with a Glasgow Coma Scale of 8 and below is unable to protect their airway and will require airway management of some description. Patients who are unable to maintain their airway are also at increased risk of vomiting and aspirating gastric contents into their airway/lungs.

Look

- Observe the patient's chest rise and fall and evidence of respiratory effort.
- Are their respirations slow or fast?
- Observe the patient's colour – look for signs of cyanosis.
- Open the patient's mouth and inspect the airway for signs of obstruction, eg vomitus, loose teeth or other foreign bodies.
- Observe how the patient is positioned.

Listen

- Listen for breath sounds – are they present? Note the rate, rhythm and depth of ventilation.
- Is the patient's breathing noisy? The following noises may indicate an obstructed airway:
  - Gurgling – may indicate the presence of fluid in the mouth or upper airway.
  - Snoring – may indicate pharynx is partially obstructed by the tongue.
  - Dysphonia (hoarse voice) may be heard in relation to trauma (blunt or thermal injury) and may lead to airway oedema. Ask the patient if their voice sounds normal to them.
  - Inspiratory stridor – may be caused by an obstruction above or at the level of the larynx usually due to foreign body or oedema. The noise is made as sir tries to pass through the partially obstructed airway.
  - Wheeze – indicates a lower airway obstruction, eg bronchospasm in asthma).

Feel

- Feel at the mouth and nose for expired air.
- Feel for chest rise and fall.

3.5 AIRWAY MANAGEMENT

Airway-opening manoeuvres

In a high proportion of cases, simple airway opening manoeuvres such as 'Head Tilt Chin Lift' and 'Jaw Thrust' will relieve airway obstruction. These should be familiar to you from Basic Life Support.

The jaw thrust manoeuvre is to be used in patients with suspected spinal injury as the cervical spine is not hyper-extended.

Clearing the airway

- Use Magill's forceps to remove large objects.
- Use a wide bore rigid (Yankauer) catheter to suction fluid.
- To remove secretions lower than the pharynx, use a flexible (Y-suction) catheter inserted down an airway adjunct, such as an oropharyngeal airway or a nasopharyngeal airway.

Airway adjuncts

Airway adjuncts, such as an oropharyngeal airway or a nasopharyngeal airway, are used for:

- Airway maintenance for unconscious patients.
- Bag-valve-mask ventilations.
- Preventing the patient biting ETT.
- Suctioning.

When using the oropharyngeal (Guedels) airway:

- Use caution when inserting.
- Measure from the centre of the teeth to angle of jaw.
- Insert concave up then rotated 180 degrees (adults only).

When using the nasopharyngeal airway:

- Use in patients with seizure activity.
- Insertion may cause epistaxis.
- Do not use in patients with facial trauma or base of skull fractures.
- Measure from nasal nare to the tragus of ear.
- Lubricate well, bevel facing septum, direct posteriorly and rotate slightly.
- May be better tolerated in patients that have a gag reflex as it does not touch the soft palate and induce a gag reflex like the oropharyngeal airway does.

Assess the effectiveness of your Interventions

- Reassess the patient to see if there has been a change in their condition.
- Reassess level of consciousness and then look, listen and feel as described in airway assessment.

3.6 CERVICAL SPINE IMMOBILISATION

Note the following regarding suspected cervical spine injuries:

- **Assume a cervical spine injury unless proven otherwise.**
- **Think about the mechanism of injury.**
- **Apply a correctly fitted rigid cervical collar if not already in situ and instigate full spinal precautions.**
- **The rigid cervical collar is a one-piece polyethylene rigid collar available in six sizes. The purpose of a rigid cervical collar is to provide temporary neck immobilisation.**
- **If a patient presents to the emergency department with a rigid cervical collar in situ, you must still check that it is the correct size for the patient.**
- **A rigid cervical collar is kept in situ until the spine has been cleared according to emergency department protocol.**

Complete Activity 5 in the Participant Workbook

3.7 OXYGENATION

Following assessment of the airway and implementation of any airway management strategies oxygen is applied using an oxygen mask or BVM ventilation.

Oxygen mask

When using an oxygen mask, note that:

- The oxygen delivery device and amount delivered (L/min) will be guided by the patient's current condition and the reason for applying the oxygen.
- Assume until further reassessment that a patient who has a compromised airway requires high flow oxygen.
- If the patient is not breathing after the airway has been established, ventilation will need to be commenced via bag-valve-mask ventilation.

Bag-valve-mask ventilation

Bag-valve-mask (BVM) ventilation allows for oxygenation and ventilation of patients until a more definitive airway can be established.

- BVM ventilation requires a good seal between the mask and around the nose and mouth, and a patent airway.
- To create a good seal whilst maintaining the airway use the thumb and index finger to apply downward pressure on the mask then use your 3rd, 4th and 5th fingers to pull patient's jaw up and open the airway.
- When conducting BVM, airway adjuncts can assist the operator by helping to maintain the airway so the operator can focus on achieving a good seal.
- Certain factors predict difficult BVM ventilation. These include the presence of facial hair, lack of teeth, a body mass index (BMI) greater than 26, age older than 55 years, and a history of snoring.
- Obtaining a good seal with the mask whilst maintaining the airway to allow for ventilation, are very difficult skills to master and require lots of practice!

Complete Activities 6 and 7 in the Participant Workbook

3.8 INTUBATION

When physical manoeuvres and oro/nasopharyngeal airways are unsuccessful in establishing an airway, endotracheal intubation is required. The risk of complications with this procedure is markedly increased. The risk of hypoxia increases significantly if the procedure is not completed within 30 seconds, so it is important to have all necessary equipment on-hand.

Although the majority of nurses will only ever assist the doctor with intubation, it is very important to have a good understanding of the procedure so that you may provide safe and timely assistance to whoever is performing the intubation.

Depending on which emergency department you work in, **this may not be a skill you undertake until well after you finish this transition program**. It is included in this Program as different emergency departments will have different expectations of clinicians.

Complete Activities 8 and 9 in the Participant Workbook

3.9 INTUBATION DRUGS

General anaesthetic agents

Complete Activity 10 in the Participant Workbook

Neuromuscular blocking agents

Neuromuscular blocking agents are also referred to as '**paralysing agents**'. In effect, neuromuscular blocking agents in some way block or inhibit the process of nerve stimulation at the neuromuscular junction. These drugs DO NOT provide any sedative effects.

Neuromuscular blocking agents are divided into two types: **depolarising muscle relaxants** and **non-depolarising muscle relaxants**, as outlined below.

Depolarising muscle relaxants (suxamethonium) mimic the action of acetylcholine on nicotinic receptors. Unlike acetylcholine, these agents are not destroyed by acetylcholinesterase, so their action is sustained. Paralysis is achieved in the patient as the drug blocks the repolarisation of the motor end plate. What you will see in the patient is immediate muscle spasm (or muscle fasciculations) of all of their muscles. This lasts briefly, then the muscles go flaccid and the patient is paralysed. Because of their short time to onset (0.5 seconds) and short half-life (about five minutes), depolarising muscle relaxants are the drug of choice in the emergency department for rapid sequence intubation unless contraindicated.

Non-depolarising muscle relaxants (eg Vecuronium, rocuronium, pancuronium) work by flooding the nicotinic receptors by competing with acetylcholine (or acting as an antagonist). This result in non-depolarisation of the motor end plate, the muscles stay flaccid, and paralysis is achieved.

The non-depolarising muscle relaxants have an advantage over the depolarising agents in that their action can be reversed with the drug Neostigmine. The non-depolarising agents have various times of onset and duration. Some can take a full 3–5 minutes to begin working. For this reason they are not useful in the emergency department for rapid sequence intubation, but are used more often for ongoing paralysis of the patient.

Ensure paralysing agents are administered AFTER sedating agents. Ongoing administration of a sedating and paralysing agent will be required post anaesthetic induction.

Cricoid pressure

Is not used in all intubations, however it is a technique used to:

- Prevent aspiration of stomach contents into the lungs.
- Assist visualisation of the cords.

Cricoid pressure is used in situations where the patient has a known full stomach or if fasting times are unknown. Situations such as trauma, acute intra-abdominal pathology (eg appendicitis), pregnancy and hiatus hernia are also considered.

The finger and thumb of the right hand are placed on the cricoid ring and pushed firmly back with the pressure that would be painful if placed on the bridge of the nose.

If pressure is applied to the thyroid cartilage it distorts the larynx and makes intubation more difficult.

Intubation procedure

Step 1 Check the equipment

Prior to an intubation, all equipment should be checked and readied. Ensure the correct size laryngoscope blade (No 3 for women, No 4 for men) is in position and the bulb is bright and secure.

The endotracheal tube is prepared (with lubricant) and cuff checked for leakage by inflating it. Ensure the cuff has been fully deflated prior to use.

Step 2: Hyper-oxygenation

The patient is hyperoxygenated with 100% oxygen for three minutes. The airway may need to be suctioned. Partial plates and dentures may be removed prior to intubation. Oxygen saturations are monitored via pulse oximetry and if available CO_2 monitoring.

Step 3: Administration of induction agent

An intravenous induction agent is administered. Once enough time has passed for induction to occur a muscle relaxant is then administered.

Step 4: Apply Cricoid pressure

Step 5: Position the patient

The patient is placed in the supine position, with the head in moderate extension (unless there is a suspected spinal injury, in which case in-line stabilisation will need to be provided) and elevated 3-4 cm above the level of the table or bed

Step 6: Place the ET tube

- The laryngoscope blade is introduced gently into the right corner of the mouth. It is then centred, which displaces the tongue to the left.
- The jaw is displaced forward as the blade is advanced until the epiglottis is visualised.
- With the vocal cords in view, the ET tube is passed along the edge of the blade, between the vocal cords, through the larynx, and into the trachea until the cuff is 1 cm below the cords.
- Stylets (if present) are removed. The cuff is inflated to prevent aspiration and the laryngoscope removed.

Step 7: Patient care following tube placement

- The ET tube is connected to the source of ventilation. If required, the patient is actively oxygenated and suctioned.
- Endotracheal intubation is confirmed on capnography/$ETCO_2$ sensor (demonstrated by expired CO_2) and auscultation. This is important to ensure correct tube placement and exclude endobronchial intubation.
- The epigastrium is auscultated to ensure the absence of sounds – indicating air may be entering the stomach.
- A chest X-ray may also be used to check tube placement. The tip of the tube should be visible on x-ray about 3 cm above the carina.
- The cuff remains inflated to prevent aspiration of gastric contents, but with only enough air to prevent a gross leak while positive pressure is maintained.
- When correct positioning of the tube has been confirmed, the tube is taped/tied securely to prevent descent or slipping out of the tube.
- Observe and document the depth of the ET tube, measured at the teeth.
- Observe and document indicators of adequate oxygenation and perfusion such as colour.
- Monitor the patient's respiratory rate, pulse oximetry, pulse rate, blood pressure, end tidal CO_2, and ECG. Document as per hospital policy.

Step 8: Check tube placement

Following intubation a chest xray is indicated to identify tube placement.

Cricoid pressure can only be released at the Airway Doctor's instruction based on the following six tube placement indicators being satisfied:
- **ET tube is visualised to have passed through the vocal cords.**
- **Witnessed bilateral rise and fall of the chest during ventilation.**
- **Auscultation of air entry in bilateral lung fields.**
- **Confirmed ET tube capnography/$ETCO_2$ sensor.**
- **Maintenance or improvement in patient colour.**
- **Maintenance or improvement in SpO_2.**

Complete Activity 11 in the Participant Workbook as required.

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4 Breathing

4.1 LEARNING OUTCOMES

On completing this module, you will be able to competently assess and manage a patient presenting to the emergency department with breathing difficulties. In particular, you will be able to:

- Describe the normal principles of respiratory anatomy and physiology.
- List the key components of a respiratory history.
- Demonstrate basic skills in performing a respiratory assessment including inspection, auscultation, palpation and percussion.
- Describe the common adventitious sounds that may be heard on auscultation.
- Interpret clinical findings of a patient with a breathing disorder.
- Describe the common diagnostic tools used to assess a patient with a breathing disorder including their purpose.
- Identify normal arterial and venous blood gas levels.
- Demonstrate the use of a peak flow meter and/or spirometer.
- Define the common lung volumes.
- Describe the common oxygen delivery devices including the flow per minute and fraction of inspired oxygen delivered.
- Identify the indications for NIPPV.
- Describe the nursing considerations when caring for a patient on NIPPV.
- Describe the mode of action, indications and potential side effects of the common medications used to treat patients with a respiratory disorder.

4.2 INTRODUCTION

The primary function of the respiratory system is to deliver oxygen to the cells and eliminate carbon dioxide (CO_2) from the body (Levitzky, 2007). In addition to gas exchange, the respiratory system fulfils a number of other important functions. These include:

- Regulating acid base balance through the elimination of CO_2 from the body.
- Filtering and removing inspired particles to protect the body from infection and facilitate removal of inhaled foreign particles.
- The metabolism of important substrates that are necessary for normal pulmonary function (Levitzky, 2007).

Complete Activity 12 in the Participant Workbook

Mechanics of Breathing

Breathing is an active process that consists of two phases: inspiration, expiration and a pause (Brown & Edwards, 2008). During inspiration the diaphragm contracts and moves downwards, increasing the volume of the thoracic cavity. At the same time the intercostal muscles pull the ribs up expanding the rib cage, further increasing the thoracic volume. As the volume of the thoracic cavity increases it lowers the air pressure in the alveoli to below atmospheric pressure. Because air flows from a region of high pressure to a region of lower pressure the change in pressure gradient results in air rushing into the respiratory tract and alveoli (Brown & Edwards, 2008). During expiration the reverse occurs as the diaphragm and intercostal muscles relax the thoracic cavity returns to its original volume, increasing the air pressure in the lungs. When the air pressure in the thoracic cavity exceeds atmospheric pressure air is forced out (Brown & Edwards, 2008).

Gas Exchange

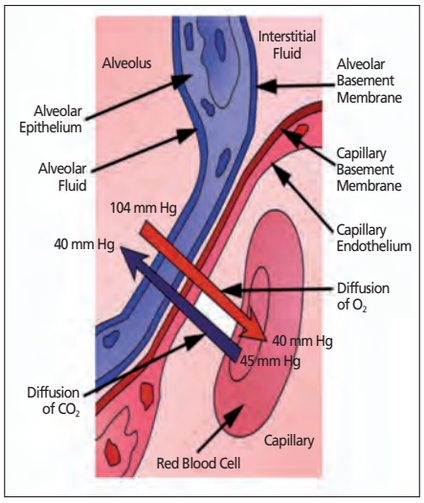

Figure 1: Diffusion of Gases

The exchange of carbon dioxide and oxygen occurs in the alveoli through a process of osmotic diffusion (Porth, 2006). Systemic venous blood entering the pulmonary capillaries has a higher PCO_2 and a lower $P0_2$ than the alveoli. The difference in partial pressure of oxygen and carbon dioxide on either side of the capillary membrane results in net diffusion of gases from an area of higher concentration to lower concentration (Porth, 2006). That is oxygen diffuses from the alveoli to the blood and carbon dioxide moves from the blood to the alveoli. As capillary blood Po_2 increases and the PCO_2 decreases and equilibrium is reached diffusion ceases (Porth, 2006). The normal partial pressures of oxygen and carbon dioxide at both the alveoli and capillary end are depicted in the image.

Source: http://www.pdh-odp.co.uk/Swot%20 Diffusion%20 of%20Gases.htm

The rate of diffusion of gases across the alveolar membrane is influenced by four factors (Porth, 2006). These include:

- *Surface area available:* The surface area available may be decreased by a number of conditions. These include atelectasis, resection of lung tissue, or emphysema. If the total surface area of the lung is diminished by approximately one-third to one-fourth of normal the exchange of gases through the membrane is significantly inhibited (Tintinalli, Gabor, Kelen, Stapczynski, Ma, Cline, 2004).
- *Thickness of the alveolar-capillary membrane:* The thickness of the membrane is rarely a significant barrier to the transfer of CO_2. As O_2, is 20 times less soluble than CO_2, however, it is affected by any increase in the diffusion distance (Tintinalli et al, 2004). Common conditions that increase the diffusion distance are pulmonary oedema and pulmonary fibrosis.
- *The difference in the partial pressure of gases on either side of the membrane:* The pressure difference on either side of the respiratory membrane is the difference between the partial pressure of the oxygen and carbon dioxide in the alveoli and their partial pressure in the blood. When breathing room air the difference between the partial pressure of alveolar oxygen (PAO_2) and the partial pressure of arterial oxygen (PaO_2) is normally 2-10mmHg. In high altitudes where the partial pressure of oxygen is reduced diffusion of oxygen across the membrane will be reduced. Conversely if we increase the partial pressure of oxygen in inspired air by providing supplemental oxygen the diffusion capacity will be increased (Porth, 2006). The difference between $PACO_2$ (alveolar carbon dioxide) and $PaCO_2$ (arterial carbon dioxide) is normally zero (Tintinalli et al, 2004). An increase in the difference between the partial pressure of alveolar carbon dioxide and arterial carbon dioxide is attributed to an increase in alveolar dead space (Tintinalli et al, 2004). Alveolar dead space refers to the alveoli that are ventilated but not perfused thus it does not participate in gas exchange resulting in dilution of the alveolar carbon dioxide (Tintinalli et al, 2004).
- *The characteristics of the gas:* Carbon dioxide is 20 times more soluble than oxygen so diffuses across the membrane more rapidly (Porth, 2006).

4.3 LUNG VOLUMES

Lung volumes and capacities vary with the age,height, weight and sex of the person (Levitzky, 2007). The four standard lung volumes and four standard lung capacaities measure different features about the lungs. Normal physiological processes and certain physiological changes that occur with certain respiratory disorders can alter the normal lung volume and capacities (Levitzky, 2007). Understanding the normal values and what feature of the lung is being measured assists in identifying those with potential respiratory disorders.

Complete Activity 13 in the Participant Workbook

4.4 RESPIRATORY ASSESSMENT

History-taking

History-taking provides the basis and direction for the physical examination of the patient that presents with a respiratory disorder (Urden, L.D., Stacy, K.M. & Lough, M.E., 2006). If a patient is in acute distress, the history-taking should be restricted to the presenting problem and precipitating events until their distress has been alleviated. If the patient's condition permits, essential elements of the patient's history should be collected prior to physical examination.

Physical examination (the four techniques)

The four techniques used to physically examine a patient who presents with a respiratory disorder are: inspection, palpation, percussion and auscultation (Urden et al, 2006), as outlined below.

1. Inspection

Inspection involves direct purposeful observation of the patient. Ensure the patient's chest, neck and abdomen are appropriately exposed. Note the following:

General appearance

- Observe the patient's general appearance and colour including the colour of mucous membranes and nail beds. Is there any sign of central or peripheral cyanosis? Cyanosis is a sign of reduced transport of oxygen and occurs when more than 5 g Hb/100 mL of arterial blood is in the deoxygenated state (Levitzky, 2007).
- Is the patient pursing their lips together when breathing? Pursing of the lips on expiration is a common feature of chronic airways limitation (Levitzky, 2007).
- Are the patient's digits clubbed? Clubbing of the fingers may be indicative of chronic hypoxaemia.
- Observe the patient's position. Patients with acute airflow obstruction tend to sit and lean forward to facilitate respiration (Colleton, 2008). This is called tripod positioning.

Shape of the thorax. Thoracic malformations are significant to note as they may be indicators of either chronic disease or factors that alter the mechanics of breathing.

Dynamics of respiration. Observing the patient's respiratory dynamics includes noting:

- Respiratory rate. The respiratory rate must be counted for one full minute. The normal respiratory rate is 12 to 18 breaths per minute (Urden LD, Stacy KM and Lough ME, 2006). Bradypnea is defined as a rate of less than 10 breaths per minute and may indicate a number of conditions including raised intracranial pressure, depression of the respiratory centre due to medication, recreational drugs or decreasing level of consciousness (Cretikos, 2008).Tachypnoea is defined as a rate greater than 20 and is an early indication of respiratory distress or severe deterioration in the patient's condition (Cretikos, 2008).

'Respiratory rate has been shown to be an important predictor of serious events such as cardiac arrest and admission to an intensive care unit … a respiratory rate higher than 27 breaths/minute (is) the most important predictor of cardiac arrest in hospital wards'.

- Rhythm. A normal respiratory rhythm has a slightly longer expiratory phase than the inspiratory phase and cycles regularly (Moore 2007). Abnormal rhythms may indicate underlying disorders.
- Symmetry of the expansion of the thorax. Observe for symmetry in chest movement on inspiration and expiration. Paradoxical movement of the chest wall may be indicative of a flail segment (American College of Surgeons Committee on Trauma, 2008). Restricted or asymmetrical chest wall expansion may also be indicative of atelectasis or pleural effusion, unilateral airway obstruction, pulmonary or pleural fibrosis, or splinting from chest pain(Le Blond, Brown and McGowin, 2009; Moore 2007).
- Work of breathing. Observe the patient for the use of accessory muscles during inspiration. The use of accessory muscles of respiration, the sternocleidomastoid, the scalenus, trapezius and/or intercostal muscles indicates high work of breathing. At rest, the use of accessory muscles is a sign of significant pulmonary impairment. Collapse of the abdomen on inspiration indicates weakness of the diaphragm (Le Blond et al, 2009).

Signs of respiratory distress include:

- Nasal flaring.
- Accessorymuscle use.
- Tracheal tug.
- Dyspnoea.
- Abnormal colour- cyanosis, pallor.
- Grunting.
- Difficulty speaking in sentences.
- Tripod positioning(leaning on outstretched arms to improve air entry).
- Decreased level of consciousness.

2. Palpation

Palpation involves palpating the trachea and thorax with the finger pads of your hands to identify areas of tenderness, assess any observed abnormalities, and further assess respiratory excursion. You need to note:

Trachea.

- Observe the position of the trachea.
- Place your forefinger in the suprasternal notch, draw an imaginary line vertically through the notch and compare the position of the trachea. Any deviation from the midline may indicate mediastinal displacement due to pneumothorax, pleural effusion or collapse of a lobe or lung (Porth 2006).

Thoracic wall.

- Palpate the soft tissues including the large muscles of the thorax to elicit tenderness. Feel for soft-tissue crepitus.
- Palpate the intercostal spaces for tenderness and masses.
- Palpate the costal cartilages and palpate the costochondral junctions (the point where the ribs articulate with the sternum).
- Gently palpate the ribs for point tenderness, swelling, or bone crepitus.
- Palpate the xiphisternal joint for tenderness.
- Finally, palpate the soft tissue and ribcage of the posterior surface.

Excursion of the thorax.

- ***Upper thorax.*** Place your hands on each side of the patient's neck with palms against the upper anterior thoracic wall. Curl your fingers firmly over the superior edges of the trapezii. Move your palms downward against the skin until the palms lie in the infraclavicular fossae. Then extend your thumbs so the tips meet in the midline. Ask the patient to inspire deeply. The patient's upper four ribs should move forward with inspiration, and your thumbs diverge from the midline. Any asymmetric excursion may be indicative of a lesion on the lagging side in the chest wall, the pleura, or the upper lobe of the lung (Le Blond et al 2009).
- ***Anterior middle thorax.*** Place your fingers high in each axilla with your thumbs abducted. Move your hands medially until your thumb tips meet in the midline at the level of the patient's sixth ribs. Ask the patient to inspire deeply and your thumbs should move apart equally (Le Blond et al 2009).
- ***Posterior lower chest.*** Ask the patient to sit or stand with their back to you. Placing your fingers in each axilla with your palms resting on the patient's chest and your forefingers one or two ribs below the inferior angles of the patient's scapulae. Ask the patient to inspire deeply, your thumbs should move apart. A unilateral lag is indicative of a lesion in the pleura, nearby wall, or lower lobes of the lung (Le Blond et al 2009).
- ***Costal margins***. Lie the patient supine. Place your hands palms down so the thumbs lie along the inferior edges of the costal margins. Ask the patient to inspire deeply. Normally, the thumbs will move apart. Reduced movement away indicates depression of the dome of the diaphragm; movement inward indicates flattening of the diaphragm dome (Le Blond et al 2009).

3 Percussion

Percussion is performed to determine if the lungs are filled with air, fluid or solid matter (LeBlond et al, 2009). Press the middle or distal phalanx of your middle finger on your non-dominant hand on the patient's chest wall. Tap the finger with the middle finger of your dominant hand in a sharp tapping motion.

Follow the sequence shown in the following diagrams and compare all areas bilaterally.

Commencing with the posterior surface, ask the patient to sit with their head bent forward and arms folded in front to move the scapulae laterally, and expose more of the lung. Then ask the patient to raise their arms overhead and percuss the lateral and anterior chest wall. Ensure you percuss at 4–5 cm intervals over the intercostal spaces and move systematically from superior to inferior and medial to lateral (Seidel, Ball, Dains & Benedict, 2006).

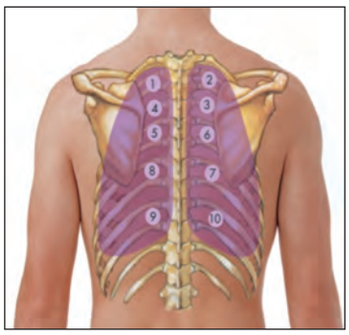

Figure 3.17 Posterior Chest Wall

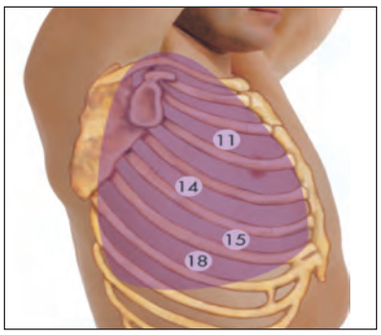

Figure 3.18 Lateral Chest wall

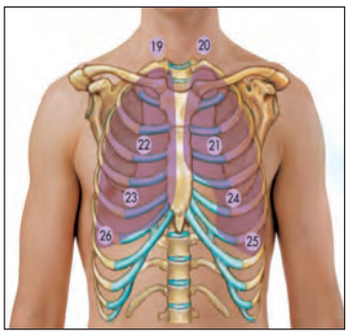

Figure 3.19 Anterior Chest wall

Source: Adapted from Seidel: Mosby's Guide to Physical Examination

Because the lungs are primarily 95% air you should expect to hear resonant sound (a low-pitched, hollow sound) over normal lung tissue (Seidel, et al). Flat or very dull sounds are found over solid areas such as bone. Dull or thud-like sounds are heard over solid organs. If you hear dull sounds over lung tissue it is indicative that the air containing lung tissue contains fluid or solid tissue such as occurs in the presence of pneumonia, pleural effusions or tumours. Hyper resonant sounds (louder and lower pitched than resonant) indicate the presence of hyper inflated lungs and may indicate pneumothorax or emphysema. Tympanic sounds are hollow, and drum-like and indicate the presence of excessive air such as that which occurs with a tension pneumothorax (Seidel, et al).

4. Auscultation

Auscultation of the chest is performed to assess air movement through the tracheo-bronchial tree and to identify the presence of abnormal sounds (Urden et al, 2006).

The technique involves placing the diaphragm of the stethoscope on the patient's chest wall, and listening to the sound generated as the patient breathes in and out as you move the stethoscope around the patient's chest in the same sequence as described for percussion (Urden et al, 2006).

Breath sounds are best heard in a quiet environment and require the patient to be positioned as follows (LeBlond et al, 2009):

- Posterior thorax – sitting with head bent forward and arms folded.
- Lateral – sitting with arms raised above the head.
- Anterior thorax – sitting with arms down and shoulders back.

Normal breath sounds differ depending on their location, and are classified as vesicular, bronchovesicular, or bronchial (Urden et al, 2006). (See Table below.)

Sound	Characteristic	Location Heard
• Bronchial	• High pitch; loud and long expiration.	• Trachea.
• Bronchovesicular	• Medium pitch; inspiration and expiration are the same duration.	• Main bronchus area and upper right posterior lung field.
• Vesicular	• Low pitch; soft, short expiration; long inspiration.	• Most of lung field.

Source: Adapted from Urden (2006). Thelan's Critical Care Nursing: Diagnosis and Management, 5th ed.

Abnormal breath sounds are commonly referred to as adventitious and include: crackles, wheezes, stridor and rhonchi (Urden et al, 2006). Adventitious sounds can be further divided into continuous or discontinuous sounds.

Complete Activity 14 in the Participant Workbook

4.5 COMMON DIAGNOSTIC TOOLS

Pulse oximetry

Pulse oximetry provides an estimate of a patient's arterial oxyhaemoglobin saturation (SpO_2). The pulse oximeter consists of a light-emitting diode (LED), a photo detector probe and a sensor. The device works by emitting beams of red and infrared light that pass through the pulsating arteriolar bed (Brown & Edwards, 2008). The sensors detect the amount of light absorbed by oxyhaemoglobin and deoxyhaemoglobin in the red blue cells. Oxygenated blood is brighter red than deoxygenated blood, which is more blue-purple in colour. The ratio of red to infrared blood light transmitted gives a measure of the oxygen saturation of the blood (Brown et al). Brown et al defines a normal SpO_2 as 95–100%.

Pulse oximetry is not a suitable substitute for assessing a patient's respiratory rate, as it is not a reliable indicator of adequate ventilation. Pulse oximetry measures the SaO_2 not the patient's CO_2.

Chest X-rays

Chest X-rays may be used as a diagnostic tool to facilitate the assessment of a patient with a respiratory disorder or to ensure that invasive devices – eg endotracheal tubes, nasogastric tubes, and central lines – are in the correct place. They may also be used to review the progression of a disease or review the patient's response to treatment (Brown et al).

The following articles will give you a better understanding of X-rays and a systematic approach of how to interpret them.

Read the article available at http://www.nursingconsult.com/das/journal/view/147862634-2/N/21659789?issn=1089-9472&ja=682700&ANCHOR=text&PAGE=1.html

Blood gas analysis

In many emergency departments, venous blood gases (VBGs) are taken when routine bloods are collected to obtain a baseline Ph and PO_2. An arterial blood gas (ABG) should be taken if an accurate CO_2 result is required. Be aware of local policies in relation to arterial and venous blood gases in your emergency department.

Oxygen should not be removed from patient when an arterial blood gas (ABG) is being taken. The FiO_2 value should be written on the request form so the laboratory is able to better interpret the results.

Computed tomography (CT)

A CT scan creates cross-sectional images of the entire body (Tintinalli, Gabor, Kelen, Stapczynski, Ma, Cline, 2004). The CT scan is used to evaluate areas difficult to assess by conventional x-rays. The patient must be able to lie still as they pass through a gantry that has an X-ray tube on one side and detectors on the other (Tintinalli et al, 2004).

Ventilation perfusion (v/q) scan

The V/Q scan is primarily used to screen for pulmonary embolus (Tintinalli et al, 2004). The ventilation portion involves the patient inhaling a radioactive gas that outlines the alveoli (Tintinalli et al, 2004).

Normal scans show even radioactivity in the vasculature and alveoli. Diminished or absent radioactivity infers a lack of perfusion or airflow (Tintinalli et al, 2004).

4.6 RESPIRATORY FUNCTION TESTS

Peak expiratory flow rates (PEFR)

The peak expiratory flow rate (PEFR) is measured with a hand-held device and reflects the maximum airflow rate generated at the end of a forceful expiration (Brown & Edwards, 2008).

The PEFR primarily reflects the degree of airway obstruction in the larger airways (Neuspiel, 2009). As the measurement is heavily reliant on patient effort, isolated readings must be interpreted cautiously (National Asthma Council Australia, 2006). Generally, the patient must be shown the correct technique. The best of three readings is then compared with the predicted norm. The predicted norm for an individual is based on their height, age and gender (Edwards & Brown, 2008).

Normal values are related to the patient's height as shown in the following table[3].

Height (cm)	PEFR (L/min)*
120	215
130	260
140	300
150	350
160	400
170	450
180	500

Complete Activity 15 in the Participant Workbook.

Spirometry

Spirometry measures how much air moves in and out of the lungs and the degree of airflow limitation. It is the pulmonary function test of choice for the diagnosis of asthma and for determining asthma control (National Asthma Council Australia, 2006). It is also considered more accurate than PEFR for identifying the degree of airway obstruction in COPD. Generally the test is performed before and after the administration of short-acting beta2 agonists.

Complete Activity 16 in the Participant Workbook

[3] Phttp://www.med.monash.edu.au/paediatrics/resources/pefr.html

4.7 OXYGEN THERAPY DEVICES

Oxygen is a colourless, odourless, tasteless gas that is essential for normal cellular metabolism. The air we breathe contains approximately 21% oxygen. The goal of providing supplemental oxygen is to increase the concentration of inspired oxygen to facilitate full use of the oxygen-carrying capacity of the arterial blood, and ensure adequate cellular oxygenation (Urden et al, 2006).

Supplemental oxygen is primarily used to treat hypoxaemia caused by a variety of respiratory disorders. The aim is to reduce the work of breathing, reduce the workload on the heart and maintain the patient's SpO_2 at greater than 90% both at rest and during exertion (Urden et al, 2006).

Prior to commencing supplemental oxygen the patient should have a baseline assessment of their oxygenation status attended unless the patient is unstable. This includes SaO_2, work of breathing, and respiratory rate. Monitoring of the patient's oxygenation status is performed routinely, and the oxygen adjusted until the desired response is achieved. This allows the desired response to be achieved with the lowest dose of oxygen possible (Urden et al, 2006).

The administration of high concentrations of supplemental oxygen to patients with chronic obstructive pulmonary disease may result in a decreased level of consciousness, apnoea and or cardio respiratory arrest. However, unrelieved hypoxia is fatal, so oxygen should never be withheld from a chronic COPD patient. For the COPD patient in respiratory distress, the goal of oxygen therapy is to maintain a SpO_2 of 90% (Tintanelli et al, 2004).

Supplemental oxygen can be delivered by many different devices. These devices may be classified as low-flow or high-flow systems, or reservoir (Urden et al, 2006).

Remember when you breathe in air you are breathing in 21% oxygen. If your patient is requiring a high concentration of oxygen, eg 50–100%, and are saturating at only 95% or below, they have the potential to deteriorate! Increasing supplemental oxygen does not fix the underlying pathology – what it does is highlight that the patient's condition is continuing to deteriorate! To prevent further deterioration, clinicians must regularly re-evaluate therapeutic interventions for effectiveness.

Read the journal article by Pruitt, 'Breathing lessons: basics of oxygen therapy', available on CIAP at http://ovidsp.tx.ovid.com/spa/ovidweb.cgi?&S=FMHMFPMHDBDDOKEFNCFLEDMLHBPKAA00&Link+Set=S.sh.41%7c4%7csl_10

Complete Activity 17 in the Participant Workbook

4.8 NON-INVASIVE POSITIVE PRESSURE VENTILATION (NIPPV)

Benefits of non-invasive positive pressure ventilation (NIPPV)

NIPPV can be described as the delivery of positive pressure ventilatory support via a special face or nasal mask (Tintinalli et al, 2004). Seen as an effective alternative to endotracheal intubation, it has become commonplace in the treatment of many forms of acute respiratory failure (Antonelli and Conti, 2000). The non-invasive nature of the procedure allows easy application and removal, overcomes the complications of endotracheal intubation and has been found to result in a decreased frequency of hospital-acquired pneumonia (Urden et al, 2006).

Contraindications

Contraindications include: uncooperativeness, apnoea, inability to maintain own airway and/or clear secretions, hemodynamic instability, and intolerance of the mask (Urden et al, 2006). Positive pressure ventilation can affect the cardiovascular system (Brown et al, 2008). The increased intro-thoracic pressures associated with NIPPV decrease both preload and after load.

Common methods of NIPPV

The two most common methods of NIPPV that occur in the emergency department are:

- Continuous positive airway pressure (CPAP) ventilation, and
- Bi-level positive airway pressure (BiPAP) ventilation.

These methods of NIPPV are described in the following sections.

Both methods of NIPPV rely on positive end-expiratory pressure (PEEP) to prevent alveolar collapse at the end of expiration (Brown et al, 2008). An initial PEEP setting of 5–10 cm H2O is common. Positive pressure ventilation affects the cardiovascular system, decreasing both preload and after load (Brown et al, 2008). The potential clinical impact of this on patients who are haemodynamically compromised needs to be considered when initiating NIPPV (Brown et al, 2008).

BE AWARE: NIPPV can lower the blood pressure in the patient due to its cardiovascular effects.

Continuous positive airway pressure (CPAP)

Continuous positive airway pressure (CPAP) delivers constant positive pressure during both inspiration and expiration. It can only be used if the patient is spontaneously breathing (Penuelas, Frutos-Vivar and Estaban, 2007). Continuous positive pressure throughout the respiratory cycle acts to improve cardiac output and delivery, functional residual capacity and respiratory mechanics, reduce the effort of breathing and decrease the after load of the left ventricle (Penuelas et al, 2007). In chronic airways limitation, CPAP reduces the work of breathing by offsetting the inspiratory threshold load that is imposed by the positive end-inspiratory pressure that occurs in the presence of airflow obstruction (Penuelas et al, 2007).

Bi-level positive airway pressure (BiPAP)

Bi-level positive airway pressure (BiPAP) uses a combination of inspiratory positive airway pressure (IPAP) and expiratory positive airway pressure (EPAP), resulting in a proportional increase in the mean airway pressure (Crummy & Naughton, 2007). In addition to providing the same effects as CPAP, the increased inspiratory support provided by BiPAP acts to rest fatigued respiratory muscles and reduce the work of breathing (Crummy & Naughton, 2007). EPAP, on the other hand, increases functional residual capacity, resulting in an increased Pao_2 level.

Complete Activities 18 and 19 in the Participant Workbook

4.9 COMMON RESPIRATORY PRESENTATIONS

Asthma

Asthma remains a significant health problem in Australia, with over two million people affected (National Asthma Council, 2006).

Asthma is an inflammatory condition of the airways that results in widespread narrowing of the airways. Common symptoms on presentation include wheezing, chest tightness and breathlessness (National Asthma Council, 2006).

Review the section 'Managing Acute Asthma in Adults' in the Asthma Management Handbook (National Asthma Council, 2006. It is available at http://www.nationalasthma.org.au/cms/images/stories/amh2006_web_5.pdf

Complete Activity 20 in the Participant Workbook

Chronic obstructive pulmonary disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a group of progressive lung diseases characterised by airflow limitation or obstruction that is not reversible (Porth, 2006). The airflow restriction is associated with an abnormal inflammatory response of the lung to irritants and is generally progressive. The diseases that comprise COPD include chronic bronchitis, emphysema and bronchiectasis (Hanley & Welsh, 2003). Common symptoms include chronic cough, hyper secretion of mucus, and dyspnoea on exertion and at rest as the disease progresses. Patients with advanced COPD may show signs of hyperinflation of the lungs, and have decreased breath sounds on auscultation (Hanley & Welsh, 2003).

Read the section 'Managing Exacerbations' in *Australia and New Zealand Guidelines for the Management of Chronic Obstructive Pulmonary Disease* (Australian Lung Foundation and the Thoracic Society of Australia and New Zealand, 2009) available at http://www.copdx.org.au/guidelines/index.asp.

Complete Activity 21 in the Participant Workbook

Pulmonary embolism

A pulmonary embolism is the occlusion of the pulmonary arteries by fat, tumour tissue, air or a thrombus. The occlusion results in partial or complete occlusion of pulmonary arterial blood flow to the lungs. Areas of the lung distal to the occlusion are ventilated but not perfused (Brown & Edwards, 2008).

Read the article by Dressler, 'Death by Clot: Acute Coronary Syndrome, Ischemic Stroke, Pulmonary Embolism and Disseminated Intravascular Coagulation' in *AACN Advanced Critical Care*, 20(2):166-176, April/June 2009. It is available on CIAP at On Line Journals http://www.ciap.health.nsw.gov.au.

Complete Activity 22 in the Participant Workbook

Pneumonia

Pneumonia is an inflammation of the lung (Brown & Edwards, 2008). Common causative organisms include: viruses, fungi, parasites, chemicals, mycoplasma and bacteria (Brown & Edwards, 2008). In addition to classifying pneumonia according to the causative agent, pneumonia is further classified as either community acquired or hospital acquired. Community acquired pneumonia is defined as pneumonia occurring in individuals who have not been hospitalised or who have been in hospital less than 48 hrs (Brown & Edwards, 2008). Hospital acquired pneumonia is defined as pneumonia that occurs 48 hours post hospital admission (Brown & Edwards, 2008).

Read the section on pneumonia in Chapter 63 of *Emergency Medicine: A Comprehensive Study Guide* 6th ed (Tintinalli, 2004) on CIAP Online books.

Complete Activity 23 in the Participant Workbook

Acute pulmonary oedema

Acute pulmonary oedema is defined as an excessive accumulation of fluid in the tissues and alveoli of the lung. Although heart failure is the most common cause, a range of other heart and lung conditions can result in pulmonary oedema. Acute pulmonary oedema is a potentially fatal disorder that must be treated as a medical emergency (Brown & Edwards, 2008).

Read the pulmonary oedema section in Chapter 33 of Harrisons Principles of Internal Medicine – Part Two: Clinical Manifestations and Presentations of Disease, available on CIAP Online books.

Complete Activities 24 and 25 in the Participant Workbook

Pneumothorax

A pneumothorax is defined as a collection of air in the pleural space between the visceral and parietal lining. It may be classified as open or closed, and be either spontaneous or traumatic in nature (Brown & Edwards, 2008). A spontaneous pneumothorax occurs in the absence of any precipitating factor such as trauma. A primary spontaneous pneumothorax occurs in individuals with no underlying pulmonary disease and is generally more prevalent in young taller than average males (Urden et al, 2006). Traumatic pneumothorax will be discussed in the trauma section of the program.

Read the section on Air Leak Disorders in Part IV in Chapter 23 of *Thelan's Critical Care Nursing: Diagnosis and Management, 5th ed (Urden, Stacy and Lough, 2006). It is available on CIAP Online Books.*

Complete Activities 26 and 27 in the Participant Workbook

4.10 NEBULISERS AND METERED-DOSE INHALERS

Metered-dose inhalers and nebulisers are the two types of devices used for aerosol therapy. When used properly, they are equally effective in drug delivery to the lungs (Goodman & Gilman, 2006). Inhalation therapy deposits medications directly, but not exclusively, in the lungs. The distribution of inhaled drug between the lungs and oesophagus is dependent on the particle size and the efficiency of delivery to the lungs (Goodman & Gilman, 2006). About 90% is swallowed and absorbed into the systemic circulation. The remaining 10% is absorbed by the lungs. Optimal particle size for deposition in the small airways is 1–5 µm (Goodman & Gilman, 2006).

4.11 COMMONLY USED MEDICATIONS

The main pharmacological preparations for respiratory disorders include: short-acting beta-agonists, antic-cholinergic bronchodilators, inhaled corticosteroids, oral and intravenous corticosteroids, and leukotreine receptor antagonists.

Review a pharmacology text and the section 'Drugs and Devices' in the *Asthma Management Handbook* (National Asthma Council Australia, 2006) available at http://www.nationalasthma.org.au/cms/images/stories/amh2006_web_5.pdf.

Review the article 'Respiratory Assessment in Adults' available at http://www.snjourney.com/ClinicalInfo/Systems/Resp/RespAss.pdf

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5 Circulation

5.1 LEARNING OUTCOMES

On completion of this module, you will be able to competently conduct a cardiovascular examination and manage a patient who presents with cardiovascular compromise. In particular, you will be able to:

- Demonstrate a greater understanding of how alterations to cardiac anatomy, physiology and electrophysiology are reflected in common clinical presentations.
- Demonstrate the key elements of cardiovascular assessment.
- Explain the fundamentals of acute coronary syndrome (ACS) and management aligned to current evidence-based practice.
- Recognise and identify the classifications of shock and management.
- Outline the important considerations related to fluid and electrolyte management.

5.2 INTRODUCTION TO CARDIOVASCULAR ANATOMY AND PHYSIOLOGY

The circulatory system (or cardiovascular system) is an organ system that moves nutrients, gases, and wastes to and from cells, and helps stabilize body temperature and pH to maintain homeostasis. Inadequate circulation leads to decrease tissue perfusion, cellular hypoxia, anerobic metabolism and eventually metabolic acidosis.

The purpose of cardiovascular examination is to assess the function of the heart, its valves, carotid artery and jugular veins in the neck, and the peripheral arterial and venous systems. In general, we are assessing the hearts effectiveness as a pump for the delivery of oxygenated blood to the organs and structures of the body.

Adequate circulation is needed to oxygenate the brain. Circulation can be impaired because of cardiac conditions, haemorrhage, dehydration, and other medical conditions. Cardiovascular assessment is an integral part of clinically assessing patients that present to the emergency department.

Inspection will involve observation of the patient's general appearance. Here the main priority is determination of the adequacy of perfusion and oxygenation to the brain and vital organs. When performing an "across the room assessment" the focus should be on the major body systems, as it will direct you towards potential life threatening problems. Using the body systems approach, a decrease in cardiac output and function may manifest in the following way.

Respiratory: Alterations in blood flow and pulmonary vascular pressures may result in shortness of breath, respiratory distress, desaturation and pulmonary oedema

Neurologically: A reduction of cerebral perfusion/oxygenation may lead to agitation, restlessness, confusion, irritability and disorientation. Combative behaviour may also be seen.

Renal: A reduction in afferent arteriole blood supply will lead to a reduction in the glomerular filtration rate and urine output, below 0.5 – 1.0 ml/Kg/hr. If not managed this will increase serum urea and creatinine levels resulting in acute renal failure.

Peripheral pulse assessment includes the characteristics which will indicate causal considerations, refer to the following table:

Characteristics	Cause
Weak	• ↓ Cardiac output • Shock
Bounding	• ↑ Cardiac output • Hyperdynamic states • Inotropic therapy
Abnormal Rate	• Bradycardia • Tachycardia • Arrhythmias (heart block)
Irregularity	• Arrhythmias (AF, PVC)

Your ability to conduct a comprehensive cardiovascular assessment is integral to providing patients with the care that they require.

The first step in being able to care for your patient and understand your assessment is to have an understanding of cardiovascular anatomy and physiology.

Complete Activity 28 in the Participant Workbook

To assess your patient's circulatory system, use the 'look, listen and feel' technique. Document and escalate your findings if not within normal parameters.

Circulatory assessment

Circulation Assessment	Assessment Tips Do I need to act before progressing?
Inspection – Look	To ascertain if the patient is safe Look for: • Colour – pallor, cyanosis, mottling. • Work and rate of breathing. • Level of consciousness. • External haemorrhage. • Internal haemorrhage – swelling/distension, discolouration under skin. • Decreased urine output as a result of under-perfused kidneys.
Auscultate – Listen	• Heart sounds
Palpate – Feel	• Palpate pulses for quality, rate and rhythm, both centrally and peripherally – see Table 2. • Skin temperature/moisture, diaphoresis (excessive sweating). • Capillary return – is capillary refill time >2 seconds?
Severe Limb Injury	• Is the case of a limb injury threatening the viability of the limb? Neurovascular observations are essential.

Complete Activity 29 in the Participant Workbook

ECG/rhythm strip interpretation

Basic ECG/rhythm interpretation is an essential nursing skill for staff working in the emergency department. Your ability to identify the abnormal ECG/rhythm and escalate your findings appropriately will determine the presence and extent of the patient's problem, identify subsequent changes from the baseline, and reduce the risk of adverse events (ACCN: 2007:228).

Complete Activities 30 and 31 in the Participant Workbook

Become accredited in basic life support with an expectation to progression and accreditation in advanced life support. Your individual hospital will have resources to enable this, see your facilitator or support person for more information.

RESOURCE

Access the Australian Resuscitation Council online at www.resus.org.au for all current guidelines.

5.3 FLUIDS AND ELECTROLYTES

Fluids are used in the emergency setting for a number of clinical presentations including shock. Crystalloids and colloids refer to two different types of IV fluids used for volume management in critically ill patients:

- **Crystalloids** refer to normal saline, Hartmann's solution and dextrose solution.
- **Colloids** refer to blood products, fresh frozen plasma, platelets, albumin and gelofusine.

Adequacy of IV fluid replacement depends on strict, ongoing evaluation and frequent adjustment. Frequent monitoring of serum electrolyte levels is also required, the selection of fluid to successfully resuscitate haemodynamically unstable patients has been a controversial topic in critical care, however no evidence to date can recommend one type of fluid over the other.

Table 4. Clinical Manifestations of Electrolyte Imbalance

Electrolyte imbalance	Clinical manifestations
Hypocalcaemia	• Numbness with tingling of fingers. • Hyperactive reflexes. • Muscle cramps. • Tetany and convulsions. • Alterations in mental status may include anxiety, depression, and frank psychosis. • In chronic hypocalcemia, fractures may be present as a result of bone porosity. • Sudden precipitous drops in plasma calcium levels may cause hypotension from vasodilation and heart failure from decreased myocardial contractility.
Hypercalcaemia	Symptoms are usually absent unless the calcium concentration is greater than 11 mg/dL. • Lethargy. • Weakness. • Anorexia. • Nausea. • Vomiting. • Polyuria (from nephrogenic diabetes insipidus). • Itching. • Bone pain. • Fractures. • Flank pain (from renal calculi). • Depression. • Confusion. • Paresthesias. • Personality changes. • Stupor. • Coma.
Hypokalaemia	• Muscle weakness. • Dysrhythmias (especially premature ventricular contractions (PVCs). • ECG changes (eg, flattened T wave, presence of U waves).
Hyperkalaemia	• ECG changes associated with hyperkalemia (ie tall peaked T wave and widened QRS)
Hyponatraemia	• Neurologic symptoms usually do not occur until the serum sodium level has dropped to approximately 120 to 125 mmol/L or less. Seizures, coma, and permanent neurologic damage may occur when the plasma sodium level is less than 115 mmol/L. • Patients at increased risk for neurologic complications of hyponatraemia include children, premenopausal women, polydipsia psychiatric patients, older adult patients on thiazide diuretics, and hypoxic patients. • Hyponatraemia with decreased ECF volume: Irritability, apprehension, dizziness, personality changes, postural hypotension, dry mucous membranes, cold and clammy skin, tremors, seizures, and coma. • Hyponatraemia with normal or increased ECF volume: Headache, lassitude, apathy, confusion, weakness, oedema, weight gain, elevated blood pressure, muscle cramps, convulsions, and coma.
Hypernatraemia	• Symptomatic hypernatremia occurs only in individuals who do not have access to water or have an altered thirst mechanism (eg infants, older adults, those who are comatose). • Intense thirst. • Fatigue. • Restlessness and irritability. • Altered mental status.

Source: Heitz & Horne: Pocket Guide to Fluid, Electrolyte, and Acid-Base Balance, 5th ed.

Circulatory assessment and management interventions including venous access is the cornerstone of emergency treatment for the maintenance and resuscitation of presenting patients.

Adequacy of IV fluid replacement depends on strict, ongoing evaluation of the patient's fluid balance and hydration status and appropriate adjustment. This is to ensure the patient is not dehydrated or fluid overloaded. This can be achieved by assessing the patient regularly, keeping a strict fluid balance chart, and assessing the patient's electrolytes, urea and creatinine blood levels.

To ensure a strict fluid balance is maintained, the patient may require the insertion of an indwelling bladder catheter. Catheterisation for male patients requires specialist training – each individual facility will have its own training and requirements.

Shock is defined as circulatory insufficiency that creates an imbalance between tissue oxygen supply and oxygen demand. The result of shock is global tissue hypoperfusion and is associated with a decreased venous oxygen content and metabolic acidosis (lactic acidosis). Shock is classified into four categories by aetiology: hypovolaemic, cardiogenic, distributive and obstructive.

It is important to recognise the early clinical signs of shock to prevent the patient from being coming critically unwell and dying.

Due to compensatory mechanisms, a patient's blood pressure may be normal despite the presence of shock.
Always escalate patient care if you are concerned that they are in shock.

Read http://www.nursingconsult.com/das/journal/view/180656383-2/N/21537466?ec=true&ja=673989&PAGE=1.html&sid=945443735&source=EM&summaryresults=true&SEQNO=1

Complete Activities 32 and 33 in the Participant Workbook

Acute coronary syndromes

Acute coronary syndromes (ACS) are disease processes that include unstable angina, non-ST – segment elevation acute coronary syndrome (NSTEACS) and ST – elevation myocardial infarction (MI) (STEMI). ACS is a major cause of death amongst Australians, and effective systems of care are required to deliver optimal care.

A 12-lead electrocardiogram (ECG) continues to be the most reliable, quick, inexpensive and non-invasive tool in the diagnosis of myocardial ischaemia and infarction when used in conjunction with an associated history and clinical assessment.

Acute coronary syndromes – treatment and management

The treatment and management of ACS is a rapidly evolving field and the current focus is on multiple therapeutic modalities. This approach is based on the pathophysiology of the coronary artery thrombus, the purpose of which is to disrupt the thrombus and restore adequate blood flow. Aspirin, Heparin and thrombolytics antagonise the elements associated with thrombi and clot formation by different mechanisms.

To prevent ischaemia and, ultimately, cardiac tissue death, rapid and complete restoration of patency of the infarct-related artery is the key to preserving myocardial muscle and improving survival outcomes. An analysis of clinical trials in humans suggests that patients presenting within two hours of symptom onset benefit most from reperfusion therapy. However, benefits may still be realised up to 12 hours after onset of symptoms. Effective assessment and access to timely care impacts on the long-term outcomes in cardiac patients.

Percutaneous coronary intervention (PCI) has been considered as the gold standard as a reperfusion strategy provided it can be performed promptly by a qualified interventional cardiologist in an appropriate facility; this is not available in all facilities across NSW.

Complete Activity 34 in the Participant Workbook

REFERENCES AND RESOURCES

NSW Health (2009). *Acute Coronary Syndrome,*
http://www.health.nsw.gov.au/resources/quality/sabs/pdf/sn20090428.pdf

NSW Health, CIAP website for interactive ECG tutorials.

Merriam-Webster (2008). Circulation Diagram Source.
http://visual.merriam-webster.com/human-being/anatomy/blood-circulation/principal-veins-arteries.php

Ambulance Technician Summary (2006). ECG Picture Source.
http://www.ambulancetechnicianstudy.co.uk/rhythms.html

Elliott, D., Aitken, L., Chaboyer, W. (2007). *ACCCN's Critical Care Nursing,* Chapter (10) pp215-262)

The Medical Journal of Australia (2010). 'Guidelines for the management of acute coronary syndrome 2006', vol (8), no8.

Heitz & Horne, 'Pocket Guide to Fluid, Electrolyte, and Acid-Base Balance', in *Mosby's Nursing Consult* (2009). '5th ed, Accessed through CIAP http://www.ciap.health.nsw.gov.au

Huszar, 'Basic Dysrhythmias: Interpretation & Management', in *Mosby's Nursing Consult* (2009). 3rd ed. Accessed through CIAP

Morgan, G. E., Jr, Mikhail, M. S., Murray, M. J., 'Fluid Management & Transfusion' (Chapter 29), in Morgan, G. E., Jr, Mikhail, M. S., Murray, M. J., *Clinical Anaesthesiology,* 4th ed, Accessed through CIAP

Potter, P. and Perry, A. (2001). *Fundamentals of Nursing,* 5th edition Mosby.

Useful websites:

- Trauma www.trauma.org
- Stroke www.strokefoundation.com
- Cardiac www.csanz.edu.au
- Heart foundation www.heartfoundation.org.au

6 Disability

6.1 LEARNING OUTCOMES

By completing this section you will gain a greater understanding of how to assess and treat patients presenting to the emergency department with alterations to their neurological function. In particular, you will be able to:

- Understand the anatomy and physiology of the nervous system.
- Accurately and confidently perform a neurological assessment.
- Demonstrate how to interpret the neurological findings and treat accordingly.
- Describe the common neurological presentations to the emergency department.
- Describe and demonstrate the nursing considerations when caring for a patient with abnormal neurological activity.

6.2 INTRODUCTION

'The emergency nurse encounters a variety of neurologic emergencies related to illness or injury, including stroke, head trauma, spinal cord trauma, headache, and meningitis. Regardless of cause, a neurologic emergency is one that causes severe temporary or permanent disability or is an immediate threat to the patient's life'(Brown and King 2009).

The purpose of assessing a patient's neurological function is to evaluate their level of consciousness, identify deterioration and prevent secondary brain injury. As symptoms can be subtle, an understanding of normal neurological function is imperative.

Regardless of the disorder, your priority is always to assess and treat the patient's airway, breathing and circulation. Only once you have done this should you assess the patient's neurological status.

Brain physiology

Brain activity requires a constant flow of blood. This is achieved by three key processes:

- Cerebral blood flow (CBF) – the blood supply to the brain in a given time.
- Cerebral perfusion pressure (CPP) – the difference between arterial flow into the brain and venous flow out.
- Intracranial pressure (ICP) – the state of continuing changes in pressure of the brain.

These terms are explained below.

Cerebral blood flow (CBF)

Cerebral blood flow (CBF) is the blood supply to the brain in a given time. Normal CBF is about 750 mL/minute. CBF is directly related to the metabolic rate of cerebral tissue, oxygen, carbon dioxide and pH).

The brain's ability to maintain a constant cerebral blood flow, despite changes in perfusion pressure, is called auto-regulation. This is done in response to:

- Intrinsic factors – levels of O_2, CO_2, H-+ change the flow of blood through the brain vessels through vasoconstriction and vasodilatation.
- Extrinsic factors – changes in systolic BP. This only works to a certain point; once the mean arterial pressure goes outside the range of 60–150 mm Hg, auto-regulation fails and small changes make big differences to CBF.

Cerebral blood flow is critically dependant on constant levels of oxygen and glucose. There are no storage areas in the brain, so levels of oxygen and glucose will run out after three minutes if a constant flow is not maintained.

Cerebral blood flow is also affected by changes in carbon dioxide in the blood:

- ↑CO_2 →vasodilatation.
- ↓CO_2 →vasoconstriction.

Cerebral perfusion

Cerebral perfusion pressure (CPP) is the pressure required to drive blood into the brain and perfuse it. The rate of blood flow to the brain is critically dependent on two factors:

1. Mean arterial pressure (MAP): Patients need a Mean Arterial Pressure of at least 90mmHg to perfuse their brain.
2. Intracranial pressure (ICP): is the state of continuing changes in pressure of the brain, blood and cerebro-spinal fluid (CSF) volumes. The normal pressure is < 10 mm Hg.

   The skull is a rigid structure filled to capacity with non-compressible elements. Its contents include:

   - Brain 80%.
   - Cerebro-spinal fluid 10%.
   - Blood 10%.

   An increase in one constituent or an expanding mass within the skull leads to an increase in intracranial pressure. This is known as the 'Monroe-Kellie doctrine' (Lindsay & Bone, 2001:73).

   The Monroe-Kellie doctrine states that a small increase in volume of brain, CSF or blood is compensated for by a decrease in volume of another.

   So, if there is raised intracranial pressure, the body will try to compensate by decreasing the total volume in the skull. There are several different ways that this can occur:

   - CSF can be reabsorbed into the sub-arachnoid space.
   - Blood volume can be reduced – small intracranial veins compress, others vasoconstrict.

This compensatory mechanism will only work until these processes are maximised – once this occurs you will see significant rises in ICP with small blood volume changes.

Causes of Raised ICP

- Expanding mass eg tumour.
- Cerebral oedema.
- Increase in cerebral blood volume.
- Increase in CSF.

The following effects can then occur:

- Cerebral oedema.
- Hydrocephalus – dilatation of venous system when CSF production exceeds the absorption rate.
- Intracranial hypertension.
- Herniation or "coning".

To prevent secondary brain injury cerebral perfusion pressure (CPP) should be kept between 70-90 mm Hg. Cerebral perfusion = MAP – ICP

- If CPP is low (<50 mm Hg), hypoperfusion and ischaemia of the brain can result.
- If CPP is high (>150 mm Hg), cerebral oedema and hypertensive encephalopathies can result.

6.3 NEUROLOGICAL ASSESSMENT

A reduction in level of consciousness can lead to serious complications that include airway compromise and aspiration.

Use AVPU

AVPU is a mnemonic to describe a rapid assessment of a patient's level of consciousness. The letters stand for:

A **Alert – is the patient alert?**

V **Verbal stimuli – does the patient respond to verbal stimuli?**

P **Painful stimuli – does the patient respond to painful stimuli?**

U **Unresponsive – is the patient unresponsive?**

The Glasgow Coma Scale

The Glasgow Coma Scale (GCS) provides a universal scale by which to measure a patient's level of consciousness and response. It is used to assess eye opening, best verbal response and best motor response. The total score is the sum of the scores in the three categories.

The range is from 3–15; patients with scores of 3–8 are usually said to be in a coma. Coma is defined as:

- Not opening eyes,
- Not obeying commands, and
- Not uttering understandable words.

Although widely used in the emergency department, the GCS has some limitations and must therefore be used in conjunction with your clinical judgement. Limitations of the GCS include:

- The patient may have had pre-hospital analgesia/sedation.
- Patient may have associated injury (eg spinal injury).
- It is not appropriate for children under 3 years.
- A deceased person can score 3 on the Glasgow Coma Scale!!

E + M + V = a score of 3 to 15

A score of 8 is critical, as this is the level at which the patient is no longer able to protect their airway. 'Less than or equal to 8 – intubate'.

A drop of 2 points on the GCS is also significant and must be escalated to a senior member of the ED team.

Complete Activity 35 in the Participant Workbook

Assessing the patient's neurological function provides information about changes to cerebral perfusion. You will notice that the early and late warning signs of raised ICP correspond to elements of a neurological assessment.

You can use a number of tools to assess a patient's neurological function. The first step in the assessment process is to ask yourself the following questions.

Look

- Is the patient safe?
- Can the patient maintain their own airway?
- What is the patient's respiratory rate?
- Is the patient moving spontaneously?
- Does the patient respond to external stimuli?
- Does the patient have a steady gait?
- What does examination of the pupils indicate (size, equality and reaction to light)?
- Are there any risk factors to be aware of – diabetes, recent administration of sedatives, analgesics or anaesthetic drugs, hypoxaemia, trauma, seizure activity, neurological compromise etc?

Listen

- Is the patient's verbal response appropriate?
- Is their speech slurred?
- Does the patient appear confused?

Feel

- How does the patient respond to pain?
- Is the patient unresponsive to all external stimuli?
- What is the patient's blood glucose level?

6.4 HOW TO OBTAIN A HEALTH HISTORY

Patients experiencing a problem with their neurological system will often present to the emergency department with symptoms of headache, visual disturbances, dizziness, faintness, confusion, impaired mental status, disturbances with balance or gait, and changes in their level of consciousness or behaviour (Springhouse, 1998:283).

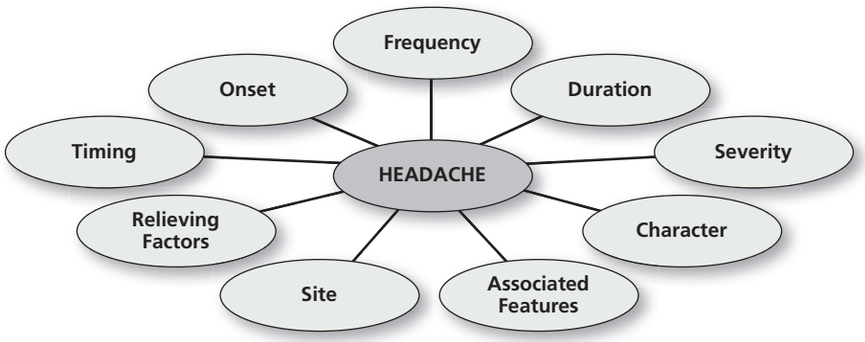
Headache history

Patients may present to the emergency department with a headache, but the cause can be due to a variety of reasons. Part of your assessment will involve the history of the headache and its associated symptoms. Certain groups of symptoms will suggest a particular diagnosis. It is important to understand these variances, as it may lead you to ask more specific questions of your patient and their family.

Questions may include the following:

- Do they currently have a headache? If yes, use the PQRST mnemonic to ascertain provocation/palliation, quality/quantity, region and radiation, severity and time.
- Are they photophobic?
- Are there any other symptoms that accompany the headache – eg visual disturbances, vomiting, motor deficits, confusion, neck stiffness, dizziness, seizures, rash and fever.

Diagram 1: Taking a Headache History[4]



Questions to ask your patient about their past medical history

Many chronic diseases and medications can affect neurological function. So, in addition to undertaking a nervous system history, you will also need to ask your patients questions in relation to their medical history. Inquire about:

- Major illnesses.
- Medications including anticoagulant therapy/natural remedies.
- Recurrent minor illnesses or significant events.
- Accidents/trauma/assaults.
- Surgical procedures (eg lumbar puncture, epidural etc).
- Allergies.
- Family history. As many diseases are familial, ask your patients about their family history. A family history of epilepsy and/or headaches may be significant!

Read the following articles on pupillary assessment and traumatic brain injury:
http://www.nursingcenter.com/prodev/ce_article.asp?tid=792067
http://www.encyclopedia.com/doc/1G1-156651345.html

The following articles may help you to consolidate your learning:

- Mooney, G. P., et al, 'Neurological observations', in *Nursing Times,* Vol. 99, Issue 17, page 24, 29 April 2003.
- Teasdale G., Jennett B., 'Assessment of coma and impaired consciousness', in *Lancet,* 1974, pages 81-84.
- Dawes E., et al (2007). *Monitoring and recording patient's' neurological observation.*

Complete Activity 36 in the Participant Workbook

6.5 NEUROTRAUMA

Neurotrauma is the most common feature in multisystem trauma. Neurotrauma is classified as either mild, moderate or severe.

To gain a further understanding of traumatic brain injury read resources available from the following website: http://www.maa.nsw.gov.au/default.aspx?MenuID=148

Adult trauma clinical practice guidelines on 'Initial management of closed head injury in adults' are available on the Institute of Trauma Management website. http://www.itim.nsw.gov.au

[4] Diagram 1 adapted from Lindsay and Bone (1997 :2)

Primary injury

Primary injury in neurotrauma can be classified as:

- Skull fracture.
- Concussion.
- Contusion.
- Intracranial haematoma (extra-dural, sub-dural and intracerebral haemorrhage).
- Diffuse axonal injury.
- Penetrating injury.

The focus of emergency management is to identify a suspected traumatic brain Injury and its severity together with interventions to minimise/prevent secondary brain injury.

6.6 HOW TO PREVENT A SECONDARY BRAIN INJURY

Types of secondary brain injury

Patients will generally present to the emergency department after the primary neurotrauma has occurred. The role of clinicians is to maximise outcomes and prevent secondary brain injury. Secondary brain injury is usually a result of the biochemical responses to primary injury. This includes:

- Hypoxia.
- Cerebral oedema.
- Cerebral vasospasm.
- Hypotension.
- Anaemia.
- Hypercapnia.

Identification and management of hypotension and hypoxia are imperative as both will result in changes to autoregulation and thus ultimately in decreased cerebral perfusion pressure.

Nursing considerations to minimise secondary brain injury:

- Elevate head of bed 30° – this will slightly decrease intracranial pressure (ICP) without affecting CPP. Ensure the cervical spine has been assessed and presence of injury ruled out.
- Ensure optimal oxygenation – there may be injury or damage to respiratory centres in the patient's brain, which will reduce the patient's ability to increase oxygen intake. This will lead to impaired gas exchange, the patient will become hypoxic which will increase cerebral blood flow, thus causing a rise in intracranial pressure.
- Ensure the patient has normal arterial carbon dioxide pressure (normocarbia),
- Aim for mean arterial pressure (MAP) > 70 mm Hg.
- Ensure your patient has adequate end organ perfusion (i.e blood pressure). This is ensured through restoring adequate fluid volume. Vasopressors and/or inotropes may also be indicated to support the blood pressure.
- Undertake minimal nursing activities ie suctioning, invasive procedures as these may result in noxious stimuli, raising intracranial pressure.
- Administer antibiotics if required – this is indicated for compound fractures of the skull.
- Administer anticonvulsant therapy as prescribed – to prevent secondary injury from complications of seizure.
- Ensure the patient has a normal body temperature (normothermia). If your patient is too cold or too hot this will increase their metabolic rate and therefore may raise their ICP.
- Early analgesia is paramount to good nursing care.
- Sedation may be considered by medical staff to reduce metabolic requirements (O_2 + glucose) therefore decreasing blood supply to the brain and ICP.

- Mannitol or hyopertonic saline may be used clinically to reduce acutely raised intracranial pressure until more definitive treatment can be applied. Mannitol is an osmotic diuretic which moves fluid from cerebral extracellular tissues to intravascular beds, thereby reducing total brain mass, therefore decreasing ICP.

REFERENCES AND RESOURCES

Brown, and King D. (2009) Sheehy's Emergency Nursing, 6th ed Mosby, An Imprint of Elsevier
http://www.nursingconsult.com/das/book/174231752-2/view/2064

Elliot, D., Aitken, l., Chaboyer, W. (2007). *ACCCN's Critical Nursing.* Principles and Practice of Critical Care.

Lindsay, K. and Bone, I. (1997). Neurology and Neurosurgery Illustrated.

http://www.nursingcenter.com/prodev/ce_article.asp?tid=792067

http://www.encyclopedia.com/doc/1G1-156651345.html

7 Exposure and environment

7.1 LEARNING OUTCOMES

On completing this module, you will have a greater understanding of how to assess a patient for exposure and environment within the emergency department. In particular, you will be able to:

- Identify the need for exposure of the patient to enable complete visual assessment
- Identify the requirements for preserving clothing required for forensic evidence.
- Inspect surfaces for;
  - Colouration, texture and temperature.
  - Obvious deformity.
  - Skin integrity.
- Assess pain.

7.2 WHY REMOVE CLOTHING?

There will be occasions when you will need to remove the patient's clothing in order to complete your assessment. By removing the patient's clothes, you can:

- Assess the patient's skin.
- Assess the patient's hygiene.
- Ascertain the presence of any scars, wounds or rashes.
- Feel the patient's skin for temperature, clamminess and any abnormal findings.
- Comprehensively assess all surfaces for potential injury.

You can complete this task by either asking the patient to change into a gown or assisting them to remove clothing. In a trauma setting, you may need to cut the patient's clothes to remove them so as not to further injure the patient or cause unnecessary pain (e.g. for a patient with a suspected spinal injury or a disfigured limb). As this step in the primary survey occurs before the taking of x-rays, virtually all trauma patients will have their clothes cut off.

7.3 CLOTHING AND FORENSIC EVIDENCE

There may be circumstances where clothes may be required for forensic evidence. If a patient's clothes are needed for forensic evidence, you are required to follow these steps:

- Handle the clothes as little as possible so as not to contaminate forensic evidence.
- Place each article of the clothing into a separate paper bag with the patient's identification clearly marked on the bag and a description of the article of clothing.
- Do not cut through areas on the clothing of particular forensic note, such as bullet holes or stab holes, as this could disrupt police evidence.
- Use paper bags (plastic makes the evidence deteriorate and could encourage the growth of microbes).
- Contact the police to ensure prompt collection of clothing/belongings and sign on receipt.
- Ensure that the name of the accepting police officer is documented in the patient's clinical notes.

How to assess a rash

While assessing the skin, it is important not to overlook the presence of rashes, A good way to assess a rash is to mark the borders of the rash and note the time, so you can see if the rash is growing, and at what rate.

It is also important to describe the rash – eg size, colour, appearance and if the skin is raised. It may require a second opinion.

Some rashes are distinctive which may give clues to the patient's condition. For example the rash associated with meningococcal disease, which can range from being light purple and blanching to, a deep purple non blanching rash that spreads rapidly. This is usually a very late sign and presence or absence of the rash should not be used as an absolute indicator.

RESOURCES

Access and read the following resources to facilitate your learning:

Meningococcal Australia Inc website http://www.meningococcal-australia.org.au/index.html

NSW Health (2005). *Children and Infants with Bacterial Meningitis – Acute Management* (policy directive). http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_383.pdf

7.4 TEMPERATURE: HYPOTHERMIA AND HYPERTHERMIA

Hypothermia

Prior to presentation in the emergency department the patient may have had a prolonged period of exposure leading to hypothermia. This may be compounded by exposure of the patient to the cool environment within the emergency department. Checking the patient's temperature on arrival and regularly should be a priority.

Once you have completed your assessment, ensure you keep the patient covered and warm.

Hypothermia can result in poor perfusion to the extremities and cause the patient to enter a state of shock. It is one component of the trauma triad of death (acidosis, coagulopathy, hypothermia), and should be avoided.

Using warmed fluids and/or warmed blankets, where indicated, can help to avoid hypothermia.

Special considerations – hypothermia in the very old and very young

The very young and the very old are at particular risk of hypothermia. People in these age groups often do not compensate for cold as well as young adults and are dependent on others to anticipate their needs and keep them warm. Very old people quite often become hypothermic while indoors from sitting immobile in a cold room for hours. Infants lose body heat rapidly and are particularly susceptible to hypothermia.

Hyperthermia

Where a hyperthermic patient is febrile, they may require less covering so they can cool naturally, or you can provide active cooling to prevent further complications. Active cooling may be indicated in individual emergency departments for patients who have presented with cardiac arrest or hyperthermia.

Further reading

Aitkin LM, Hendrikz JK, Dulhunty JM, Rudd MJ, (2009), 'Hypothermia and Associated Outcomes in Seriously Injured Trauma Patients in a Predominantly Sub-tropical Climate', in *Resuscitation,* Vol. 80(2), pp. 217–223.

Review the following study to show the advantages of active warming as opposed to passive warming: http://www.ncbi.nlm.nih.gov/pubmed/8604866?dopt=Citation

Familiarise yourself with the warming protocols and aids used in your emergency department.

Complete Activity 37 and 38 in the Participant Workbook

7.5 ENVIRONMENT

The patient's environment may be an important reason for their presentation. For example:

- A backpacker presenting with a rash may have been a victim of bed bugs that they have contracted from the youth hostel where they are staying.
- An elderly gentleman presenting with an injury may have fallen in his unit due to frayed carpets.

The patient's environment is also an important factor for the safety of persons in the emergency department, so be aware of the environment that the patient has come from. Patients can be exposed to environmental factors such as burns (radiation, contact, and chemical) or toxic chemicals that may cause the health worker harm.

The table below gives some 'red flags' when assessing patients.

Findings	Possible diagnostic significance
Hyperthermia or hypothermia	• Hypovolaemic (severe dehydration). • Distributive shock (eg septic). • Cardiogenic shock.
Unsuspected wounds (especially in axilla, back, neck, perineum)	Hypovolaemic shock (hemorrhagic shock from occult trauma).
Odours: • Foul smelling urine • Scorched almonds • Garlic • Fruity • Alcohol	 Distributive shock (urosepsis). Cyanide toxicity. Organophosphate or arsenic toxicity. Ketoacidosis, isopropyl alcohol toxicity. Complications of alcohol abuse (trauma, multi-organ toxicity).
Track marks of IV drug use	• Distributive shock (sepsis). • Cardiogenic shock (valvular disease). • Opiate overdose. • Non-cardiogenic pulmonary oedema.
Dialysis shunt (AV fistula)	• Cardiogenic shock (volume overload). • Obstructive shock (pericardial tamponade). • Hyperkalemia. • Uraemic encephalopathy.
Periumbilical or flank ecchymosis (bruising)	• Retroperitoneal haemorrhage. • Aneurysm, ectopic pregnancy, hemorrhagic. • Pancreatitis and other abdominal catastrophes).
Diffuse purpuric rash	Distributive shock (meningococcal sepsis). Viral Haemorrhagic Fevers (VHF)
Diffuse maculopapular rash	Distributive shock (toxic shock syndrome). Mealses
Unilateral lower extremity oedema	Obstructive shock (massive pulmonary embolism).

Table 1 http://www.thecorrect.com/medical-emergency/primary-survey-of-resuscitation.html

REFERENCES AND RESOURCES

Aitkin LM, Hendrikz JK, Dulhunty JM, Rudd MJ, (2009), 'Hypothermia and Associated Outcomes in Seriously Injured Trauma Patients in a Predominantly Sub-tropical Climate', in *Resuscitation,* Vol. 80(2), pp. 217–223.

PubMed.gov, 'Warming Patients Actively and Passively' at http://www.ncbi.nlm.nih.gov/pubmed/8604866?dopt=Citation.

The Correct.com (2006). 'Primary survey of resuscitation', Table 1, at http://www.thecorrect.com/medical-emergency/primary-survey-of-resuscitation.html.

Meningococcal Australia Inc website http://www.meningococcal-australia.org.au/index.html.

NSW Health (2005). *Children and Infants with Bacterial Meningitis – Acute Management* (policy directive), at http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_383.pdf.

8 Pain assessment and management

8.1 LEARNING OUTCOMES

On completing this module, you will have a greater understanding of how to assess and manage a patient presenting to the emergency department with pain. In particular, you will be able to:

- List the physiological symptoms of pain.
- Describe the assessment and measurement of pain.
- Describe different types of analgesia, indications/contraindications.
- Discuss analgesia treatment regimes.

8.2 WHAT IS PAIN?

"Pain is whatever the experiencing person says it is, existing whenever the experiencing person says it does" (from McCaffery and Beebe, 1989).

About six million people present annually to Australian emergency departments, with 78–86% due to pain symptomology (Yeoh & Huckson, 2007). The purpose of pain assessment is to quickly and efficiently identify the cause of pain and bring the patient's pain to a level where it is manageable, optimally eliminating it all altogether. Its subjective description and location also provides us with an index of suspicion as to the underlying cause of disease (Tortora and Anagnostakos: 1987:342).

8.3 PATHOPHYSIOLOGY

Complete Activity 39 in the Participant Workbook

'Acute ' and 'Chronic pain'

Traditionally, the distinction between acute and chronic pain has relied upon an arbitrary interval of time from onset; the two most commonly used markers being 3-6 months since the onset of pain. Chronic pain has a potential for under treatment. (Australian government department of health and ageing:2007, 39)

Complete Activity 40 in the Participant Workbook

Adverse effects of undertreated severe acute pain

Cardiovascular	Tachycardia, hypertension, increased peripheral vascular resistance, increased myocardial oxygen consumption, myocardial ischemia, altered regional blood flow, deep vein thrombosis, pulmonary embolism.
Respiratory	Reduced lung volumes, atelectasis, decreased cough, sputum retention, infection, hypoxemia.
Gastrointestinal	Decreased gastric and bowel motility, increased risk of bacterial transgression of bowel wall.
Genitourinary	Urinary retention.
Neuroendocrine/ metabolic	Increased catabolic hormones: glucagon, growth hormone, vasopressin, aldosterone, renin and angiotensin. Reduced anabolic hormones: insulin, testosterone. This catabolic state leads to hyperglycaemia, increased protein breakdown, negative nitrogen balance leading to impaired wound healing and muscle wasting.
Musculoskeletal	Muscle spasm, immobility (increasing risk of deep vein thrombosis), muscle wasting leading to prolonged recovery of function.
Psychological	Anxiety, fear, helplessness, sleep deprivation, leading to increased pain.
Central nervous	Chronic (persistent) pain due to central sensitisation.

Macintyre.P, Scug,S. (2007) Acute pain management. A practical guide. 3rd edition. Sydney. Page 5.

8.4 HOW TO ASSESS PAIN

When clinically assessing how intensely a patient is feeling pain, and to monitor the effectiveness of treatments at different points in time, a systematic assessment should include the following mnemonic **PQRST**:

Provocation and Precipitating factors

Quality of pain (burning, stabbing, aching, etc.)

Radiation / **R**egion

Severity of pain (eg, 0–10 scale; verbal descriptor scale)/Signs and Symptoms

Time / **T**reatment

(Chummun, Gopaul and lutchman. 2009: pg 1297)

As seen in the earlier table vital signs can be affected by pain and hence are important measurements to document in order to monitor response to pain relief interventions.

8.5 PAIN SCALES (OR SCORES)

Pain is always subjective. A patient's level of pain is what the patient states it is. It can be measured through the use of scaling systems.

It is important that the same pain scaling system is being used within the same facility so scores can be compared and a timeline established to show the pattern (and management) of the pain the patient has experienced (Duignan and Dunn, 2008).

Some examples of pain scores are the visual analogue scale, numerical rating scale, faces rating scale, behavioural rating scale, and functional activity score. Examples of pain rating scales can be accessed via the following links:

- http://www.health.vic.gov.au/qualitycouncil/downloads/app1_pain_rating_scales
- Paediatric pain source book accessed via http://painsourcebook.ca/docs/pps92.html
- http://www.sch.edu.au/links/go/?http://www.painsourcebook.ca/

If a patient has dementia or is unable to verbalise the **Abbey Pain Scale** can be a useful tool accessed via the link: http://www.apsoc.org.au/owner/files/piracf4.pdf.

Local guidelines should be referred to in order to ascertain pain management protocols and standing orders for specific presentation types.

Self-reporting of pain should be used whenever appropriate as pain is by definition a subjective experience. (Australian and New Zealand College of Anaesthetists: 2007, pg 4)

Patients are usually asked to rate their pain when they are resting. However, a better indicator of the effectiveness of analgesia is an assessment of the pain caused by physical activity, such as coughing, deep breathing or movement. Therefore the pain score at rest and with movement or coughing should be recorded. (Macintyre.and Scug: 2007, 30)

Effective management of pain:

It is helpful to identify precipitating causes of the pain if possible, although this should not delay administration of analgesia.(Australian medicines handbook:2010, chapter 3)

Musculoskeletal pain can be effectively reduced through measures such as rest, ice, compression and elevation (RICE) which can be used as adjuncts to pharmacological management. Whether the pain is acute, chronic or acute exacerbation of chronic, humane practice mandates the prompt assessment and relief of pain.(Australian government department of health and ageing,:2007, 39)

Effective and safe management of acute pain is best achieved by tailoring pain therapies to the individual patient. Pain tolerance is the maximum degree of pain intensity a person is willing to experience. In reaction to this tolerance a patient will exhibit a response. This will vary greatly amongst individuals, from being very quiet to being vocal and screaming.

Effective pain management has many benefits including a reduction in the adverse effects of pain, aiding recovery, improved quality of life and minimising suffering. Pain is best treated early because, once established, it is more difficult to treat. In addition, there is increasing clinical evidence that appropriate early, aggressive management of acute pain may minimise the transition to chronic pain.

Complete Activity 41 and 42 in the Participant Workbook

Drug of choice

In acute episodes of pain pharmacological interventions depend on assessment of the patient's pain score;

1. Severe pain (pain score 7-10).
2. Moderate pain (pain score 4-6).
3. Mild pain (pain score 1-3).

A particular importance is associated with the special populations and the following point pertinent to our overall assessment and management. "Children are less likely than adults to have a pain score documented, or receive i.v. morphine" (Furyk & Sumner:2008, 482). Children feel pain and if it is appropriate should be seriously considered for parental analgesia.

Key Points

1. Self-reporting of pain should be used whenever appropriate as pain is by definition a subjective experience.
2. A systematic assessment of pain should include the following mnemonic PQRSTA.
3. Humane practice mandates the prompt assessment and relief of pain.
4. Pain is best treated early.
5. Pain score at rest and with movement or coughing should be recorded.
6. Pain should be assessed regularly particularly following any interventions.
7. All assessment findings must be documented using a pain assessment tool.

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9 Trauma

9.1 LEARNING OUTCOMES

This module provides an introduction to the initial assessment and management of the trauma patient in the emergency department. This module is designed to prepare nurses to perform a systematic assessment, identify potentially life-threatening injuries and initiate appropriate management of the trauma patient.

In completing this module, you will be able to:

- Demonstrate the ability to perform a primary and secondary assessment on a trauma patient.
- Discuss the priorities in managing the trauma patient.
- Discuss the potential life-threatening injuries to 'ABCD' and how to manage these.
- Understand the physiological response to hypothermia and measures to prevent it in the trauma patient.

9.2 WHAT IS TRAUMA?

The term 'trauma' refers to a physical injury. Injury is defined as unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical or chemical energy or from the absence of such essentials as heat or oxygen (Royal College of Surgeons England, 2000).

The spectrum of trauma encompasses patients who have sustained minor trauma that can be quickly treated at local emergency departments, through to severe trauma that requires hospital admission and access to specialised resources.

The management of trauma requires an organised, multidisciplinary approach. It focuses on a structured primary and secondary survey, appropriate investigations, early identification of injuries and early definitive care.

9.3 TRAUMA – INITIAL ASSESSMENT AND MANAGEMENT

Primary and secondary survey is an established systems framework used in the initial assessment and management of the trauma patient (American College of Surgeons, 2008). It aims to identify physiological abnormalities, with treatment directed at early identification and correction of life-threatening injuries to Airway, Breathing, Circulation and Disability.

A-Airway

The first priority is the assessment and establishment of a patent airway. An obstructed airway results in inadequate ventilation and hypoxaemia. Use the following steps:

- Begin airway assessment by assessing the patient's ability to verbalise in the absence of stridor or other signs of obstruction.
- Manage any airway compromise immediately. The airway can be cleared by simple manoeuvres including a chin lift or jaw thrust, oropharyngeal/nasopharyngeal airway and/or suction.
- If airway patency is unable to be maintained or remains compromised, early definitive airway control will be required.
- Airway protection can be compromised by an altered level of consciousness. Intubation is required if the GCS ≤8 (Ollerton, 2007).

Key points

Patients at risk of airway obstruction include those with:

1. Facial fractures (swelling and bleeding).
2. Burns, inhalational burns.
3. Altered GCS (head injury, drugs and alcohol).

Keep in mind that cervical spine immobilisation should be maintained for patients sustaining blunt trauma. The incidence of adult cervical spine injury after blunt trauma is 2–6% (Marion, Domeier and Dunham 2000; Grossman, Reilly, Gillett, et al 1999; Davis, Phreaner, Hoyt et al, 1993; Stiell, Wells, Vandemheen et al, 2001; Hoffman, Wolfson, Todd, et al, 1998)

Those older than 65 years are at a significantly higher risk of cervical spine injury than younger patients (Bub, Blackmore, Mann et al, 2005).

In major head injury, incidence of an associated spinal injury increases to 5% (Widder, Doig, Burrowes et al, 2004).

For information referring to emergency airway management in the trauma patient refer to www.itim.nsw.gov.au.

B-Breathing

Once the airway is secured ,a spontaneously breathing patient should receive high-flow oxygen, via a non re-breather mask. You will then need to assess for breathing, adequate ventilation and identification of life-threatening thoracic injuries. Use the following steps:

- Examine for obvious chest wall deformity, penetrating wounds, bruising or abrasions or air leaks (Kirkpatiric, Ball D'Amours et al, 2008).
- Assess the respiratory rate, work of breathing and chest symmetry.
  - Abnormalities may indicate underlying fractured ribs, pulmonary contusions, haemothorax or pneumothorax.
  - Asymmetry may indicate splinting of the rib cage or flail chest.
- Auscultate the apical and lateral chest wall. Decreased or absent entry is suggestive of a thoracic injury.

Pulse oximetry is used to measure peripheral oxygen saturation but it should not solely be relied upon to assess for respiratory compromise. Ideally, patients should have saturations greater than 95% on room air. Patients often have advanced respiratory pathophysiology before they manifest an alteration in oxygen saturation.

Identify any thoracic life-threatening injury using the following table.

Life threatening injury	Signs and symptoms	Management
Massive haemothorax	• Hypotension and tachycardia • Increased respiratory rate • Signs of shock* • Decreased chest symmetry • Mediastinal shift to unaffected side (tracheal deviation is a late sign) • Decreased breath sounds and dullness to percussion on affected side (may be difficult to hear in noisy resuscitation bay)	• Oxygen • Chest drain • Restoration of blood volume
Tension pneumothorax	• Hypotension and tachycardia • Increased respiratory rate • Signs of shock* • Decreased chest symmetry • Decreased breath sounds affected side and hyperresonant to percussion on affected side (may be difficult to hear in noisy resuscitation bay • Mediastinal shift and tracheal deviation to unaffected side (tracheal deviation is a late sign) (Miller, 2006; Leigh-Smith & Harris, 2005)	• Oxygen • Needle thoracentesis and/or insertion of chest drain
Flail chest Two or more rib # in two or more places (American College of Surgeons, 2008:88)	• Rapid, shallow breathing • Ineffective ventilation • Asymmetrical chest wall movement & paradoxical movement (if large segment) • Underlying pulmonary contusions (Wanek & Mayberry, 2004)	• Supplemental oxygenation management +/- intubation (dependant on degree of ventilatory compromise) • Intubation may be required to maintain adequate oxygenation • Analgesia
Open pneumothorax	• Chest wall deformity with open chest wound • Tension pneumothorax may develop	• Oxygen • Cover wound with 3 sided dressing • Chest drain • Debridement in OT
Cardiac tamponade	• Hypotension • Tachycardia • Increased respiratory rate • Distended neck veins • Muffled heart sounds • Pericardial fluid on FAST	• Urgent thoracotomy • Pericardial window and evacuation of clot • Pericardiocentesis not recommended for definitive management due to clotting of blood (American College of Surgeons, 2008)

* Signs of shock will be present due to compression of the vena cava, therefore decreasing venous return to the heart and decrease in cardiac output (Buchman, Hall, Bowling et al., 2004).

C-Circulation and haemorrhage control

Early identification of shock is essential in managing the trauma patient. Shock is defined as an abnormality in the circulatory system, resulting in inadequate organ perfusion and tissue oxygenation (American college of Surgeons, 2008). Hypovolaemia is the most common cause of shock in the trauma patient.

Principles of managing shock:

1. Identify shock early. **2. Identify where the patient is bleeding from.**
3. STOP the bleeding! **4. Replace volume loss.**

Physiology: Keeping it simple!

Decreased circulating volume causes a reduction in mean arterial pressure, resulting in activation of the sympathetic nervous system. Released catecholamines result in vasoconstriction, increased heart rate and a reduced pulse pressure. This also increases myocardial oxygen requirements. In an effort to increase oxygen delivery to the major organs (heart, brain), blood is shunted away from the peripheral tissues and skin. This results in anaerobic metabolism and lactic acidosis.

Clinical signs and symptoms of hypovolaemic shock

- Tachycardia (catecholamine release).
- Skin pallor and diaphoresis (vasoconstriction).
- Decreased pulse pressure (decreased volume & catecholamine release).
- Hypotension (blood volume loss).
- Tachypnoea (hypoxia and acidosis).
- Anxiety, agitation or confusion (cerebral hypoxia and acidosis).
- Decreased urine output (reduced kidney perfusion).

Initial assessment of shock requires careful physical assessment and exclusion of other causes of shock (tension pneumothorax, cardiac tamponade or other forms of shock).

ANY trauma patient who is cool and tachycardic is potentially in hypovolaemic shock until proven otherwise. Beware! Neurohormonal mechanisms can compensate for 30% blood loss especially in the young, normally healthy adult. (American College of Surgeons, 2008:58)

Where is the patient bleeding from?

There are five body regions where significant haemorrhage can occur;

- Thorax.
- Abdomen.
- Retroperitoneum.
- Long bones.
- External bleeding.

Complete Activity 43 in the Participant Workbook

Key points

1. Is the patient haemodynamically unstable?
   - A patient who is **pale** and **sweaty** is unstable, regardless of vital signs.
   - **Hypotension**-SBP measured in resuscitation bay or pre-hospital <90 mm Hg.
   - **Persistent tachycardia** >130 bpm.
2. Requiring **blood product**s during resuscitation.

Initial management of circulation

When a patient presents to an emergency department with hypovolemia due to trauma, their management consists of the following:

- Two large bore cannulae.
- Full bloods: FBC, EUCs, coags, venous gas including pH, base excess and lactate (as a measure of cellular perfusion) G&H, X-match.
- Volume restoration via a fluid warmer to support cardiovascular function and maintain adequate tissue oxygenation.
- CXR and PXR, which should be performed in the first 10 minutes to assist in identifying injuries causing haemorrhage.
- Focused Abdominal Sonography Test (FAST), if available.
- Pelvic binding for potentially unstable pelvic injuries.
- Application of limb splints to reduce further movement and bleeding.
- Identification of source of bleeding.
- Definitive care.

Key points

Questions to ask:

1. Is the patient haemodynamically unstable?
2. Who do I need to call?
3. Does the patient require immediate care for haemorrhage control?
4. Does the patient require transfer to another hospital?

For information relating to the management on hypovolaemic shock in the trauma patient refer to the following web site: www.itim.nsw.gov.au.

D-Disability

During the primary survey, you must:

- Undertake a quick neurological assessment using the AVPU acronym (A=Alert, V=Verbal, P=Pain, U=Unresponsive). This will determine a baseline level of responsiveness.
- Assess pupil size and reaction to light.
- Undertake a baseline assessment of limb movement to assess for potential spinal cord injury.

Beware of the intoxicated head-injury patient. Don't assume that agitation and combative behaviour is due to alcohol or drugs!

Key points:

Prevention of secondary brain injury in the head injured patient:

1. Prevent hypotension systolic (BP >90 mm Hg).
2. Prevent hypoxia (SpO_2 >90).
3. Prevent hyper/hypocarbia (maintain $ETCO_2$ 35–40 mm Hg).

(Reed, 2007)

For guidelines relating to the initial management of adults wtih closed-head injury, refer to the following website: www.itim.nsw.gov.au.

Immediately after primary survey:

- Quickly perform a log roll to assess for posterior chest wounds, ongoing bleeding and for removal of the spinal board. Maintain C-spine immobilisation as required.
- CXR and PXR to identify any significant injuries to the thorax or pelvis.

9.4 SECONDARY SURVEY: E-F-G-H-I-J-K

Secondary survey requires careful examination of the whole body to allow for identification of further injures. It is performed as a head-to-toe assessment using the mnemonic 'EFGHIJK', as outlined below.

E – Expose the patient (if not already complete)

This allows for identification of injuries.

It is essential to prevent hypothermia in the trauma patient. The following reference may be useful Aitkin LM, Hendrikz JK, Dulhunty JM, Rudd MJ, (2009), 'Hypothermia and Associated Outcomes in Seriously Injured Trauma Patients in a Predominantly Sub-tropical Climate', in *Resuscitation,* Vol. 80(2), pp. 217–223.

F – Full set of vital signs

Assess or undertake the following:

- Assess RR, SpO_2, BP, HR, Temp, GCS & pupils, $ETCO_2$ (if ETT).
- Undertake regular monitoring.
- Assess core temperature.

G – Gadgets

Consider any gadgets or interventions required (this may be performed later):

- Cardiac monitoring (ongoing patient assessment).
- Orogastric or naso gastric tube (to decrease gastric distension in an intubated patient). Avoid insertion of a nasogastric tube if a basal skull fracture is suspected.
- IDC (indication of shock and organ perfusion). Avoid if unstable pelvis and blood present at urethral meatus, scrotal haematoma or vagina blood and perineal bruising.
- ECG (blunt chest injury, underlying cardiac pathology predisposing to injury).
- BGL (predisposition to injury).

H – Head-to-toe assessment to assess for other injuries

See secondary survey chart on next page.

Secondary Survey – Head to Toe Assessment

Continuously Reassess ABCD

FACE
- lacerations
- facio maxillary fractures
- check for broken teeth
- check for contact lenses
- check eye vision and pupils
- inspect for ecchymosis around the eyes

NECK AND CERVICAL SPINE
Immobilise until injury has been excluded.
Inspect and palpate for:
- tenderness
- penetrating wounds
- subcutaneous emphysema
- tracheal deviation
- laryngeal fracture
- observe appearance of neck veins

HEAD
- Examine and palpate scalp for swellings, depressions and lacerations
- examine ear canals, mouth and nose for leakage of CSF

THORAX
Examine entire chest
- palpate cavicle and ribs
- apply gentle sternal compression to check for sternal fracture or flail segments
- auscultate breath and heart sounds
- do ECG
- consider cardio/
- pulmonary contusion:
  - cardiac arrhythmias
  - ruptured aorta/ diaphragm
- perforated oesophagus
- think abodominal injuries if lower ribs injured

MUSCULOSKELETAL
Inspect all limbs:
- bruising
- wounds
- soft tissue injuries
- deformities
- pain/tenderness
- vascular/neuro deficits
- pelvis mobility

ABDOMEN
Inspect, auscultate and palcate for:
- presence of free intra-peritoneal fluid
- bowel sounds
- guarding

Look for bruising/ pain/tenderness.
Consider signs of renal injury:
- flank pain
- bruising
- haematuria

SPINE AND NEUROLOGICAL
- Includes motor and sensory evaluation of the extremities
- re-evaluation of:
  - conscious level
  - puil size and response
  - full GCS
- Signs of spinal injury:
  - hypotension
  - relative bradycardia
  - decreased motor power and sensation below level of lesion
  - decreased sphinter tone
  - priapism

PELVIS AND PERINEUM
Inspect for:
- haematoma/ bleeding
- contusion/ lacerations
- scrotal haematoma
- tampon
- consider pregnancy test
- consider pelvic fractures

Rectum
Inspect and palpate for:
- sphinter tone
- prostate
- blood in faeces

OTHER CONSIDERATIONS
- Danger to self
- Completely undress the patient for examination, rembember privacy and warmth during examination
- Get a complete set of vital signs
- Ensure clear, accurate and concise documentation
- Obtain history
- Pre hospital information
  - **M** - Mechanism of injury
  - **I** - Injuries sustained
  - **S** - Signs and symptoms
  - **T** - Treatment
  - Patient generated history
  - **A** - Allergies
  - **M** - Medications
  - **P** - Past history
  - **L** - Last ate and drank
  - **E** - Events leading up to incident
- Tetanus
- Analgesia
- Antibiotics

INSERT (if time permits)
Inset tubes as necessary

NGT
- decompress stomach
- consider orogastric tube, if # base of skull suspected
- protect cervical spine

IDC
- only insert if pelvis stable and no blood at urethral meatus
- monitor urinary output
- urinalysis attended – blood
- consider suprapubic catheter

Enquiries to: Pat Standen, 5333 6026. pat.standen@dhs.vic.gov.au ; April 2004

Used with the permission of CENA Trauma Nursing Program http://www.tnp.net.au

I – Inspect the back

This may have been performed quickly after primary survey to assess for posterior wounds, ongoing bleeding and removal of the spinal board.

Have an index of suspicion based on mechanism.

Remember: if you don't look, you won't find!

J – Jot down any further information:

- History.
- Clinical assessment findings.
- Interventions and response to management.
- Plan of care.

K – Kindred, Koffee and debrief post-trauma resuscitation

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www.itim.nsw.gov.au

10 Burns

10.1 LEARNING OUTCOMES

When you complete this module, you should be able to confidently assess and apply first-line treatment to a patient presenting with a burn injury. In particular, you should be able to:

- Define the function of skin.
- Assess and manage a patient presenting to the emergency department with a burn injury. This includes providing first aid and wound management.
- Identify injuries that require a patient to be referred to a specialised burns unit for treatment.

10.2 INTRODUCTION TO BURN INJURIES

Burns are common injuries in the community. While the majority of burn injuries heal with no or minimal medical intervention, a small proportion of burn victims sustain devastating and life-threatening injuries, requiring intensive and long-term treatment.

The nature and complexity of severe burn injury requires a collaborative approach to patient care. This is provided by a multi-disciplinary team with expertise in the management of severe burns in a burns unit with supporting services such as critical care, surgery, reconstruction and rehabilitation.

All burn injuries require primary and secondary assessment. Severe burns require immediate assessment and treatment followed up with a more detailed assessment and ongoing monitoring.

10.3 ANATOMY AND PHYSIOLOGY OF THE SKIN

Alterations to the skin affect the overall wellbeing of the individual.

Review the structure and function of the skin in any anatomy and physiology textbook.

The skin, also referred to as the integumentary system, is the largest organ of the body, with a surface area of 1–2 metres. It is also the heaviest organ of the body. Average adults have 4–7 kg of skin. The skin provides the following functions:

- Temperature regulation.
- Sensory interface.
- Immune response.
- Protection from bacterial invasion.
- Control of fluid loss.
- Metabolic function.
- Psycho-social function.

10.4 STRUCTURE OF SKIN

Skin structure consists of several layers. The uppermost is the epidermis and dermis; beneath are the subcutaneous fat, muscle and skeletal layers.

The epidermis and dermis

The epidermis is the first barrier for protection of foreign substance invasion. Keratinocytes are the main cells of the epidermis, gradually migrating to the surface and sloughed off in ‘desquamation’. In the epidermis, keratin is flexible, but is thicker, stiffer and harder in the finger and toe nails. Hair is also made up of keratin.

The epidermis comprises five layers (or strata):

- Stratum corneum.
- Stratum lucidium.
- Stratum granulosum.
- Stratum spinosum.
- Stratum germinativum.

The dermis controls thermoregulation and supports the vascular network. Hair follicles, nerve fibres, sweat glands and nails are located in the dermis layer and protrude through the epidermis 12. The dermis contains mostly fibroblasts, which secrete collagen and elastin. Immune cells defend against foreign substances that have come through the epidermis.

The dermis consists of two layers:

- Papillary dermis.
- Reticular layer.

Subcutaneous fat cells

The subcutaneous fat cells insulate the body against the cold. When the body overheats, the small blood vessels carry warm blood near the surface for cooling.

10.5 EMERGENCY ASSESSMENT AND MANAGEMENT OF SEVERE BURNS

First aid

It is important to document if any first aid measures have been initiated. Generally smaller burns should be cooled for 20 mins under tepid water.

Ensure ice is not used to cool burns, studies show that this practice can actually make burns worse.

Primary survey

Primary survey involves the letters in the mnemonic '**ABCDEF**'.

A. Airway maintenance with cervical spine control

- Inspect the airway for foreign material/oedema. If the patient is unable to respond to verbal commands, open the airway with a chin lift and jaw thrust; and stabilise the neck if suspected C Spine injury.
- Report any signs of airway compromise immediately as these patients require early intubation.
- Look for singed facial and nasal hair.
- Assess if the is voice normal, or has hoarseness developed? This could be indicative of inhalation burns and early intubation may need to be considered.

B. Breathing and ventilation

- Expose the chest and ensure that chest expansion is adequate and bilaterally equal – beware circumferential deep dermal or full thickness chest burns. Escharotomy may need to be considered if this is present.
- Administer 100% oxygen.
- Ventilate via a bag and mask if necessary.
- Test for carbon monoxide poisoning if suspected – non burnt skin may be cherry pink in colour in a non-breathing patient. Patients who have carbon monoxide poisoning may have a normal SpO_2, you will need to monitor other respiratory function in these cases such as ABG's and work of breathing
- Monitor respiratory rate – beware if rate <10 or > 25 breaths per minute.

C. Circulation with haemorrhage control

- Monitor the peripheral pulse for rate, strength (strong, weak) and rhythm.
- Apply capillary blanching test (centrally and peripherally to burnt and non-burnt areas) – normal return is under two seconds.
- Inspect for any obvious bleeding – stop with direct pressure.

D. Disability: neurological status

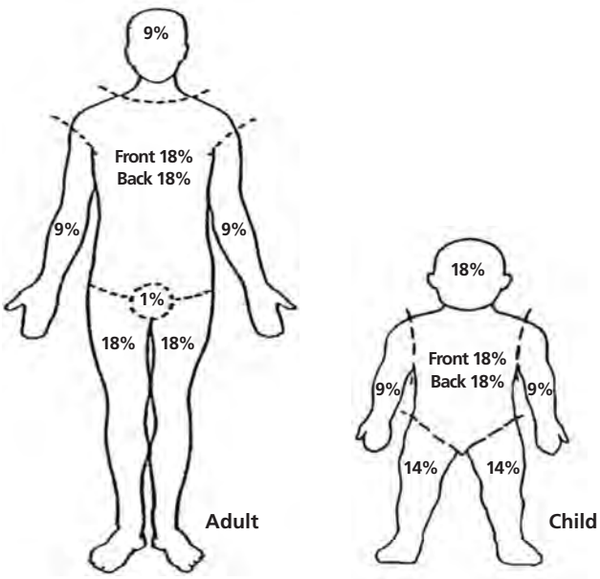
- Patients who are severely burnt or with any suspected airway involvement will require regular Glasgow Coma Scores. This is important when hypoxia or hypovoleamia is suspected

E. Exposure with environmental control

- Remove clothing and jewellery. Beware of material that has adhered to the skin.
- Keep patient warm.
- Roll and remove wet sheets and examine posterior surfaces for burns and other injuries.

F. Fluids resuscitation

- Fluid resuscitation will be required for a patient who has sustained a burn >10% for children, >15% for adults.
- EstimateTBSA (total body surface area) using 'Rule of Nines' (diagram below). For smaller burns, the palmar surface (including fingers) of the patient's hand (represent 1% TBSA) can be used to calculate the %TBSA burnt.



- Insert two large-bore, peripheral IV lines, preferably through unburned tissue.
- Collect bloods simultaneously for essential baseline bloods – FBC/EUC/LFT/Group & hold/Coags. Others to consider – drug/alcohol screen/Amylase/Carboxyhaemoglobin
- Obtain patient's body weight in kilograms.
- Commence resuscitation fluids as ordered, IV Hartmann's at an initial rate using the Parkland Formula:
- 2-4 ml x (body weight in kg) x % TBSA burnt = IV fluid ml to be given in 24 hours following the injury.
- Give ½ of this fluid in the first 8 hrs from the time of injury.
- Give ½ of this fluid in the following 16 hours.
- Patients who have significant burn injuries require an indwelling catheter with hourly urine measurements. Adjust fluids according to urine output.
- All patients (adults and children) require maintenance fluids in addition to resuscitation fluids.

REMEMBER: The infusion rate is guided by the urine output, not by formula.

The urine output should be maintained at the following rate:

- Adult: 0.5-1 ml/kg/hr.
- Children: 0.5-2 ml/kg/hr (aim for 1 ml/kg/hr).
- If urine output <0.5 ml/kg/hr, increase IV fluids by 1/3 of current IV fluid amount. If urine output >1 ml/kg/hr for adults or >2ml/kg/hr for children decrease IV fluids by 1/3 of current IV fluid amount (see fluid balance chart on following page). For example:
  - If the last hour's urine = 20 ml, received 1200 ml/hr, increase IV to 1600 ml/hr.
  - If the last hour's urine = 100 ml, received 1600 ml /hr, decrease IV to 1065 ml/hr.

More IV fluids may be required if:

- Haemoglobinuria (dark red, black urine) is present. This occurs when the person has endured thermal damage to muscle eg electrical injury.
- In cases of delayed resuscitation.

Undertake and monitor ECG, pulse, blood pressure, respiratory rate, pulse oximetry or arterial blood gas analysis as appropriate.

10.6 PAIN RELIEF

Burn injuries are very painful. Administer morphine (or other appropriate analgesia), intravenously and in increments according to the pain score and sedation scale. Patients may require substantial amounts to relieve pain.

Due to the nature of some types of burn and potential complications, referral to a specialised burns unit is often required/recommended. Most burn injuries presenting to the Emergency Department are minor and will require a primary and secondary survey, immediate first aid measures, analgesia and appropriate wound dressing.

Complete Activities 44 and 45 in the Participant Workbook

10.7 REFERRAL CRITERIA FOR BURNS

Due to the potential damage a burn can inflict on the human body, the types of burns listed below are to be referred to a specialist burns unit.

- Partial thickness burns in adults >10% TBSA (total body surface area).
- Full thickness burns in adults >5% TBSA.
- Partial/full thickness burns in children >5% TBSA.
- Burns to the face, hands, feet, genitalia, perineum, and major joints.
- Chemical burns.
- Electrical burns including lightning injuries.
- Burns with concomitant trauma.
- Burns with associated inhalation injury.
- Circumferential burns of the limbs or chest.
- Burns in patients with pre-existing medical conditions that could adversely affect patient care and outcome.
- Suspected non-accidental injury including children, assault or self inflicted.
- Pregnancy with cutaneous burns.
- Burns at the extremes of age – infants and frail elderly.

Specialist burns units are more than happy to consult on burn injuries and assess burns remotely through the emailing of digital photographs to them.

Complete Activity 46 in the Participant Workbook

REFERENCES AND RESOURCES

Clinical practice guidelines:

http://www.health.nsw.gov.au/resources/gmct/burninjury/pdf/clinical_practice_guidelines.pdf.

EMSB Course Manual, p46, Partial Thickness Burns – Current Concepts as to Pathogenesis and Treatment, p21. (Jan Darke CNC RNSH).

NSW Severe Burn Injury Service at http://www.health.nsw.gov.au/gmct/burninjury.

Minor burn management

http://www.health.nsw.gov.au/resources/gmct/burninjury/pdf/minor_burn_management.pdf.

Skin information

http://www.skinhealing.com/3_1_burntreatments.shtml

http://www.essentialdayspa.com/Skin_Anathomy_and_Physiology.htm

http://www.meddean.luc.edu/lumen/MedEd/medicine/dermatology/melton/skinlsn/skini.htm

http://www.nurse-prescriber.co.uk/education/anatomy/anatomy2.htm

http://reference.allrefer.com/encyclopedia/S/skin.html

http://www.swiss-creations.com/sc-14story.htm#The%20Human%20Skin

11 Assault

11.1 LEARNING OUTCOMES

After completing this module, you will have gained a further understanding of how to care for patients who have been assaulted. In particular, you will be able to:

- Outline the principles of intervention.
- List the charter of patients' rights.
- Define the role of the sexual assault unit.
- Define domestic violence.
- Outline the role of the emergency nurse.
- Explain crisis counselling.
- Outline medical assessment and management.
- Explain the process of forensic examination.
- Document appropriately.

11.2 ABOUT SEXUAL POLICIES AND PROCEDURES IN NSW

Sexual assault is a crime of violence for which the perpetrator is solely responsible (NSW Health, 2005). Sexual assault patients often experience shame, guilt and fear, and find it difficult to trust others. Societal misconceptions attached to sexual assault often intensify these feelings and heighten the trauma experienced by patients. This prevents many patients from seeking assistance or reporting the crime to police (NSW Health, 2005).

The information in this section has been taken from the NSW Health *Sexual Assault Services Policy and Procedure Manual (Adult)* PD 2005_607. The following material is an excerpt only. The full details can be accessed through the NSW Department of Health link.

The above policy document provides the principles and minimum standards for the provision of sexual assault services in NSW. Local policies put these principles and standards into practice. It is strongly recommended that you review your local policies and procedures with your mentor so you can familiarise yourself with the processes to ensure you can provide the service sexual patients require.

11.3 PRINCIPLES OF INTERVENTION

It is critical that the actions of each participant in a coordinated community response be guided by core principles of intervention. The principles of intervention (NSW Health, 2005) include:

- High quality, timely counselling and appropriate medical services must be offered to all sexual assault patients.
- Strategies to improve the utilisation of sexual assault services should be implemented.
- Sexual assault services will reflect a philosophy that locates the responsibility for the assault with the offender.
- Immediate and appropriate intervention is the most valuable in terms of the patient's recovery and for minimising long term problems
- Effective intervention focuses on both the issues arising from the abuse and the patient's strengths and resiliencies
- The provision of sexual assault services will be consistent with Interagency Guidelines for Responding to Adult Patients of Sexual Assault to ensure a coordinated response.
- The service should seek to maximise the patient's experience with the service in relation to choice and control.
- Measures should be taken to facilitate access to the service for non-English speaking people.

11.4 CHARTER OF PATIENTS' RIGHTS

The sexual assault service must have a written statement on the rights of people accessing the service. In NSW (NSW Health, 2005), this includes the right to:

- A safe environment for counselling.
- Confidentiality and privacy within health policy and legal constraints.
- Make decisions and be informed about the care.
- Decide on whether or not to pursue legal action.
- A fair investigation of their complaints.
- Respectful and quality healthcare.
- Decide if they want involvement in research.
- A choice regarding accepting care/services from students.
- Choice a support person to accompany them.
- Be told about the nature and security of any files/records kept by the service and how long the files will be stored.
- Have access to an interpreter if they require.
- Have access to an Aboriginal liaison officer if they wish.
- Request their case be transferred to another counsellor/medical officer if they wish.
- To review their medical record and counselling notes.
- Refuse any treatment or counselling.
- Make a complaint about their treatment to the Health Care Complaints Commission.

11.5 THE ROLE OF SEXUAL ASSAULT SERVICES

Patients of sexual assault require crisis counselling, specialist medical assessment, and ongoing counselling (NSW Health, 2005).

Crisis Counselling

Immediately after assault, people experience shock, fear, numbness, and denial. Access to timely crisis counselling may prevent or mitigate against a post-traumatic stress response. Crisis counselling assists in addressing the trauma of the assault, provides the patient with information about the nature of the assault and the legal system, and provides practical support and validation to the patient (NSW Health, 2005).

Specialist medical assessment

Sexual assault services offer medical examinations by specially trained medical officers who are sensitive to the trauma of sexual assault. The medical assessment has a vital role to play in identifying medical treatment needs and proving support and reassurance. Assessment findings can also assist with the investigation of the allegations of sexual assault and can contribute to the prosecution of the perpetrator (NSW Health, 2005).

Ongoing counselling

Ongoing counselling is offered to the patient and, if appropriate, to the family and friends. The focus of counselling is on overcoming the impact of the abuse. Empowerment of the patient is an important philosophy underlying counselling (NSW Health, 2005).

Complete Activity 47 in the Participant Workbook

11.6 ROLE OF THE EMERGENCY NURSE

In facilities where access to the sexual assault service is via the emergency department, the emergency nurse will often be required to:

- Contact the appropriate sexual assault service.
- Support the patient until a member of the sexual assault service is available.
- Ensure the environment is safe and private for the patient.
- Ensure the facility's policy in regard to forensic evidence is adhered to.

Given the humiliation, stigma and shame commonly associated with sexual assault, clients need to be assured that their privacy and confidentiality will be respected.

11.7 REPORTING TO THE POLICE

The decision to report the crime to the police rests with the patient and should be respected. However, in the event of sexual assault by a Health employee or serious injury, notification must be made to the police.

The sexual assault worker is responsible for discussing the steps involved in proceeding with a formal complaint to the police (NSW Health, 2005). Information provided to the patient by the sexual assault worker includes: his/her right to make or not make a statement, the steps involved in reporting the crime to the police information about the general and forensic medical examination that may be required, and the process and the prosecution times frames (NSW Health, 2005).

In some cases, patients may report the crime to the police but elect to not give a full statement as they do not wish to proceed to legal action. The police will take this information in the form of a report. Under these circumstances, legal action against the perpetrator cannot proceed. If the police identify that a serial offender may have committed the crime, they may contact the patient at a future time and request further action be taken (NSW Health, 2005).

11.8 MEDICAL ASSESSMENT AND MANAGEMENT

Trained sexual assault forensic examiners are required to carry out timely forensic and general examinations on patients. The examiners may be either nurses or medical officers who have attended specialist training. Training requirements include knowledge of the NSW Health *Sexual Assault Services' Policy and Procedures Manual (Adult)* PD2005_67 (NSW Health, 2005). This includes:

- Impact and nature of sexual assault.
- Needs of sexual assault patients in crisis.
- Forensic procedure and protocol.
- Pregnancy and STD prophylaxis including interpretation of test results.
- Documentation requirements.
- Evidentiary issues.

Initial contact with the sexual assault forensic examiner should occur with minimal delay. Current NSW Health policy indicates that this contact must occur within two hours of a request by the sexual assault counsellor (NSW Health, 2005). Often this may involve bypassing the triage and medical assessment requirements of the facility due to immediate contact with the sexual assault counsellor. This does not preclude the patient being triaged as per normal process to assess for injury. Clinical examination, however, in the absence of life-threatening injury, is conducted after a sexual assault counsellor assesses the patient.

11.9 MEDICAL ASSESSMENT PROCEDURE

Timing and consent

In non-urgent cases prior to the commencement of the clinical examination, the forensic examiner must consult with the counsellor and, if appropriate, the police, in regard to the timing and nature of the examination (NSW Health, 2005). A rapid response is emphasised, especially for assaults occurring within the previous 72 hours – forensic evidence is likely to be present if within the past 72 hours, and may still be present up to seven days after the incident (NSW Health, 2005).

Unless it is a medical emergency, no examination can occur without the patient's valid written consent. For consent to be valid, the following conditions must be met (NSW Health, 2005):

- Consent must be given freely.
- Capacity to give consent must be present. That is, the patient must be capable of understanding what they are doing and not under the influence of a mental disorder, drugs or alcohol.
- The consent must be specific to the examination or procedure.
- The patient must be given the appropriate information about the examination or procedure.

Information concerning the examination must include:

- The reason for the examination and the reason for the timing of the procedure.
- Details concerning the release of the findings, as appropriate to the person.

If the patient is from a non-English speaking background and an interpreter is not used, valid consent is not obtained and the examination cannot proceed (NSW Health, 2005).

The explanation must continue through the procedure, ensuring the patient is kept appraised of what the medical examiner is doing.

If the patient is unconscious and there is a suspicious of sexual assault per vaginal examinations can only be conducted after the patient has been stabilised, recovers consciousness and is capable of giving informed consent unless medically indicated.

For the purpose of a forensic examination where the patient does not recover consciousness and there are clear indicators that an assault has occurred, the decision to proceed with the examination is made by the on-call counsellor or Sexual Assault Co-ordinator, the forensic examiner, and the treating medical officer in consultation with the police and family or person responsible for the patient.(NSW Health 2005)

Substitute consent

Where an examination is indicated, substitute consent may be obtained from the 'person responsible' for the patient (NSW Health, 2005). The categories of 'person responsible' include a:

- Legally appointed guardian who has the legal right to consent to dental or medical treatment for the person.
- De facto spouse or spouse where there is a continuing close relationship.
- Unpaid carer who arranges or provides domestic support on a regular basis.
- Previous carer, if the person is now in residential care.
- Relative or close friend who has maintained a close personal relationship through frequent personal contact and is not paid.

The 'person responsible' can only give consent for a forensic examination if it is considered an adjunct to appropriate treatment for the patient.

If the 'person responsible' cannot be located or is unwilling to respond, substitute consent may be sought from the Guardianship Tribunal.

Consent to release the kit remains with the patient. If the patient dies, the kit is to be held by the sexual assault counsellor until collected by the police. In the event that the patient does not or is unlikely to regain consciousness, only a guardian appointed by the Guardianship Tribunal has the authority to give consent for the release of the kit (NSW Health, 2005).

Consent from a person with an intellectual disability

The same requirements for informed consent are required with patients who have an intellectual disability. Some people with an intellectual disability may have the capacity to make informed consent. It is the responsibility of the clinician to assess whether the person can understand the nature of the examination and give informed consent (NSW Health, 2005).

In the event that an examination is required and the person does not have the capacity to consent, substitute consent may be obtained from a 'person responsible'. The categories of a 'person responsible' and the principles of substitute consent are the same as those outlined under substitute consent.

Consent from a person with a mental illness

A person with a mental illness may have the capacity to give informed consent. The responsibility for determining if the person has the capacity rests with the attending medical officer and the person's mental health medical practitioner. In the event that the person does not have the capacity to consent, substitute consent may be obtained by a 'person responsible' (NSW Health, 2005). The categories of a 'person responsible' and the principles of substitute consent are the same as those outlined under substitute consent.

In the event that a 'person responsible' has no authority to give consent on behalf of the person, an application must be made to the Guardianship Tribunal for a guardian to be appointed (NSW Health, 2005). If the patient has been scheduled to a gazetted psychiatric unit under the Mental Health Act the authority to give consent for a forensic examination is the responsibility of the Medical Superintendent or a medical officer delegated by the Medical Superintendent (NSW Health, 2005). This consent must be documented in the forensic protocol.

If the police or others request a forensic examination and a medical examination is not indicated, the 'person responsible' does not have the authority to give consent and an application must be made to the Guardianship Tribunal for a guardian to be appointed. The guardian is then responsible for making the decision on behalf of the person.

Consent to release the kit to police is not included in the consent for a forensic examination. Where possible, it is preferable to wait for the person to recover so they can make their own decision. The decision on whether the person will recover the capacity to consent sits with the treating mental health practitioner and the patient (NSW Health, 2005). The decision and the process for reaching the decision must be documented in the person's notes. If the person does not recover the capacity to give consent, only a guardian appointed by the Guardianship Tribunal has the authority to give consent to release the kit to the police (NSW Health, 2005).

Witness to the examination

Patients must be offered the opportunity to have a support person of their choice present during the forensic examination (NSW Health, 2005). The counsellor may act as both a support person for the patient and as a witness to the examination. If the support person is not employed by a Health Services Act as a witness to the examination, then an appropriate Health Service employee will need to act and sign as a witness for the examination.

Police presence during forensic examination

The police do not have to witness the examination to ensure the integrity of the evidence. Specimens collected during the examination are placed in a sealed kit, documented in a forensic register and secured in a locked fridge until handed over to the police. If the patient makes an uncoerced request to have a police officer present as their support person the patient's wish should be granted (NSW Health, 2005).

Testing for sexually transmissible diseases (STDs)

Laboratory testing will not identify most STDs before a minimum of 72 hours so testing during the immediate post exposure time frame should only be taken to rule out pre-existing STDs. In cases where the patient specifically requests them in the immediate post exposure period, or there are clinical indicators of an STD, immediate post exposure testing may be carried out (NSW Health, 2005).

Follow-up testing for STDs is generally provided two weeks post assault with the exclusion of bacterial STDs such as gonorrhoea and Chlamydia (NSW Health, 2005). To cover the window period for diseases such as HIV, hepatitis B and syphilis, follow-up screening should occur at three months post assault.

Counselling should be provided on the need for safe sex practices until after the window period and results have been returned (NSW Health, 2005). Written information on STDs should be provided to the patient.

STD prophylactic medication

Prophylactic medication for STDs following a sexual assault is generally not recommended. HIV prophylaxis in particular has substantial side effects and is generally not indicated. Assessing the risk of STD exposure, however, is important (NSW Health, 2005). If it appears that HIV PEP is warranted following the risk assessment, an Area authorised prescriber such as a HIV specialist physician or sexual health physician should be consulted (NSW Health, 2005).

Post-coital contraception

The post-coital contraceptive must be available and offered to all female patients of sexual assault unless contraindicated (NSW Health, 2005). A written handout explaining the use of post-coital contraception and a comprehensive verbal explanation must be provided to all patients.

Discussion of examination findings

On completion of the examination, the forensic examiner will discuss any findings with the patient ensuring adequate time to deal with any issues that may arise from the discussion (NSW Health, 2005). If the person consents, the examiner will also discuss the findings with the police and counselling staff.

Liaison with other healthcare providers

If the person requires continuing or follow-up care from other medical personnel, the sexual assault forensic examiner is responsible for providing the medical practitioner with a summary of the treatment provided once the patient has consented (NSW Health, 2005).

Testing for drugs administered by the perpetrator

Toxicology screening for drugs and alcohol is recommended if it is suspected that the patient may have been unlawfully administered a drug as apart of the assault (NSW Health, 2005). The patient must be informed that the screening may identify prior use of cannabis, opiates and stimulates for a period of three months prior to presentation. The patient must also be informed that the toxicology screen will not identify when, how or the amount of the substance administered and that all of the results will be admissible in court (NSW Health, 2005).

Toxicology screening cannot be performed at the request of the police unless the patient has been informed of the above and consents. The Sexual Assault Investigation Kit (SAIK) contains a separate consent for the collection of blood samples for toxicology.

If the patient requests screening for their own peace of mind, they can be offered screening provided by the hospital. They should be advised, however, that police or others could subpoena these results for use in court (NSW Health, 2005).

Issuing of medical certificates

Patients attending a sexual assault in crisis should be offered a medical certificate so they can take time off work or study. The certificate must not detail the reason for their presentation to the service (NSW Health, 2005).

11.10 SEXUAL ASSAULT FORENSIC PROTOCOL

Restriction of use

Use of the Sexual Assault Investigation Kit (SAIK) is limited to sexual assault forensic examiners working with the sexual assault service (NSW Health, 2005).

Storage and destruction of the kit

In the event that a patient has not given consent for the release of the SAIK to the police, the kit should be kept for a minimum of three months at the Sexual Assault Service unless previously discussed with the police and patient (NSW Health, 2005). The SAIK contains a section that the patient needs to sign on completion of the examination if they are undecided about releasing the kit to the police. This section clearly articulates that the kit will be destroyed after three months if they do not contact the sexual assault service and sign consent for the release of the SAIK to the police (NSW Health, 2005).

Following the destruction of a SAIK, a record will be made in the person's file stating the date and the reasons for the SAIK's destruction (NSW Health, 2005).

11.11 MEDICAL RECORDS AND REPORT WRITING

Examination findings

Details of the sexual assault and the examiner's findings are usually recorded in the SAIK if police action is anticipated.

A separate form of record is kept for patients who clearly indicate they do not want the matter reported to the police (NSW Health, 2005). Sexual assault documentation is not filed on a general medical record but remains on the sexual assault service's files.

Legal reports and statements

If the matter proceeds to court, statements prepared by the medical practitioners must be done so in a timely manner and in an acceptable format for the courts. Responsibility for the provision of medico-legal reports sits with the area health service and forms part of the forensic medical examination process (NSW Health, 2005).

Forensic register

A register that tracks all forensic kits must be maintained and completed by the Sexual Assault Service. The register includes the following details (NSW Health, 2005):

- Name of the person.
- Name of the medical officer.
- Name of the counsellor.
- Date of examination.
- Date of disposal or collection of the kit.
- Name of person handing kit to police.
- Name of police officer collecting the kit.
- Whether consent to release the kit has been signed.

The register must be kept in a secure place. The Sexual Assault Service must have clearly documented procedures for the disposal of SAIKs (NSW Health, 2005).

Complete Activities 48, 49 and 50 in the Participant Workbook

11.12 DOMESTIC VIOLENCE

Who is affected?

Domestic violence occurs when a family member, partner or ex-partner attempts to physically or psychologically dominate or harm the other.

According to the Commonwealth's Office for Women (OFW), domestic violence can be exhibited in many forms, including physical violence, sexual abuse, emotional abuse, intimidation, economic deprivation or threats of violence.

Domestic violence occurs in all geographic areas of Australia and in all socioeconomic and cultural groups, although domestic violence is a more significant problem for certain groups, such as regional and rural Australia and Indigenous communities.

Scope of the issue

Domestic violence and its impact on women and children in Australia have a major effect on health services. Gerard (2006) suggests that 30–40% of women who seek care in an emergency department have issues directly related to domestic violence. The associated cost to the health service was estimated during 2003–04 as $314 million (Access Economics 2004).

Incidence

As most incidences of domestic violence often go unreported, it is difficult to measure the true extent of the problem. According to a study conducted in 1998 by Carlos Carcach from the Australian Institute of Criminology (AIC), *Reporting Crime to the Police,* most assaults against women where the victim knows the offender go unreported. The 2005 Australian Bureau of Statistics (ABS) *Personal Safety Survey,* estimates that 36% of women who experienced physical assault by a male perpetrator reported it to the police in 2005 compared to 19% in 1996, and that 19% of women who experienced sexual assault reported it to the police in 2005 compared to 15% in 1996.

The best indicators available to date about the levels of violence against women in Australia are from the 1996 ABS publication Women's Safety Survey and the more recent ABS *Personal Safety Survey 2005,* which surveyed both men and women. The surveys asked women about their experiences of violence and found that:

- 5.8% of women had experienced violence in the 12-month period preceding the survey in 2005, compared with 7.1% in 1996.
- 4.7% of these women had experienced physical violence (this includes physical assault and threat of physical assault) in 2005 compared with 5.9% in 1996, and 1.6% had experienced sexual violence (this includes sexual assault and threat of sexual assault) compared to 1.5% in 1996.
- Of the women who experienced sexual violence during the 12 months prior to the 2005 survey, 21% had experienced sexual assault by a previous partner in the most recent incident, and 39% by a family member or friend.
- Of those women who were physically assaulted in the 12 months prior to the 2005 survey, 38% were physically assaulted by their male current or previous partner. Of the women who had experienced violence by a current partner, 10% had a violence order issued against their current partner and of those women who had violence orders issued, 20% reported that violence still occurred.

The role of the emergency nurse

The role of the emergency nurse is to identify, support and treat patients of domestic violence. According to the literature, both NSW and internationally, there is a high use of health services by woman experiencing domestic violence but a low identification rate by health care workers.

11.13 SCREENING

Shame, fear of not being believed, and fears for their safety often prevent women from disclosing domestic violence.

Screening strategies focus particularly on early identification of clinical indicators. The following screening questions have been developed for routine screening and referral. These questions should be used by staff that are able to support and refer the patient accordingly. This may involve escalating a patient's care to a senior member of staff.

Screening questions

- Within the last year, have you been hit, slapped or hurt in other ways by your partner or ex-partner?
- Are you frightened of your partner or ex-partner?
- Are you safe to go home when you leave here?
- Would you like some help with this?

Complete Activity 51 in the Participant Manual

Emergency nurses are well placed to identify or suspect domestic violence, to take action and intervene early. Where indicators or inconsistent histories are present, nurses can direct questions about the cause of injury or the dynamics within relationships even when domestic violence is not the reason for presentation to an emergency department.

11.14 DOMESTIC VIOLENCE AND CHILDREN

Children living with domestic violence are at risk of serious physical and psychological harm. The *Australian Personal Safety Survey* found that 61% (822,500) of those who had experienced violence from a previous partner had children in their care during the relationship (ABS, 2006). In 2004–05, domestic violence was the most common primary reported child protection issue to the NSW Department of Community Services. Please refer tot he child well being website.

All domestic violence interventions must have a child protection perspective. Mandatory reporting is required for all healthcare workers. Refer to NSW Health Policy Directive 2006-084.

Complete Activity 52 in the Participant Manual

Be aware that males are also susceptible to the effects of domestic violence.

REFERENCES AND RESOURCES

Australian Bureau of Statistics (2005). *Personal Safety Survey, 2005.*

Australian Bureau of Statistics (1996). *Women's Safety Survey, 1996.*

Carcach, C (1998). *Reporting Crime to the Police,* Australian Institute of Criminology.

Parliament of Australia, Parliamentary Library – E-Brief: Online Only issued 7 August 2003, updated by Janet Phillips, September 2006. http://www.aph.gov.au/library/intguide/sp/Dom_violence.htm

NSW Health (2003). *Policy and procedure for identifying and responding to domestic violence.* http://internal.health.nsw.gov.au/pubs/p/pdf/procedures_dom_violence.pdf

NSW Health (2005). *Sexual Assault Services Policy and Procedure Manual (Adult)* PD 2005_607 http://www.health.nsw.gov.au/policies/pd/2005/PD2005_607.html

NSW Health (2005). *Guidelines for the Promotion of Sexual Safety in NSW Mental Health Services.* http://www.health.nsw.gov.au/policies/GL/2005/pdf/GL2005_049.pdf

The Benevolent Society (2009). *Moving forward: women's journeys after leaving an abusive relationship.* http://www.bensoc.org.au/uploads/documents/Moving-Forward-full-report-June-09.pdf

Raphael, B (2000). 'Domestic violence', in *Medical Journal of Australia,* Vol 173, No. 10, pp. 513-514.

Domestic violence and child protection: http://www.lawlink.nsw.gov.au/lawlink/vaw/dvguidelines.nsf/pages/childprotection

NSW Government help for victims of sexual assault: http://www.lawlink.nsw.gov.au/lawlink/victimsservices/sexualassault.nsf/pages/sexual_assault_resourses_websites

NSW Health sexual assault fact sheet: http://www.health.nsw.gov.au/publichealth/sexualhealth/sex_assault.asp

Contact phone numbers for sexual assault services: http://www.aboutdaterape.nsw.gov.au/finding_help/contact_numbers.htm

List of NSW Health Sexual assault services: http://www1.health.nsw.gov.au/services/Default.cfm?S_UNITNAME=sexual+assault

ACON sexual assault fact sheet: http://www.acon.org.au/anti-violence/Sexual-Assault/What-is-sexual-assault

NSW Wales Rape Crisis Centre: http://www.nswrapecrisis.com.au/

City of Sydney Domestic Violence Booklet: http://www.cityofsydney.nsw.gov.au/Community/documents/Safety/DomesticViolence0806.pdf

Community safety and domestic violence: http://www.fnc.org.au/pdfs/Domestic_Violence_Against_Women_May2009.pdf

Domestic violence in gay and lesbian relationships: http://ssdv.acon.org.au/

Domestic violence inter-agency guidelines:
http://www.lawlink.nsw.gov.au/lawlink/vaw/dvguidelines.nsf/pages/childprotection

NSW Government Victim Support http://www.nsw.gov.au/Victim_results.asp?area=DOMESTIC_VICTIM_LIFE_SNSW&parent=VICTIM_LIFE_SNSW

NSW Health Domestic Violence: http://www.health.nsw.gov.au/topics/domestic.html

NSW Police Force Domestic Violence:
http://www.police.nsw.gov.au/community_issues/domestic__and__family_violence
http://www.police.nsw.gov.au/community_issues/domestic__and__family_violence/domestic_violence_in_same-sex_relationships

NSW Government Domestic Services:
http://www.community.nsw.gov.au/DOCS/STANDARD/PC_101007.htm

NSW Women's Refuge Movement Resource Centre: http://www.wrrc.org.au/

Penrith City Council Domestic Violence: http://www.dvhelppenrithregion.nsw.gov.au/

Women's issues and social empowerment http://www.infoxchange.net.au/wise/DVIM/index.htm:

NSW Health sexual assault information
http://www.health.nsw.gov.au/publichealth/sexualhealth/sex_assault.asp
http://www1.health.nsw.gov.au/services/Default.cfm?S_UNITNAME=sexual+assault
http://www.acon.org.au/anti-violence/Sexual-Assault/What-is-sexual-assault

Date rape: http://www.aboutdaterape.nsw.gov.au/finding_help/contact_numbers.htm

Rape crisis: http://www.nswrapecrisis.com.au/

12 Elderly

12.1 LEARNING OUTCOMES

After completing this module, you will have a better understanding of how to assess and manage the elderly patient within the emergency setting. In particular, you will be able to:

- Define elderly patients.
- State pathological/physiological differences in the main systems.
- State the importance of preventing falls.
- State the importance of teams in caring for elderly patients.
- Differentiate between delirium, depression and dementia.
- Identify elderly patients at risk.
- State the importance of comprehensive discharge planning.

12.2 INTRODUCTION

Challenges facing the nurse

Elderly patients offer an exciting challenge to clinicians in the emergency department as they:

- Challenge our observational skills, communicational skills and investigational skills.
- Are at significant risk of deterioration due to physiological changes, polypharmacy, nutritional complications and age-related disease.
- Are increasingly frequent users of emergency departments.
- Have complex medical and social needs over and above the clinical cause of attendance.
- Are more frequently admitted and experience adverse outcomes after they are discharged from the emergency department (Salvi, et al, 2007:292).

Most of the patients that you will care for are over the age of 65 years and about one-third of all hospital stays/presentations are associated with this age group (Knol V, 2009: Slide presentation).

Elderly patients require a thorough assessment and in-depth discharge planning to prevent readmission and other complications. Once admitted, older persons often require longer length of stay due to the associated delirium, falls and other complex problems (Huppatz, E, 2008: Slide presentation).

To provide a high level of care, it is important to understand some of the possible alterations to physiological function that may occur as the patient become older.

In addition, you need to remember that if the elderly patient is multilingual, they may revert to their first language because of surrounding stress. They may also be easily distracted by the busy environment and, therefore, may find it difficult to concentrate and answer questions.

Differences

People may be chronologically old but remain physically fit, mentally active and productive in society. People may also be chronologically young, but physically or functionally old.

It is important to look at possible physical, physiological and psychosocial changes that may occur during ageing.

The following sections highlight some important pathological/physiological changes that may be present when assessing and examining the elderly patient.

12.3 AIRWAY AND BREATHING

People experience a loss of about 30% in pulmonary function between the ages of 25–75 years. The airway and breathing of elderly patients is affected by:

- Decreased biting force and brittle teeth due to reduction in enamel. They may even have false teeth in situ. These should remain in situ unless they are loose or pose a threat to airway obstruction.
- An increase in residual lung volume.
- Muscle atrophy and rigidity.
- Thickened membranes, alveoli and capillaries (Knol, V, 2009: Slide 16).
- Diminished salivary production and alteration in taste.
- A diminished gag reflex.

The above factors predispose the elderly to pneumonia. Therefore, it is important to assess the patient for clinical signs of pneumonia and consider the potential for acquiring pneumonia. You can do this by assessing the patient's vital signs, and the effect that the patient's diagnosis will have on their activities of daily living.

Case study

Anna (84-years-old) presents to the emergency department as she tripped and fell at home onto a chair and has pain and bruising to her left side. She lives at home with her son who cooks and cleans for her, Anna is able to wash and dress herself independently.

Anna is assessed by a medical officer. Nil fractures are found, but she is bruised and sore. She is given Panadol for pain and the plan is to discharge Anna on regular Panadol with follow-up by her regular general practitioner.

Anna is at risk of pneumonia due to a diminished gag reflex, and increased residual lung volume from degenerative changes and potentially shallow breathing due to pain caused by the injury and not taking adequate analgesia or taking her analgesia correctly.

It is important for medical staff to assess Anna's cognitive state to ensure that she understands why, how and when to take her medication, understands her injuries and what to do if she continues to be in pain. Anna is fortunate as her son is able to reiterate what the medical and nursing staff has advised. Written information is always advised for patients and families to refer to at a later time and date.

Complete Activity 53 in the Participant Workbook

12.4 CIRCULATION

Cardiac output decreases up to 50% between ages 25–75 years. The circulation of elderly patients is affected by:

- Protein degeneration: lipofuscin accumulation in tissues.
- Fibrosis of blood vessel lumen, calcification of arteries, elongation of arteries.
- Thickening of vessel membranes, decreased elasticity.
- Increased perivascular fibrosis.
- Less efficient use of oxygen.
- Thickening of valves, which become more rigid.
- Myocardium loses elasticity (Knol, V, 2009: Slide 15).

The above factors predispose the elderly to cardiovascular disease.

Remember that 20% of elderly patients with a heart attack will not complain of chest pain. Instead, they will complain of weakness, vomiting, shortness of breath, abdominal; pain or fainting/dizziness. Therefore, it is important to consider attending an ECG on patients over the age of 65 to rule out a cardiac event.

12.5 DISABILITIES (INCLUDING DRUGS)

The following factors need to be remembered when managing and assessing elderly patients:

- Behavioural changes, diminished intensity of emotions, confusion, disorientation.
- Slower stimuli-response reaction, and less sensitivity to light, touch and pain stimuli.
- Diminished overall coordination of neuromuscular circulatory, glandular systems, increased susceptibility to shock, slower nerve muscular transmission, sensitivity to excessive heat or cold.
- Less awareness of position, increased likelihood of falls.
- Introspection, enjoyment of remembering past events.
- Tendencies toward depression, paranoia, discouragement.
- More likely to have hearing impairment.
- More likely to suffer illnesses associated with dementia or Alzheimer's. Alzheimer's disease is the most common form of dementia, accounting for 50–70% of all dementia cases (Alzheimer's Australia, 2009:1).
- Challenging for the clinician to discern between delirium, dementia or depression.
- Elderly patients are often on many different medications.
- Most often on anti-coagulant and anti-thrombotic drugs (ie ACAT drugs).
- Elderly persons with intra-abdominal pain are more likely to present with symptoms other than abdominal pain (eg chest pain or altered mental status).
- Pain can also precipitate the onset of delirium and altered mental state.

Elderly patients are more likely to fall. Ascertaining the cause of the fall is very important. A fall in association with anti-coagulant/anti-thrombolitic drugs can be fatal.

12.6 EXPOSURE

The following factors relating to exposure need to be remembered when managing and assessing elderly patients:

- Dermal thinning.
- Subcutaneous fat loss.
- Decreased collagen and elastin.
- 50% decline in cell replacement.
- Mucous membranes become dry.
- Sweat gland output lessens.
- Body temperature becomes difficult to regulate.
- Melanocyte production decreases – localises – brown spots (senile lentigo).
- Hair pigment decreases – grey or white hair.
- Hair thins.
- Nails grow at different rates – longitudinal ridges, flaking, brittle and malformations.
- Hyperplastic skin conditions – senile keratosis (dry, harsh skin) senile angioma (benign tumour of dilated blood vessels).

Elderly patients are more susceptible to pressure care problems, skin tears and hypothermia.

Therefore:

- It is imperative that pressure area assessment is attended on all elderly patients and that pressure area care and special aids such as pressure mattresses are used for those at risk.
- It is important that the patient is kept warm. This may include using extra blankets or dressing a patient in their usual sleepwear after assessment.
- It is important to assess a patient's skin integrity and try and reduce skin tears wherever possible. For example electronic blood pressure cuffs can cause bruising and tears when repeatedly blown up on a patient's arm.

Also remember that examination (when the patient is exposed) may reveal new and/or old injuries consistent with abuse or neglect (Cham, 2000: 572).

12.7 HEAD, FACE AND NECK

The following factors need to be remembered when managing and assessing the head, face and neck of elderly patients:

- Be aware that the patient may have a hearing and/or visual deficit and requires aids for these deficits.
- Assess the patient's hydration status by examining not only skin, but also mucous membranes. Elderly patients are at risk of dehydration or fluid overload.
- This is also a good time to assess the possibility of a stroke. Assess the following factors and, if the patient tests positive for one or more of these factors, then suspect a stroke:
  - Facial movements – ask the patient to smile or show teeth – look for new lack of symmetry.
  - Arm movements – ask the patient to lift arms together and hold – does one drift and fall?
  - Speech – ask the patient to speak – look for NEW disturbance of speech.
  - Test all 3 – if 1 or more – suspect stroke.

Remember that a patient > 65 years with a mild head injury (GCS 14–15) is considered 'high risk'.

Elderly patients who have sustained a head injury require regular GCS assessment and a baseline of what is normal for them. They may also require a longer observation period and possible admission and further investigations such as a head CT scan to rule out an intracranial bleed.

Complete Activity 54 in the Participant Workbook

12.8 OBSERVATIONS AND HISTORY-TAKING

As in all presentations, a primary survey must be conducted and life-threatening conditions treated immediately.

As in all patient assessments, it is important to investigate and document the following (but note that accurate history-taking may be impeded cognitive and sensory impairments):

- General appearance – look for signs of neglect and abuse, dishevelled appearance. Be aware of odours (eg a fetid urine smell may indicate a urinary tract infection).
- Presenting problem/s – be aware that the patient should be assessed thoroughly including a Glasgow Coma Scale (GCS), urinalysis, ECG, and pressure area assessment.

'Risk screening' questions

It is important to incorporate the nursing assessment 'Risk screening' questions early. If yes to any of the following questions, then the patient should be referred to a member of the Aged care Services Emergency Team (ASET) or a complex care coordinator:

- Do you live alone?
- Are you a carer for someone else at home?
- Do you receive community services?
- Do you have difficulty with self-care (washing/shopping/walking/getting out of bed, etc)?

- Do you have a history of recent hospital admission?
- Do you take six or more medications per day?
- Do you have a history of falls?

You will also need to undertake:

- A full set of observations – RR, SpO_2, PR, BP, temperature (including urinalysis and MSU).
- GCS and consider an ECG.
- Pain investigation as per previous chapters using the PQRST mnemonic.
- Skin integrity assessment, documenting findings (use the Waterlow/Norton scales).

Where applicable, advanced care directives and lasting powers of attorney should be respected.

12.9 TEAMS

Involving team members from other specialties in the assessment and care of patients ultimately impacts on the care provided and the patient's overall hospital experience. Teams have proven themselves very effective in reducing mortality and morbidity rates.

Example of teams

- Aged care Services Emergency Teams (ASETs). These are multidisciplinary teams comprising medical, nursing and allied health practitioners experienced in aged care. ASETs employ a model of care based on early identification of older people likely to benefit from access to specialised multidisciplinary aged care services (NSW Health, 2007:17.2).
- Aged Care Assessment Team (ACAT). These teams help older people and their carers work out what kind of care will best meet their needs when they are no longer able to manage at home without assistance. ACATs provide information on suitable care options and can help arrange access or referral to appropriate residential or community care.

Remember there are seven 'Es' that you use to assess for patients at risk (Jacques et al, 2006:175); and as you read through these you will see that elderly patients rate high on this risk analysis. It is quite possible that an elderly patient could score five out of seven on this risk analysis. The seven 'Es' are:

- Emergency.
- Elderly.
- Existing co-morbidities.
- Extreme illness.
- Emerging from anaesthesia.
- Exsanguination.
- Exiting from critical care units.

12.10 FALLS

Falls are the most common trauma and associated morbidity and mortality in elderly people British Geriatric Society, 2008:1).

Falls are common among older people and often result in fractures or other serious injuries. Fall-related injury is a major cause of morbidity and mortality for older people. Between one-in-four and one-in-three community-dwelling people aged 65 years or over report at least one fall per year and many fall more than once. Fall injury is a major cause of injury-related hospitalisations and loss of independence among people aged 65 years and over in NSW.

Resources

The Clinical Excellence Commission in conjunction with NSW Health has developed the following guidelines, which are on their website to help prevent falls in hospital:

- http://www.cec.health.nsw.gov.au/programs/falls-prevention.html.
- *Falls prevention strategies:* PDF ~236kb l TXT ~4kb.
- *Falls prevention in hospitals: for older person aged 65 years or over:* PDF ~252kb l TXT ~2kb.
- *Post fall assessment and management:* PDF ~584kb l TXT ~4kb.
- McClure, R J, 'The population approach to falls injury prevention in older people: findings of a two community trial', in *BMC Public Health,* 2010, 10.
- http://www.biomedcentral.com/content/pdf/1471-2458-10-79.pdf.

Many patients will present with injuries secondary to a fall. Falls are as a result of factors such as:

Table 1. Factors that contribute to falls in the elderly

Cause of fall	Explanation
Lack of physical activity	Failure to exercise regularly results in poor muscle tone, decreased strength and loss of bone mass and flexibility.
Impaired vision	Cataracts, glaucoma and deterioration of vision though degenerative changes and other causes limit the patient's ability to safely negotiate their environment.
Medications	Medications can contribute to falls by reducing mental alertness, hypotension, and worsening of balance and gait.
Environmental hazards	• In the patient's home, hazards can include tripping on rugs, lack of bars in the shower or bath, furniture overcrowding and unsteady furniture. • Outside patient's home, hazards can include uneven pavements, obstacles on the pavements, obstacles in corridors of shops and pathways.
Heart disease or failure (CHF)	Heart conditions can cause dizziness, balance problems, muscle weakness and fatigue, even with only slight exertion. Heart disease is also frequently associated with respiratory difficulties, which can result in many of the same falls-related conditions.
Stroke	Strokes often result in muscle weakness, and/or sensory imbalances on one side of the body, which can compromise one's ability to move about safely.
Parkinson's disease	Tremors, stiff aching muscles, and slow limited movement (especially when the person tries to move from a resting position) are all falls risks associated with Parkinson's disease. A person with Parkinson's disease is likely to take small steps and shuffle with their feet close together, bend forward slightly at the waist (stooped posture), and have trouble turning around. Balance and posture problems may result in frequent falls, especially as the disease progresses.
Low blood pressure	Low blood pressure, particularly when rising from a lying or sitting position, is a common cause of falls due to dizziness and/or fainting.
Chronic obstructive pulmonary disease (COPD)	The shortness of breath that is caused by COPD (chronic bronchitis and/or emphysema) can make you feel weak, dizzy or faint, even when you do simple things like get dressed or fix a meal.
Diabetes	Diabetes can cause a loss of feeling in the feet (diabetic 'neuropathy'), which compromises your balance and sense of where obstacles and uneven footing may be a hazard.
Arthritis	The loss of joint flexibility due to arthritis makes it difficult to maintain a safe gait, to avoid potentially dangerous obstacles, and maintain balance.
Vision problems	A decrease in vision, whether caused by glaucoma and cataracts, or just aging eyes, makes it far more difficult to judge distance and avoid obstacles that could trip you up. This is naturally a particular concern at night or when in the dark.
Mental confusion	Mental confusion can increase the chance of a fall since it may be more difficult to determine whether an activity is putting one at greater risk, or it may take longer to respond to a situation where a fall might otherwise be averted.

Patient falls are the most common adverse event reported in acute care settings, affecting 2–10% of annual hospital admissions. In line with international experience, in-hospital falls are a significant high-cost, high-volume hospital-acquired condition within NSW hospitals. Patient falls in hospitals increases their length of stay, requires additional diagnostic investigations, and impacts on patient treatment, resulting in increased costs to the system.

Hospital stays and rehabilitation are lengthy and expensive, and having had a recent fall is one of the leading reasons for premature admission to permanent residential aged care. No other single injury cause, including road trauma, costs the health system more than fall injury.

12.11 ABUSE AND NEGLECT

The added stress placed on the family when caring for an older person can lead to maltreatment. When referring to this, researchers generally distinguish two broad types: abuse and neglect:

- Abuse is commonly used to label an act of commission. In other words, there is an active involvement or interaction on the part of the abuser.
- Neglect is used as a general label for acts of omission, namely those with only a passive involvement of the abuser (McCallum, Matiasz & Graycar1990, p. 8).

More information on abuse and neglect of the elderly can be located at: http://www.aic.gov.au/documents/5/7/E/%7B57ED2491-7C7D-498F-A12C_7626D80D6339%7Dti37.pdf

If you are concerned for a patient in relation to abuse or neglect, consult with a senior colleague or clinician and adhere to local policy or contact your local ACAT team via the usual process, or via the numbers below.

- Aged Care Assessment Team – contact Commonwealth Carelink Centre on 1800 052 222.
- Aged Care Information Line – 1800 500 853.

12.12 DELIRIUM, DEPRESSION AND DEMENTIA

The table below defines the differences between delirium, depression and dementia.

This can assist nursing staff in assessing if the presentation is acute or chronic and the types of interventions and investigations that may be required. For example, an elderly person may become delirious and be brought in by family due to confusion. On assessment the cause may be as a result of a urinary tract infection.

Clinical features of delirium, depression and dementia

	Delirium	Depression	Dementia
Onset	Abrupt.	Often corresponds to changes in life circumstance.	Slow, insidious onset that is often unnoticed.
Daily course	Fluctuating course Often worse at night.	Usually doesn't fluctuate throughout day. Occasionally worse in the morning.	Usually doesn't fluctuate throughout the day. May be worse during moments of stress.
Length of course	Hours to weeks.	Variable but at least 6 weeks. May be months to years.	Months to years.
Consciousness	Reduced.	Clear.	Clear.
Alertness	Increased or decreased or variable depending upon type.	Normal.	Usually normal.
Activity	Increased, decreased or mixed depending upon type.	Variable, may be agitated or have slowing.	Variable.
Attention	Fluctuates but generally disordered.	Highly distractible.	Generally normal.
Orientation	Usually impaired but may fluctuate.	Usually normal although may have little interest in answering.	Often impaired.
Speech	Incoherent, slow or rapid.	May be slow.	Difficulty finding the correct words.
Affect	Variable.	Flat.	Labile.

12.13 DISCHARGE

Elderly patients require a thorough assessment of their presenting complaint and also their home situation as their condition may affect their discharge. Many patients return to the emergency department as they were unable to cope due to inadequate discharge planning.

One study found "a four-fold increase in the likelihood that an elderly patient would not go directly home from hospital if they were boarded in the emergency department for more than six hours" (Schneider, S, 2008).

Before being discharged, every elderly patient leaving the emergency department should have:

- A gait test. This should be attended by two staff members at the bedside to prevent the possibility of a fall. The patient should then be asked to walk a pre-determined distance (with their usual walking aid if used at home). The test should include:
  - The necessary tools to walk (eg walking frame, walking stick, etc).
  - An assessment of the patient's ability to walk up and down steps to ensure independence (only if they have to use steps to access their home).
  - A risk assessment to ensure that they are safe to go home.
- An assessment of:
  - Cognition (the mental process of knowing, such as awareness, perception, reasoning and judgement).
  - Continence.
  - Wound care (community nursing notified?).
  - Hygiene needs (able to shower by self or requires help).
  - Nutrition (Meals on Wheels etc.
  - Mobility (Grimmer, K, et al, 2004:1).

In addition, you need to consult local policies and procedures for discharge of an elderly patient in your individual emergency department. Discuss any questions with your support person.

Consider the following prior to discharge

- Is the patient going home to an empty house?
- Does the patient have a support person who can check to see if they are safe? For example: neighbour, relative or friend?
- Will the patient be able to be independent in activities of daily living?
- Do they require additional or services to be arranged prior to discharge?
- Is it safe to send the patient home? Consider the time of night and area in which they live. Is it safe to send them home?
- Can someone pick them up? This person can also pick up any groceries and other requirements if necessary.
- Do they have all the appropriate paperwork prior to discharge?
- Do they have the keys to their home?
- If admitted do they have any pets that will require looking after?

If you are concerned about one or more of the above considerations, the patient may require admission until the problem can be resolved.

Aged Care Assessment Teams (ACAT) and Aged Services Emergency Teams (ASET) may be available in your area and will need to be contacted. Physiotherapists, occupational therapists and social workers may need to be involved. The patient's general practitioner will need to be informed of the patient's admission and discharge requirements.

Key points

1. Speciality teams have proven themselves very effective in reducing mortality and morbidity rates.
2. 20% of elderly patients with a heart attack will not complain of chest pain. Instead, they will complain of weakness, vomiting, shortness of breath, abdominal pain, or fainting. Therefore, it is important to consider attending an ECG on patients over the age of 65 to rule out a cardiac event.
3. Elderly patients are more likely to suffer falls. The cause of the fall is very important.
4. A fall in association with ACAT drugs can be a lethal combination.
5. Elderly patients are more susceptible to pressure care problems, skin tears and hypothermia.
6. Patients > 65 years with a mild head injury (GCS 14–15) is considered 'high risk'.

Elderly patients require a thorough assessment of their presenting complaint and also their home situation as their condition may affect their discharge.

Complete Activity 55 in the Participant Workbook

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13 Obstetric & gynaecological emergencies

13.1 LEARNING OUTCOMES

After completing this module, you will be able to care for patients who present to emergency departments with an obstetric and gynaecological emergency. In particular, you will be able to:

- Define common obstetric and gynaecological emergencies.
- Perform a comprehensive nursing assessment and initiate appropriate nursing care, including diagnostic and nursing interventions.
- Recognise the complications of an ectopic pregnancy.

13.2 INTRODUCTION

Women with obstetric and gynaecological problems are seen frequently in emergency departments. Knowledge of the normal reproductive system and function is imperative to the nursing management and care of these women. Obstetric and gynaecological emergencies may pose a significant challenge for the emergency nurse. Women may not seek care or, despite presenting to emergency, may be embarrassed about symptoms. Ensuring privacy and cultural safety is fundamental to the care provided.

The following reference is useful for assessing and managing women with obstetric emergencies (every emergency department in NSW has a copy):

The Australian College of Midwives NSW Branch Inc, *Maternity Emergency Guidelines for Registered Nurses*.

Copies can also be obtained by contacting The Australian College of Midwives NSW Branch Inc. on: 61 - 2 - 9281 9522 or Email admin@nswmidwives.com.au.

Guidelines on the management of early pregnancy complications can also be found at http://www.wcha,asn,au/index.cfmspid/1_47.cfm

Revise the normal anatomy and physiology of female reproductive organs.

Complete Activity 56 in the Participant Workbook

13.3 COMMON PRESENTATIONS

Abdominal pain and vaginal bleeding

Abdominal pain and vaginal bleeding are the most common obstetric or gynaecological presentations to emergency. The possible causes are:

- Gynaecological
  - Ovarian cyst.
  - Endometriosis.
  - Dysfunctional uterine bleeding.
  - Sexually transmitted diseases.
  - Trauma.
  - Pelvic inflammatory disease.
- Obstetric
  - Bleeding in early pregnancy.
  - Ectopic pregnancy.
  - Hyperemesis.
  - Haemorrhage (ante/post-partum).
  - Pre-eclampsia.
  - Labour.

Pelvic pain

Pelvic pain is a common presenting chief complaint in patients seeking care in the emergency department. Pelvic pain is classified as acute, chronic, or cyclic.

Pain in the lower abdomen or pelvis may be due to a variety of causes. The uterus, cervix, and adnexa share the same visceral innervation as the lower ileum, sigmoid colon, and rectum. Therefore, it may be difficult to distinguish pain originating in the gynaecologic organs from pain originating in the gastrointestinal organs.

- Poorly localized visceral pain originates in organs and viscera innervated by autonomic nerves. This may be caused by distension of a hollow viscus (eg fallopian tube or bowel), distension of the capsule of a solid organ, or stretching of pelvic ligaments or adhesions.
- In contrast, pain that is well localized originates from somatic nerve irritation, such as irritation of the peritoneum caused by an inflamed organ (eg endometritis, appendicitis) or the presence of blood or purulent fluid (eg ruptured ectopic pregnancy or ovarian cyst).

An accurate history and physical examination is crucial in this patient population because the condition causing the pain may be life threatening.

Diagnosis is made through a combination of patient history, physical examination and clinical investigation.

Pregnancy testing

In women of childbearing age, pregnancy must be considered. This should be ruled out by a beta hCG test (also known as a pregnancy test). All pregnancy tests are designed to detect human chorionic gonadotropin (BHCG). BHCG is a hormone that is released from the placenta, which correlates to the size and viability of pregnancy

Each individual emergency department will have their own referral process for referring and transferring patients. Familiarise yourself with your emergency departments policy and guidelines on referring and transporting pregnant women. This includes Early Pregnancy Assessment Services for the management of early pregnancy complications.

13.4 COMMON GYNAECOLOGICAL PRESENTATIONS

Ovarian cysts

Most ovarian cysts cause no symptoms and resolve without the woman ever realising that they were there. Symptoms that can cause a woman to present to the emergency department are pain in the abdominal or pelvic region. This pain can be caused by:

- Cyst rupture.
- Rapid growth and stretching of the cyst.
- Bleeding into the cyst.
- Torsion (twisting of the cyst around its blood supply).

Most ovarian cysts in women of childbearing age are follicular cysts (functional cysts) that disappear naturally in one to three months. Although they can rupture (usually without ill effects), they rarely cause symptoms. They are benign and have no real medical consequence. They may be diagnosed coincidentally during a pelvic examination in women who do not have any related symptoms. All women have follicular cysts at some point that generally go unnoticed.

A follicular cyst in a woman of childbearing age is usually observed for a few menstrual cycles because the cysts are common, and ovarian cancer is rare in this age group. Sometimes ovarian cysts in menstruating women contain some blood, called haemorrhagic cysts, which frequently resolve quickly.

Ultrasound is used to determine the treatment strategy for ovarian cysts because it can help to determine if the cyst is a simple cyst (just fluid with no solid tissue, seen in benign conditions) or a compound cyst (with some solid tissue that requires closer monitoring and possibly surgical resection).

The treatment of ovarian cysts depends upon the individual situation and varies from observation and monitoring to surgical procedures.

In summary, the ideal treatment of ovarian cysts depends on the woman's age, the size (and any change in size) of the cyst, and the cyst's appearance on ultrasound.

Endometriosis

Endometriosis occurs when the tissue that normally lines the uterus (the endometrium) is found in sites outside the uterus. The misplaced tissue implants itself onto the surface of the tissue or organ where it has been deposited and begins to grow and function. Symptoms can include:

- Period pain.
- Abdominal, back and/or pelvic pain.
- Heavy or irregular bleeding.
- Premenstrual symptoms.
- Tiredness.
- Mood changes.
- Bloating.
- Bowel or bladder symptoms.

Treatment will depend on the severity of the condition, the symptoms occurring and whether pregnancy is desired. Treatments can include surgery, hormone therapy and natural therapies, as well as medication for pain relief.

Endometriosis can be a chronic, recurring condition. More information can be found at:
http://www.endometriosis.org.au/
http://www.endometriosis.org.au/images/stories/Education/Documents/endometriosis.pdf

Pelvic inflammatory disease (PID)

PID is a generic term used to describe an acute or chronic infection of the fallopian tubes, ovaries, pelvic peritoneum, or pelvic connective tissue. PID may denote infection of one or all of these areas. In women aged less than 25 years, 60–80% is caused by sexually transmitted gonococci or Chlamydia mixed with other commensals and anaerobic flora. Otherwise, PID often occurs by ascending spread of genital commensals often following surgical trauma, pregnancy, and IUD insertion or removal.

Symptoms of PID vary from none to severe. When PID is caused by Chlamydia infection, a woman may experience mild symptoms or no symptoms at all, while serious damage is being done to her reproductive organs. Because of vague symptoms, PID goes unrecognized by women and their health care providers about two thirds of the time. Women who have symptoms of PID most commonly have lower abdominal pain. Other signs and symptoms include fever, unusual vaginal discharge that may have a foul odour, painful intercourse, painful urination, irregular menstrual bleeding, and pain in the right upper abdomen (rare).

PID is usually treated with antibiotics. Hospitalisation may be necessary in some cases, depending on the severity.

Dysfunctional uterine bleeding

Patients present with pain, and irregular and excessive or prolonged menstrual bleeding (menorrhagia). Causes of dysfunctional uterine bleeding can be caused by pelvic inflammatory disease, fibroids, adenomyosis and appendicitis. Tests include bloods, including beta hCG.

Symptoms should be treated appropriately, and follow-up with a gynaecologist may be required. Patients may require admission if anaemic, or if they have uncontrolled or severe pain.

Genitourinary/pelvic trauma

Patients may present to the emergency department with blunt or penetrating trauma to the abdomen, pelvis and genitalia. They can present as pain, bleeding or in a shocked state. As with all presentations, a primary survey should be conducted and life-threatening conditions treated initially.

Management of most genitourinary trauma will be carried out as part of the secondary survey. Treatment will depend on the severity of the condition and may include surgical intervention or be treated conservatively.

13.5 COMMON OBSTETRIC PRESENTATIONS

Pregnant women may present to the emergency department with problems such as a fractured arm, trauma, and allergic reactions. Often their main concern is not for themselves but for their unborn child, so it is important to give reassurance and provide follow-up care if required. A primary assessment should be conducted to consider the patient's safety and ascertain if the patient's care needs to be escalated.

It is important to be aware of the following physiological differences when assessing a pregnant woman in the emergency department.

Table 2. Physiological changes to be aware of when assessing a pregnant woman in the emergency department

System	Anatomical and physiological changes	Clinical significance
Pulmonary	• Increased tidal volume by 40%. • O_2 consumption increases up to 60%.	• Prone to hypoxia during periods of hypoventilation.
Cardiovascular	• Cardiac output increases 30–40%. • Increased blood volume. • Venous return impaired due to uterus compressing on pelvic vessels. • Plasma volume 50% increased.	• Heart rate of 10–20bpm. • Decreased BP 5–15 mm Hg. • Will have lost a greater percentage of blood (>40% or more) than the average non-pregnant patient. • An increased risk of thromboembolic complications.
Gastrointestinal	• Metabolic rate increases 30%. • Delay in gastric emptying time and intestinal transit time due to decrease in motility. • Progesterone relaxes smooth muscle, slows gastric emptying, and the lower oesophageal sphincter tone is decreased. • Gastrointestinal contents and diaphragm is compressed upward secondary to the enlarging uterus.	• Increased O_2 demand. • Increased risk of aspiration.
Genitourinary	• Bladder moves anteriorly and superiorly out of the pelvis into the abdomen. • Renal blood flow increases 25–50% • Uterine blood flow increases from 10 ml/min at 10 weeks gestation to 450-700 ml/min at term. • Ureters are markedly dilated.	• Increased risk of bladder trauma. • Urinary frequency. • Potential for massive blood loss from a traumatized uterus. • Increased risk of urinary tract infection.

Vaginal bleeding

Vaginal bleeding can be as a result of trauma, cancer, infection, medications and menopause and normal menstrual cycle. It is important to determine how much blood a woman is losing. This can be achieved by asking the patient:

- How many pads/tampons they are using.
- If the pads/tampons are soaked through.
- Colour of the blood loss.
- If any clots have been passed.
- Abdominal pain or cramping

Vital signs and observational assessment are an important part of forming a comprehensive assessment of the patient with vaginal bleeding.

Miscarriage

In Australia and New Zealand, the recommended medical term for pregnancy loss prior to 20 weeks is 'miscarriage'.

Miscarriage can be defined as:

- Threatened – any vaginal bleeding other than spotting before 20 completed weeks of gestation.
- Complete – a miscarriage needing no medical or surgical interventions. Products of conception have been passed, and ultrasound scan shows no apparent products.
- Incomplete – a miscarriage where some of the foetus or placenta are unable to be naturally expelled by the mother. An ultrasound confirms non-viable pregnancy with bleeding. Some products of conception remain in the uterus.

Miscarriage occurs in 10–20% of clinical pregnancies and accounts for 55,000 couples experiencing early pregnancy loss each year in Australia.

While the rate of miscarriage has remained fairly predictable, better diagnostic and therapeutic interventions have changed standard treatments; what once was 'routine surgical evacuation' has become less so. In the last five years, with the advent of more refined diagnostic techniques and therapeutic interventions, treatment is now provided more and more on an outpatient basis, in both GP and outpatient hospital settings.

Clinical and psychological needs of the patient

The initial assessment of women with bleeding/pain in early pregnancy less than 20 weeks involves the following:

- History.
- Vital signs including orthostatic vital signs.
- Establish if pregnancy is confirmed. Perform a blood or urinary pregnancy test.
- Establish gestation based on LMP.
- Abdominal Assessment.
- Assess PV loss.

If the patient has significant bleeding or pain the patient need to be assessed in the clinical area immediately. Intravenous access needs to be established and patient resuscitated, as required.
A diagnostic ultrasound will be attended to to establish the following:

- Is an intrauterine gestational sac identified.
- Is a fetal pole seen.
- Is a mass seen in adnexa, ovary or fallopian tube.

All of this information will help establish the following diagnosis:

- A progressing uterine pregnancy.
- Intrauterine pregnancy uncertain viability.
- Missed miscarriage.
- Early fetal demise.
- Ectopic pregnancy.
- Pregnancy of unknown location.

In addition to the obvious medical (and possibly surgical) implications of miscarriage, research over the last two decades indicates that significant psychological effects can occur in women who suffer a miscarriage, while further research has shown that appropriate support during and after the event can have positive, lasting effects.

The clinical and psychological needs of the patient presenting with early pregnancy complications must be addressed and there may be a need for a lower threshold for admission to hospital to ensure that such clinical and psychological needs can be met. The health professionals in the environment in which such women are admitted must be cognisant of the particular clinical and psychological needs.

The negative psychological impact of early pregnancy loss can be both severe and protracted and affects both women and their families and may be different for every couple. The needs of each woman (and couple, as appropriate) should be identified and acknowledged, and assistance and referral given to facilitate the grieving process.

Treatment is site-specific and each individual department will have local policies that need to be adhered to.

Complete Activity 57 and 58 in the Participant Workbook

READING

Snell, BJ, 'Assessment and management of bleeding in the first trimester of pregnancy', in *Journal of Midwifery & Women's Health,* Nov. 2009; 54(6): 483-91. Accessed via CIAP.

NSW Health (2009). *Maternity – Early Pregnancy Complications,* PD2009_058. Access via: http://www.health.nsw.gov.au/policies/pd/2009/pdf/PD2009_058.pdf

13.6 ECTOPIC PREGNANCY

Ectopic pregnancy affects about 1 in 80 pregnancies. Statistics indicate the incidence is rising, but the associated mortality is decreasing due to improved diagnostic performance of transvaginal sonography and biochemical sensitivity, and establishment of early pregnancy services and clinics.

Ectopic pregnancies are most commonly situated in the fallopian tube (about 95%). Less common sites are: interstitial, cervix, ovary, caesarean scar or (rarely) abdomen. Risk factors may only be present in 25–50% of patients diagnosed with an ectopic pregnancy. These include:

- Previous ectopic pregnancy.
- Tubal surgery.
- Assisted reproductive technology.
- Intra-uterine contraceptive device in situ.
- Use of emergency contraception.
- History of pelvic inflammatory/sexually transmitted disease.
- Documented tubal pathology.

Ectopic pregnancy is a medical emergency and must be medically assessed immediately.

Treatment and management of ectopic pregnancy

The treatment options are either surgical or medical:

- Ruptured ectopic pregnancies are always managed surgically, which involves either a salpingostomy (which preserves the fallopian tube) or salpingectomy (removal of the affected tube). Laparoscopy is the method of choice for stable women who are medically fit and of appropriate BMI. Laparotomy is preferred in cases of haemorrhagic shock. Patients who present with an unruptured ectopic can also be offered medical management with methotrexate. Methotrexate is an anti-metabolite that prevents the growth of rapidly dividing cells by interfering with DNA synthesis.

Ectopic pregnancy must be excluded in any woman presenting with pelvic pain and/or bleeding ('prune jelly' appearance) and a history of amenorrhoea.

Other symptoms suggestive of ectopic pregnancy are shoulder tip pain and dizziness or fainting spells.

Ectopic pregnancy is a potentially lethal condition if undiagnosed as it may lead to tubal rupture and haemorrhagic shock and/or death. In haemodynamically unstable patients, minimum volume resuscitation (see **Intravenous fluid rates in the seriously ill**) should be used while arranging transfer for specialist care. Exclude or confirm pregnancy by:

- Urinary beta-hCG.
- Quantitative serum beta-hCG to help determine the stage of pregnancy.
- Ultrasound if available (note that an adnexal mass still may not be seen in 15–35% of patients).

Note that an empty uterus on ultrasound with a beta-hCG greater than 1000 suggests an ectopic pregnancy. Urgent gynaecological referral is essential if ectopic pregnancy is confirmed or cannot be excluded.

(Source: Revised February 2008. ©Therapeutic Guidelines Ltd (etg29, November 2009) Emergency Medicine accessed via CIAP clinical guidelines http://proxy9.use.hcn.com.au/tgc/emg/emgtoc.htm

Treatment options will depend on:

- Clinical state of the woman.
- Size ectopic visualised on transvaginal ultrasound.
- Presence/absence of hemoperitoneum.
- Serum hCG level.
- Patient choice and potential compliance.

When is Anti-D necessary?

Anti-D (also known as Rh D Immunoglobulin) is given to prevent isoimmunisation of rhesus negative women. Isoimmunisation occurs if a rhesus negative woman is exposed to rhesus positive blood. This results in the development of antibodies and increased risk of future miscarriages and hydrops foetalis. Such an exposure can occur in miscarriage and ectopic pregnancies and thus the administration of Anti-D prevents antibody formation. The dose is as follows:

- <13 weeks gestation: 250 IU.
- >13 weeks gestations: 625 IU.

Non-sensitised rhesus negative women must receive anti-D immunoglobulin in the following situations: ectopic pregnancy and any miscarriage, regardless of gestational age of the foetus or uterine evacuation method.

Anti-D must be administered in accordance with NSW Department of Health Policy Directive PD 2 006_074.

Pre eclampsia

Preeclampsia is a disorder that occurs only during pregnancy and the postpartum period and affects both the mother and the unborn baby. Affecting at least 5–8% of all pregnancies, it is a rapidly progressive condition characterised by high blood pressure and the presence of protein in the urine. Swelling, sudden weight gain, headaches and changes in vision are important symptoms; however, some women with rapidly advancing disease report few symptoms.

Typically, preeclampsia occurs after 20 weeks' gestation (in the late 2nd or 3rd trimesters or middle-to-late pregnancy), though it can occur earlier.

While there may sometimes be no symptoms, pre-natal checks may detect the following conditions.

- Hypertension – high blood pressure is defined as blood pressure of 140/90 or greater as measured on two separate occasions within six hours. However, a woman who normally has a low baseline blood pressure, such as 90/60, could be considered hypertensive at a blood pressure of less than that, especially if she has other symptoms. A rise in the diastolic (lower number) of 15 degrees or more, or a rise in the systolic (upper number) of 30 degrees or more is cause for concern. Symptoms may include headache, problems with vision, racing pulse and mental confusion.
- Proteinuria – proteinuria is the result of proteins, normally confined to the blood, spilling into the urine because the small blood vessels in the kidneys become damaged. This can be diagnosed through urinalysis.
- Nausea or vomiting – nausea or vomiting is particularly significant when the onset is sudden and in the second or third trimesters.
- Changes in vision – vision changes include temporary loss of vision, sensations of flashing lights, auras, light sensitivity, and blurry vision or spots. For some women who are farsighted, vision may actually improve.

Treatment and management of pre eclampsia

Treatment requires the clinician to:

- Manage blood pressure with frequent observation using a manual sphygmomanometer and anti-hypertensive medications.
- Check urine for protein.
- Monitor blood for changes in liver function tests; and urea, electrolytes, creatinine, blood sugar levels, serum uric acid, and clotting studies.
- Monitor fetal welfare using ultrasound and cardio-tocograph (CTG).

In the event of severe hypertension (BP >170 mm Hg systolic and/or >110 mm Hg diastolic) the patient will require urgent management with admission, referral and transfer to a tertiary unit.

Delivery of the baby occurs if blood pressure remains uncontrolled or the mother's condition deteriorates. (Refer PD2005_346 Hypertension in Pregnancy)

Labour and emergency delivery

If a woman presents in labour, determine the following:

- Gestational age.
- History of pregnancy and previous deliveries.
- Signs of imminent delivery: eg involuntary or uncontrolled urge to push, presenting part on view.
- Spontaneous rupture of membranes and colour of fluid
- History of the pregnancy, including the postion of the foetus and presentation (cephalic/breech).
- Midwife or obstetrician caring for the woman.
- Refer to local policy regarding where to deliver and contacting the birthing unit to assist.

Ovarian hyper stimulation syndrome

This syndrome is an iatrogenic condition associated with the treatment of infertility with ovulation-inducing drugs. The hyper stimulation leads to an increase in vascular permeability, resulting in hypoalbuminaemia and electrolyte disturbances, causing intravascular fluid to shift to the extravascular spaces. The woman may present with mild symptoms but can progress to a potentially fatal syndrome. Onset of symptoms is within 72 hours of hyper stimulation. Patient may report abdominal pain, nausea and vomiting and if the syndrome progresses it may result in ascites and pleural effusion.

REFERENCES AND RESOURCES

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Fraser, DM, & Cooper, MA (2003). *Myles Textbook for Midwives.*

NSW Department of Health (2006). *Having a Baby.*

Venereology Society of Victoria (2002). *National Management Guidelines for Sexually Transmissible Infections.*

Health Communication Network (2010). ©Therapeutic Guidelines Ltd, Emergency Medicine, http://proxy9.use.hcn.com.au/tgc/emg/emgtoc.htm

Emergency Nurses Association (2009). *Sheehy's Emergency Nursing.*

The Jean Hailes Foundation For Women's Health website, Information on Endometriosis, http://www.endometriosis.org.au/

Snell, BJ (2009). 'Assessment and Management of Bleeding in the First Trimester of Pregnancy', in *Journal of Midwifery and Women's Health,* Vol (54) Issue 6.

14 Mental health

14.1 LEARNING OUTCOMES

After completing this module, you will gain a greater understanding of how to assess and treat patients presenting to the emergency department with alterations to their mental status. In particular, you will be able to:

- Describe for mental health presentations and the essential processes of assessment and management.
- Explain the relationship between mental health symptoms and physical disorders.
- Identify clinical indicators of urgency/risk.
- Describe duty of care in relation to mental health presentations.
- List common mental health presentations.

14.2 INTRODUCTION

Emergency departments assess, treat and refer many patients living with altered mental health every day. How the patient is treated and their symptoms managed ultimately influences the patient's journey and experience. People with a mental illness have often been stigmatised for many years and feel apprehensive about how they will be treated by mainstream health departments.

While there are no quick and easy recipes for managing or responding to these complex presentations there are some fundamental principles that can assist you and your team to provide patient-centred care. An understanding of how to care for these patients will enable you to minimise potential risks and optimise your patient's outcomes

14.3 ASSESSMENT AND MANAGEMENT – SACCIT

Following triage, there are six essential clinical processes of assessment and management that need to be provided in emergency settings for mental health presentations. These assessment and management processes are covered by mnemonic 'SACCIT'. Note that the sequence of providing these clinical processes will vary between individual emergency departments and will be dependent on local practice. SACCIT stands for:

- Safety.
- Assessment.
- Confirmation.
- Consultation.
- Immediate treatment.
- Transfer of care.

14.4 SAFETY

There is a need to ensure that the patient's risks of self-harm or harm to others is well managed for the duration of their emergency department admission. To do this you will need to consider the safety of:

- Yourself.
- The patient.
- Staff.
- Others – family, dependent children, other patients.

One of the first steps in ensuring safety is to assess the level of risk. Prior to the patient's assessment, ask yourself the following questions:

- Can I interview this patient safely on my own, or do I need assistance?
- Is the patient going to be safe where they are?
- Can the patient be left alone safely?
- What degree of observation does the patient need?
- Is the patient able to engage in communication?
- Where is the most appropriate place to interview the patient given their level of arousal/agitation?
- Can management and treatment be negotiated?
- Is the patient able to understand the consequences and likely response from the treating team if their behaviour arouses concern?

Maintaining safety in the interview

- Be alert to the potential for aggressive, suicidal or absconding behaviours.
- Let colleagues know where you are at all times.
- Use personal duress alarms where available.
- Ensure the immediate environment is free from items that could be used as weapons.
- Interview with another staff member until you are sure the situation is safe.
- Call security if worried.
- Allow easy exit for both you and the patient so neither feels trapped.
- Keep potentially self-harming or aggressive patients under close observation.

14.5 ASSESSMENT

Patients can present to the emergency department displaying a myriad of behaviours (eg self-harm, aggression, bizarre actions), emotions (eg distress, anger, worry, and sadness), thoughts (suicidal ideation, delusions) and physical symptoms (eg agitation, overactivity)

Like all patients presenting to the emergency department, the first step in the provision of care is to conduct a comprehensive assessment. The assessment includes the risk assessment, taking a clear and reliable history, mental state examination, vital signs and physical examination.

Note: the accuracy of the history may be affected by the patient's mental state impairment.

Risk assessment

A risk assessment should be conducted as part of the formal assessment. Common risks to consider for patients with altered mental state presenting to the emergency department include:

- Risk of absconding.
- Risk of self-harm.
- Risk of physical illness being missed.
- Risk of suicide.
- Risk of harm to others.

Strategies to minimise risk

- A calm, courteous approach.
- Keep patients and families informed of waiting times, delays and the reasons for the wait/delay.
- Ensure you listen and talk to the patient, clearly seeking their contribution to their care, explaining actions, and providing reassurance.
- Anticipate the patient's needs – eg treat pain or other symptoms such as psychosis; provide information, offer drink, food.

- Reduce the stimulation from the environment if possible; this can be difficult in a busy emergency department.
- Involve trusted others (friends, family).

Duty of care

Duty of care requires clinicians to intervene to preserve life and prevent serious injury to the patient's health. Duty of care comes under the tort of 'negligence'. Understanding the law and the components of negligence will help you understand what your duty is:

- There needs to be a dereliction of your duty.
- Damage to the person.
- The damage needs to be a direct or proximate result of the decision, and the consequences could be foreseen.

The question is: can you defend your decision in a court of law?

This duty of care obligation does not overrule the right of the patient to self-determination except in emergency situations where the failure to act would endanger the patient's life or seriously injure their health.

Situations where a person can be treated against their consent are outlined in:

- Chapter 10, 'Management of patients under the *Mental Health Act 2007'* (NSW).
- *Mental Health Forensic Provisions Act* 1990 (NSW).
  http://www.austlii.edu.au/au/legis/nsw/consol_act/mha2007128/

For mental health emergencies, the Mental Health Act 2007 (NSW) provides the legislative framework for the involuntary detention, treatment and control of people with mental illness.

The Mental Health Act is NOT an instrument to be used to authorise emergency medical or surgical treatment in the emergency department.

Special considerations dependent children and pregnant women

Always consider:

- Female patients may be pregnant, particularly before prescribing medication.
- Postnatal depression occurs in up to 13% of women. Urgent mental health assessment is required.
- The welfare of any dependent children – where are they and who is looking after them now? Mothers with post partum disorders may need assistance in caring for their children.

Be aware that suicidal parents occasionally are so distressed by the thought of abandoning their children that they may consider ending the lives of their children as well as their own.

If the patient has dependent children consider:

- Where is the child now?
- Is there a reliable adult to care for the child?
- Is the child/young person at risk of physical, emotional or sexual abuse/neglect?
- Is the child exposed to domestic violence?
- Is community services currently involved, or has it been in the past?
- Is there a risk of harm to an unborn child? (Note: under the *Children's Care & Protection Act 1998,* a report may be made on an unborn child thought to be at risk.
  Refer http://www.austlii.edu.au/au/legis/nsw/consol_act/caypapa1998442/).

Principles of assessment

- Introduce yourself by name.
- Explain what your role is in the emergency department and what you need to do to help the patient.
- Explain in concrete, straightforward terms about emergency department processes. While these processes are familiar to you, they are not necessarily evident to emergency department patients.
- Reassure your patient that your intention is to help them. For example, 'I am Jane and I am a nurse. I need to ask you some questions so that we can help you.'
- Listen to the person's concerns with a genuine, non-judgemental approach. It is better to obtain clarity of the fears or paranoia rather than argue or disagree with them.
- Be calm – patients who are fearful and paranoid can be reassured with a calm presence.

General interview points

- Control or eliminate the number of external distractions.
- Maintain privacy.
- Limit staff conversations in the vicinity of the patient as they may think you are talking about them.
- Pay attention to your vocal manner – be calm.
- Ask a combination of questions – some standardised, others derived from cues that the patient has given you.
- Ask questions that you think will complete your assessment, but avoid a barrage of questions. Statements such as 'Please tell me…" or "Please let me know how I a can help?" may provide you with a wealth of information without the conversation being seen as an interrogation.
- Clarify important points – say that you do not understand rather than feign that you do
- Paraphrase what you think the patient has said and ask them if you have understood what has been said.
- Be mindful of your body language – maintain non-threatening body language.
- Maintain a 'safe' distance and do not enter into the personal zone of the person (less than one metre).

Stress can increase the likelihood that a person from a culturally and linguistically diverse community may revert to their language of origin.

What Is the context?

- Why is the patient presenting now?
- Is there a physical problem?
- How did they get to the hospital?
- Has anything happened to precipitate this presentation – ie any recent events or problems
- Has anything like this happened before?
- Are they currently in treatment?
- If they have a history of mental illness, do they have a case manager or primary carer? If yes, who are they?
- Are they currently taking any medication?
- Are drugs and alcohol a problem?
- What is their level of social support?

Mental state examination (MSE)

The Mental State Examination (MSE) or the Modified Mini Mental State Examination (3MS) are useful instruments for screening cognitive functioning. You can view these tools on the following website: http://www.reconnect.salvos.org.au/mse.pdf.

The Mental State Examination (MSE) examines 10 major aspects, as outlined in the following sections.

Appearance

- Description (tall, short, thin, obese, gender, age).
- Nutritional status.
- Odour (alcohol, ketosis, chemical poisoning, strong body odour).
- Presentation (well-groomed, dishevelled, unshaven).
- Scars from previous self-harm (be aware that some self-harm may occur in areas of the body that is not obvious, eg thighs, abdomen, breasts) or evidence of drug use.

Behaviour

- Motor activity, mannerisms, tics, abnormal movements, bizarre, unpredictable actions.
- How is the person reacting to the situation? Use a descriptor, eg hostility, anger, hyper-vigilance?
- Cooperation – eg friendly, cooperative, uncooperative, suspicious, hostile, evasive, seductive perplexed.

Affect and mood

- What do you observe about the person's emotional state? eg flat, restricted, normal, labile?
- Is their emotional state appropriate in the context of the patient's speech or ideation?
- How does the person describe their emotional state? eg depressed, anxious, normal, irritable, angry or euphoric?

Speech

- How is the person talking? eg rate, volume, tone, quality and quantity?

Thought, form and content

- How does the person express him/herself? Do they have logical thought connections?
- Do they have any pathological features? Preoccupations, obsessions, compulsions, overvalued ideas?
- What is the person thinking about? eg delusions, paranoid, depressed, anxious, suicidal, homicidal?

Perception

Is the person experiencing any misinterpretations of sensory stimuli reported and observed? eg hallucinations, illusions, heightened perception, de-realisation/depersonalisation?

Cultural differences can influence symptomatology, perception of symptoms and help-seeking behaviour.

Cognition

- Is the person oriented?
- Can the person concentrate on questions ask and focus on the overall interaction?
- Is the person able to recall recent events?
- Is the person able to make judgments about the situation?

Insight

- Does the patient have an awareness of their illness, its effects and implications assessed as good, partial or poor?

Judgement

- Does the patient have the ability to accurately assess a situation and act appropriately in response? Assessed this as intact or impaired.

In older patients with visual/hearing deficits, misinterpretations can occur. These may not be indicative of a mental health problem.

Physical examination

The main aim of the emergency department physical examination in relation to mental health presentations is to reasonably exclude organic disease (a disease in which there is a physiological change to some tissue or organ of the body) as a cause for the presentation or as a clinical issue requiring acute management.

An organic cause for the presentation is more likely with:

- New presentations.
- The elderly.
- Abnormal vital signs.
- Atypical symptoms (eg visual hallucinations).

Physical assessment history

In the physical assessment history:

- Undertake a routine symptom review.
- Pay specific attention to medication and substance use history including over-the-counter, prescribed, and alternative medications.
- Ask specifically about sleeping medication and 'nerve' medication, as patients may not include them with their general medical medication.
- Ask the patient what illicit substances or alcohol they have taken.

Relationship between mental health and physical disorders

- Patients presenting with a mental health complaint or symptoms may have an underlying physical illness (eg aggressive behaviour or visual hallucinations may be secondary to delirium from sepsis or hypoxia).
- Mental health symptoms in a person with a known mental illness may arise from a physical illness and not the mental illness (eg hallucinations in a person with schizophrenia may be secondary to delirium).
- Mental illness may prevent the effective communication of physical symptoms (eg a patient with schizophrenia who is very thought-disordered or preoccupied with delusions may not be able to describe their chest or abdominal pain).
- Physical illness may be a stressor that could exacerbate a person's mental illness.
- A corroborative history is essential and should be sought in every case.

Behavioural disturbance can arise from underlying physiological problems (eg head injury, malignancy) or mental health problem (eg acute psychotic state), or from an intoxication (eg alcohol or amphetamines.

Physical examination

Physical examination should be guided by the history and specific presenting symptoms and will vary from a brief examination through to a comprehensive work-up. As a minimum, an examination will include:

- Vital signs – respiratory rate, oxygen saturation, heart rate, blood pressure, temperature.
- Respiratory system.
- Cardiovascular system.
- Neurological systems
- Gastrointestinal system.

For advice on culturally relevant matters contact the Telephone Interpreter Service and/or Transcultural Service.

Gross observations

Sometimes, a full physical examination may not be possible (eg if the patient is uncooperative, confused, violent, or sedated). Gross observation can still be conducted from a distance and will provide important information. For a gross observation, you need to note the following aspects of the patient's appearance and gross neurology.

Appearance

- Substance abuse (track marks).
- Medical information bracelet (epilepsy, diabetes etc).
- Obvious signs of injury.
- Manner (eg pacing, restless, calm).
- Colour (eg cyanosed, flushed, pale).

Gross neurology

- Moving all limbs.
- Facial asymmetry.
- Tremor.
- Orientation (are aware they are in hospital).
- Level of consciousness (note if stable or fluctuating).
- Pupils (size, reactivity, equality).
- Signs of head injury (recent or old).

14.6 CONFIRMATION OF PROVISIONAL DIAGNOSIS

The following information will help you to obtain the vital information to help you reach a provisional or working diagnosis.

Obtain corroborative history

It is vital to obtain a history (recent and past) from family, friends, accompanying agencies (eg Police; Ambulance), the patient's GP or case manager.

There should be clear recognition that the absence of such information reduces the confidence a clinician can place in their assessment.

In collecting history, the clinician needs to consider the patient's right to privacy against information that could be provided by others to assist with the discharge of the clinician's duty of care. This does not mean that if the person refuses to have their family contacted, that you automatically comply. It is important to explain the purpose of the call and elicit their concern – they may not want the content of your conversation disclosed, rather than them not being contacted at all.

Perform investigations to confirm or exclude organic factors

Relevant investigations to exclude organic causes or co-morbidities are essential. Investigations in the emergency department will be guided by the patient's history and examination findings.

Table 3. Relevant investigations to confirm/exclude organic factors

Organic cause	Relevant investigation
Infection	• Full blood count. • Urinalysis. • Lumbar puncture. • Chest x-ray. • HIV testing. • Syphilis serology. • Mid stream Urine (MSU). • ESR/CRP.
Cardiac	• ECG. • Chest X-ray. • Cardiac enzymes.
Other	• Liver function tests • Thyroid function tests Vitamin B12 + folate. • Blood alcohol. • Drug serum levels (eg lithium, sodium valproate and carbamazepine).
Head injury	• Neurological exam. • CT scan. • Urine drug screen.
Diabetes~	• Blood glucose. • Urinalysis.

14.7 CONSULTATION

Consultation is about optimising patient outcomes by involving the most appropriate people in the care of the patient. This section lists the key organisations to consult.

Mental Health Services

- Seek information about when to involve Mental Health Services and/or when to involve other services such as Drug and Alcohol, Aged Care or Child and Adolescent Mental Health Services.
- Rural services should use video-conferencing, where available, to assist with consultation.
- If war trauma is a factor, advice may be sought from the Service for the Treatment and Rehabilitation of Torture and Trauma Survivors (STARTTS) on (02) 9646 6666.

Aboriginal health services

- For indigenous patients, consider involving Aboriginal Mental Health Workers, Aboriginal Health Service or the Aboriginal Medical Service.
- Refer to the NSW Health policy on Aboriginal Mental Health and Wellbeing.

Interpreter service

- Use the healthcare interpreter service If the patient speaks a language other than English at home.
- Interpreters should be professional healthcare interpreters and family should not be used except in emergencies. If the NSW Health Care Interpreter Service is unable to provide a service at the time required, the Telephone Interpreter Service is available 24 hours a day, 7 days a week on 131 450. Note that it is important to explain clearly to the patient the reason for the use of the telephone as it may increase anxiety.
- Family may consciously or unconsciously filter what is being said and confidential issues may be difficult to discuss. (Accurate health interpretation requires training, the ability to maintain confidentiality, and accurate documentation.)
- Be aware that a prior relationship between the patient and interpreter can be a problem in small ethnic groups with few interpreters.

14.8 IMMEDIATE TREATMENT

Immediate treatment involves providing the right short-term intervention, using the biopsychosocial paradigm, namely:

- Biological: eg treating any underlying cause, pharmacological treatment of presenting psychiatric symptoms, medication for sedation.
- Psychological: eg therapeutic engagement, supportive counselling, and using de-escalation.
- Social: eg mobilising social supports, family and others to provide care post-discharge, finding emergency accommodation.

14.9 TRANSFER OF CARE

Transfer of care involves ensuring the safe and effective transfer of care to inpatient or community settings. This will require appropriate documentation and communication. On discharge consider the following:

- Is the patient able to be safely discharged?
- Does the patient have a location to go to where they will be safe given their current state?
- If the person has a dependent older person or person with a disability in their care, consider where is the person now?
- Is there a reliable adult to care for the dependent person?
- Is the dependent person at risk of physical and/or emotional abuse/neglect?

Complete Activity 59 in the Participant Workbook

REFERENCES AND RESOURCES

NSW Health – Mental Health and Drug and Alcohol Office (2009). Mental Health for Emergency Department Reference Guide.
http://www.hnehealth.nsw.gov.au/__data/assets/pdf_file/0004/63292/mh_emergency.pdf

Mental Health Consolidated Act 2007 (NSW) and Mental Health Forensic Provisions Act 1990 (NSW).
http://www.austlii.edu.au/au/legis/nsw/consol_act/mha2007128/

New South Wales Consolidated Act 2010.

Children and Young Person's (Care & Protection) Act 1998.
http://www.austlii.edu.au/au/legis/nsw/consol_act/caypapa1998442/.

15 Drugs and alcohol

15.1 LEARNING OUTCOMES

After completing this module, you will be able to holistically assess and manage a patient with a substance and/or alcohol-related presentation. In particular, you will be able to:

- Outline the effects of psychoactive, depressant, stimulants & hallucinogen drugs on the body.
- Outline the effects and implications of intoxication, overdose, tolerance, dependence and withdrawal on the body and mind.
- Differentiate between dependency, tolerance and withdrawal.
- Perform a comprehensive drug and alcohol history.
- Competently complete the Alcohol Withdrawal Scale.
- Discuss the nursing management of patients with a substance and/or alcohol related presentation.
- Discuss the legal, ethical and moral issues surrounding patient care for this cohort.

15.2 INTRODUCTION

Patients are admitted to the emergency department with a range of health concerns and injuries that may be a consequence of drug and alcohol use. The assessment, treatment and management of patients with substance misuse related problems are relevant to all areas of nursing.

Emergency department nurses should be aware of, and have the knowledge and skills to identify and manage patients with drug and alcohol problems. Nurses who are knowledgeable, non-judgemental and experienced will ensure that the encounter can have a positive impact on an individual.

Due to a myriad of reasons, many patients presenting with alcohol and drug related problems do not receive specialist treatment. This can be due to:

- Poor identification of drug and/or alcohol misuse.
- Lack of skills and knowledge in the treatment of addictions.
- The attitude and beliefs of clinicians.

Your ability to undertake a comprehensive patient assessment will enable you to care for your patient, improve their outcome and refer to appropriate services (if required).

15.3 DRUG HEALTH ASSESSMENT

Goals of assessment

All clients who access the emergency department undergo the assessment, the goals of which are to:

- Assess and act upon immediate risk of danger to the patient.
- To treat any emergency or acute problem or injury.
- To identify and manage any symptoms of withdrawal or intoxication as required.
- Gather information about the client, which will then inform the most appropriate treatment. This includes determining the extent and severity of the drug and/or alcohol problem.
- Identify the client's individual strengths, weaknesses, and readiness for treatment.
- Recommend a level of service appropriate to address the client's problems and/or deficits.

What to ask in the assessment

A drug health assessment should include the following:

- Drug and alcohol use – history of use and current use.
- Types of drug currently used
- Pattern of drug use.
- Route of administration for each drug currently used.

- Previous history of overdose.
- Risk-taking behaviours – eg is the patient injecting safely? Are they using clean equipment? Do they share equipment? This is an excellent opportunity to provide brief interventions to reduce harm. For example, information re access to sterile injecting equipment such as needle exchange programs, testing for hepatitis and HIV, and immunization for Hepatitis B.
- Assessment of the degree of dependence. When asking about alcohol use, ask how many standard drinks they drink per day and use financial outlay to determine the quantity of other drugs used. When asking questions, over-estimate the amount (eg you could ask: "would you ever drink more than 20 schooners on any one occasion?")
- Always ask the patient the date, time and amount the last drugs or alcohol were taken. This will inform treatment in terms of withdrawal regimes.
- Identification of any physical illness and/or mental health problems including suicide risks.
- Identification of social, financial housing and domestic violence issues.

Referral

If patients require referral. Please consult local hospital teams for advice or local community services.

15.4 SUBSTANCE DEPENDENCE AND WITHDRAWAL

Dependence is a condition that develops after repeated use of a substance, characterised by the presence of at least three of the following criteria at some time during the previous year:

- Tolerance.
- Withdrawal.
- Discontinuation of important social activities and other pleasurable events and/or failure to meet occupational obligations.
- Increased dosage and/or duration of use.
- Significant amount of time spent obtaining, using or recovering from the substance.
- Persistent use despite significant associated problems.
- Compulsion to take the substance.
- Desire to cut down use, or unsuccessful attempts to cut down.

Definitions

Dependence is defined as being abnormally tolerant to and dependent on something that is psychologically or physically habit-forming, especially drugs and alcohol. wordnet.princeton.edu/perlwebwn 2009

Withdrawal refers to the feelings of discomfort, distress and intense craving for a substance that occur when the use of a substance is stopped. about.com.psychology.2009

Tolerance is the capacity to absorb a drug continuously or in large doses without adverse effect, and the diminution in the responses to a drug after prolonged use. Dorland's Medical Dictionary for Health, 2007

15.5 CNS DEPRESSANTS

The depressants have a strong effect on the central nervous system (CNS). They affect cognition, judgment and level of consciousness, and they can suppress respiration, cough and gag reflex. Examples include heroin, morphine, methadone, alcohol and benzodiazepines.

The effects of depressants in small doses are usually feelings of wellbeing, calmness and relaxation, drowsiness or stupor. They relieve pain and anxiety and decrease awareness of the outside world. In larger doses, depressants can lead to a deep sleep. They can slow respiration and stop breathing. Some depressants in large doses may cause memory problems, depression and poor coordination.

Alcohol is the most widely used depressant (see below).

The body tends to develop tolerance for CNS depressants, and larger doses are needed to achieve the same effects. Withdrawal from some CNS depressants can be uncomfortable; for example, withdrawal from a depressant treating insomnia or anxiety can cause rebound insomnia or anxiety as the brain's activity bounces back after being suppressed. In some cases, withdrawal can result in life-threatening seizures. CNS depressants should be administered to elderly individuals with care, as these individuals have a reduced ability to metabolize them.

When taken in excess, CNS depressants can cause confusion and dizziness, and impair judgment, memory, intellectual performance, and motor coordination.

15.6 ALCOHOL DEPENDENCE

Alcohol affects the brain – in the short term it impairs judgment, coordination and reflexes. When people use alcohol regularly they may develop tolerance and dependence.

Tolerance means they will require more alcohol to achieve the same effect they used to get with smaller quantities, because the brain compensates for the sedating effects of alcohol and the liver breaks it down more quickly.

Dependence means that alcohol use becomes central in their life. A lot of time is spent thinking about alcohol, obtaining it, using it and recovering from its effects. Use is continued despite knowing that it is causing harm.

A common feature of dependence is that a person will experience withdrawal symptoms if they reduce or stop drinking, due to increased excitability of the brain. Typical alcohol withdrawal features last about five days.

What to do when managing intoxicated patients

- Let other members of staff know that you are with a patient who is intoxicated.
- Remain calm, attentive and confident.
- Adjust your pace to that of the patient.
- Speak slowly and use simple words.
- Only ask for essential information.

Withdrawal symptoms

Generally, all withdrawal symptoms have a predictable pattern although they vary in magnitude from person to person. The symptoms of alcohol withdrawal are:

- Trembling – trembling begins five to six hours after the last drink. It usually gets more aggravated after 24 hours. This phase is characterised by nausea, vomiting, profuse sweating, and increased blood pressure, breathing, anxiety, irritability and insomnia.
- Alcohol hallucination– these symptoms start emerging within 12 to 24 hours and may last for another two days. This phase is characterized by vision of multiple small-moving objects, eg crawling insects. It can be a very imaginative vision phase.
- Withdrawal seizures – these normally occur 48 hours after drinking stops. If it occurs within 24 hours, immediate medical attention is required as it can be fatal.
- Delirium tremens – commonly known as 'the DTs', this symptom has very serious risk involved. Generally, it begins after two to three days and may continue for more than a week. It intensifies on the fourth or fifth day after the last drink. This phase is characterised by dangerous shifts in breathing, blood circulation, and control of body temperature. Also check for significant electrolyte imbalances in these patients.

Patients who are withdrawing from alcohol are more at risk for life threatening events than patients who are currently intoxicated.

Management of alcohol withdrawal

To manage patients with alcohol withdrawal:

- Inform the patient of the symptoms and the management that will provide relief from their symptoms.
- Encourage the patient to drink fluids.
- Keep the patient in a low-stimulus environment (this can be challenging in a busy emergency department).
- Ensure the alcohol withdrawal scale is completed at regular intervals – and ensure that vital signs are taken regularly.

Medications used to treat withdrawal

Benzodiazepines

These drugs produce sedative effects by enhancing GABA neurotransmission from binding to GABA receptors. All benzodiazepines appear similarly effective in the treatment of alcohol withdrawal syndrome. In moderate-to-severe withdrawal, long-acting agents are preferred over short-acting drugs. Symptom-triggered therapy is preferred over fixed-schedule therapy because it decreases the duration and total dose of treatment to resolve symptoms. Fixed-dose depresses all levels of CNS (eg limbic, reticular formation), possibly by increasing GABA activity.

When using these drugs, individualize dosage and increase cautiously to avoid adverse effects. Idiosyncratic apnoea can occur in addition to progressive depression of respiratory drive and hypotension with accumulating doses.

Thiamine (Vitamin B-1)

Thiamine is an essential cofactor in multiple metabolic processes. Thiamine deficiency can occur relatively quickly in starvation states, as body stores are limited. Manifestations of deficiency include beriberi and Wernicke-Korsakoff syndrome.

Management and treatment post withdrawal

Management involves medication, counselling and rehabilitation, as outlined below.

Medication

Medication includes:

- Acamprosate, which works on the brain, acting on some of the same receptors and transmitters (messengers) as alcohol. It can help to restore the chemical imbalance in brain cells caused by long-term heavy alcohol use. Acamprosate can help to reduce craving for alcohol making it easier to resist a lapse to drinking.
- Naltrexone, which also works on the brain, blocking the effects of alcohol on the opioid receptors that cause the 'high' or lifting of mood experienced when drinking alcohol. As a result of taking naltrexone, craving for alcohol is reduced and drinking is much less pleasurable.

15.7 CANNABIS

Cannabis refers to the dried flowers and leaves of the plant, which are smoked or eaten to produce a psychoactive effect. Other names for cannabis include grass, dope, pot, weed, and mull. The main active ingredient in cannabis that produces a 'high' is called delta-9 tetrahydrocannabinol or, more commonly, THC.

Tolerance and dependence

Cannabis dependence and tolerance are quite common among regular users of cannabis.

Tolerance means that the person requires more cannabis to achieve the same effects they used to get with smaller amounts.

Dependence means that cannabis has become central in their life, they may spend much of their time thinking about cannabis and obtaining it, they may have trouble controlling their use, or continue to use cannabis despite experiencing problems.

People who abruptly stop using cannabis may experience mild withdrawal symptoms, such as sleep disturbance, anxiety and irritability.

Signs and symptoms of cannabis intoxication

Patients with cannabis intoxication may suffer from:

- Euphoria, relaxation, sleepiness.
- Hunger (munchies), feeling of wellbeing.
- Perceptual distortions eg altered sense of time, impaired memory.
- Tachycardia and hypotension.
- Vasodilatation (especially conjunctiva – red eyes).
- Reduced intra-ocular pressure.
- Bronchodilatation.
- Anti-emetic effect.
- Muscle relaxant.

Cannabis withdrawal

The withdrawal syndrome may be mild or severe, but is not life threatening. The most common symptoms are:

- Anxiety, sleep disturbances (eg insomnia).
- Restlessness, mild depression.
- Panic attacks, nightmares, headaches, anorexia.
- Irritability and mood swings, which may persist for weeks or months.

Treatment for withdrawal

There is currently no validated assessment tool for cannabis.

A short course of diazepam (eg 5–20 mg four times a day as necessary) may be useful, particularly with severe agitation and aggression or insomnia.

Psychosis

Some patients may suffer a short-lived psychotic state with high doses and in those clients with a pre-existing vulnerability. This generally resolves within a few weeks after cessation.

Cannabis-induced psychosis may be difficult to distinguish from precipitation of psychosis in people predisposed to mental illness who have not been using cannabis.

15.8 OPIOIDS

Opioids include heroin, methadone, morphine, codeine and pethidine.

The indicators of use include:

- Drug/metabolites in urine or blood (toxicology screen).
- Past overdose history.
- Puncture marks.
- Cellulitis, phlebitis, skin abscesses.
- Bacterial endocarditis, septicaemia, blood-borne infection/s.
- Dental disease.
- Side effects (eg constipation).

Indicators of intoxication include:

- Drowsiness.
- Mood changes.
- Mental clouding.
- Pinpoint pupils.

Withdrawal symptoms

The onset of heroin withdrawal symptoms begin six to eight hours after the last dose is administrated. Major heroin withdrawal symptoms peak between 48 and 72 hours after the last dose of heroin and diminish after about one week.

COWS (Clinical Opiate Withdrawal Scale) may be used to monitor the symptoms of the withdrawal. Signs/symptoms are not life threatening but can be distressing. Acute opiate (heroin) withdrawal can be described as having four stages of intensity:

- First Stage (time to onset = 8 hours).
  - Yawning.
  - Perspiration.
  - Running eyes and nose.
- Second Stage (time to onset = 12 hours) – increased intensity of above symptoms plus:
  - Dilated pupils.
  - Hair on arms and legs standing on end.
  - Muscle twitches.
  - Hot and cold flushes.
  - Bone, joint and muscle pain.
  - Anorexia.
- Third Stage (time to onset = 18–24 hours) – increased intensity of above symptoms plus:
  - Increased blood pressure, temperature, pulse rate.
  - Restlessness.
  - Nausea.
  - Insomnia.
- Fourth Stage (time of onset = 24–36 hours) – increased intensity of above symptoms plus:
  - Feverish face.
  - Curled-up position.
  - Vomiting.
  - Diarrhoea.
  - Spontaneous ejaculation/orgasm (high dose withdrawal).

Naloxone Hydocholride (Narcan) is the first line drug of choice for patients who have severe respiratory depression from opioids. It can be administered IMI or IVI.

Treatment for heroin dependence

A number of medications are used in treating patients undergoing withdrawal from opioid dependence. These are outlined below.

Methadone

Methadone is a long-acting (more than 24 hours) drug from the opioid class. The pharmacological effects of methadone help prevent withdrawal, reduce drug cravings in adequate amounts, and block the euphoric effects of heroin and other opioids. It is taken orally on a daily basis. Methadone maintenance treatment is also known as MMT.

Unlike heroin, methadone does not provide the user with a euphoric sensation. However, its effects on the body are similar to heroin in many other ways, including:

- Pain relief.
- Feelings of general wellbeing.
- Reduced blood pressure.
- Slower heart rate.
- Drop in body temperature.

Methadone can cause unpleasant side effects, but adjusting the dose can help. In other cases, side effects can be caused by taking more than the recommended dose or by using other drugs at the same time, such as alcohol or tranquillisers. Side effects of methadone can include:

- Constipation.
- Sexual dysfunction (inability to reach orgasm).
- Changes to the menstrual cycle.
- Drowsiness.
- Heart palpitations.
- Dizziness, nausea and vomiting, skin rashes.

Buprenorphine

Buprenorphine (Subutex) is a partial opiate agonist, which means it stimulates the cell receptors that are normally stimulated by opioid drugs like heroin and methadone. The advantages of using buprenorphine over methadone are as follows:

- Buprenorphine is as effective as methadone in managing the symptoms of heroin withdrawal.
- Methadone withdrawal can be unpleasant and lengthy, while the effects of buprenorphine withdrawal are mild and brief.
- A short course of buprenorphine can help a person to withdraw from their methadone maintenance program.
- Only one daily dose (or less) of buprenorphine is needed.
- Buprenorphine is administered in tablet form, and given sublingually.
- Buprenorphine is also combined with naloxone in tablet form. This is known as Suboxone. Naloxone is an opiate antagonist. This means that it blocks the opiate receptors in the brain and the effects of the opiates.

Naltrexone

Naltrexone is an opioid antagonist, which means it blocks the opiate receptors in the brain and the effects of the opiates. Naltrexone doesn't appear to be as effective as methadone in controlling the symptoms of heroin withdrawal.

15.9 BENZODIAZEPINES

Benzodiazepines (BZD) are depressants that slow the messages going to and from the brain to the body, including physical, mental and emotional responses. Usually, BZDs are prescribed by doctors for short-term use only. This is due to the fact dependency becomes a concern with prolonged use and increased tolerance is often the result. Withdrawal symptoms occur with rapid cessation of the drug.

Non-medical use of BZDs can lead to overdose and death, particularly if they are injected mixed with other drugs (heroin and alcohol) or used binge style.

Symptoms of intoxication

Symptoms of intoxication include:

- Poor motor coordination, ataxia.
- Slurred speech.
- Vertigo, blurred vision.

- Lethargy, poor memory recall, confusion.
- Sedation, increasing drowsiness.
- Stupor, hypnotic effects (sleepiness).
- Agitation and delirium (rare).

Withdrawal symptoms

Common withdrawal symptoms include:

- Anxiety, insomnia, restlessness, agitation, irritability, poor concentration, poor memory, depression.
- Increased muscle tension, aches and twitching.

Less frequent withdrawal symptoms include:

- Nightmares, agoraphobia, feelings of unreality, depersonalization, panic attacks.
- Nausea, dry retching, decreased appetite, weight loss, sweating, lethargy, increased sensory perception, aches and pains, headaches, palpitations, tremor, blurred vision, raised body temperature, ataxia, GIT upsets, menstrual changes.

Uncommon withdrawal symptoms include:

- Delusions, paranoia, hallucinations, persistent tinnitus.

Withdrawal seizures can occur on cessation/severe reduction in dose. Symptoms of severe withdrawal include agitation, confusion, convulsions, delirium.

Withdrawal management

Withdrawal management can be done as either an inpatient or an outpatient. It may take several months, depending on the dose being used.

Diazepam is most frequently prescribed drug for the treatment of benzodiazepine withdrawal as it is a long-acting BZD.

Note that BZDs should not be ceased abruptly – a dose reduction regime is required. Please refer to NSW Health *Drug and Alcohol Withdrawal Management Guidelines* for recommendations regarding reducing regimes.

Supportive care

Supportive care for patients being treated for BZD should include:

- Providing verbal and written information regarding likely withdrawal features and coping strategies.
- Supportive counselling from a health worker. This includes coping strategies for cravings, maintaining motivation, sleep behaviour and relaxation techniques. Continued participation in supportive care plans (eg counselling) should be offered as a voluntary component of the withdrawal program.

Complete Activity 60 in the Participant Workbook

15.10 STIMULANTS

Stimulants include amphetamine, cocaine, methamphetamine, methylphenidate, MDMA, and nicotine. Stimulants produce euphoria, increased energy, over-confidence, increased psychomotor performance, appetite suppression, and sleep disturbances. High doses may cause coma and death.

The onset of action varies. For example:

- Oral dose – effects in 30–60 minutes.
- Intranasal (snorting) – effects within a few minutes.
- Smoking and intravenous use – even faster effects.

Acute toxicity should be considered in a young person presenting with:

- Seizures or CVA.
- Myocardial ischaemia/infarction, arrhythmias, myocarditis, or dilated cardiomyopathy,

Complications from MDMA use are unpredictable but may include:

- Altered CNS ability to regulate body temperature (hypothermia or hyperthermia). This is partly dependent on ambient temperature.
- Water intoxication and hyponatremia from drinking excessive water without salt replacement and increased secretion of anti-diuretic hormone.

Withdrawal symptoms

The signs and symptoms of stimulant withdrawal are not life threatening, and clinician need only treat symptomatically.

However, severe depression resulting from withdrawal can lead to suicidal ideation, self-harm, and possible death. Be alert for complications/presence of other medical illnesses/injuries either related or coincidental to stimulant intoxication and withdrawal.

Complete Activity 61 in the Participant Workbook

REFERENCES AND RESOURCES

NSW Health, Mental Health and Drug and Alcohol Office (MHDAO) website
http://www.health.nsw.gov.au/policy/cmh/publications/depression/depression_elderly.pdf

NSW Health (2008). *Drug and Alcohol Withdrawal Clinical Practice Guidelines.*
http://www.health.nsw.gov.au/aboutus/legal/drug.asp

NSW Health (2007). *Changing the Culture of Alcohol Use in NSW.*
http://www.alcoholinfo.nsw.gov.au/response/section_3

NSW Department of Health and Ageing (2008). *Don't Turn A Night Out Into A Nightmare* – public health campaign. http://www.drinkingnightmare.gov.au/internet/DrinkingNightmare/publishing.nsf

NSW Health (2007). *Illicit Drugs.* http://www.druginfo.nsw.gov.au/illicit_drugs

16 Paediatrics

This module is for participants who work in emergency departments that treat children.

16.1 LEARNING OUTCOMES

After completing this module, you will have a greater understanding of assessing and managing paediatric patients in the emergency department. In particular, you will be able to:

- Define the anatomical and physiological differences between children and adults.
- Recognise and respond appropriately to a deteriorating child.
- Understand the importance of the parent/guardian in the provision of care to a sick child in the emergency care setting.

16.2 WHAT'S DIFFERENT ABOUT CARING FOR A CHILD?

In NSW, 90% of hospital paediatric activity is in the emergency department. Therefore, emergency clinicians must consider the special needs of children attending the emergency department.

There are a number of anatomical and physiological differences between children and adults that influence your clinical assessment and treatment of paediatric patients.

A child's condition can deteriorate rapidly, due to their strong cardiovascular system, which enables them to compensate well and mask the seriousness of an illness. Therefore, it is important that you perform a thorough assessment on admission, and continue to monitor the child's condition closely during their stay.

To better understand how to assess and care for paediatric patients, you first need to understand the differences between adults and children.

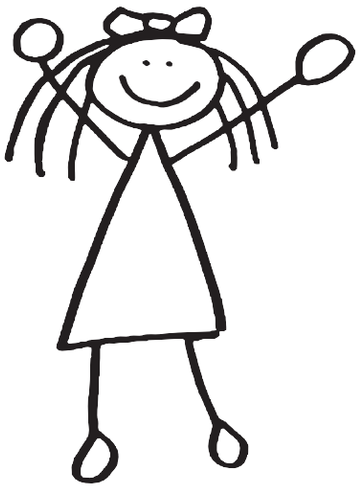
Figure 1. How children differ from adults

Accurate weight of infants and children is essential, as all medication doses are calculated on age and weight.

Infants and children are at particular risk of hypothermia due to an increased surface-area-to-volume ratio, leading to increased heat loss. Avoid exposing infants/children more than is necessary; consider overhead heaters when exposure is unavoidable.

Infants and children have smaller, narrower airways making them prone to more rapid airway obstruction, particularly in the event of increased mucous production.

The blood volume in children is about 80 ml/kg. (For example, on a 5 kg child, the blood volume is 400 ml – only 2 standard cupfuls). Therefore a small haemorrhage in an adult can be very serious for a small child.



Children/infants have healthy cardiovascular systems. This enables them to compensate well for hypovolemia and may mask the seriousness of the situation until there is a catastrophic deterioration later in the illness.

In illness children's already high basal metabolic rate (BMR) is increased. This is combined with a large surface area for body weight ratio increasing insensible fluid losses.

Another factor predisposing children/infants to more rapid dehydration is their immature renal function. This means they are less able to concentrate urine or conserve urine and sodium in times of excess fluid loss.

Fluid requirements are based on age and body weight to ensure adequate hydration while preventing fluid overload. Intravenous fluids will generally be different for children than adults.

Picture reference: http://www.mrsvandyke.com/pics/girl5-stick-figure.jpg

Text reference: NSW Health Paediatric Emergency Guidelines Training http://doh.edmore.com.au

The following table outlines anatomical differences and how they impact on your assessment and management.

Table 4. Anatomical differences between adults and children, and how they impact on your assessment and management

Differences	Impact on Clinical Presentation
Airway • Smaller airway. • Large tongue. • Lots of soft tissue. • Anterior larynx. • Short trachea/floppy epiglottis. • Cricoid cartilage narrowest part of airway.	• Obstructs easily. • Obstructs airway easily, especially in patient's with < LOC. • Greater risk oedema/obstruction. • Increased risk aspiration. • Intubation difficult/intubate RT main bronchus. • Uncuffed ETT.
Breathing • Pliable chest/poorly developed muscles. • Less compensatory reserve. • Thin chest wall. • Fewer and smaller alveoli. • Respiratory age rate dependant. • Higher metabolic rate.	• Retraction indicates respiratory distress. • Tire easily. • Transmits sound. • Hypoxia occurs quickly. • Neonate 40–60 bpm/infants 24 bpm/slowly decreasing to adult rate. • Greater O_2 demands.
Circulation • Myocardium less compliant, smaller stroke volume limited. • Less circulating blood volume. • Infant 90 mls/kg. • Child 80 mls/kg. • Adults 70 ml/kg. • Maintain output for long periods. • Greater % of total body fluid is water. • Immature sympathetic nervous system.	• HR not stroke vol increases output. • Small losses can cause hypovolaemic shock. • Loss of 25% vol before hypotension. • High risk for dehydration. • Sensitive to sympathetic stimulation.
Disability (neurological) • GCS dependant on stage of development. • Flexed posture predominant in infants. • Cranial structures (fontanelle) not fused until 16–18 months age.	• Brain function remains the best indicator of a child's well being. Interaction with environment are essential clues when assessing neurological status. • Indicates normal neurological status. • Gradual increased in ICP will be accommodated by expanding head size.
Environmental factors • Larger body surface area to weight ratio. • Infants cannot produce heat by shivering, they have to burn brown fat.	• Develop hypothermia easily. • Require large amounts of oxygen for this process.
Other differences • Infants < 3 months have immature immune systems. • Significant change in weight occurs as child grows and develops. • Limited glycogen stores. • Allowances must be made when using weight as a basis for dosing in oedematous or obese children. In such children the ideal weight for height and age should be used. In many cases, progressive dose adjustments may be required according to the patient's response. • Doses based on surface area are quoted for some drugs. For this purpose a nomogram age/weight/body surface area table and body surface equation are included[5].	• Sepsis is a major risk factor. Infants cannot effectively localise infection. Neonates can have an infection without fever. • Almost every intervention is weight related EG fluids and drugs. Weight recording is mandatory for all paediatric admissions. • Hypoglycaemia develops rapidly in the sick or injured child. Monitor BSLs early and regularly.

[5] Paediatric pharmacopeia accessible via CIAP http://www.use.hcn.com.au/login.%60$I1%60/home.html?I1=pharmacopoeia&U1=nhtrain

16.3 ASSESSMENT

Assessment of a child involves the following process:

- What is the normal development and vital signs for a child?
- The degree of pain and distress.
- The severity of illness or injury.
- Health history.
- Examination.
- The potential vulnerability.

However, there are differences when conducting a child assessment, as outlined in the following sections.

16.4 NORMAL DEVELOPMENT

Staff should also be aware of the normal development process for children, to assess the child/infant accurately.

Brief overview of normal development is given in the table below.

Table 5. Brief overview of normal development

Age	Normal development
Infants 1 month – 1 year	• Rapid physical and psychosocial growth and development. • Dependent on caregivers to meet their needs. • Explore objects by sucking, chewing and biting. • By 6–8 weeks, newborns can fix and follow objects. • In first month of life, reflexes such as sucking, rooting, startle and grasp are present. • Common fears include separation and stranger anxiety. • 50th percentile weight is 3.5–10 kg. • Nasal breathers for 1st three months of life. • Breathe predominately using abdominal muscles. • Metabolic rate infant is about two times the adult rate. • Circulating blood volume 90 ml/kg. • Immature renal function – urine output 2 ml/kg/hr. • Autonomic nervous system not fully developed; their ability to control body temperature in response to environmental changes is limited.
Toddlers 1–2 years	• By about 18 months, the toddlers are able to run, grasp, manipulate objects, feed themselves, play with toys and communicate with others. • Toddlers are curious, although they have no sense of danger. • Toddler's experiences are strongly sensory based. • Fears include separation anxiety and loss of control. • 50th percentile weight is 10–12 kg. • A Babinski's reflex is present until the child starts walking. After 2 years, the child would normally have plantar reflex. • Toddler uses abdominal muscles for breathing. • Improved thermoregulatory ability but can still develop cold stress when ill or exposed for extended periods.
Preschoolers 3–5 years	• Preschoolers have many misconceptions about illness, injury and body function. • They will tell you where it hurts. • Need to gain their trust. • Common fears include body mutilation, loss of control, darkness and being left alone. • 50th percentile weight is 14–18 kg • Urine output 1 ml/kg/hr. • Continue to use abdominal muscles for breathing.
School age 6–10 years	• Ability for logical thought processes is beginning, although they may misinterpret words and phrases. • Likely to be involved in their own care. • Able to express their concerns, although some older school-aged children will tend to hide their thoughts and feelings. • 50th percentile weight is 20–32 kg. • By about 8 years, respiratory anatomy and physiology approximates that of an adult. • Circulatory blood volume is 80 ml/kg.

Source: Ruperto, K (2007). Paediatric Orientation. The St George Emergency Department: Front Line of the Hospital, p. 5

16.5 ASSESSING A CHILD/INFANT

The World Health Organisation (2005) states that: "the signs of serious illness in young children are often subtle. In contrast to the systematic approach to clinical examination in adults, the examination of the young child needs to be organised in order to upset the child as little as possible".

Observing staff members who have experience working with children in the emergency setting will assist you in your assessment and management skills.

General tips on communicating with children and parents/carers

Staff need to understand that parents/carers play a fundamental role in the care of a child in the emergency department. Quite often, children will not be able to answer all of your questions or provide you with a detailed history. This information will need to be sourced from the parents, carers and, if appropriate, the ambulance officer. In order to ensure the best outcomes for your patient, it is vital that parents/carers are involved in all stages of care and that communication is maintained throughout the patient's stay.

Communication with the child and the parent is paramount. It is important to gain trust from the child; this can be done with open and honest communication.

Generally, parents know their children best and recognise when they are unwell. Always listen to parents' concerns.

Also remember that communicating with children can be very different from communicating with adults. Here are some tips on communicating with a child:

- Identify yourself to the child. For example, say "hello, my name is Sarah, and I am a nurse. I am here to try and make you better".
- Build a rapport with the child and parent/carer.
- Communicate at their level of comprehension (not their chronological age).
- Children often need to have you repeat things, not because they are being tiresome but because they want to establish whether or not you really mean it.
- If something is going to hurt, let the child know that they may feel pain for a short time.
- When explaining the insertion of an IV to a child, do so in terms that they will understand. For example, show them what it will look like at the end on a doll so that they can look and touch it so they get a better understanding. Explaining an IV to a child may be along the lines of "it is a drinking straw for the hand, we can put medicine and water through the straw so that you can get better sooner."
- When you speak with a critically ill child, keep in mind that each child, no matter how old, will have a different developmental ability to process information and discuss it with you.
- Magical thinking: children often attribute outside events to their own thoughts or actions ("mummy told me to tidy my room – I didn't and that's why she's ill') so take care to abolish ideas of guilt/blame.

Communicating with babies

What babies understand

Babies take cues from your behaviour, so you need to reassure them with your loving presence. Even though young babies are nonverbal, they will respond to the tone in your voice and pick up on parental tension and emotions.

Ways to explain, words to use

Touching and holding babies will help comfort them. Parents of babies in the Neonatal Intensive Care Unit (NICU) are encouraged to pick them up. You can also tell babies that you are here for them and you will be there after they come back from any kind of procedure. "It's important to talk to babies,

even if you're not sure what they understand, but the words are less important than the context and tone," says Dr. Goldman. For example, if a baby were to get a spinal tap, you might say, "An ouch is coming. Someone else may hold you, and then mum or dad will pick you up." (Taken from World Health Organisation (2005). 'Diagnostic approach to the sick child', in *Pocket Book of Hospital Care for Children – Guidelines for the management of common illnesses with limited resources.)*

Communicating with toddlers and preschoolers

What toddlers and preschoolers understand

Young children know when they feel bad and when they feel good. They may not have an actual understanding of what illness is, but they do relate to what hurts. Toddlers may associate needles with injections and start to cry when they see them. Older preschoolers can understand that medicine will help them get well. They also live in fantasy. "I let kids ride on IV polls to demystify the experience," comments Dr. Goldman. "At this age, kids love to play make-believe". Can you imagine what they must think about?

Ways to explain, words to use

Just as babies do, toddlers and preschoolers need reassurance and will understand honest, tangible, age-appropriate descriptions. For example, if they find monitoring machines scary, you might say, "The stickies on your chest are helping the doctors and nurses know you are okay."

Communicating with school-aged children

What school-aged children understand

Children at this age have practical concerns about how illness will affect their lives. They want to know if this illness will keep them out of school or play activities. They understand that illness makes them stand out and feel different. As children get older (fourth grade and up), they begin to see how their illness is affecting others. They may worry about their parents and try to protect them. Kids at this age want to be 'normal' so, if possible, try not to let doctors' appointments interfere too much with school and normal routines.

Ways to explain, words to use

It's important to relieve them of any guilt, so they don't feel they caused this illness or condition. It's also important to use concrete explanations and to give them some control over their bodies. "While you can't let them stop treatment," says Dr. Goldman, "You can tell them they have the right to make sure the procedure is explained to them so they understand it." It's also important to talk honestly and use terms they can understand. It's very useful to offer choices about their treatment – for example, "Do you want to take your medicine (or do your exercises) before you do your homework or after you finish it?"

Communicating with teenagers

What teenagers understand

Most teenagers can understand the medical details of their illness as well as any adult. But keep in mind that at times teens will react with great maturity and at other times will act out in very age-appropriate ways. Having an illness at this age means giving up some of the independence that comes naturally to healthy teens. "It's typical for teenagers to rebel against treatment," reports Mary Mathews. "It's almost abnormal for a teenager not to stop taking his meds." In addition, if a teen has had a long-term chronic illness, they may almost need proof that they are still sick. (Taken from World Health Organisation (2005). 'Diagnostic approach to the sick child', in *Pocket Book of Hospital Care for Children – Guidelines for the management of common illnesses with limited resources.)*

Ways to explain, words to use

Talk to teenagers honestly and treat them with great respect. It's important to involve teens in their treatment and plot out a program together which they agree to follow. While regimens must be adhered to, threatening non-compliant teens is usually unsuccessful. "You have to engage them and have this be their decision as much as possible," recommends Mary Mathews.

Tips for examining a child

- Try not to upset the child unnecessarily.
- Leave the child in the arms of the parent/carer.
- Observe as many signs as possible before touching the child.
- Children are usually shy around strangers. They may not comply with commands, but you can assess a child's illness by other methods. For example, a child who has fallen and is complaining of a sore arm may not want you to touch it but you can hold their favourite toy out to see if they grab it with that arm, or ask them to try and catch bubbles etcetera.
- Always show the child the equipment you are going to use for assessment and give them a moment to touch it. Demonstrate what you are going to do either on yourself, their parent/carer or a doll before using it on them.
- Explain what you are going to, how you are going to do it and what the child (and parent) might expect. For example: the red light on the SpO_2 probe is not hot, it just wraps around your finger.
- Be honest – if what you are going to do will hurt, tell them what it may feel like. If you ask their permission, you must consider that they will refuse and then you are unable to perform the procedure.
- It is important to give children choices, but here are certain situations that you are unable to give them a choice. For example, if you wanted to look at a child's wound and you say "can I look at your cut?" And they say "no" what do you do? A better option is to say "I am going to look at your cut, then when we have done that we can play with the teddy or car" or maybe have a treat like an icy pole, etc.

16.6 ASSESSING A CHILD – ABCDEFG

Often, children will display a number of symptoms that will indicate to you they are sick, or their condition is deteriorating. It is important you are able to recognise these signs and intervene before their conditions deteriorates further and becomes life-threatening.

As in all cases, life-threatening conditions should be managed immediately.

When assessing a child, the assessment process is based on the acronym ABCDEFG – Airway, Breathing, Circulation, Fluids in, Fluids out. Assessment should be followed by a secondary survey.

Airway, alertness and arousal

- Airway
  - Assess patency and treat life-threatening conditions.
- Alertness
  - Is the child floppy or lethargic?
  - Does the child appear drowsy?
  - Or is the child sleeping for long periods?
- Arousal
  - Is the child irritable?
  - Is there a poor response to stimulation?
  - Does the child agitated?

Breathing

- Apnoea
  - Any history of apnoea?
- Respiratory rate
  - Is the child breathing fast or slow? Refer table below.

- Effort
  - Is there any tracheal tug?
  - Is there lower chest wall in drawing?
  - Is there in drawing between the ribs (intercostal recession)?
  - Is there any nasal flaring?
- Colour and noises
  - Is the child cyanosed or pale?
  - Is there any stridor or wheeze?
  - Is there any grunting with breathing?

Table 6. Normal respiratory rates for children

Age	Rate (breaths/min)
Newborn	35
1-11 mo	30
2 yr	25
4 yr	23
6 yr	21
8 yr	20
10 yr	19
12 yr	19
14 yr	18
16 yr	17
18 yr	16-18

Beware – a normal respiratory rate in the presence of other signs of respiratory distress is concerning.

Circulation

If the answer is YES to any of these questions the child's care should be escalated as the child warrants prompt attention. Normal heart rates and blood pressures for children are listed in the tables below.

- Pulse
  - Is the pulse fast or slow?
  - Is the pulse thready and weak?
- Colour
  - Is the child pale, mottled or cyanotic?
- Is there
  - Bold perfuse bleeding?
  - Excessive fluid loss?
  - Slow capillary return (>2 seconds)?

Bradycardia is a LATE sign of serious illness in children and often indicates impending collapse. Similarly, a normal heart rate in the presence of serious illness or fever is concerning. Watch for earlier signs such as tachycardia, irritability or restlessness.

Table 7. Normal ranges of heart rates in children

	RATE (BEATS/MIN)		
Age	Resting (Awake)	Resting (Sleeping)	Exercise (Fever)
Newborn	100–180	80–160	<220
1 wk to 3 mo	100–220	80–180	<220
3 mo to 2 yr	80–150	70–120	<200
2 yr to 10 yr	70–110	60–100	<180
10 yr to adult	55–90	50–90	<180

Modified from Gillette PC, 'Dysrhythmias', In Adams FH, Emmanouilides GC, Riemenschneider TA (editors) (1989). Heart disease in infants, children, and adolescents.

Table 8. Minimum systolic blood pressure: normal values in children

Age	Systolic blood pressure (mm Hg)
Term infant	50
6 months	60
1 year	65
4 years	70
8 years	80
12 years or more	90

Revised February 2008. ©Therapeutic Guidelines Ltd (etg29, November 2009) accessible via CIAP http://www.ciap.health.nsw.gov.au/

Disability

- Refer to arousal an alertness – a modified Glasgow Coma Scale (GCS) is used to assess a child's neurological status.
- Pain.
  - Age-appropraite pain scales should be used inchildren and analgesia administered accordingly. Refer to 'Module 8 – Pain' to refresh your memory.
- Exposure.
  - In some cases it is important to undress the child to assess the skin for colour, rashes, wounds, bruises etc.

Fluids in

If the answer is **YES** to any of these questions the child's care should be escalated as the child warrants prompt attention.

- Is the child having difficulty sucking or breastfeeding?
- Is the fluid intake less than 50% of normal?
- Are the mucous membranes dry?

Fluids out

If the answer is **YES** to any of these questions the child's care should be escalated as the child warrants prompt attention.

- Is there a history of reduced urine output or anuria or excessive urine output?
- Are there less than four wet nappies in 24 hours?
- Are there stools with blood?
- Is vomiting:
  - Persistent?
  - Bile?
  - Blood?
  - 'Coffee grounds'?

Glucose

All unwell children must have a BGL attended during their ED presentation.

With diarrhoea, it may be difficult to ascertain urine output. Beware of hidden fluid losses: children may lose large amounts of fluid or blood into their peritoneal cavity.

Other factors to assess

- Weight
  - Accurate weight of infants and children is essential, as all medication doses are calculated on age and weight.
  - Allowances must be made when using weight as a basis for dosing in oedematous or obese children. In such children the ideal weight for height and age should be used. In many cases, progressive dose adjustments may be required according to the patient's response.
  - Doses based on surface area are quoted for some drugs. For this purpose, a nomogram age/weight/ body surface area table and body surface equation are included.

Always be aware of the possibility that some children may be at particular risk of injury or harm because of personal, family or social factors. Revise the assault module in this Program and reflect on the mandatory child-protection training program conducted by your area health service.

Warning signs in children

Any of the points highlighted in bold require immediate management and review by a senior clinician either locally or by contacting the local retrieval service of paediatric tertiary referral hospital.

- General appearance/loss of consciousness – well children are usually alert, interested, pink and well perfused.
- Skin colour should be consistent and mucous membranes pink. Mottled grey skin colour and/or pallor is concerning and care should be escalated.
- Specific assessment of systemic perfusion (colour, blood pressure, heart rate):
- Capillary refill time less than two seconds.
- Perfusion of extremities – they should be warm with pink nail beds. Peripheral pulses should be strong and equal.
- Heart rate should be appropriate for age and clinical condition.
- Tachycardia is an early sign of distress. Tachycardia in the absence of fever and following fluid boluses is concerning and care should be escalated.
- Bradycardia is an ominous sign in infants and children as young children are dependent on a high heart rate to maintain cardiac output.
- Arterial blood pressure should be appropriate for age and clinical condition. **Hypotension is a late sign of imminent collapse in children** and may indicate late decompensated shock.
- Infants and young children who are febrile, drowsy and pale have a high risk of serious illness.
- Urine output should be at least 2 ml/kg/hr in infants, 1 ml/kg/hr in children and 0.5 ml/kg/hr in adolescents and adults. [Adapted from Kendrick T and Morrison A (2006). 'Paediatric considerations in critical care', in *ACCCN's Critical Care Nursing.* Eds Elliot D, Aitken L and Chaboyer W.]

16.7 DISTRACTION THERAPY

Distraction therapy can be defined as a non-pharmalogical method used to enable a child to reduce anxiety and pain, by focusing on something other than the procedure. Key elements of distraction therapy include:

- Child-friendly environment. To develop trust with a child, the environment must be child-friendly and inviting to the child. Ideally, mixed emergency departments should have separate waiting rooms for adult and children patients seeking treatment. Emergency departments can be scary places for adults let alone children.
- Good communication – you can't build a trusting relationship without good communication. Once a good rapport has been established with the child and parent, distraction will flow.
- Distraction kits – these are available from www.tlcforkids.com telephone 1300 361 461. Distraction kits do not need to be expensive; they can consist of very simple items such as:
  - Washable plastic dolls or calico dolls. These are useful for showing a procedure to a child. (Children have a better understanding of something when they see it.)
  - Photo books, which show the child in a CT scanner, X-ray machine, in a gown, IV pump set, etc. This gives the child a clear understanding of what something looks like and then reduces anxiety.

Ensure that the parent is involved so hey can do the distracting and comforting of the child, but they must be given clear instructions of what to do and not to stop until the procedure is completed. If a parent is relaxed, then the child will be, too. Children can pick up on a parent's stress, which does not help them relax.

Table 9. Examples of distraction therapy

Babies and infants	Children	Adolescents
• Rocking and stroking. • Rattles. • Playing music. • Singing a favourite song. • Reading a book.	• Deep breathing. • Blowing bubbles. • Counting. • Reading a book. • Playing a favourite DVD. • Humour.	• Listening to music. • Choice of parental presence. • Hand holding. • Mind pictures, guided imagery.

The following ideas will also make the medical equipment a little more child-friendly. You can add your own, or learn new ones from staff around you.

- Nitrous masks – lip-smacker lip-gloss smeared inside the mask gives the mask a nice smell for the child.
- Comfort – the child can sit on their parent's lap, or on a chair – they do not need to be flat on a bed.
- Spacers – children can count bubbles as they are using the spacer.
- Books – popular books like *Where's Wally* and *I Spy* are great distraction tools.
- Jokes – laminated jokes on the wall for older children so that the child can read them themselves (it also means you don't have to remember jokes all the time).
- Craft and books for the waiting area – often parents and children have to wait to see a doctor or get results from a test. Colouring books, gluing or reading, etc can fill in this time.

16.8 COMMON PRESENTATIONS

The acute management of common presentations to the emergency department and how to recognise the sick child is covered in the online interactive training package which is available in most emergency departments.

16.9 POLICIES AND GUIDELINES

NSW Health and clinicians from the three paediatric service networks have prepared the following Clinical Guidelines for Paediatric Care:

- Recognition of a Sick Child in Emergency Departments.
- Acute Management of Infants and Children with Acute Abdominal Pain.
- Acute Management of Infants and Children with Asthma.
- Acute Management of Infants and Children with Bacterial Meningitis.
- Acute Management of Infants and Children with Bronchiolitis.
- Acute Management of Infants and Children with Croup.
- Acute Management of Infants and Children with Fever.
- Managing Young Children and Infants with Gastroenteritis in Hospitals.
- Acute Management of Infants and Children with Head Injury.
- Acute Management of Infants and Children with Otitis Media.
- Acute Management of Infants and Children with Seizures.
- Acute Management of Infants and Children with Sore Throat.

Complete Activity 62 in the Participant Workbook

16.10 DISCHARGE

It is important that the following points are answered on discharge if you are concerned the child may need to be admitted for management until the problem can be resolved:

- Do the parents/carers understand the current illness and management?
- Does the family have access to out-of-hours transport/communication?
- Does the family live far from medical assistance?
- Does the family have the resources and equipment to manage the illness at home?
- Does the family know which warning signs to be aware of and when to seek medical advice?

Parents/carers of children discharged from the emergency department should always be provided with:

- Written and verbal information about the presenting illness.
- Management to be provided at home.
- When to seek help.
- Follow-up instructions.

Fact sheets are available via Sydney Children's Hospital accessed via http://www.sch.edu.au/health/factsheets/

REFERENCES AND RESOURCES

World Health Organisation (2005). 'Diagnostic approach to the sick child', in *Pocket Book of Hospital Care for Children – Guidelines for the management of common illnesses with limited resources.*

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Kendrick T and Morrison A, 'Paediatric considerations in critical care' in Elliot D, Aitken L and Chaboyer W (eds, 2006). *ACCCN's Critical Care Nursing.*

Children's Emergency Care Project implementation and education tool kit – www.cec.health.nsw.gov.au.

Fact sheets are available via Sydney Children's Hospital accessed via http://www.sch.edu.au/health/factsheets/

Distraction kits are available from www.tlcforkids.com (phone 1300 361 461).

The Greater Eastern and Southern NSW Child Health Network (GESCHN), in line with the Statewide Paediatric Network's goal for standardised quality of care, have developed guidelines for the treatment of the 10 most common paediatric presentations to emergency departments. These are available at http://www.sch.edu.au/geschn/index.asp?id=18