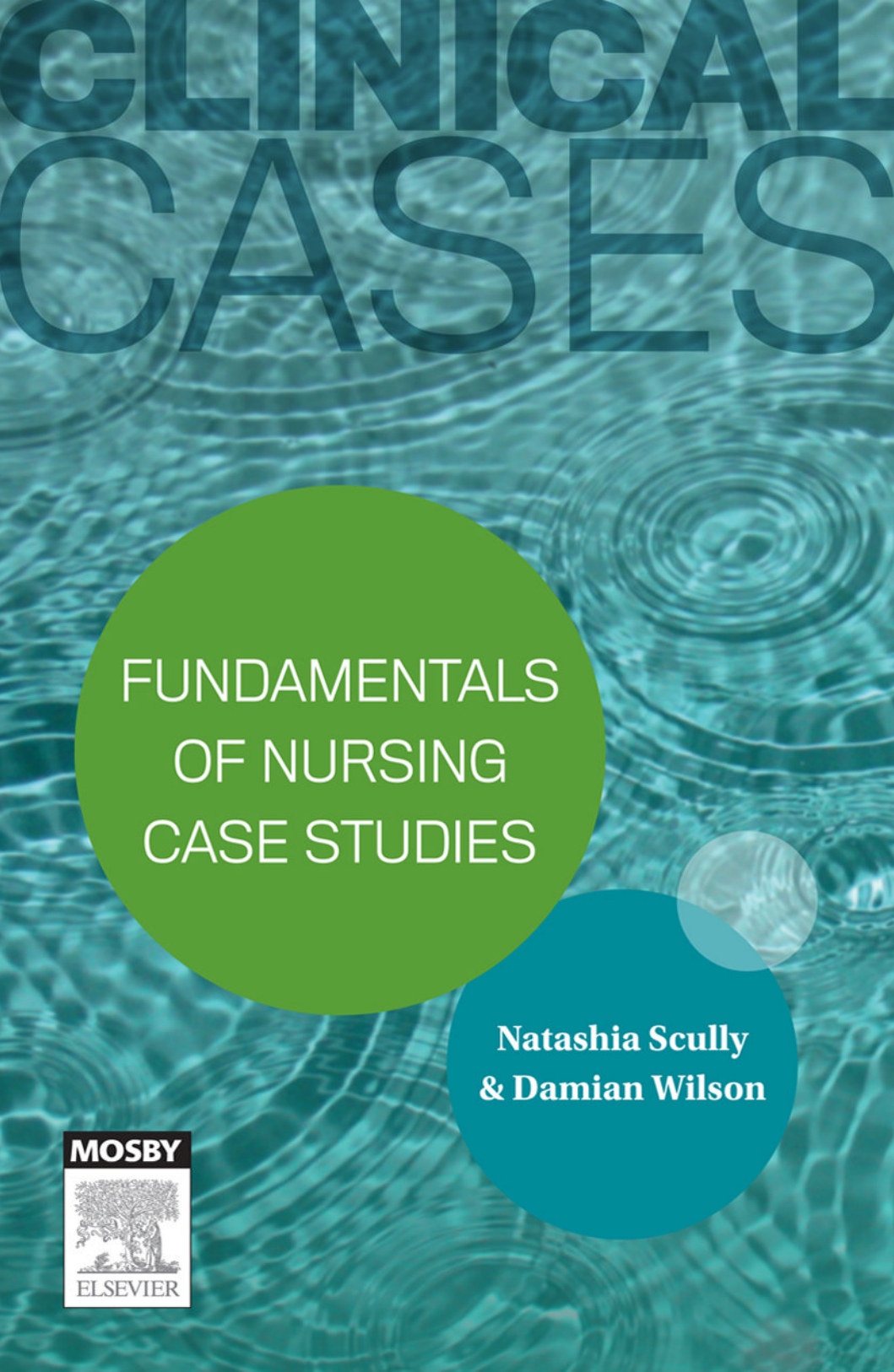
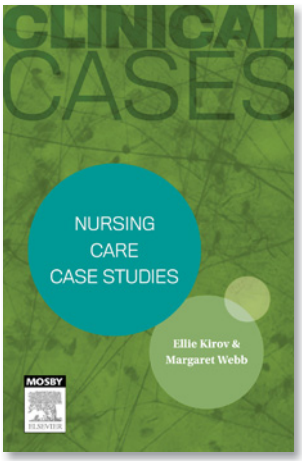
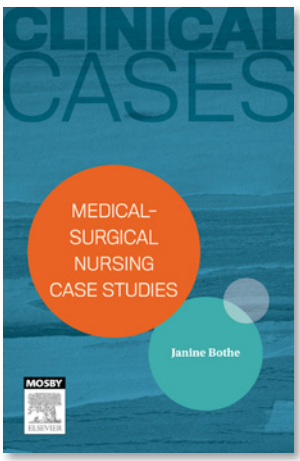
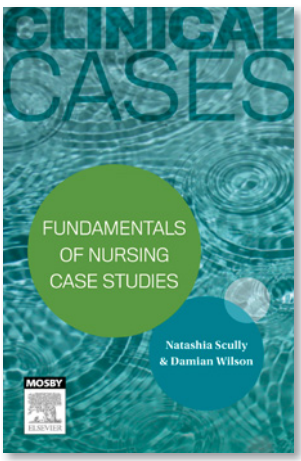

CLINICAL
CASES
FUNDAMENTALS
OF NURSING
CASE STUDIES
Natashia Scully
& Damian Wilson
MOSBY
ELSEVIER

# **CLINICAL** CASES SERIES



This page intentionally left blank

# FUNDAMENTALS OF NURSING CASE STUDIES

**Natashia Scully & Damian Wilson**

This page intentionally left blank

CLINICAL CASES

# FUNDAMENTALS OF NURSING

Natashia Scully
& Damian Wilson

Mosby is an imprint of Elsevier

Elsevier Australia. ACN 001 002 357
(a division of Reed International Books Australia Pty Ltd)
Tower 1, 475 Victoria Avenue, Chatswood, NSW 2067



National Library of Australia Cataloguing-in-Publication Data

Clinical cases: fundamentals of nursing case studies / Natashia Scully and Damian Wilson.

9780729542098 (paperback)

Nursing.
Nursing--Case studies.
Nursing--Study and teaching (Higher)

610.73071

Senior Content Strategist: Libby Houston
Content Development Specialist: Natalie Hamad
Project Manager: Rochelle Deighton
Edited by Melissa Faulkner
Proofread by Tim Learner
Cover and internal design by Georgette Hall
Typeset by Midland Typesetters
Printed in China

# TABLE OF CONTENTS

# About the authors

**Natashia Scully** completed a Bachelor of Arts at Monash University before undertaking a Bachelor of Nursing at the Australian Catholic University (ACU) in Melbourne. She worked at the Alfred Hospital in Melbourne, completing her Graduate Nurse Program and Postgraduate Diploma of Nursing Science in Emergency Care in the Alfred's Emergency and Trauma Centre. Concurrently, Natashia taught nursing science and practice at ACU. She completed a Master of Public Health through the University of Sydney, focusing on injury prevention and chronic disease management. Natashia is currently a Lecturer in Nursing at the University of New England in Armidale and also works in the Emergency Department and Intensive Care Unit at the Armidale Rural Referral Hospital.

**Damian Wilson** has completed a Graduate Certificate in Emergency Nursing at RMIT University and a Master of Emergency Nursing at La Trobe University. He is currently completing a Graduate Certificate in Higher Education at La Trobe University and will commence his PhD in 2013. Damian is a Lecturer of Nursing at La Trobe University as well as Subject Coordinator of the third-year subject, Complex Care Nursing. For this resource, Damian's clinical experience in critical care allowed for the development of scenarios aimed at exposing readers to real-world examples of patient care in a variety of different and potentially confronting scenarios, with the aim to engage readers and encourage self-directed learning. Damian has also edited and contributed to the development of *Fundamentals Clinical Skills Workbook*, 2nd edition.

# Case study
## Acute care 1

## Introduction: Presenting condition and symptoms

Jeanette is a 46-year-old woman who has visited her general practitioner (GP) today, brought in by her husband, Steve, with a 5-day history of nausea, mild abdominal pain and constipation. She decided to see the doctor today, as the pain and nausea were much worse when she woke up this morning and she has vomited twice in the past 3 hours. She also reports her abdomen feels distended and bloated.

Jeanette says she had tried to drink more water and eat more fruit and was having bran for breakfast for the past 3 days, as she initially thought she was simply constipated. With the increased generalised abdominal pain and vomiting this morning, she thought she should get a medical opinion.

Jeanette has a past medical history of hypercholesterolaemia, hypertension, atrial fibrillation and type 2 diabetes mellitus (T2DM) and her BMI is 32 kg/m$^2$. She experienced appendicitis 6 months ago, for which she had an appendicectomy. Her current medications are simvastatin, warfarin and diamicron.

The GP takes her vital signs which are:

- BP – 163/87 mmHg
- HR – 86 beats/minute
- RR – 16 breaths/minute
- T – 36.7°C
- $SpO_2$ – 97% with no supplemental oxygen

Suspecting a small bowel obstruction, the GP arranges for Jeanette's admission to hospital. Steve offers to drive her there and the GP agrees as Jeanette's condition is not critical.

Jeanette and Steve live at home with their 17-year-old son and 15-year-old daughter, both of whom attend school. Steve works full time and Jeanette usually takes the children to and from school.

1. Which of the following health care workers are involved in the treatment of a patient in an acute care setting?
   a. Physiotherapists
   b. Nurses
   c. Occupational therapists
   d. All of the above

2. Which of the following from Jeanette's past medical history is likely to have led to her current condition?
   a. Hypertension
   b. Appendicectomy
   c. T2DM
   d. Obesity

# Phase 1

Jeanette is admitted to the ward and you accept care of her. The initial plan is to avoid surgery and see if her bowel obstruction spontaneously resolves. She has an abdominal computed tomography (CT) scan to identify the small bowel obstruction and its location.

Jeanette is now 'nil by mouth'. You establish intravenous (IV) access and commence an infusion of normal saline solution to keep her hydrated. You commence a fluid balance record.

She is still vomiting and reports considerable nausea and abdominal pain. Her abdomen is also quite distended. The treating medical officer asks you to place a nasogastric tube and to aspirate the tube every 2 hours, while setting it on free drainage in between, in an attempt to decompress her stomach and relieve the vomiting. She is also prescribed antiemetics.

After 24 hours of this treatment, Jeanette reports she still has continuous abdominal pain, despite the analgesia, and her abdomen remains distended. Her vital signs are now:

- BP – 109/62 mmHg
- HR – 104 beats/minute
- RR – 20 breaths/minute
- T – 36.5°C
- $SpO_2$ – 97% with no supplemental oxygen

You notify medical staff of her current condition, also noting that her urine output has reduced since admission. A decision is made to prepare Jeanette for surgery to relieve the bowel obstruction as it has not spontaneously resolved and she is displaying the early stages of hypovolaemic shock. She is to have an abdominal laparotomy.

1. Establishing rapport with patients anticipating surgery is important for which of the following reasons?
   a. Understanding why the patient is having surgery
   b. Being able to listen to and alleviate their concerns
   c. Completing the pre-operative check list
   d. Educating the patient about their surgery

2. When taking Jeanette's medication history, which of the following should be identified as having the potential for complication as Jeanette anticipates surgery?
   a. Simvastatin
   b. Digoxin
   c. Warfarin
   d. Mylanta

# Phase 2

To further assess Jeanette's current condition and prepare her for surgery, you are asked to take blood tests for urea, electrolytes, creatinine, a full blood count and blood grouping. Here are some of the results:

- Sodium – 130 mmol/L
- Potassium – 2.4 mmol/L
- Urea – 13.1 mmol/L
- Creatinine – 136 micromol/L
- Leucocytes – 11.0 ($\times 10^9$/L)

The results of these blood tests further indicate that Jeanette is in the early stages of hypovolaemic shock. You complete a preoperative

checklist for Jeanette as the decision has been made to perform the operation in 2 hours' time. She is visited by the surgeon and anaesthetist, who conduct their assessments and inform Jeanette of her operation, and she signs a consent form. You talk to her about the abdominal laparotomy and answer any questions she has.

Her IV infusion rate is increased and the fluid is changed to Hartmann's solution. You take her vital signs a few minutes before she is transferred to the operating theatre; the results are:

- BP – 104/64 mmHg
- HR – 102 beats/minute
- RR – 24 breaths/minute
- T – 37.4°C
- $SpO_2$ – 97% with no supplemental oxygen

1. Which classification fits best for Jeanette's surgery?
   a. Urgent surgery
   b. Major surgery
   c. Diagnostic surgery
   d. Restorative surgery

2. Which of the following anaesthesia methods is likely to be used in Jeanette's case?
   a. Epidural anaesthesia
   b. General anaesthesia
   c. Conscious sedation
   d. Local anaesthesia

## Phase 3

The surgeon is happy that the abdominal laparotomy has initially been successful. Jeanette has spent a total of 6 hours post-surgery in the post anaesthesia recover unit (PARU) and she has just returned to the ward.

Jeanette has a Glasgow Coma Scale score (GCS) of 15 and reports minimal pain, rated 3 out of 10, located predominantly where the laparoscopic incisions were made, and a dull ache across her abdomen. She is prescribed regular OxyContin for the next 2 days, with morphine for analgesia if required. She remains 'nil by mouth'

for the next day. She has an IV infusion of Hartmann's solution. Her current vital signs are:

- BP – 131/62 mmHg
- HR – 87 beats/minute
- RR – 22 breaths/minute
- T – 37.3°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

The blood tests taken before Jeanette's surgery are repeated 24 hours afterwards and show improvement:

- Sodium – 135 mmol/L
- Potassium – 3.6 mmol/L
- Urea – 8.1 mmol/L
- Creatinine – 129 micromol/L
- Leucocytes – 10.0 ($\times 10^9$/L)

1. Which of the following should be monitored closely in the 24 hours after Jeanette's surgery?
   a. Urine output
   b. Passing of flatus or faeces
   c. Pain
   d. All of the above

2. Which of the following conditions in Jeanette's past history is likely to impact on her recovery from surgery?
   a. Hypertension
   b. Appendicectomy
   c. Angina
   d. T2DM

## Conclusion: Patient outcome

The abdominal laparotomy was considered successful when Jeanette began to pass flatus approximately 20 hours after the surgery. A catheter was placed after Jeanette was unable to pass urine in the 8 hours following her surgery. She was kept on a strict fluid balance record to ensure she did not become dehydrated or relapse into hypovolaemic shock.

Twenty-four hours after her surgery, Jeanette was passing flatus and her abdominal distension was resolving and her pain levels were reported as 2 out of 10. She was allowed to commence oral food and fluids at this point, so you began by encouraging small amounts of water, progressing on to free fluids then light meals. Jeanette experienced some nausea after her meals, but there was no vomiting and her pain continued to resolve. She was able to pass her first bowel movement 2 days after the laparotomy.

Jeanette was monitored for the next week in hospital for signs of relapse or complications from the surgery. She received prophylactic antibiotics to prevent infection. IV fluids were infused at a slow rate to supplement her oral intake until she was able to eat and drink normal amounts. A strict fluid balance record was kept to monitor for fluid retention or dehydration.

After one week of acute treatment, Jeanette was able to be discharged home. Education was given to Jeanette and her family regarding the possible reason for this bowel obstruction and how to recognise signs and symptoms should Jeanette experience this again.

## Discussion

A bowel obstruction is defined as occurring when the contents of the bowel fail to move forwards (Elliot et al., 2012). Obstructions can be of paralytic or mechanical origin, most commonly caused by hernias, neoplasms or, in Jeanette's case, adhesions (Elliot et al., 2009). Following abdominal surgery, adhesions form due to the presence of scar tissue and a build-up of fibrin from the healing process (Leung et al., 2009; Tierris et al., 2011). If these adhesions occur in the lining of the small bowel, they could cause a physical obstruction (Leung et al., 2009). It is estimated that 2.8% of patients receiving an appendicectomy experience small bowel obstruction within the 4 years following the surgery (Leung et al., 2009).

A person presenting with a small bowel obstruction will generally be describing colicky-type abdominal pain, associated nausea and vomiting (sometimes faecal fluid) with abdominal swelling (Elliot et al., 2012). It is vital to gather a detailed patient history as part of a comprehensive assessment for presentations with abdominal pain, as the worst case scenarios of appendicitis, ruptured abdominal aortic aneurysm or ectopic pregnancy should be considered in the first instance (Elliot et al., 2012). Assessment of female patients, as well as elderly, should be made with caution as there is a higher potential for misdiagnosis (Elliot et al., 2012).

Management of small bowel obstruction can be medical or surgical. Conservative medical management involves the management of symptoms and placement of a nasogastric tube to decompress the bowel and relieve nausea and vomiting and to replace IV fluids (Elliot et al., 2012). If the obstruction does not resolve with medical management, the patient is at risk for developing peritonitis and hypovolaemic shock (Diaz et al., 2008). Abdominal laparoscopic surgery is emerging as the most feasible option to relieve a small bowel obstruction, as opposed to open surgery, as increases in experience and technical advances with this approach grow as well as the reduced potential for post-operative complications (Tierris et al., 2011).

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Diaz, J., Bokhari, F., Mowery, N., Acosta, J., Block, E., Bromberg, W., Collier, B., Cullinane, D., Dwyer, K., Griffen, M., Mayberry, J., Jerome, R. (2008) Guidelines for management of small bowel obstruction. *Journal of Trauma-Injury Infection and Critical Care* 64(6):1651–64.

Leung, T., Dixon, E., Gill, M., Mador, B., Moulton, K., Kaplan, G., Maclean, A. (2009) Bowel obstruction following appendectomy: What is the true incidence? *Annals of Surgery* 250(1):51–3.

Tierris, I., Mavrantonis, C., Stratoulias, C., Panousis, G., Mpetsou, A., Kalochristianakis, N. (2011) Laparoscopy for acute small bowel obstruction: Indication or contraindication? *Surgical Endoscopy* 25(2):531–5.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 38, 44.

# Case study
## Acute care 2

## Introduction: Presenting condition and symptoms

Rod is a 24-year-old man who was the passenger in a car involved in a head-on collision with another car. Rod's car was travelling at approximately 60 km/h. Rod is brought into the emergency department (ED) by the paramedics approximately 35 minutes after the collision occurred. Rod was not trapped in the car, although he had to wait until the ambulance arrived to assist in extricating him as he couldn't move his left leg due to pain.

Rod tells you he has pain in the upper right side of his chest that is 4 out of 10 in intensity. You note there is a considerable amount of bruising in this area, consistent with the location of Rod's seatbelt. You perform an electrocardiogram (ECG), which shows a normal sinus rhythm.

The paramedics have placed a splint on Rod's left leg. He reports that, prior to application of the splint, he had sharp pain in his left upper leg at 8 out of 10 intensity. He was administered a total of 20 mg of morphine prior to his arrival in ED, which has reduced the pain to 5 out of 10. He has a large laceration to his left thigh, approximately 20 cm long. The paramedics report it had been actively bleeding when they arrived; it is now covered in a pressure dressing.

Rod is not reporting any pain in his neck or back, although paramedics have immobilised him on a spinal board and spinal precautions are observed in the ED due to the mechanism of his injury.

Rod's vital signs on arrival to ED are:

- BP – 153/74 mmHg
- HR – 112 beats/minute

- RR – 22 breaths/minute
- T – 35.9°C
- $SpO_2$ – 96% with no supplemental oxygen

It is arranged for Rod to have X-rays of his chest, pelvis, spine, arms and legs to assess for any fractures. A computed tomography (CT) scan of his spine has also been organised.

Two large bore cannulas are inserted and blood is taken to test urea, electrolytes, cardiac enzymes, full blood count and his blood group. You prepare normal saline solution for intravenous (IV) infusion.

Rod is normally a fit and healthy man and does not take any regular medication. He admits to smoking 'socially' and lives with his room-mate. He is currently working as a draftsman. His parents live a 15-minute drive away from Rod's house.

1. Which of the following is considered an acute care setting?
   a. Hospital ward
   b. Emergency department
   c. Hospital in the home
   d. All of the above

2. Which of the following comprises an acute illness?
   a. A condition developed a year ago
   b. A condition contracted 2 months ago
   c. A congenital condition
   d. A disease persisting for more than 3 months

# Phase 1

Rod has returned from the radiography area where the X-rays and CT scan were performed. Results show the following:

- Chest X-ray – no evident rib fractures, normal heart size, lung fields have good air entry
- Pelvic X-ray – pelvis intact, no bone displacement or evident fracture
- Limb X-rays – simple, closed fracture of left femur with swelling around the left thigh; no other injuries evident
- Spinal X-ray and CT – no injuries evident

Rod's blood test results are also now available; all are showing results within normal limits and his blood group is A+. You take another set of vital signs upon his return; the results are:

- BP – 143/73 mmHg
- HR – 102 beats/minute
- RR – 20 breaths/minute
- T – 35.7°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

Medical staff determine that, although Rod's X-rays and CT scan indicate his spine is not injured, spinal precautions are to be observed until the effects of the morphine are not masking the physical assessment of pain throughout his spine. His left leg will require surgery to stabilise his fracture but, as it is not urgent, the decision is made to wait until his left thigh's swelling subsides.

Arrangements are made for Rod's transfer to a ward, but a bed will not be available for several hours. You begin a full secondary survey assessment of Rod and commence your nursing care.

1. The application of the nursing process is necessary because:
    a. The nurse is able to direct the doctor in treatment priorities
    b. It prevents the doctor form being disturbed unnecessarily
    c. The nurse can individualise strategies to ensure the patient has a successful admission
    d. All of the above

2. After gathering this assessment data on Rod, the next step in the nursing process ensures you do which of the following with the information you have?
    a. Identify nursing interventions for Rod, accompanied by rationales for each
    b. Evaluate the care provided to Rod up to this point
    c. Cluster cues from the assessment data and form nursing diagnoses
    d. Identify appropriate and realistic outcomes of care for Rod

# Phase 2

Rod has now been in hospital for a total of 4 days. He was cared for in the ED for 8 hours awaiting bed availability on an appropriate ward. Rod is no longer being nursed with spinal precautions, having had his spine cleared after 24 hours of care.

Rod attended the operating theatre 2 days ago for an open reduction and internal fixation (ORIF) of his left femur. He had an uneventful stay in the post-anaesthesia recovery unit (PARU), where he was cared for, for 4 hours before being discharged to the ward.

You take over his care this morning and commence his normal postoperative care. You administer his enoxaparin injection and note that he does not have his calf compressors on, a direct instruction from the treating surgical team. His current vital signs are:

- BP – 133/73 mmHg
- HR – 92 beats/minute
- RR – 18 breaths/minute
- T – 35.6°C
- $SpO_2$ – 97% on room air

You note the low temperature trend and apply warm blankets and make available a warming blanket for more active warming if his temperature does not improve.

Rod was taught by the physiotherapist to deep breathe and cough a few times every hour when he returned from surgery. He has been complying with this, though the bruising to his chest is inhibiting him from taking very deep breaths. Rod was also taught some active leg exercises to be performed every 2 hours. Rod confesses he has only been doing these in the morning and before he goes to sleep.

He is complaining of pain and swelling in his right calf and you note it is swollen and red. You notify the treating doctor who orders an ultrasound, revealing a small clot in one of the veins in Rod's leg.

1. Which of the following has contributed to the development of deep vein thrombosis (DVT) in Rod's right leg?
    a. His past history of sporting injuries
    b. Rod was performing his leg exercises twice per day
    c. Rod's temperature is 35.6°C
    d. All of the above

2. Which of the following interventions is aimed at reducing the potential for post-operative pneumonia?
    a. Deep breathing and coughing exercises
    b. Leg and foot exercises
    c. Elastic compression stockings
    d. Administration of enoxaparin

## Phase 3

The enoxaparin dose was increased to treat Rod's DVT. You integrate into your nursing plan to remind Rod to complete his leg exercises every 2 hours, as instructed by the physiotherapist. Calf compressors are ordered in and applied as soon as possible to encourage more venous blood flow.

Rod was initially feeling nauseated after his surgery and has been unable to eat without vomiting for the past 2 days. He has been treated with antiemetics and states he is now feeling much better. His IV infusion is ceased and the treating doctors are happy for him to commence oral food and fluids as tolerated. You integrate this into your nursing care plan, though you leave his IV cannula in situ in the event that he is unable to tolerate oral food and fluids and his IV therapy needs to be recommenced.

The dressing on Rod's left thigh from his surgery needs to be changed every second day. You plan your patient care around this task as it is a big dressing and aseptic technique at each change takes up to 40 minutes.

You plan to check Rod's vital signs every 4 hours. His last results, one hour ago were:

- BP – 126/78mmHg
- HR – 86 beats/minute
- RR – 18 breaths/minute
- T – 36.3°C
- $SpO_2$ – 97% with no supplemental oxygen

1. Now that Rod's IV infusion has been ceased and he is able to be commenced on oral food and fluids, which of the following is best to encourage Rod to start with?
    a. A light diet of soup and sandwiches
    b. His regular diet pre-surgery

c. Water and clear fluids
d. Vitamised meals

2. Which of the following interventions is aimed at promoting wound healing?
   a. The nurse's use of aseptic technique during dressing changes
   b. Ensuring the patient receives adequate nutrition
   c. Checking Rod's vital signs every 4 hours
   d. All of the above.

## Conclusion: Patient outcome

The increased dose of enoxaparin combined with the calf compressors and frequent leg exercises were sufficient to prevent further DVT development while Rod was in hospital. The DVT he developed post-operatively proved to be small and dissolved within the next week without further complications. Rod was given education on both the likely cause of the DVT and the importance of performing his leg exercises. His pain levels were assessed and treated along with his vital signs to ensure this issue did not inhibit his ability to do the exercises.

Neurovascular observations are performed on Rod's left leg after his surgery to ensure adequate perfusion to his extremities. He is also monitored for signs of compartment syndrome, a common complication of limb fractures.

He was initially treated with a patient-controlled analgesia (PCA) device containing morphine. This delivered 1 mg morphine on demand with a 5-minute lock-out function. Rod initially used this frequently for the first 12 hours after returning to the ward. After 24 hours, Rod was switched onto oral long-acting OxyContin tablets with an order for morphine if the tablets proved insufficient. Rod reports his pain is 3 out of 10 using the tablets and does not request further pain relief.

Surgical staples were used to close the incision wound. The laceration on the left thigh was sutured closed and was able to heal by first intention. The staples and sutures were able to be removed after 10 days; there were no signs of infection in the wound. Rod received prophylactic antibiotics to prevent infection.

Rod was able to be discharged from the ward after 2 weeks of acute care treatment. He was discharged to the rehabilitation unit where he received a number of services including physiotherapy, counselling and occupational therapy to aid in his recovery.

## Discussion

The femur is the longest, strongest and largest bone in the human body (Patton & Thibodeau, 2012). Blunt trauma to the femur is commonly associated with acceleration/deceleration forces resulting in injury, as seen in motor vehicle incidents (Elliot et al., 2012). Initial assessment and management of this injury includes splinting to maintain alignment, which both reduces pain and assists in haemorrhage control, analgesia and neurovascular assessment as well as regular vital signs (Elliot et al, 2012). Temperature monitoring is essential in trauma patients to avoid coagulopathy, acidosis and decreased myocardial contractility caused by hypothermia (Ireland et al., 2011).

The nursing process is a conceptual framework for planning nursing care. It draws on assessment and critical thinking skills as well as the application of medical and nursing interventions to develop an integrated, personalised and evidence-based plan of care for each patient (Huckabay, 2009). The nurse gathers subjective and objective assessment data and uses this information to develop nursing diagnoses (Huckabay, 2009). A realistic and achievable outcome is identified for each nursing diagnosis and an evidence-based plan of care is developed for the patient. The plan is implemented and evaluated and then altered accordingly if necessary to ensure the optimal patient outcome is achieved (Huckabay, 2009).

Postoperative nursing care for the trauma patient focuses on monitoring and maintaining respiratory, circulatory and neurological status and the management of pain. Promoting wound healing to avoid prolonged hospital admission and delayed rehabilitation is also vital to the postoperative care of the trauma patient. This involves maintaining adequate nutrition and circulation as well as giving prophylactic antibiotics and using suitable aseptic technique to avoid infection and promote healing.

Postoperative patients with femoral fractures are at high risk for development of DVT and the progression to pulmonary embolism (PE). Due to the nature of their injuries, these patients remain relatively immobile, creating stasis of venous blood flow. This stasis encourages blood coagulation and development of DVT

(Patton & Thibodeau, 2012). Fat embolism syndrome (FES) can also occur in patients with long bone fractures (Elliot et al., 2012). This complication presents 12–48 hours after the injury and can lead to PE, potentially requiring ventilator support (Elliot et al., 2012).

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care Nursing*, 2nd edn. Sydney: Elsevier.

Huckabay, L. (2009) Clinical reasoned judgement and the nursing process. *Nursing Forum* 44(2):72–8.

Ireland, S., Endacott, R., Cameron, P., Fitzgerald, M., Paul, E. (2011) The incidence and significance of accidental hypothermia in major trauma – a prospective observational study. *Resuscitation* 82(3):300–6.

Patton, K., Thibodeau, G. (2012) *Anatomy and Physiology*, 8th edn. Sydney: Elsevier.

Seidel, H., Ball, J., Dains, J., Flynn, J., Solomon, B., Stewart, R. (2006) *Mosby's Guide to Physical Examination*, 7th edn. Sydney: Elsevier.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 5, 29, 30, 44.

# Case study
# Adolescent mental health

## Introduction: Presenting condition and symptoms

You are working as the school nurse at a secondary school. Your first student has been referred by another member of the faculty who is concerned about a student called Jaime. The faculty member has noticed that, over the past month, Jaime has become withdrawn. He is quiet in class and no longer participates in class discussion with other members of the class, especially when it is team-based. Jaime's school work and overall marks are starting to suffer and the faculty member is concerned as a recent parent–teacher interview did not identify any external causes for the change in Jaime's behaviour and presentation. He is aware that there may be some issues with other students but cannot elaborate in any detail. It is 9.00 a.m. and Jaime has not arrived yet.

1. What is the function of a mental health assessment?
    a. To identify the mental state of the client
    b. To identify if there is a mental health problem
    c. To identify current mental thought processes
    d. To identify if the patient has a mental health history

2. Mental health assessments occur in conjunction with …?
    a. Comprehensive neurological assessment
    b. Complete Glasgow Coma Scale
    c. No other assessment is required
    d. Complete systematic assessment

# Phase 1

The door of the school nurse office opens at 9.10 a.m. and in walks a small-framed boy. He identifies himself as Jaime, and walks into the office and sits down on the chair furthest from where you are sitting. From the student file you read that Jaime is a 14-year-old boy who commenced attendance at the school the previous year. He lives with both his parents who are successful in their professional lives and active in their local church and community. He has an older brother Jay, who also attends the school, and a younger sister Jane, who is still in primary school. You begin your assessment to try and identify a cause for the changes in Jaime's behaviour.

1. When interviewing an adolescent client, it is important **NOT** to …?
    a. Consider your attitude
    b. Communicate honestly
    c. Speak in language that the client uses
    d. Use ice breakers

2. In order to develop rapport, what questions could you ask?
    a. Open-friendly questions
    b. Closed-friendly questions
    c. Direct questions
    d. Indirect questions

# Phase 2

You begin by introducing yourself to Jaime and explaining to him that he is here because of some concerns that one of his teachers has about his change in behaviour. You inform Jaime that you are going to be asking him some questions and assure him that your office is a safe, confidential environment that allows him to speak the truth without information leaving the office space. Jaime sits there nodding his head to acknowledge that he is listening to you but, otherwise, provides yes/no close-ended answers to any questions you ask to try and develop rapport with him. Jaime appears to answer your questions reluctantly initially but, when you ask him about music, you notice a change in his affect and body language and he begins to open up. You discuss music with Jamie for about 20 minutes and observe an improvement in his mood, which has made him more receptive to your attempts to assess him.

1. What mnemonic could assist you in performing a mental health assessment?
    a. COLDSPA
    b. BATOMI
    c. QRST
    d. IAPP

2. What specific assessment would be appropriate?
    a. Mini-Mental Examination
    b. Cognitive Examination
    c. Mental Status Examination
    d. Mental Cognitive Examination

## Phase 3

Jaime was happily answering your questions but, when you ask about other interests, he suddenly stops and starts to cry. He asks if he can tell you something that he has not told anyone. You reinforce that anything spoken in the office would remain confidential; however, if he were to talk about hurting himself or another person, you would not be able to maintain his confidence. Jaime explains that he has been concerned about emerging feelings that he has begun having towards his best friend Simon. He feels confused and has no one he can talk too. Jamie explains that his older brother, Jay, plays football and hangs out with 'tough' mates. Jaime doesn't have a large circle of friends and he doesn't feel he can speak to his parents and is starting to feel bullied by comments made by some students. The inability to talk with anyone about this has led to his feeling isolated and confused, affecting his ability to concentrate on his school work or other activities, and he can't see a way out of his predicament and just wants it all to stop.

1. The presenting symptoms displayed throughout the assessment are common of what condition?
    a. Suicide
    b. Schizophrenia
    c. Depression
    d. Bipolar disorder

2. With this new information how can you best support Jaime?
    a. Ask him to leave
    b. Provide education
    c. Provide support
    d. Provide education and support

## Conclusion: Patient outcome

You thank Jaime for his openness and remind him that you are here to support him in any way that you can. You explain to Jaime that your role is to provide support and that you do not judge him, or see him any differently than any other student. You console Jaime and allow him to express his emotions. You provide him with some tissues and a drink of water while Jamie gathers himself. You ask Jaime what would be a good outcome for him at this stage. He informs you he doesn't want anyone to know, especially his family or friends, but he is happy to meet with you again. You respect Jaime's requests and organise to meet with him initially on a weekly basis with the option to increase or decrease the number of times that you meet should Jaime feel that he needs too. You provide Jaime with the number of a Gay and Lesbian Counselling Service (Gay and Lesbian Counselling Service of NSW, 2012) that he may use in addition to your weekly meetings, and you identify the option of Jaime's meeting with other like-minded people at a gay and lesbian support group. Jaime leaves the appointment feeling better about himself and his situation. He feels supported and empowered by the information that you have provided and promises that he will use the support line when he is feeling low or cannot meet with you.

## Discussion

The school nurse's responsibility is to assist the client, who presented with a mental health problem. The nurse conducts a comprehensive assessment to identify the needs of the client and will use this information to work with the client to develop a mental health care plan to ensure the client's safety.

Adolescents (14%) and young adults (27%) are two groups of individuals who experience the highest incidence of mental health problems amongst the population, including depression, often as a consequence of bullying (Nizette, 2009).

Bullying is a complex series of behaviours that is currently commonly experienced by a number of adolescents in the community, and is a leading cause for the increase in the number of adolescents diagnosed with depression and/or suicidal thoughts (Nizette, 2009).

The challenge of developing one's sexual identity has also been demonstrated as having an impact on the number of adolescents being diagnosed with depression. The Australian Bureau of Statistics (ABS) has reported that the rates of depression and other related disorders were three times as high in the homosexual and bisexual community (19%) than in the heterosexual community (6%) (Australian Bureau of Statistics, 2008).

Adolescents who are bullied because of their perceived sexual identity are three times more likely to be assaulted, threatened with a weapon or involved in a physical fight when at school. These negative experiences are liable for absenteeism from school in this age group, primarily due to feeling unsafe (Swearer et al., 2008; Espelege & Swearer, 2008).

Research has shown that, even though victimisation resulting from homophobic taunts was not solely directed at same-sex attracted identified students, these methods could be used by bullies to create a hostile learning environment for those who did not conform to the established masculine and feminine gender roles (Espelege & Swearer, 2008).

The phenomenon of bullying is no longer limited to those who are bullied and the bully. In addition, the attitudes of parents, teachers and other school administrators have been shown to contribute to acts of bullying within the school environment (Mishna et al., 2009).

The human development that occurs during adolescence is complex, and self-concept and overall self-identity are at the fore of the development process. During this time it is important for educational and health care professionals to support the development of self-confidence and decision-making skills in adolescents for use in later adult life. These attributes can be supported by programs that help the adolescent to develop assertion skills, crisis management strategies and sexual-identity acceptance and, more importantly, to effectively manage mental health conditions such as depression and suicide prevention (Nizette, 2009).

## REFERENCES

Australian Bureau of Statistics. (2008) Cat. No. 3303.0 – *Causes of Death, Australia*. Online. Available: http://www.abs.gov.au/ausstats/abs@.nsf/Products/6B3EE404901565F8CA2576F600124E28?opendocument (accessed 8 September 2012).

Gay and Lesbian Counselling Service of NSW. (2012, May 28th) Online. Available: http://glccs.org.au/ (accessed 8 September 2012).

Barling, J. (2009) Assessment and diagnosis. In: R. Elder, K. Evans, D. Nizette (eds), *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 173–202.

Espelege, D., Swearer, S. (2008) Addressing the research gaps in the intersection of homophobia and bullying. *School of Psychological Review* 37(2):155–9.

Jarvis, C. (2008) *Physical Examination and Assessment*, 5th edn. Missouri: Saunders Elsevier.

Mishna, F., Newman, P., Daley, A., Solomon, S. (2009) Bullying of lesbian and gay youth: A qualitative investigation. *The British Journal of Social Work* 39:1598–614.

Moore, S., Rosenthal, D. (2006) *Sexuality in Adolescence: Current Trends*. London: Routledge, pp. 1–4.

Nizette, D. (2009) Mental health across the life span. In: R. Elder, E. Evans, D. Nizette (eds), *Psychiatric and Mental Health Nursing*. Sydney: Mosby Elsevier, pp. 134–54.

Swearer, S., Turner, R., Givens, J., Pollock, W. (2008) "You're so gay!": Do different forms of bullying matter? *School of Psychological Review* 37(2):160–73.

## RESOURCES

| Crisis helplines | |
|---|---|
| Lifeline | http://www.lifeline.org.au/; 13 11 14 |
| Suicide Call Back Service | http://www.suicidecallbackservice.org.au/; 1300 659 467 |
| Kids Helpline (for young people aged 5 to 25 years): | http://www.kidshelp.com.au/; 1800 55 1800 |

## WEBSITES

| | |
|---|---|
| NSW Government Health | www.health.nsw.gov.au/pubs/2005/suicide_risk.html |
| Gay and Lesbian Counselling and Community Services of Australia | http://glccs.org.au/ |
| ReachOut.com | ReachOut.com |
| Crisis Support Services | www.crisissupport.org.au/SuicideLine.aspx |

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 45, Box 45-5.

# Case study
## Bowel elimination 1

## Introduction: Presenting condition and symptoms

Gary is a 56-year-old gentleman who is being brought in by ambulance with severe abdominal pain. On arrival, he appears to have severe cramp-like pain; he is guarding his abdomen and panics when staff members attempt to touch his abdomen. He appears restless and is difficult to calm down. Gary's past medical history includes: laparoscopic resection of the descending colon due to colon cancer in 2004, mild hypertension, osteoarthritis in his left knee and coeliac disease. He quit smoking thirty years ago and drinks socially; he recently changed his diet and walks every day to keep himself 'fit and healthy'; his BMI is 30.

Vital signs on arrival:

- T – 37.5°C
- HR – 136
- RR – 30
- BP – 191/89
- $SaO_2$ – 98% RA
- Pain score – 10/10

Gary indicates that he has had the pain intermittently for 4–5 days but it always went away when he sat down. He had been frequently vomiting up 'foul-smelling' vomitus that he describes as having an orange-brown colour (Schmelzer & Morcom, 2008). He also reports that he has not been opening his bowels regularly; in fact, he cannot remember when he last opened his bowels properly (indicating it may have been over a week).

1. After completing your primary survey, what is your next nursing priority?
    a. Secondary survey
    b. Pain management
    c. Abdominal assessment
    d. Tea break

2. Using the information provided by Gary, what is the most likely cause of his pain?
    a. Irritable bowel syndrome
    b. Constipation
    c. Paralytic ileus
    d. Small bowel obstruction (SBO)

## Phase 1

Gary has an intravenous cannula inserted (venous bloods are taken on insertion and sent to pathology) while in the emergency department and is written up for morphine 2.5–10 mg IV PRN for pain relief by a medical officer. You administer 2.5 mg morphine IV with no effect; a further 2.5 mg morphine IV is administered and Gary slowly begins to settle down and appears to relax. Gary's pain is resolving after the pain relief and he is now able to provide you with further information. He informs you that his abdomen is 'bigger than normal' and his left upper and lower quadrants are tender on movement and it 'really hurts when people push on my tummy'. He also confirms that he hasn't used his bowels in over a week, which is not normal for him.

Post morphine vital signs:

- T – 37.5°C
- HR – 86
- RR – 18
- BP – 154/63
- $SaO_2$ – 96% RA
- Pain score – 4/10 at rest

1. Gary reports that he has not gone to the toilet in over a week. How often should Gary be opening his bowels?
    a. Daily
    b. Depends how much he eats

c. 3–4 times per day
d. It varies depending on the individual

2. What is the significant meaning of diminished or absent bowel sounds in this patient?
   a. Impaired bowel function
   b. Your patient hasn't eaten
   c. Healthy bowel function
   d. Your patient has eaten

# Phase 2

The nurse performs an objective assessment of Gary's abdomen and documents the following findings. On inspection the abdomen appears distended and there are several small scars in the left and right lumbar regions and umbilical region of his abdomen. There are no obvious signs of trauma or injury. Bowel sounds can be heard on auscultation; however, they appear to be decreased on the left side of the abdomen. The abdomen is firm on palpation, and Gary reports that the pain increases when you push on his abdomen. On percussion of Gary's abdomen, the nurse notices wide distribution of percussive sounds (tympany) but notices dull percussive sounds in the left lower quadrant, which could indicate a mass.

1. In what order should you assess his abdomen?
   a. Inspection, palpation, percussion, auscultation
   b. Auscultation, inspection, palpation, percussion
   c. Inspection, auscultation, percussion, palpation
   d. Percussion, palpation, inspection, auscultation

2. What type of percussive sounds would you expect to hear during percussion over the area of the small bowel obstruction?
   a. Dull
   b. Tympany
   c. Accentuated tympany
   d. Hyper-resonance

# Phase 3

The surgeon confirmed that on abdominal X-rays Gary has a distal blockage of his small bowel most likely due to adhesion from the

resection of his descending colon. The surgical team consider medical management of Gary's SBO prior to considering a surgical option. The nurse develops the following action plan:

- routine abdominal assessment
- nil by mouth (NBM)
- insertion of a nasogastric tube
- intravenous therapy (IVT) (+/– potassium replacement)
- pain relief (Schmelzer & Morcom, 2008).

After 48 hours of medical management staff had not seen any improvement in Gary's condition, he consented for removal of the SBO.

Post-operative examinations:

- On inspection of the abdomen, there are no sign of distension; there are three separate puncture sites from the laparoscopic surgery, which are covered with surgical dressings that are dry and intact. The wounds need to be monitored for signs of inflammation and infection; dressing change as per the surgeon's orders.
- On auscultation bowel sounds are absent in all four quadrants.
- Gary reports mild abdominal pain but is comfortable with the pain relief that he has been administered.

1. What is the clinical rationale for inserting a nasogastric tube?
    a. To inflate the stomach
    b. To feed the patient through
    c. To remove gastric content
    d. To measure the stomach pressure

2. What are the major concerns for this patient?
    a. Malnutrition
    b. Fluid and electrolyte imbalance
    c. Perforation of the bowel
    d. Peritonitis

## Conclusion: Patient outcome

The SBO was located in the distal portion of the small bowel approximately 50 cm from the ileocaecal valve. The position of the blockage allowed for Gary to be able to absorb some fluids and

electrolytes preventing him from developing an imbalance. The surgeon removed the obstruction and anastomosed the healthy ends. The remaining bowel was healthy with no signs of ischaemia or necrosis; the formation of an ileostomy was not required.

On returning to the ward from recovery, Gary is drowsy but easily rousable and is able to answer simple questions. Following his general anaesthetic, he is breathing spontaneously with good air entry to the bases. He is haemodynamically stable on IVT, which will remain in situ until his bowel sounds return and Gary can be started on an oral diet. The NGT remains in situ on free drainage and is draining well. The oral mucosa will need to be monitored and regular mouth care provided for comfort and to prevent drying out of the oral mucosa as Gary remains NBM. Gary also has an indwelling catheter (IDC) in situ to assist with fluid status monitoring. Gary is able to move himself in bed without too much pain; however, pressure area care will need to be monitored initially post-operatively.

Three days after surgery, the bowel sounds return and Gary is passing flatus. He is commenced on ice chips and sips of fluids. Gary soon tolerates the introduction of clear fluids into his diet. Following having his bowels open Gary is commenced on a full ward diet by the end of the week. The NGT and IVT have been removed as he has tolerated the oral diet. The IDC has also been removed as Gary is now ambulating well and is able to walk to the toilet unaided.

Gary is due for discharge into the care of his wife, and will need to be educated about initial changes to his lifestyle and exercise to prevent complications postoperatively from heavy lifting or trauma. He is advised to watch out for excessive pain, weight loss or change in bowel function.

## Discussion

A bowel obstruction is a common cause of pain in the lower gastrointestinal tract. The presenting signs and symptoms can vary in characteristic ways depending on the location of the obstruction. The common site for a bowel obstruction is the small intestine. Studies have found that 76% of all bowel obstructions are located in the small bowel, with 65% of those being caused by bowel adhesions secondary to abdominal surgery (Cirocchi et al., 2010; Markogiannakis et al., 2007).

It is imperative that nurses are able to identify the physiological consequences of a bowel obstruction. If it is at the proximal end of the small bowel, the obstruction will prevent the absorption of electrolytes and fluids, which can result in dehydration, electrolyte imbalances and the potential for hypovolaemic shock (Schmelzer & Morcom, 2008).

Obstructions that occur in the distal end of the small bowel will allow the absorption of electrolytes and fluids by the bowel until the blockage has been reached. The chyme provides a nutrient-rich environment which, when there is a blockage, creates an environment for bacterial growth, resulting in the build-up bacteria, chyme and fluids and leading to the production of faecally-smelling vomitus (Schmelzer & Morcom, 2008).

The main nursing priorities in the management of an SBO after surgical intervention include supporting the return of normal bowel function, minimising the discomfort of the patient by providing regular analgesia and maintaining normal fluid and electrolyte levels by regular pathology and treatment (Weber & Kelley, 2007; Schmelzer & Morcom, 2008).

## REFERENCES

Cirocchi, R., Abraha, I., Farinella, E., Montedori, A., Sciannameo, F. (2010) Laparoscopic versus open surgery in small bowel obstruction. *Cochrane Database of Systematic Reviews* 2010, Issue 2. Art. No.: CD007511. DOI: 10.1002/14651858.CD007511.pub2.

Markogiannakis, H., Messaris, E., Dardamanis, D. et al. (2007) Acute mechanical bowel obstruction: clinical presentation, etiology, management and outcome. *World Journal of Gastroenterology* 21:432–7.

Pisani, H., Partridge, F., Taylor, C., Porter, T. (2009a) Chapter 42: Pain management. In: J. Crisp, C. Taylor, *Potter & Perry's Fundamentals of Nursing*, 3rd edn. Sydney: Elsevier Australia, p. 1093.

Pisani, H., Partridge, F., Taylor, C., Porter, T. (2009b) Chapter 45: Bowel elimination. In: J. Crisp, C. Taylor, *Potter & Perry Fundamentals of Nursing*, 3rd edn. Sydney: Elsevier Australia, pp. 1225–68.

Reid-Searl, K., Hewerdine, S. (2010) Chapter 49: Faecal elimination. In: A. Bergman, S. Snyder, B. Kozier et al., *Kozier and Erb's Fundamentals of Nursing,* Volume 3. Sydney: Pearson Australia, pp. 1386–420.

Schmelzer, M., Morcom, J. (2008) Nursing management: Lower gastrointestinal problems. In: D. Brown, H. Edwards, *Lewis's Medical-Surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Elsevier Australia, pp. 1112–66.

Weber, J., Kelley, J. (2007) *Health Assessment in Nursing,* 3rd edn. Philadelphia: Lippincott Williams & Wilkins.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 37, 41.

# Case study
## Bowel elimination 2

## Introduction: Presenting condition and symptoms

Margo is a 65-year-old woman presenting to the GP with a history of 8 days of loose stools after attending a party at her sister's house. She returned home with a plate of cooked meats, cold meat and salads from the party. Later that evening, she was feeling hungry and fixed herself a plate of food for dinner. Since that time she has had nausea and vomiting but has been able to keep a little food and fluids down. She informs the GP that everything she eats goes 'right through her'; she is opening her bowel on average 10 times per day. She admits to eating less than usual to try and manage her condition. Margo has a past history of: primary biliary cirrhosis, cataracts, smoking (20 per day). Margo is an active lady but is quick to get tired and lives with her daughter while she is in the process of selling her home.

1. What are the common classifications of the causes of diarrhoea?
    a. Decreased fluid absorption, increased fluid secretion, motility disturbance
    b. Increased fluid absorption, increased fluid secretion, motility disturbance
    c. Decreased fluid absorption, decreased fluid secretion, motility disturbance
    d. Increased fluid absorption, decreased fluid secretion, motility disturbance

2. Which of these are **not** common causes of diarrhoea?
    a. Psychological
    b. Antibiotics

c. Codeine
d. Iron

# Phase 1

Margo informs the GP that she is concerned because, due to the number of times she is going to the toilet, it hurts when she wipes herself and she is noticing a little blood on the toilet paper. She is also noticing that she is getting fatigued very easily and is experiencing increasing episodes of lethargy and dizziness, which are now affecting her ability to perform activities of daily living. She has also noticed feelings of palpitations in her chest, but denies any chest pain or feeling anxious or that she has a history of anxiety or depression.

The GP takes a set of vital signs:

- T – 36.8°C
- HR – 106
- RR – 14
- BP – 105/60 (lying down); 90/60 (standing)
- $SaO_2$ – 96% RA
- Pain score – 0/10
- ECG – ST-depression

1. What could be a cause of Margo's episodes of dizziness?
   a. Age
   b. HR
   c. BP
   d. Gender

2. Severe diarrhoea can cause a significant loss of which electrolyte?
   a. Sodium
   b. Potassium
   c. Calcium
   d. Phosphorus

# Phase 2

Margo presents to the local hospital for symptomatic management of her condition. The GP has diagnosed her with severe diarrhoea and

would like to have her admitted for a few days until her symptoms resolve. On arrival at the local hospital she is found to be severely dehydrated due to her recent history of severe diarrhoea. The nurse assesses Margo's abdomen and documents: no scar, discolouration or obvious signs of trauma or injury; bowel sounds (hyper-resonance) can be heard on auscultation in all four quadrants; abdomen is soft, mildly tender on palpation with normal percussive sounds across the abdomen. The doctor writes the following orders: cardiac monitoring; vital signs; medication—usual medication including an antiemetic, intravenous therapy (+ potassium replacement); eat and drink as tolerated; 6/24 h urea and electrolytes, strict fluid balance chart, urine and stool specimens.

1. Which of the following charts would you use to document Margo's bowel motions on her bowel chart?
    a. Glasgow Coma Scale
    b. Bristol Stool Chart
    c. Wong-Baker Scale
    d. Snellen Chart

2. What is the function of a stool specimen?
    a. Diagnostic tool
    b. Bodily function tool
    c. Monitoring tool
    d. Faecal collection

## Phase 3

Margo is transferred to the ward for management and has been receiving intravenous hydration overnight. In the morning she reports that she feeling better, her nausea is being well maintained with the prescribed antiemetic but she is still not comfortable eating as she feels this will make her diarrhoea worse. She still has to open her bowels frequently and has loose stools. The nurse notices that Margo appears to be in pain when she sits for long periods of time. She asks Margo if she is all right and is informed that her bottom is very sore from having to wipe herself after each toileting episode. The nurse inspects Margo's perianal region and finds it is red, sore and the skin appears to be breaking down. The nurse also notes a small haemorrhoid, approximately 2 cm by 2 cm, is located on the left side of her anus.

1. What intervention could be used to prevent Margo's skin from breaking down?
    a. Pressure area care
    b. Toilet hygiene
    c. Regular inspection
    d. All of the above

2. Why should antidiarrhoeal medication be used sparingly when nursing a patient with diarrhoea?
    a. It interferes with bowel function
    b. It is expensive to manufacture
    c. It causes constipation
    d. It is contraindicated in infective diarrhoea

## Conclusion: Patient outcome

Margo was admitted to the hospital for the management of dehydration secondary to severe diarrhoea episodes. Margo responded well to the intravenous therapy (IVT) rehydration and progressively began to feel better as her fluid and electrolyte levels returned to normal. A fluid balance chart was maintained to monitor her fluid status to prevent fluid overloading and to monitor renal function. She was recommenced on oral intake starting with light ward diet to help encourage her to start eating again, which she tolerated well. She eventually was upgraded to a full ward diet and reported no further episodes of nausea and vomiting and, not too long after, she started to pass formed stools. The nurse regularly monitored the skin integrity in Margo's perianal area and, by providing Margo with a non-alkaline soap to bathe with and to clean the perianal area, was able to prevent further skin breakdown. The doctors believe that the episode was caused by some improperly prepared food that Margo may have ingested from the party. She is educated on the proper storage of cooked and raw foods. She is cleared for discharge after 3 days after her symptoms resolved. Margo's morning vital signs are within normal limits and her morning blood test confirms that her electrolyte levels have returned to normal. There were no further complications with her admission and she was discharged into the care of her daughter.

# Discussion

Nearly 1.5 million children worldwide die from diarrhoea, which is more than the total number of AIDS, malaria and measles deaths combined (Wardlaw et al., 2010). Diarrhoea is an increase in the amount of loose watery bowel motions. It is a symptom of lower gastrointestinal problems caused by infection, inflammation or impairment of the function of the bowel (Pisani et al., 2009). This is a common condition that occurs throughout life but has the potential to be life-threatening given the right circumstances. When providing care to a patient with diarrhoea the nursing intervention begins with a focused patient history and assessment to identify the location, duration, intensity and frequency of the patient's symptoms (Schmelzer & Morcom, 2008; Weber & Kelley, 2007). The assessment needs to be expanded to include any overseas travel, exposure to microorganisms, food preparation, eating habits and medication use such as laxative (Schmelzer & Morcom, 2008). The main priorities for the care of this patient are to prevent the colonisation of microorganisms in the bowel, return to normal bowel functions, maintain the fluid status of the patient including balanced electrolyte and acid–base levels, return to a normal oral intake and prevent skin breakdown (Weber & Kelley, 2007; Schmelzer & Morcom, 2008).

## REFERENCES

Bryant, B., Knights, K. (2011) Chapter 30: Drugs affecting the lower gastrointestinal tract. In: B. Bryant, K. Knights, *Pharmacology for Health Professionals*. Sydney: Elsevier Australia.

Heaton, K., Lewis, S. (1997) Stool form scale as a useful guide to intestinal transit time. *Scandinavian Journal of Gastroenterology* 32(9):920–4.

Pisani, H., Partridge, F., Taylor, C., Porter, T. (2009) Chapter 45: Bowel elimination. In: J. Crisp, C. Taylor, *Potter & Perry Fundamentals of Nursing*, 3rd edn. Sydney: Elsevier Australia, pp. 1225–68.

Reid-Searl, K., Hewerdine, S. (2010) Chapter 49: Faecal elimination. In: A. Berman, S. Snyder, B. Kozier et al., *Kozier and Erb's Fundamentals of Nursing*, Volume 3, Sydney: Pearson Australia, pp. 1386–420.

Schmelzer, M., Morcom, J. (2008) Nursing management: Lower gastrointestinal problems. In: D. Brown, H. Edwards, *Lewis's Medical-Surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Elsevier Australia, pp. 1112–66.

Walker, S. (2010) Chapter 52: Fluid, electrolyte and acid–base balance. In: A. Bergman, S. Snyder, B. Kozier et al., *Kozier and Erb's Fundamentals of Nursing*, Volume 3. Sydney: Pearson Australia, pp. 1493–553.

Wardlaw, T., Salama, P., Brocklehurst, C., Chopra, M., Mason, E. (2010) Diarrhoea: Why children are still dying and what can be done. *The Lancet* 375(9718):870–72.

Weber, J., Kelley, J. (2007) *Health Assessment in Nursing*, 3rd edn. Philadelphia: Lippincott Williams & Wilkins.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 37.

# Case study
# Community-based nursing care of the older person 1

## Introduction: Presenting condition and symptoms

A rural community nurse has commenced work at her local community centre. Her responsibilities include the provision of primary health care support to three communities (her community and two other smaller rural communities). The role specifically works to assist and support local municipal council in the development and implementation of community policies and plans, aligning and supporting community leaders and facilitating meaningful dialogue between the community and local council members. The current health needs of these communities include: cardiovascular and respiratory disease prevention strategies, adequate housing, clean neighbourhood infrastructure, crime prevention and social support of impoverished families. The community nurse is currently working with the local community to develop sustainable strategies that will improve the overall health of the community. Her role allows a proportion of direct contact hours with clients in the community, allowing her to perform home visits to check and monitor *at risk* clients in the community, with the ability to provide referral to an integrated network of services, including respite or government support packages if required.

1. Primary health care includes activities to:
    a. Treat illness and promote recovery
    b. Promote hospital admission
    c. Encourage health and wellbeing
    d. Protect from disability after treatment

2. The Ottawa Charter is a health promotion …?
    a. Guide
    b. Act
    c. Law
    d. Occupation

## Phase 1

Lise is an 86-year-old woman with a diagnosis of dementia who resides in a residential aged care facility. Lise requires full nursing and allied health support due to impaired mobility and is at risk of falls and suffers with urinary and faecal incontinence. She is able to assist with transfers to her wheelchair via lifting machine. Lise was recently removed from the residential facility by her daughter due to the belief that it was better that her mother live her final years in comfort with family and not total strangers. Her daughter assumed full control of her mother's health care decisions and finances, stating that one of the rooms in her home had been renovated for her mother, specifically catering for her care needs. Some community members advised the community nurse that the pertinent reason for removing her mother from the facility was because she was financially impeded and could no longer afford the fees charged by the facility. It was her belief that the carer allowance and aged pension money would be a good source of income. The community nurse organises with Lise's daughter to visit next week to meet Lise and discuss her needs with her daughter.

1. What is the purpose of the community nurse's visit?
    a. Health assessment and financial assessment
    b. Needs assessment and financial assessment
    c. Health assessment and needs assessment
    d. Needs assessment and spiritual assessment

2. What type of basic need would the community nurse identify?
    a. Expressed
    b. Felt
    c. Normative
    d. Comparative

# Phase 2

The community nurse attends the appointment, finding Lise is now residing in a small, two-bedroom house in her rural community. The community nurse meets with Lise and her daughter to discuss Lise's needs. The community nurse notices that Lise is confined to bed and is unable to speak or mobilise herself around the bed area to prevent pressure areas due to contractured legs. The community nurse notices that the house is too small and has not been modified to enable safe transfers using a lifting machine, despite assurance of appropriate housing renovation to meet Lise's needs. It is evident that Lise would not be able to get out of bed safely in the way the bedroom is currently set up. The community nurse organises Department of Health and Ageing EACH (extended acute care at home) Dementia Package and associated nursing care support services to visit Lise three times daily to ensure that Lise's personal care needs are attended. The community nurse will also organise for a care support worker once a fortnight to assist the daughter with domestic chores.

1. What is the benefit of providing community-based care to Lise in this situation?
    a. Model of care
    b. Amount of care
    c. Type of care
    d. Price of care

2. What is the focus of community-based services?
    a. Health management and promotion
    b. Health information and promotion
    c. Health education and promotion
    d. Health maintenance and promotion

# Phase 3

During the next few weeks the daughter cancels all nursing support for her mother except for the occasional personal care shift or respite. The community nurse feels that Lise's daughter cannot manage on her own and would like to increase the visits. The daughter refuses to have any additional nursing support and, when encouraged by the visiting district nursing staff, the daughter makes it quite clear that she has the power to stop the nurses coming in the belief that she has the legal

right to do this. The district nurses who attend Lise's personal care are concerned with her wellbeing and report that she appears to be losing weight, looks unhappy and cries and screams when touched. They report noticing suspicious bruises on Lise's body that do not match the mechanism that the daughter provides them. The community nurse speaks with Lise's general practitioner for support, but he has not assessed Lise since she was removed from the residential facility. The community nurse wishes to report the incidents to the police, but evidence is scant and inconclusive. Neither Lise nor her daughter report incidences of violence or maltreatment. The community nurse holds a concern that, if a report is filed without evidence, Lise's daughter may refuse ongoing care support, preventing community nursing team access to Lise, further compromising her care.

1. What would the community nurse report to the police? Lise is allegedly …?
    a. Not being abused or neglected
    b. Being neglected
    c. Being abused
    d. Being abused and neglected

2. Are the community nursing staff required to report their suspicions?
    a. Yes, reporting of suspected elder abuse is mandatory
    b. No, reporting of suspected elder abuse is not mandatory
    c. Sometimes, reporting of suspected elder abuse is decided on a case-by-case basis
    d. Never, reporting of suspected elder abuse is not a nursing responsibility

## Conclusion: Patient outcome

In facing an ethical dilemma the community nurse decides to file a report to the police. However, they are unwilling to investigate due to lack of evidence. The community nurse believes the only way to obtain sufficient evidence is to continue care provision for Lise. The community nurse recommends care services be extended to three times a week to provide personal care for Lise, to which her daughter agrees. The community nursing team continue their precise documentation, specifically including Lise's general appearance, including bruising and/or injuries, aligned with pain

assessment charting. General care conditions, including the state of the room, equipment and nutritional aspects, are also noted. In time, the community nurse is able to obtain sufficient evidence to file a substantial report of maltreatment of Lise by her daughter. The agency files an application to the Civil and Administration Tribunal, including an emergency assessment of Lise's health and living conditions. The Senior Member representing the Guardian Administration Tribunal overturns the power of medical and financial attorney previously assigned to Lise's daughter and removes Lise from her daughter's care. Lise is subsequently admitted to hospital for assessment and treatment. Lise's daughter is charged with assault and neglect of her mother. After 2 weeks of hospital care Lise is discharged back to her previous residential aged care facility.

The community nurse visits Lise at the nursing home to find her happy and smiling. She looks comfortable and the nursing staff at the aged care facility report that she no longer cries when she is touched while they provide care. The community nurse commences a campaign to raise awareness about elder abuse in the community, working with community leaders to develop and implement strategies designed to prevent the reoccurrence of elder abuse.

## Discussion

The WHO projects a doubling of the global population of elderly from 542 million to 1.2 billion by the year 2025. This projection represents an inevitable increase in the likelihood of elder abuse cases in our community and the impact that this will have on the health care system (Stark, 2011). The United Nations Elder Population Division reports that there were between 1% and 35% chances that a person aged 65 years or older will have experienced some form of elder abuse (Jarvis, 2008). An understanding of the physiological effects of elder abuse remains limited but injuries can escalate from mild injuries through to life-threatening causes (Jarvis, 2008). Neglect is often an accompanying factor with elder abuse. Elderly people routinely have food, water or medications withheld by their carers or are used as an item of control. Basic necessities such as personal care and access to medical intervention are refused while the carer receives money from the government or has access to the elderly person's finances (Jarvis, 2008). Health care professionals have a legal, ethical and moral obligation to report any suspected cases of elder abuse (Aged Care in Victoria, 2012; Almogue et al., 2010). Clear lines of communication between concerned citizens and health care professionals need to

be established and maintained to be able to develop prevention initiatives and report cases of suspected abuse. Raising community awareness is a key intervention that a community nurse can perform by educating the community about the significant need to prevent abuse and neglect (Day, 2007).

## REFERENCES

Almogue, A., Weiss, A., Marcus, E., Beloosesky, Y. (2010) Attitudes and knowledge of medical and nursing staff toward elder abuse. *Archives of Gerontology and Geriatrics* 51:86–91.

Aranda, K., Jones, A. (2008) Exploring new advanced practice roles in community nursing: A critique. *Nursing Inquiry* 15(1):3–10.

Australian Nursing Federation. (2010) *Mandatory Reporting Guide*. Online. Available: http://www.anfvic.asn.au/multiattachments/31935.html (accessed 9 July 2012).

Day, K. (2007) Elder abuse in context of poverty and deprivation and emergency department care. *Australasian Emergency Nursing Journal* 10:169–77.

Jarvis, C. (2008) *Physical Examination & Assessment*, 5th edn. Missouri: Saunders Elsevier.

Langley Moneyham, L., Rider, M. (2008) Nursing's role in promoting health for elders in the community. *Geriatric Nursing* 9(5):282–3.

McMurray, A. (2011) *Community Health and Wellness: A Socio-ecological Approach.* Sydney: Mosby Elsevier.

St John, W., Keleher, H. (2007) *Community Nursing Practice:Theory, Skills and Issues.* Sydney: Allen & Unwin.

Stark, S. (2011) Blind, deaf, and dumb: Why elder abuse goes unidentified. *Nursing Clinics of North America* 46(4):431–6.

Victorian Government Health Department. (2012) *Aged Care in Victoria*. Online. Available: http://www.health.vic.gov.au/agedcare/policy/elder_abuse.htm#download (accessed 7 July 2012).

World Health Organization, Health and Welfare Canada and CPHA. (1986) Ottawa Charter for Health Promotion. *Canadian Journal of Public Health* 77(12):425–30.

# Case study
# Community-based nursing care of the older person 2

## Introduction: Presenting condition and symptoms

Kit is a 62-year-old Indigenous Australian woman who has a longstanding history of cardiovascular disease (CVD) and hypertension, is a heavy smoker and has osteoarthritis of the left knee. She was diagnosed with carcinoma in situ of the soft palate secondary to smoking 10 months ago, tumour infiltration into adjoining structures necessitating a partial resection of the soft palate, nasal and mandibular areas, with an oral prosthetic device fitted to be worn on a daily basis to assist speech and prevent drying of the nasal and buccal mucosa. Kit was independent prior to her surgery and expressed her desire to return home once her condition had stabilised. Her family supported this decision; however, as both sons work in the mining sector, they were concerned that they could not be present to assist her. A referral for community-oriented primary health care has been made by the hospital prior to discharge. Primary health care will be an important consideration in the management of Kit's recovery, providing her with access to the appropriate health care.

1. The Declaration of Alma Ata is important because it was the first declaration of …?
    a. A primary health care model by an international delegation
    b. The importance of primary health care by an international delegation
    c. The importance of community nursing by an international delegation

d. A primary health promotion model by an international delegation

2. Which are the primary health care principles?
   a. Accessibility, advocacy, intersectional collaboration, public participation
   b. Accessibility, appropriate technology, increased emphasis on health information management, intersectional collaboration, public participation
   c. Accessibility, appropriate technology, increased emphasis on health promotion, intersectional collaboration, public participation
   d. Accessibility, appropriate technology, increased emphasis on health promotion, international collaboration, public participation

# Phase 1

Kit was consequently discharged home after 3 months of extended rehabilitative care in a subacute rehabilitation facility. A team of interdisciplinary professionals work holistically to assist Kit to maintain her health, allowing her to live at home and preventing unnecessary readmission to hospital. Kit requires the following services: home care four times a day for percutaneous endoscopic gastrostomy (PEG) management, PEG feeds and medication administration. She requires home improvement to assist independence, including shower and over-toilet chairs. She needs a single-pronged stick and elastic knee supports to support mobility around the home. Kit's PEG feeds (Nutrasource) and sips of water necessitate the crushing of medication for administration via the PEG tube. Strict attention to mouth care, including no smoking, frequent narcotic mouth washes and PEG tube management, is a mainstay of care. EACH (extended acute care at home) funding has been secured to broker support for home care, of which the home nursing service is one service.

1. What is an essential element when working in an interdisciplinary team?
   a. Education
   b. Experience
   c. Control
   d. Communication

2. What is the responsibility of the community nurse?
    a. PEG management, PEG feeds and medication administration
    b. Home improvement to assist independence, including shower, over-toilet chairs
    c. Organising a single-pronged stick and elastic knee supports to support mobility around the home
    d. EACH (extended acute care at home) funding

# Phase 2

The hospital's discharge planner has made arrangements to have a team of community health nurses (including nurses from an Indigenous background) from the town's community health centre attend to Kit each day to administer her PEG feeds and medications and to inspect the nasal and buccal mucosa and reinforce the benefits of not smoking during her recovery from surgery. The team are due to start attending when Kit arrives home to her rural community that evening. The team meet with Kit and other female members of her community to discuss how the nurses will work with Kit to provide care. The nursing staff will attend to Kit four times a day to provide oral care, PEG management, Kit's PEG feeds and her medications. The community members inform the nursing staff that they will support Kit while her sons are away; this strong kinship has maintained a positive effect on her wellbeing and represents a strong community. A recent report by the council has found an increase in the number of Indigenous Australian members being diagnosed with CVD. The community nurses will be required to establish a health promotion initiative that will provide Kit and her community with education about the risks of CVD, including the associated risk factors.

1. What is the goal of a health promotion initiative?
    a. To prevent the community from having resources to make informed health decisions
    b. To promote self-directed learning to make informed health decisions
    c. To provide the client with resources to make informed health decisions
    d. To provide the community with resources to make informed health decisions

2. What is a major factor the community nurses should be aware of when preparing the health promotion initiative?
    a. Cultural insensitivity
    b. Cultural sensitivity
    c. Cultural identity
    d. Cultural de-identify

## Phase 3

Kit is recovering well from her surgery and, with the support of her community, is adjusting well to the changes in her lifestyle including her feeding regimens. The community nurses provide Kit with information about CVD and smoking cessation, and also prepare an education session that they will provide to the extended community at the community health centre. The community nurses demonstrate their understanding of the importance of cultural sensitivity by enlisting the help and the support of the elders of the community. They ensure that the language used will represent the cultural framework and will be understood by the community. The CVD education session is designed to empower the community so that they are able to maintain the ongoing education of members in the community. The community nurses from an Indigenous Australian background will be the members to deliver the CVD education session at the community health centre, which is the main source of primary health care for Kit's community, and will follow up the education session with focus groups. The community elders are pleased with the CVD education session and will promote the session to the community as well as attending the session themselves.

1. What are the criteria for successful community engagement in community health projects?
    a. Information about cultural identity, human population movements and primary health theories
    b. Information about primary health as it relates to the particular community, involving clarity of purpose, ability to sustain health outcomes, imparting cultural awareness, sensitivity and safety
    c. Information relating to community engagement, cultural purpose and educational outcomes
    d. Information pertaining to health, workforce planning and education

2. Which grouping of modifiable risk factors assists in the prevention of chronic disease and is of major benefit in preventative education program planning?
    a. Stress, genetic predisposition and lifestyle
    b. Health inequity, living and working conditions, genetics
    c. Living and working conditions, health inequity, cultural and lifestyle factors
    d. Lifestyle factors, health inequity, genetics, stress and microorganisms

## Conclusion: Patient outcome

The community nursing team conducts the education session about CVD. The education session provides the participants with facts about CVD, including the risk factors. The session introduces the community to the terms 'modifiable' and 'non-modifiable' risk factors, which are concepts that have not previously been explained to them. They discuss how their lifestyles can be modified to improve their health and the overall health of the community. The effects of cigarette smoking are also included due to the relationship with CVD and the number of regular smokers in the community. The community nursing team concludes with interventions and strategies that can be implemented by the community and are cost effective and can be maintained easily by the community nursing team and the community. The community elders were pleased with the session and agree to have the session conducted regularly and would like other education sessions that meet the primary health needs of the community, such as a smoking cessation session. The community health centre will be able to provide the primary health care interventions that are aimed to educate and prevent members from being diagnosed with CVD and any additional education sessions that will focus on other community illnesses. Kit has healed well from her surgery. She is aware of the effects of smoking, the effects of CVD on her body and is able to explain to the nurses the benefits of the modifications that she has made to her life such as eating healthily, quitting smoking and going on regular walks with other women from her community. She volunteers her time down at the health care centre educating adolescents and children in the community about the effects of smoking and the benefits of embracing healthy behaviours.

# Discussion

Indigenous populations around the world have a low standard of care that includes poverty, overcrowding, poor nutrition and higher prevalence of disease (Gracey & King, 2009). As some Indigenous groups move from traditional to transitional and modern lifestyles, the impact on their health is increasing (Gracey & King, 2009). Indigenous health has seen an increase in the number of patients presenting with obesity, CVD, type 2 diabetes and factors affecting physical and social wellbeing, including mental health issues, alcohol, smoking and drug use (Gracey & King, 2009). CVD is a major health concern for the Indigenous Australian population, leading to a higher morbidity and mortality rate (Hayman, 2010; Thomson & Brooks, 2006; Thomson et al., 2012). Tobacco smoking is one of the leading causes of CVD damaging not only the heart but blood vessels, resulting in potentially life-threatening changes to blood pressure and heart rate (Hayman, 2010; Johnston & Thomas, 2008). In 2004–2005 national statistics showed that 50% of Indigenous adults were smoking regularly, representing double the number of regular non-Indigenous smokers (ABS, 2006; Johnston & Thomas, 2008). The limited health promotion and poor disease prevention services for Indigenous Australians only serve to aggravate the situation (Gracey & King, 2009). The establishment of health promotion campaigns that respect the cultural sensitivities of the Indigenous Australian community will empower its members to make informed health care decisions (McMurray, 2007). Cultural sensitivity is not tolerance of the differences of other groups but understanding that the dynamic of cultural beliefs and traditional practices can influence the decision-making process and the choices about health care practices (Johnston & Thomas, 2008; McMurray, 2007). The author of this scenario is a non-Indigenous registered nurse. The terminology used in the case study is derived from the literature cited, and the author acknowledges that some terminology may not be agreeable to all members of the overall Indigenous communities.

## REFERENCES

Australian Bureau of Statistics (ABS). (2006) National Aboriginal and Torres Strait Islander Health Survey 2004–2005. Canberra: ABS (No.4715.0).

Graber O'Brien, P. (2008) The importance of nursing. In: D. Brown, H. Edwards, eds. *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems.* Sydney: Mosby Elsevier, pp. 2–21.

Gracey, M., King, M. (2009) Indigenous health. Part 1: Determinants and disease patterns. *Lancet* 374:65–75.

Hayman, N. (2010) Strategies to improve Indigenous access for urban and regional populations to health services. *Heart, Lung and Circulation* 19:367–71.

Johnston, V., Thomas, D. (2008) Smoking behaviour in a remote Australian Indigenous community: The influence of family and other factors. *Social Science & Medicine* 67:1708–16.

Lalonde, CE. (2006) Identity formation and cultural resilience in Aboriginal communities. In: R.J. Flynn, P. Dudding, J. Barber, eds. *Promoting Resilience in Welfare*. Ottawa: University of Ottawa Press, pp. 52–71.

Larsen, A., Gillies, M., Howard, P.J., Coffin, J. (2007) It's enough to make you sick: The impact of racism on the health of Aboriginal Australians. *Australia and Zealand Journal of Public Health* 31:322–9.

McMurray, A. (2007) *Community Health and Wellness: A Socio-ecological Approach*. Sydney: Mosby Elsevier.

Taylor, K., Guerin, P. (2010) *Healthcare and Indigenous Australians: Cultural Safety in Practice*. Sydney: Mosby Elsevier, pp. 55–98.

Thomson, N., Brooks, J. (2006) Cardiovascular disease. In: N. Thomson, ed. *The Health of Indigenous Australians*. Melbourne: Oxford University Press, pp. 186–206.

Thomson, N., MacRae, A., Brankovich, J. et al. (2012) *Overview of Australian Indigenous Health Status 2011*. Online. Available: http://www.healthinfonet.ecu.edu.au/overview_2012 (accessed 3 July 2012).

# Case study
# Fluid, electrolyte and acid–base balance 1

## Introduction: Presenting condition and symptoms

Terri is a 28-year-old woman with a history of type 1 diabetes mellitus (T1DM), diagnosed when she was 5 years old. She has been brought into the emergency department this morning by her partner, Greg, as she is lethargic and unable to make any sense. Greg reports she has been unwell with a flu-like illness for the past week, with nausea and vomiting over the past 2 days. Terri had decided not to take her usual insulin dose last night as she hadn't been eating and her blood sugar was only 8.1 mmol/L.

On examination you find Terri has a Glasgow Coma Scale score (GCS) of 10 (eye opening: 3; verbal response: 3; motor response: 4); she has deep, rapid respirations, acetone smell on her breath and her skin is flushed and dry. Greg reports she had gone to the toilet several times during the night and, when she woke up this morning, she had wet the bed. Her blood glucose level (BGL) is 42.1 mmol/L and her ketone levels are 7.1 mmol/L. Urinalysis shows large amounts of glucose and ketones with a low specific gravity. Her vital signs are:

- BP – 102/54 mmHg
- HR – 112 beats/minute
- RR – 36 breaths/minute, rapid and shallow
- T – 36.2°C
- $SpO_2$ – 96% with no supplemental oxygen

Medical staff suspect Terri has diabetic ketoacidosis (DKA) and order two large bore intravenous (IV) cannulae inserted for fluid resuscitation and IV insulin administration.

1. Which of the following explains the patient's hypotension and diuresis?
   a. Increased extracellular fluid
   b. Increased osmotic pressure
   c. Hyperkalaemia
   d. Increased vascular tonicity

2. Which of the following intravenous fluids is appropriate to treat this patient's dehydration?
   a. Isotonic
   b. Hypertonic
   c. Hypotonic
   d. All of the above

# Phase 1

Terri has been in the emergency department for half an hour. An indwelling catheter is placed to closely monitor Terri's fluid balance while the diuresis continues. Terri is initially commenced on a rapid infusion of normal saline to replace fluid lost through the osmotic diuresis and improve her BP.

Medical staff have ordered the commencement of an IV insulin infusion to slowly decrease Terri's BGL and you access the hospital's protocol for this and prepare the infusion.

Blood tests are taken to determine urea and electrolyte status as well as arterial blood gas analysis to assess the presence and extent of acidosis.

Although Terri's initial oxygen saturation levels were good, you apply a simple face mask with 6 L $O_2$ supplemental oxygen as she is tachypnoeic and you want to optimise her $FiO_2$. After receiving 2 L of normal saline, Terri's BP begins to improve. Her current vital signs are:

- BP – 110/62 mmHg
- HR – 102 beats/minute
- RR – 34 breaths/minute, still rapid and shallow
- T – 37.2°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

1. Which of the following has activated the renin–angiotensin–aldosterone mechanism?
   a. Low pH/acidosis
   b. Hyperkalaemia
   c. Hypotension
   d. Osmotic diuresis

2. Which of the following can explain the patient's tachypnoea?
   a. Respiratory acidosis
   b. Metabolic acidosis
   c. Respiratory alkalosis
   d. Metabolic alkalosis

# Phase 2

The results of the blood tests, received 30 minutes later, show Terri's potassium levels are 6.2 mmol/L. Her other electrolytes were within normal ranges. You immediately place her on a continuous electrocardiogram (ECG) monitor and take a 12-lead ECG, which shows high peaked T waves. Her ABG results are:

- pH – 7.18
- $PaCO_2$ – 40 mmHg
- $HCO_3^-$ – 13 mmol/L
- $PaO_2$ – 125 mmHg
- Base excess (BE) – 4 mEq/L
- $SaO_2$ – 95%

Twenty minutes after you take your initial ECG, Terri loses consciousness and her continuous ECG monitor shows a 6-second episode of ventricular tachycardia (VT), after which Terri regains consciousness, back to the original GCS 10 assessed on arrival. You notify medical staff and take another 12-lead ECG, which still shows peaked T waves, but no other abnormality. You monitor Terri closely for any further VT episodes. Her vital signs are:

- BP – 106/62 mmHg
- HR – 121 beats/minute
- RR – 30 breaths/minute, still rapid and shallow
- T – 37.0°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

Terri is admitted and transferred to a medical ward to continue her treatment.

1. Which of the following is shown in the ABG results?
   a. Metabolic acidosis
   b. Metabolic alkalosis
   c. Respiratory acidosis
   d. Respiratory alkalosis

2. Which of the following can explain the dysrhythmia experienced by the patient?
   a. Hyperkalaemia
   b. Hypotension
   c. Intravenous fluid administration
   d. Acidosis

# Phase 3

Terri has been treated for a total of 24 hours now. She has received IV fluid, which was switched from normal saline to Hartmann's solution, after receiving 2 litres of normal saline, to ensure electrolytes were maintained; her IV insulin infusion continues. After 24 hours of treatment, Terri's BGL is 31.3 mmol/L, ketones are 4.5 mmol/L and her potassium levels are now 3.2 mmol/L.

ABG tests were taken every hour for the first 6 hours, until her pH began to normalise, then every 2 hours. Her ABG is showing significant improvement and is currently:

- pH – 7.34
- $PaCO_2$ – 36 mmHg
- $HCO_3^-$ – 15 mmol/L
- $PaO_2$ – 105 mmHg
- BE – 3 mEq/L
- $SaO_2$ – 98%

A strict fluid balance chart was recorded and the indwelling catheter remained in place, for accurate urine output measurements, for 3 days until her condition stabilised. Her vital signs at present are:

- BP – 112/62 mmHg
- HR – 87 beats/minute

- RR – 22 breaths/minute
- T – 37.1°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

1. Which of the following should be monitored throughout the patient's hospital stay?
   a. Jugular venous pressure
   b. Chest auscultation
   c. Potassium levels
   d. Oxygen saturations

2. Why is it important to maintain an accurate fluid balance record for this patient?
   a. To note trends in intake and output
   b. To identify a change in the patient's condition early
   c. The patient is receiving IVT
   d. All of the above

## Conclusion: Patient outcome

Terri remained in hospital for a week. The DKA was resolved after 3 days of treatment and the insulin infusion was ceased and replaced with 2-hourly BGL measurements and insulin administration according to the result. On discharge, Terri was prescribed her original insulin regimen as this had been sufficient before her illness, which led to her DKA episode.

A diabetes educator was organised to see Terri before she was discharged and her partner, Greg, was invited to the meeting. The diabetes educator discussed with Terri and Greg the precipitating factors leading up to the episode of DKA and emphasised the importance of continuing with the regular therapy and monitoring BGL levels, especially when ill, to avoid future incidence of DKA. They discussed the signs and symptoms indicating the early stages of DKA, such as excessive diuresis, muscle cramping and nausea and lethargy and the importance of identifying these and early intervention. Greg was taught how to administer the subcutaneous insulin injections in case Terri needed him to prepare and administer the medication in the future, if she felt too unwell to complete it herself.

Terri managed her diabetes reasonably well thereafter. Though she was admitted to hospital again with DKA twice over the next

10 years, the incidents were not as severe as this episode as she and Greg were careful to monitor her BGLs and signs and symptoms closely when she encountered eliciting factors, such as the flu that triggered this episode.

## Discussion

Diabetic ketoacidosis (DKA) is a severe complication, arising from prolonged hyperglycaemia, in people with type 1 or type 2 diabetes mellitus, with possibly fatal consequences (Weber et al., 2009). It is a form of metabolic acidosis resulting from a relative or absolute lack of insulin (Elliot et al., 2012). Insulin is utilised by the body to draw glucose into cells for energy metabolism; hence a lack of this results in abnormally high blood glucose levels and gluconeogenesis ensues to ensure adequate cellular metabolism (Elliot et al., 2012). Lypolysis results in the formation of free fatty acids that, when metabolised, produce ketoacids (Elliot et al., 2012; Copstead & Banasik, 2010). The accumulation of ketoacids lowers blood pH, ultimately developing DKA. Hyperglycaemia (BGL >11.1 mmol/L), metabolic acidosis (pH <7.35) and raised blood ketones (>3 mmol/L) are hallmarks of DKA (Elliot et al., 2012; Copstead & Banasik, 2010). Excessive diuresis develops due to raised osmotic pressure in the renal tubules from elevated BGL, resulting in dehydration (Copstead & Banasik, 2012). The acidosis causes potassium to leak out of cells, causing a false hyperkalaemia and increasing the potential for life-threatening dysrhythmias (Copstead & Banasik, 2010).

The goals of treatment for DKA are to correct fluid and electrolyte disturbances; normalise blood glucose and cellular glucose levels; and increase the blood pH to within the normal range (Elliot et al., 2012). The respiratory system compensates for the metabolic acidosis by excreting $CO_2$, thus buffering the excess acids (Elliot et al., 2012). Respiratory support may be required in the presence of significant tachypnoea or Kussmaul's respirations (Elliot et al., 2012). Ongoing monitoring of BGL, potassium levels and fluid balance are essential to prevent complications (Elliot et al., 2012).

Prevention of DKA relies on self-monitoring of BGL and appropriate therapy adjustments, especially in sick day management, such as in Terri's case (Weber et al., 2009). This highlights the importance of education for the patient with diabetes and their family to both identify signs and symptoms of DKA and manage and prevent complications.

## REFERENCES

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

DeBeer, K., Michael, S., Thacker, M., Pattni, C., Gomm, M., Ball, C. et al. (2008) Diabetic ketoacidosis and hyperglycaemic hyperosmolar syndrome – clinical guidelines. *Nursing in Critical Care* 13(1):5–11.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care* Nursing, 2nd edn. Sydney: Elsevier.

Mushiyakh, Y., Dangaria, H., Qavi, S., Ali, N., Pannone, J., Tompkins, D. (2011) Treatment and pathogenesis of acute hyperkalaemia. *Journal of Community Hospital Internal Medicine Perspectives* 1(4):1–6.

Weber, C., Kocher, S., Neese, K., Joshi, S. (2009) Prevention of diabetic ketoacidosis and self monitoring of ketone bodies: An overview. *Current Medical Research and Opinion* 25(5):1197–207.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 39, 40.

# Case study
# Fluid, electrolyte and acid–base balance 2

## Introduction: Presenting condition and symptoms

Doug is a 73-year-old man who has been brought into hospital by an ambulance with extensive burns to his back, arms and legs caused by hot water. His wife, Jennifer, who is 71 years old, has accompanied Doug to hospital. Jennifer reports that Doug was getting in the shower and had turned on the water – he appeared to have mistaken the hot tap for the cold tap and submerged himself in scalding hot water. He got a shock from the water and tried to get out but fell; Jennifer came in about 2 minutes later, turned off the shower and called the ambulance, which arrived 7 minutes later and paramedics began to treat Doug.

You use the 'rule of nines' (Elliot et al., 2012) to determine the total body surface area (TBSA) damaged. Doug's back and upper arms are a deep pink colour and don't blanch on palpation. He is developing blisters around the edge of his back and down the dorsal portion of both legs. Your assessment determines he has 20% deep partial-thickness (deep second degree) burns and approximately 20% mid-dermal partial-thickness (superficial second degree) burns. His forearms are pink, indicating approximately 9% epidermal (first degree) burns. There is no evidence of burns to his face, neck or scalp.

Doug is visibly in a lot of pain: grimacing and calling out. He is unable to verbalise the intensity of his pain when asked for a score out of 10. His vital signs on arrival are:

- BP – 102/71 mmHg
- HR – 117 beats/minute

- RR – 28 breaths/minute
- T – 35.7°C
- $SpO_2$ – 93% with no supplemental oxygen

Two large bore intravenous (IV) cannulae are placed and blood samples are taken to test urea, electrolytes, full blood count and blood group as well as an arterial blood gas (ABG). Medical staff order immediate IV fluid administration; you are asked to prepare Hartmann's solution for infusion. Using the modified Parkland formula (2–4 mL/kg/%TBSA), you calculate the volume to be administered over the first 24 hours since the burn injury occurred (Elliot et al., 2012).

Doug and Jennifer live at home alone. Doug is normally fit and healthy, with a past history of mild hypercholesterolaemia and some sporting injuries. He is the primary carer for Jennifer, who has a past history of chronic back pain from compressed vertebral disks at T5–6 and moderately-severe osteoarthritis. They have three adult children living within a 10-minute drive.

1. Given that burns cause extensive cellular damage, which of the following should be closely monitored?
   a. $K^+$
   b. $Ca^{2+}$
   c. $Na^+$
   d. $Mg^{2+}$

2. Why is Hartmann's the intravenous solution of choice for this patient?
   a. Because the patient is hypotensive
   b. Because of the extracellular fluid (ECF) shift
   c. Because it is a colloid
   d. Because it is a crystalloid

# Phase 1

Morphine is being administered IV to manage Doug's pain. You cover Doug in a burn dressing product that promotes cooling of the area as well as keeping the area clean to prevent infection. Over this you place a warming blanket to prevent hypothermia.

You place an indwelling catheter with a thermometer tip to both accurately gauge Doug's fluid balance and continuously monitor his temperature, given the extent of his burns.

You apply continuous electrocardiogram (ECG) monitoring and take a 12-lead ECG, which shows normal sinus rhythm with peaked T waves.

The results of his ABG are received 5 minutes later:

- pH – 7.21
- $PaCO_2$ – 41 mmHg
- $HCO_3^-$ – 17 mmol/L
- $PaO_2$ – 125 mmHg
- BE – 3 mEq/L
- $SaO_2$ – 95%

Half an hour later, his other blood test results are received, showing his potassium levels are 6.2 mmol/L. His current vital signs are:

- BP – 105/62 mmHg
- HR – 97 beats/minute
- RR – 28 breaths/minute
- T – 35.9°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

1. Which of the following is shown in this patient's ABG?
   a. Respiratory acidosis
   b. Respiratory alkalosis
   c. Metabolic acidosis
   d. Metabolic alkalosis

2. Which of the following should be monitored in hyperkalaemia?
   a. ECG
   b. BP
   c. ICP
   d. RR

# Phase 2

8 hours after arriving in the emergency department, Doug is transferred to a high dependency ward to continue his treatment. It is now 24 hours after his burn injury occurred and initial fluid resuscitation has been completed. Doug is now receiving a slower, continuous IV infusion of Hartmann's solution.

His electrolyte levels and ABG are monitored at 2-hourly intervals now. His last potassium level (taken 1 hour ago) was at 5.4 mmol/L. His current ABG results are:

- pH – 7.33
- $PaCO_2$ – 38 mmHg
- $HCO_3^-$ – 20 mmol/L
- $PaO_2$ – 125 mmHg
- BE – 3 mEq/L
- $SaO_2$ – 95%

His current vital signs are:

- BP – 112/62 mmHg
- HR – 87 beats/minute
- RR – 25 breaths/minute
- T – 37.1°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

A social worker is organised to visit Doug and Jennifer to discuss psychosocial issues arising from this episode and to begin organising assistance for Jennifer, while she is at home alone, and for the couple when Doug returns home.

1. Ongoing need for IVT means potential for infection from numerous sources. Which of the following management strategies reduce this risk?
    a. Re-site cannula every 48–72 hours
    b. Adhering to the 'five moments for hand hygiene'
    c. Using aseptic technique when coming in contact with the site
    d. All of the above

2. Which of the following complications of IVT is the patient experiencing?
    a. Phlebitis
    b. Infiltration
    c. Infection
    d. Erythema

# Phase 3

After 3 days of treatment, Doug reports his pain levels are now under control and his IV morphine is changed to regular slow release oral OxyContin tablets, with IV morphine ordered for break-through pain relief as required. He reports feeling quite thirsty; you offer him oral fluid but stress he must sip this, rather than drink large amounts, as he has the potential for nausea and vomiting as a result of his burn injuries and hyperkalaemia. You notify medical staff to arrange for an increase in his IV therapy rate.

His electrolyte levels and ABG are now being monitored daily, as his potassium level has stabilised at 4 mmol/L over the past 2 days and his current pH is 7.38. His last ECG, taken 4 hours ago, showed normal sinus rhythm with normal T wave morphology. His current vital signs are:

- BP – 110/64 mmHg
- HR – 89 beats/minute
- RR – 20 breaths/minute
- T – 36.1°C
- $SpO_2$ – 97% with 6 L $O_2$ via simple face mask

Referrals are being made to the hospital nutritionist, physiotherapist and occupational therapist to plan for Doug's ongoing care and recovery.

1. The ongoing care of this patient is most likely to include which of the following?
    - Fluid restriction
    - Daily weigh
    - ICP measurement
    - $K^+$ monitoring

2. This amount of burns will result in which ongoing fluid balance problem?
    a. Increased insensitive loss
    b. Decreased intracellular fluid volume
    c. Decreased osmotic pressure
    d. Increased hydrostatic pressure

## Conclusion: Patient outcome

As the paramedics arrived promptly and he was taken to an appropriate emergency department for the extent of his burns and treatment was commenced within 30 minutes of his injury, further progression and severity of the burn injury was avoided. His burns remained infection-free, due to appropriate choice of dressing and nursing intervention at dressing changes.

Doug was fortunate to avoid attending the operating theatre for surgical intervention to remove necrotic tissue for his burns. He did, however, require skin grafts to his back, on the areas where the deep partial-thickness burns were located. His thighs were used as the donor site.

Physiotherapy sessions became a large part of Doug's acute treatment and rehabilitation in the following months. Active and passive movement activities were conducted and taught to Doug, Jennifer and their children to ensure scar tissue did not limit the movement in Doug's shoulder, elbow, hip and knee joints. The physiotherapist, along with medical and nursing staff, assisted with the fitting of Doug's compression garments. Doug had to wear these for the next 12 months, day and night, except when he was attending to his hygiene needs.

The occupational therapist worked with nursing staff, Doug and his family to ensure there were adequate resources for Doug when he was discharged home. Doug and his family also received ongoing counselling both during his hospital stay and after discharge. This assisted with Doug and his family's emotional recovery as he was able to function optimally when he got home.

## Discussion

Burns are injuries to the body tissues caused by thermal, electrical or chemical sources (Copstead & Banasik, 2012). Globally, the incidence

of burns severe enough to require medical attention ranked fourth highest among all injury causes (Peck, 2011). Although burns account for over 300,000 deaths each year throughout the world, the vast majority of cases are not fatal, although they are a leading cause of morbidity for survivors (Peck, 2011). Over past decades, advances in treatments for burn injuries have contributed to an overall improvement in patient survival, although patients over 60 years of age, due to the impact on healing from the ageing process, are at greater risk for mortality (Duke et al., 2011).

In thermal burns, the degree of tissue destruction is related to the duration of exposure and the temperature the skin is exposed to (Copstead & Banasik, 2010). Major burns, as in Doug's case, produce a chain of pathophysiological changes characterised by the onset of shock, hypoperfusion and acid–base imbalance (Copstead & Banasik, 2010). Without adequate management, deterioration can be seen through bacterial infection and organ dysfunction or failure (Copstead & Banasik, 2010). The physiological response to burn injury is a hypermetabolic state and activation of the immune system, in an attempt to repair damaged tissue (Copstead & Banasik, 2010).

The initial phases of treatment for burn injury should include the usual primary and secondary survey approach to assessment and stabilisation (Elliot et al., 2012). Fluid resuscitation is necessary to maintain the patient's circulating volume due to the phenomenon known as 'capillary leak', which occurs within a few minutes of the injury and persists for up to 24 hours (Copstead & Banasik, 2010; Elliot et al., 2012). Tissue injury at the cellular level causes potassium to be released from affected cells and other electrolyte disturbances (Copstead & Banasik, 2010). The modified Parkland formula is used to calculate the patient's fluid requirements for the first 24 hours of treatment and electrolytes should be monitored throughout the patient's admission (Elliot et al., 2012).

The recovery and rehabilitation phase of burn injury treatment requires a multidisciplinary approach. Ongoing needs for skin grafting, wound dressing and scar tissue management require the input of many health care professionals including medical, surgical, nursing, physiotherapy, occupational therapy, social work and counselling staff to ensure optimal recovery (Copstead & Banasik, 2010; Elliot et al., 2012).

## REFERENCES

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Duke, J., Wood, F., Semmens, J. et al. (2011) Rate of hospitalisations and mortality of older adults admitted with burn injuries in Western Australia from 1983 to 2008. *Australasian Journal on Ageing* (31(2):83–9.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care* Nursing, 2nd edn. Sydney: Elsevier.

Mushiyakh, Y., Dangaria, H., Qavi, S., Ali, N., Pannone, J., Tompkins, D. (2011) Treatment and pathogenesis of acute hyperkalaemia. *Journal of Community Hospital Internal Medicine Perspectives* 1(4):1–6.

Patton, K., Thibodeau, G. (2012) *Anatomy and Physiology*, 8th edn. Sydney: Elsevier.

Peck, M. (2011) Epidemiology of burns throughout the world. Part 1: Distribution and risk factors. *Burns* 37(7):1087–100.

Perel, P., Roberts, I., Pearson, M. (2009) Colloids versus crystalloids for fluid resuscitation in critically ill patients (Review). *Cochrane Database of Systematic Reviews* Issue 4, Art. No.: CD000567. DOI: 10.1002/14651858.CD000567.pub3.

Sax, H., Allegranzi, B., Uckay, I., Larson, E., Boyce, J., Pittet, D. (2007) My 5 moments for hand hygiene: A user-centred design and approach to understand, train, monitor and report hand hygiene. *Journal of Hospital Infection* 67:9–21.

Hand Hygiene Australia (HHA) (2012) *5 Moments for Hand Hygiene*. Online. Available: http://www.hha.org.au/home/5-moments-for-hand-hygiene.aspx (accessed 12 May 2012).

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 29, 39.

# Case study
# Health assessment and physical examination

## Introduction: Presenting condition and symptoms

You are working as a school nurse at the local high school. The school nurse has many responsibilities including student assessment, acute and chronic management, monitoring students' general wellbeing, medication administration and health promotion and education for students and their families. Your first appointment this morning is with a student that you have never met called Jay. You call Jay in from the waiting room; as he approaches you observe that he is tall and skinny, appears well and is ambulating normally with a steady gait. Jay is an 18-year-old male who informs you that he has made the appointment with you because he needs to have a 'complete physical' before his coach will allow him to participate in the school's athletics program. Jay fills in the admission form while you set up the examination room.

1. What is the primary purpose of a health assessment?
    a. To gather information
    b. To cluster information
    c. To analyse information
    d. To evaluate information

2. Before the nurse starts, does she need to gain parental consent prior to commencing the health assessment and physical examination?
    a. Yes, he is a student, regardless of his age
    b. No, he is of legal age to give consent for himself

c. Yes, he is unable to give consent for himself
d. No, he is mentally incompetent to make medical decisions for himself

# Phase 1

The nurse begins Jay's health assessment by obtaining some biographical details. Jay has completed the admission form, but it is school policy that the staff member conducting the health assessment confirms the details with the patient prior to any further assessment. The nurse confirms the following details:

- Name
- Date of birth
- Address
- Gender
- Marital status
- Nationality
- Occupation
- Past medical history
- History of presenting complaint
- Any special requirements (learning difficulty, interpreter, hearing or visually impaired)

The nurse confirms Jay's full name, date of birth, address, gender, marital status, nationality, occupation. She discovers that Jay has a past history of an appendectomy in 2008 and childhood asthma (does not use puffers) and that he has no known allergies. Jay confirms that he is fit and well and the only reason he has come to the school clinic is to have a 'complete physical' so that he is able to play football for the school's football team. He denies the need for any special requirements as listed on the admission form.

1. When conducting an interview of a patient, what type of question will elicit the best response?
   a. Closed-ended question
   b. Direct question
   c. Open-ended question
   d. Indirect question

2. What type of data/evidence is found during the interview phase of the assessment?
    a. No data or evidence
    b. Objective data
    c. Subjective data
    d. Both subjective and objective

# Phase 2

The school nurse completes her interview with Jay and has documented the subjective data that she has gathered during the assessment. Jay appears generally fit and well.

Initial observations (baseline) are recorded as charted:

- T – 37.5°C
- HR – 72 beats/minute
- RR – 14 breaths/minute
- BP – 120/89 mmHg
- $SaO_2$ – 98% RA
- Pain score – 0/10
- Height – 173 cm
- Weight – 56 kg
- BMI

During the interview the following information was recorded. Jay presents with no obvious neurological problems or history except for the occasional headache, which he treats at home with over-the-counter (OTC) medication. He admits to the nurse that he smokes cigarettes (~10 per day—but is trying to quit) and occasional marijuana use but only on the weekends (he has asked that this not be put in his file because he doesn't want his parents or coach finding out). He denies having cough/cold/fevers and states that he occasionally gets short of breath when he exercises, which he puts down to his asthma. He denies any chest pain or palpitations; there are no obvious abnormalities such as cyanosis or clubbed fingers. He states that he has good exercise tolerance from playing football. Jay denies any abdominal pain (except for when he had appendicitis) or nausea and vomiting. He is eating well, 4–6 meals a day of healthy foods, drinking 'heaps' of water, denies any bowel trouble, no diarrhoea or constipation, no issues with his kidneys or urine output. Jay has good muscle tone and his skin is pale (natural colour) but he

looks well and has not complained of anything in particular that is wrong with him. After reviewing her notes, the nurse makes sure that Jay is comfortable by explaining how she will perform the physical examination including the need for Jay to change into a gown; she confirms with Jay that he is ready to start the examination and that he has no follow-up questions. She then prepares the examination room so that Jay's physical examination can be completed smoothly and accurately with minimal interruptions.

1. When completing a physical examination, in what order should you undertake your assessment?
    a. Alphabetical order
    b. Random order
    c. Systematic order
    d. General order

2. What type of data/evidence is found during a physical examination?
    a. No data or evidence
    b. Objective data
    c. Subjective data
    d. Both subjective and objective

## Phase 3

The school nurse concludes her objective assessment of Jay and documents the following: Jay is an 18-year-old male who presents alert and orientated, his GCS is 15, pupils are equal and reactive to light and he has equal limb strengths in his upper and lower limbs. She notes an equal rise and fall of Jay's chest, no obvious lesions, scars or other injuries. His respiration rate is 14 breaths per minute, regular, quiet and deep. His lungs are clear bilaterally with good air entry into the bases of both lungs. Good skin colour, no obvious signs of cyanosis. His heart rate is 72 beats per minute, strong and regular, $S_1$ and $S_2$ heart sounds auscultated no murmur or pericardial rub. Pulses are present on palpation and are equal in the upper and lower limbs. She notes a scar in the right iliac fossa, bowel sounds are present on auscultation, the abdomen is soft and non-tender on palpation in all quadrants. Urine sample is clear good, no signs of dysuria, infection or haematuria. Jay is able to perform the full range of motion exercise of all relevant joints. His overall skin is dry and intact, nil injuries or abnormalities.

1. What is the nurse's responsibility after completing each stage of the health assessment?
    a. Document all of her findings
    b. Document some of her findings
    c. Document only the findings that the patient wants documented
    d. Document? This is a high school, not a hospital

2. If you make an error when documenting patient information, you should …?
    a. Scribble out the error
    b. Liquid paper out the error
    c. Single line through the error
    d. Double line through the error

## Conclusion: Patient outcome

On completing the health assessment and physical examination, the nurse provides Jay with privacy so he can change back into his school uniform. Once Jay is dressed, the nurse goes through the outcome of Jay's health assessment. She reports that neurologically Jay presents as alert and orientated with no signs of neurological deficits; he has appropriate motor and sensory responses to the stimuli provided during the assessment. His lungs were clear on auscultation, with good air entry to the bases; she advises Jay that smoking is most likely the cause of his shortness of breath and how it will affect his lungs if he continues to smoke. She also advises Jay that she is legally bound to document all aspects of this assessment, including his drug use, but reminds him that due to confidentiality she will not disclose this information to either his parents or his coach, and counsels him against the use of marijuana and about its effects on mental and physical health. His heart rate was normal, heart sounds were normal on auscultation, central and peripheral pulses were present on palpation and there were no signs of abnormalities. Jay's abdomen was soft and non-tender with no abnormalities present. Physically, Jay has great range of motion in all limbs and the overall presentation of someone who is fit and well and able to meet the demands of the school program. Based on this assessment the school nurse is able to document that Jay is able to participate on the football team. Over 3 months later, Jay quickly pops into your office. He informs you that he is doing well, loving football and has quit smoking and no longer

uses marijuana, and thanks you for your helping him to get on the football team.

## Discussion

Health assessments and physical examinations are among the first skills taught to nursing students and it is most critical that they get it right. The four types of basic assessment (initial comprehensive assessment, ongoing or partial, focused or problem-orientated or emergency assessment) will be performed at varying times throughout the patient's journey through the health care system. Nurses continually observe every situation (whether they are at work or in public) and collect cues and relevant information that will support their judgement (Jarvis, 2008). Nurses play a significant role in the Australian health care system, whether it is in a hospital, clinic, community (health services, immunisation, medical clinics, school etc) or long-term care (FitzGerald et al., 2012; Jarvis, 2008). Australian public hospital EDs provided cared for almost 7.4 million patients in 2009–2010; these are concerning numbers when compared to 5.4 million patients just 10 years earlier (FitzGerald et al., 2012). The notable effect of this increase is the demand for primary health care on community-based health care services and the overcrowding of EDs, where medical and nursing intervention is impeded by the number of patients (Richardson & Mountain, 2009). Overcrowding is seen daily in EDs throughout Australia and the Western world (UK, USA and Canada) (FitzGerald et al., 2009). With increases in patient presentations, it is only natural that the demand on nursing availability is high and the ability to provide an assessment that is accurate, succinct and relevant is vital for patient care (Jarvis, 2008; Weber & Kelley, 2007). An inaccurate assessment (subjective and objective data) will directly affect the ability to apply the nursing process (a critical thinking tool): assessment, diagnosis, planning, implementation and evaluation. The formation of a nursing diagnosis or problem statement will not be appropriate for the patient and will lead to the planning of goals, interventions and rationales for implementing a care plan resulting in the evaluation of interventions that do not meet the needs of the patient (Jarvis, 2008). Health assessment and physical examination is one of the key foundational skills taught to nurses. This fundamental nursing skill appears in the National Competency Standard for Registered Nurses (Domain: Provision of and Coordination of Care Standard 5.1, 5.2, 5.3) and promotes the ongoing professional development of nurses (National Competency Standards for the Registered Nurse, 2012). Nurses need

to engage in lifelong learning (continued throughout their practice) as part of their ongoing professional development and to enhance their advanced health assessment and physical examination assessment abilities (Stuart, 2007).

## REFERENCES

Alfaro-LeFevre, R. (2009) Critical Thinking and Clinical Judgement: A Practical Approach to Outcome-focused Thinking. 4th edn. St Louis: Elsevier.

Astell, L., Bourke, L. (2009) Chapter 25: Documentation. In: J. Crisp, C. Taylor, *Potter & Perry's Fundamentals of Nursing*, 3rd edn. Sydney: Mosby Elsevier, pp. 415–32.

Bird, S. (2011) Consent to medical treatment: The mature minor. *Australian Family Physician* 40(3):159–60.

FitzGerald, G., Aitken, P., Tippett, V., Toloo, S., Rego, J., Kim, J. (2009) Growing demand for emergency health services in Queensland, Australia. *Prehospital and Disaster Medicine* 24(2):s52.

FitzGerald, G., Toloo, S., Rego, J., Ting, J., Aitken, P., Tippett, V. (2012) Demand for public hospital emergency department services in Australia: 2000–2001 to 2009–2010. *Emergency Medicine Australasia* 24(1):72–8.

Jarvis, C. (2008) *Physical Examination and Assessment*, 5th edn. Missouri: Saunders Elsevier.

Nursing and Midwifery Board of Australia. (2012, May 6th) National Competency Standards for the Registered Nurse. Online. Available: http://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/Codes-Guidelines.aspx (accessed 8 October 2011).

Office of the Public Advocate. (2010) Medical Consent. Online. Available: http://www.publicadvocate.vic.gov.au/medical-consent/ (accessed 20 December 2010).

Richardson, D., Mountain, D. (2009) Myths versus facts in emergency department. *The Medical Journal of Australia* 190(7):369–74.

Stuart, C. (2007) *Assessment, Supervision and Support in Clinical Practice: A Guide for Nurses,Midwives and Other Health Professionals*, 2nd edn. Philidelphia: Churchill Livingstone Elsevier.

Ward, M. (2009) School Nursing Professional Practice Standard. Melbourne: Victorian School Nurses Australian Nurses Federation (Victorian Branch) Special Interest Group. Online. Available: http://www.pc.gov.au/__data/assets/pdf_file/0016/115252/subdr052.pdf (accessed 8 September 2012).

Weber, J., Kelley, J. (2007) *Health Assessment in Nursing*, 3rd edn. Philadelphia: Lippincott Williams & Wilkins.

## WEBSITES

| | |
|---|---|
| Australian Government, Drug and alcohol help reference | http://australia.gov.au/topics/health-and-safety/drug-and-alcohol-use |
| Quit | http://www.quit.org.au/ |

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 12, 27.

# Case study
# Medication therapy 1

## Introduction: Presenting condition and symptoms

Roseanne is a 67-year-old woman who has presented to the emergency department of your hospital with a 3-day history of shortness of breath on exertion. She reports it has been getting worse for the past 3 days and she only came in to hospital today because she was having trouble walking from the bedroom to the bathroom, a distance of approximately 10 metres, whereas before she could manage to get around her house well. Otherwise, she says she 'would've just put up with it.'

Roseanne has a past medical history including: angina, diagnosed 12 years ago; three acute myocardial infarctions (AMIs), 10 years, 7 years and 3 years ago. Her body mass index is 34 kg/m$^2$; she has smoked a pack of cigarettes per day for the past 47 years; she admits to minimal exercise; and, due to financial reasons, she eats fast food up to 5 days per week. Roseanne has brought her current medications with her and, when you ask her about her dosage, frequency and reason for taking them, she says that she takes one of each every morning and knows 'most of them are for her heart.'

Her current medication regimen is documented as:

- frusemide, 40 mg BD
- enalapril, 5 mg BD
- telmisartan, 20 mg Mane
- carvedilol, 12.5 mg BD with food
- digoxin, 62.5 microg BD
- slow K 3 tablets, Mane

- atorvastatin 40 mg, Nocte
- paracetamol 1 g, as required
- metoclopramide 10 mg, as required.

(All are prescribed as oral tablets.)

1. From the information Roseanne has given, what is the most prominent risk factor exhibited for improper use of medications?
   a. Lack of knowledge regarding the actions of the prescribed medications
   b. Bringing her medications with her to hospital
   c. Admitting to having financial difficulties at home
   d. Living at home alone

2. Polypharmacy involves the concurrent use of five or more medications by a client at one time. What are some potential problems Roseanne is facing?
   a. The drugs may interact with each other producing toxic effects.
   b. The client may become confused about the medication regimen and uses.
   c. It can become costly for the client.
   d. All of the above.

# Phase 1

After an initial medical assessment, it is determined Roseanne has an acute exacerbation of congestive heart failure (CHF); this has developed as a result of her history of angina and AMIs. She is admitted to a cardiac monitored bed. Here is some of her initial assessment:

- BP – 105/47 mmHg
- HR – 103 beats/minute
- T – 37.5°C
- RR – 24 breaths/minute
- $SpO_2$ – 82% room air, 89% 6 L $O_2$
- Peripheral oedema is present
- Chest X-ray – widespread opaque areas across lung fields, pulmonary artery congestion evident, heart enlarged

Roseanne is commenced on 80 mg BD frusemide intravenously (IV). Frusemide is a loop diuretic, increasing the urinary excretion of sodium and water (Bryant & Knights, 2011). Roseanne's body has retained an excess amount of fluid as a result of the decreased pumping ability of her heart, and the pulmonary congestion and peripheral oedema are clinical manifestations of this (Copstead & Banasik, 2011). The frusemide is given with the intention of reducing this excess amount of fluid.

1. The prescriber has both increased Roseanne's dosage of frusemide and changed from oral administration to intravenous. What is the most likely reason for this?
   a. The oral medication is contraindicated for Roseanne.
   b. Oral frusemide is not available in this hospital.
   c. Intravenous administration is more convenient and ensures the patient receives the medication.
   d. The medication is absorbed faster.

2. Which of Roseanne's vital signs should the nurse monitor closely when administering the IV frusemide?
   a. Heart rate
   b. Blood pressure
   c. Respiratory rate
   d. Temperature

## Phase 2

Roseanne has been in hospital for 2 days now and is responding well to the current treatment. Her current vital signs are:

- BP – 110/56 mmHg
- HR – 92 beats/minute
- T – 38.5°C
- RR – 22 breaths/minute
- $SpO_2$ – 86% room air, 92% 6 L $O_2$

Medical staff are concerned about Roseanne's elevated temperature. Coupled with her respiratory rate and oxygen saturations, doctors suspect an infection secondary to the pulmonary congestion. A further chest X-ray reveals a small left lower lobe pneumonia and sputum is collected for culturing. IV antibiotics are ordered: benzylpenicillin 1.6 g every 6 hours.

1. Benzylpenicillin is available on the ward in 2-g vials, to be drawn up with sterile water for injection to a total of 10 mL. What is the amount to be administered to Roseanne?
   a. 9.6 mL
   b. 8 g
   c. 8 mL
   d. 10 mL

2. During your shift caring for Roseanne, you notice that a dose of the benzylpenicillin due on the previous shift was not signed for, nor is there any indication in the progress notes that this dose was given or withheld. Which of the following 'rights' of medication administration has been overlooked here?
   a. The right time
   b. The right documentation
   c. The right dose
   d. The right reason

## Phase 3

Roseanne has been in hospital receiving treatment for her pulmonary congestion and pneumonia for one week now and the medical staff ask you to plan for her discharge in the next 2 days. Her current vital signs are:

- BP – 108/58 mmHg
- HR – 89 beats/minute
- T – 37.2°C
- RR – 22 breaths/minute
- $SpO_2$ – 94% room air

She had a chest X-ray yesterday, which now shows all her lung field is clear, with the exception of a small opaque area in her left lower lobe, signifying the pneumonia is ongoing but clearing.

You begin your nursing assessment to determine your client's preparedness for discharge, including reviewing her medical history, medication history and current medications (she is to be discharged on oral antibiotics, in addition to her regular medications, which she is to take every 6 hours), and her diet and exercise patterns. You also determine Roseanne's perceptual ability and coordination to

determine if she is capable of self-administering her medication when she returns home.

While assessing Roseanne's current medical condition, her attitude to medication use, her understanding of her reason for hospitalisation and her learning needs, she tells you that she was simply getting too tired to look after herself at home and, hence, came in to hospital for some care. When questioned about her medical history, Roseanne is unable to make a connection between her cardiac problems and her current presentation.

1. When assessing Roseanne's learning needs prior to discharge, which element of her history will most alert the nurse to engage in further education for the client?
    a. She is taking numerous medications.
    b. She has a complex past history.
    c. She says she was simply getting tired, which was why she brought herself to hospital.
    d. She had a low blood pressure on admission.

2. Which of the following is the most important referral for the nurse to make upon Roseanne's discharge?
    a. Pharmacist
    b. Dietitian
    c. Occupational therapist
    d. All of the above

## Conclusion: Patient outcome

Roseanne is seen by the pharmacist before discharge, who explains each medication she is being discharged with, why they are to be taken and when she needs to take each of them. You follow up this consultation to ensure Roseanne has understood what she has been told and to see if she has any further questions. You provide her with the available hospital pamphlets with information about some of the medications she will be taking and give her contact details if she has any further questions.

You spend some time with Roseanne explaining her presenting condition and ensuring she understands the medical problems she has experienced in the past have developed into CHF and that her current presentation is a manifestation of this heart failure.

You explain the importance of taking the prescribed medication and ensuring she restricts her fluid intake to attempt to prevent the development of this issue again and readmission to hospital.

Roseanne is also seen by a dietitian prior to discharge who talks to her about healthier food options considering her financial situation. An appointment is made for Roseanne with her GP for follow-up care in 2 weeks' time; you encourage her to attend and explain the importance of ongoing care for her chronic condition.

The GP who sees Roseanne 2 weeks later notes her improved understanding of her condition, but she tells him she is still confused about the times she needs to take the medications. He suggests a Webster pack is made for her by the dispensing pharmacist to assist with correct administration of her medication.

## Discussion

Acute exacerbations of chronic illness, particularly cardiovascular disease, account for many unplanned emergency department presentations and hospital admissions (Stone & Packer, 2010). Evidence suggests that many of these could be avoided if improved strategies for management were introduced and implemented effectively. Successful, sustainable chronic disease care must involve the patient (Stone & Packer, 2010). There is strong evidence indicating self-management reduces unplanned hospital admissions and/or length of stay, encourages more efficient use of health professionals' time as well as improving self-care capacity and skills (Stone & Packer, 2010).

Accurate assessment of the patient's medical condition in hospital and adherence to legal guidelines contribute to both quality use of medications in the hospital setting and the effective prescription and utilisation of those medications to ensure positive patient outcomes. It is important for nursing staff to understand their responsibility and accountability regarding the administration of medications in this setting.

Upon discharge, the nurse's responsibility extends to a thorough assessment of the client's perceptions and management abilities of their medication regimen when they are in the community setting. As has been demonstrated in the research literature to date, this can be pivotal in the development of appropriate health literacy in patients with chronic illnesses to prevent acute exacerbations of their condition and subsequent hospital admission. By encouraging patient

self-management and empowerment of the client, the health care costs posed by hospital admission and other treatments relating to frequent acute exacerbations are reduced and the quality of life for clients with chronic illness is improved.

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Clement, S., Ibrahim, S., Crichton, N., Wolf, M., Rowlands, G. (2009) Complex interventions to improve the health of people with limited literacy: A systematic review. *Patient Education and Counseling* 75(3):340–51.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Fulton, M., Allen, E. (2005) Polypharmacy in the elderly: A literature review. *Journal of the American Academy of Nurse Practitioners* 17(4):123–32.

Frazier, S. (2005) Health outcomes and polypharmacy in elderly individuals. *Journal of Gerontological Nursing* 31(9):4–11.

Harris, M., Zwar, N. (2007) Care of patients with chronic disease: The challenge for general practice. *Medical Journal of Australia* 187(2):104–7.

Stone, G., Packer, T. (2010) Evaluation of a rural chronic disease self-management program. *Rural and Remote Health* 10:1203. Online. Available: www.rrh.org.au (accessed 4 April 2012).

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 31, 40.

# Case study
# Medication therapy 2

## Introduction: Presenting condition and symptoms

Jeremy is a 54-year-old man, married with three teenage children. He has a past medical history of asthma. He works as a barrister, a job he admits is stressful. He has been admitted to your ward following a diagnosis of new onset atrial fibrillation (AF). Jeremy had been experiencing dizziness and intermittent palpitations for the past 2 to 3 months, initially dismissing it as being overworked and tired. He attended his general practitioner (GP) two days ago, where it was found he had an irregular heart rate of 140 beats/minute. He was sent straight to the emergency department where an electrocardiogram (ECG) was done and blood tests taken including urea and electrolytes, full blood count and cardiac enzymes. The ECG showed rapid AF at a rate of 154 beats/minute. His blood pressure was 102/54, respiratory rate 18 breaths/minute, temperature 36.6°C and oxygen saturations 98% on room air.

Jeremy has been commenced on digoxin, a medication he has not had before and you are relatively unfamiliar with. You discover that digoxin is a cardiac medication that increases the force of contraction, decreases conduction through the atrioventricular node and ultimately decreases heart rate (Bryant & Knights, 2011). This is particularly useful for treatment of AF as this condition can produce several hundred impulses from the atria that, without a therapeutic level of digoxin, would be transmitted through to the ventricles (Bryant & Knights, 2011). Digoxin can take up to 5 days to reach a plasma steady state and has a very narrow therapeutic range (Bryant & Knights, 2011).

1. The nurse's role and accountability in administering medication are:
    a. Knowledge of the medication, therapeutic and non-therapeutic effects and education needs of the client
    b. Knowledge of the correct dosage
    c. Knowledge of the pharmacokinetics of each medication administered
    d. Knowledge of the pharmacodynamics of each medication administered

2. When the rate of drug administration is equal to the rate of drug excretion, this is referred to as:
    a. The medication's half-life
    b. Bioavailability of the medication
    c. The peak rate of absorption of the medication
    d. The peak plasma concentration

# Phase 1

While Jeremy is in hospital, he has been ordered subcutaneous injections of heparin every 4 hours. Heparin is an anticoagulant agent, acting by binding to antithrombin III and augmenting the action of this compound (Bryant & Knights, 2011). The result is the inhibition of several clotting factors, including thrombin factor IIa, preventing the formation of fibrin and hence the formation of a stable clot (Bryant & Knights, 2011). This is being administered as AF causes stasis of blood in the atria as the atria do not contract effectively, increasing the potential for the formation of blood clots (Copstead & Banasik, 2010).

As a more permanent and convenient ongoing form of anticoagulation prophylaxis, Jeremy is also commenced on warfarin, which is given as oral tablets once per day. Heparin has an onset of action after subcutaneous injection of 1 to 2 hours, whereas warfarin is much slower with an onset of action of 1 to 2 days (Bryant & Knights, 2011). With the administration of heparin, Jeremy is covered until the warfarin becomes effective.

1. When administering a subcutaneous injection of heparin, the nurse should consider which of the following:
    a. Using the abdomen as the preferred site of administration

b. Inject at a 45° angle into the subcutaneous tissue anywhere on the body
c. Use the deltoid region of the patient's arm for administration
d. Always select a site based on patient preference

2. You are having a very busy shift on your ward and delegate the preparation of your patient's heparin subcutaneous injection to another nurse who has offered to help. She has drawn up the medication and hands you the syringe and the heparin vial to check. You administer the subcutaneous injection. Which of the following 'rights' have you overlooked?
   a. Right time
   b. Right route
   c. Right medication
   d. Right client

## Phase 2

The day after his admission, Jeremy presses his nurse call buzzer, you go to his room and he states he is feeling more dizziness and palpitations. He looks pale and sweaty and quite agitated. Moments later he becomes unconscious and you escalate the situation, calling a 'code blue', as your hospital policy states.

It was found that Jeremy has experienced ventricular tachycardia (VT), a potentially life-threatening rhythm. During the episode, his blood pressure fluctuated between 80 and 100 mmHg systolic, his respiratory rate was stable at 14 breaths/minute, his temperature was 36.4°C and his oxygen saturations fluctuated between 86% and 90% on room air, which responded well to oxygen therapy rising to between 93% and 96% on 10 L $O_2$.

1. The doctor orders amiodorone 300 mg to be given now to correct the ventricular tachycardia. This is an example of:
   a. a standing order
   b. a 'stat' (statim) order
   c. a single dose (one time) order
   d. a PRN order

2. After the VT episode, the doctor ceases the subcutaneous heparin administration and orders a heparin infusion. You

prepare the infusion by mixing heparin with a compatible intravenous fluid and affix a medication additive label to the IV bag. The use of the medication additive label adheres to which 'right' of administration?

a. Right medication
b. Right dose
c. Right patient
d. Right documentation

## Phase 3

The day after the VT episode, Jeremy's condition has stabilised. He is no longer reporting episodes of dizziness and palpitations, his blood pressure is now 113/64 mmHg, heart rate is fluctuating between 82 and 98 beats per minute, respiratory rate is 16 breaths/minute, temperature is 36.2°C and oxygen saturations are 97% on room air.

Blood tests for a PTT show the heparin infusion has reached a steady plasma concentration level. Jeremy's INR blood test is reaching target level. Given the VT episode yesterday, the medical staff decide to continue the current treatment for the next day. You are planning your nursing care based on this medical plan.

1. After setting up and commencing the IV heparin infusion, it is important to regularly monitor which of the following:
   a. Blood pressure
   b. Check patient for bruising
   c. Conscious state and GCS
   d. Pain scale

2. You are concerned about your patient's ongoing nausea after the arrhythmia episode, that vomiting might lead to further demands on the heart. You phone the treating medical officer for an antiemetic. Who is able to take a phone order?
   a. Two Registered Nurses must hear the order
   b. A Registered Nurse and an Enrolled Nurse
   c. A final year medical student and a Registered Nurse
   d. Both a and b
   e. All of the above

# Conclusion: Patient outcome

Jeremy's heparin infusion was ceased 2 days after the VT episode and oral warfarin was continued. While in hospital, Jeremy had INR blood test at 0600 hours every morning to determine the stability of these levels and the effectiveness of the warfarin dose. Each day Jeremy is in hospital, a 12-lead ECG is taken to assess the overall functioning of Jeremy's cardiac conduction and the success of the digoxin treatment.

Jeremy is discharged home after a week-long admission to hospital. He is prescribed digoxin and warfarin upon discharge to continue the stabilisation of the AF and the prevention of clot formation due to the stasis of blood flow through the atria. He is educated about this medication by the pharmacist and nursing staff prior to going home. You also spend some time talking to Jeremy and his wife and family about the VT episode he experienced and the importance of recognising symptoms and getting help quickly, should he experience it again.

A month after his discharge, Jeremy sees his GP again for follow-up treatment and assessment of his condition. The GP adds a low daily dose of atenolol to Jeremy's medication treatment of AF as his heart rate, though remaining stable with no further episodes of rapid AF, is quite high ranging from 90–100 beats per minute. Atenolol is a beta receptor antagonist, reducing the effects of noradrenaline and adrenaline at the cardiac beta 1 receptors, reducing the heart rate (Bryant & Knights, 2011).

# Discussion

Atrial fibrillation is a completely disorganised and irregular atrial rhythm, generally accompanied by an irregular ventricular rhythm (Copstead & Banasik, 2010). Due to the chaotic nature of the electrical activity in the atria, the P wave (representing a coordinated atrial depolarisation) is absent from the ECG, replaced by a continuous bumpy ECG baseline at a rate of approximately 300–500 beats/minute (Elliot et al., 2012). The ventricular response rate is determined by the state of AV node conduction (Elliot et al., 2012).

The atria quiver rather than contract due to the disorganised nature of the electrical activity in the region, leading to stasis of blood and the potential for clot formation, as explained above. This condition is a major cause of pulmonary embolism (thrombi forming in the right side of the heart) and cerebrovascular stroke (thrombi forming in the left side of the heart) (Copstead & Banasik, 2010).

This lack of atrial contraction reduces the end diastolic volume by approximately 15–20% due to the lack of the 'atrial kick', meaning the resultant stroke volume is affected and ultimately potentially reducing blood pressure. Patients with heart failure may find this effect more obvious (Copstead & Banasik, 2010).

Jeremy's case was treated with digoxin, heparin, warfarin and finally atenolol, as explained above. Other antiarrhythmic agents used for treating AF include calcium channel blockers and amiodorone (Copstead & Banasik, 2010; Bryant & Knights, 2011). If pharmacological treatment is unsuccessful surgical ablation or a permanent pacemaker may be necessary to control AF (Elliot et al., 2012). Regular and frequent monitoring of the patient's vital signs, with particular focus on blood pressure and heart rate, are paramount when administering medications of this nature due to their pro-antiarrythmic potential (Bryant & Knights, 2011). Patients admitted for this condition, especially as a first presentation, also require constant cardiac monitoring with intermittent 12-lead ECGs taken to assess both the nature of their heart rhythm and the success of any treatment.

Ongoing anticoagulant therapy for AF has traditionally consisted of warfarin or acetylsalicylic acid (ASA) (LaHaye et al., 2012). These therapies have been proven to reduce the risk of stroke related to AF by 64% (LaHaye et al., 2012). Research with positive evidence supporting new oral anticoagulant therapies has been released recently, with guidelines set to follow—LaHaye et al. (2012) is recommended further reading on this topic.

Jeremy's episode of VT was likely due to his underlying diagnosis of AF. The occurrence was within the timeframe of the digoxin reaching a plasma steady state and, hence, its optimal functioning. This illustrated the importance of monitoring medication levels and effects of any medication given.

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care Nursing*, 2nd edn. Sydney: Elsevier.

LaHaye, S., Gibbens, S., Ball, D. Day, A., Olesen, J., Skanes, A. (2012) Clinical decision aid for the selection of antithrombolitic therapy for the prevention of stroke due to atrial fibrillation. *European Heart Journal* doi: 10.1093/eurheart/ehs167.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 31.

# Case study
## Mental health 1

### Introduction: Presenting condition and symptoms

You are a mental health nurse working in the community clinic when several members of Mark's community family approach you. They request that Mark needs to be taken to town because he has complained of hearing voices and seeing things for a few weeks telling him that he is 'no good' and the community would be better off without him there. Mark is a 24-year-old Indigenous man who lives a traditional lifestyle in a rural town and has been initiated in certain ceremonies. The family states that his behaviour worsened after he was accepted into a music program but was unable to go because his guitar was recently stolen during a burglary 3 weeks ago. Yesterday, he was found trying to hang himself with a rope on the family property. The family bring Mark in to speak with you for an assessment.

1. Mark's presentation can best be described as a ...?
   a. Stressful event
   b. Behaviour issues
   c. Crisis situation
   d. Over-protected family

2. What should be the first intervention during a crisis situation?
   a. Call the police
   b. Care plan development
   c. Medication
   d. Assessment

# Phase 1

Your assessment of Mark does not identify an organic cause for the changes in his behaviour or the auditory hallucinations that Mark's family state he is experiencing. You need to interview Mark further but he is no longer answering your questions and the family are unable to provide any additional information that could help you. You have contacted Mark's community Indigenous health care worker, who is unable to visit the community to speak with Mark until Monday morning but would be able to see him tomorrow morning at the inpatient unit in the city. You ring the on-call psychiatric registrar and hand over Mark's presentation. Mark is accepted for admission tonight under an involuntary treatment order until there is time to investigate Mark's situation further. Transport is organised for Mark, and his family has chosen a cousin–brother, Roy, to accompany Mark on his journey and to stay until the morning.

1. What could be the cause of Mark's silence?
    a. Unable to develop rapport
    b. Unable to modify his behaviour
    c. Unable to understand the question
    d. Unable to speak English

2. Under what Act of Parliament are patients made involuntary?
    a. Mental Health and Community Health Act 1986
    b. Mental Health Act 1986
    c. Mental Health and Assessment Act 1986
    d. Mental Health and Community Health Act 1986

# Phase 2

The journey to the hospital by plane was uneventful and you arrive safely at the hospital. The decision is made to admit Mark to the unlocked unit because Roy had agreed to stay with him during his admission to the hospital. You hand over to the admitting nurse and she pages the on-call Indigenous health care worker and the psychiatric registrar to come to admit the patient. The on-call Indigenous health care worker agrees to meet with Mark. The Indigenous health care worker arrives; she is a young girl that Mark and Roy do not recognise. The two of them do not respond well to the Indigenous mental health care worker and do not engage well when

she interviews Mark alone. When the psychiatric registrar arrives, Mark identifies that he knows this doctor and that he has worked with the community for many years and generally seems happy to see the registrar. During the assessment Mark discloses that he occasionally has alcohol and sometimes will smoke marijuana, which can make him aggressive towards others, but he has not harmed himself or anyone else during these episodes. He also discloses that the 'voices' are usually heard when he is stressed or when he has smoked marijuana.

1. Why do you think that Mark is unresponsive to the Indigenous health care worker?
    a. Gender
    b. Time
    c. Attitude
    d. Community status

2. What new information discovered during the interview would be the most relevant to Mark's admission?
    a. Age
    b. Anti-social behaviour
    c. Substance use
    d. Alcohol use

## Phase 3

During the evening Mark received a phone call from his family. When he got off the phone he was visible distressed and started to pace up and down the hallway while Roy tried to calm him down. You notice Mark talking to himself under his breath; you approach Mark, but he does not respond to you. Roy reassures you that Mark is all right; there has just been some trouble at home with his family. You page the on-call Indigenous health care worker to come and speak with Mark and see if she can offer some assistance during this acute episode of agitation. The same Indigenous health care worker arrives and tries to speak with Mark but her arrival exacerbates the situation, causing Mark to become restless and start to pace in the day room.

1. What could be the source of Mark's agitation?
    a. Family issues
    b. Auditory hallucination

c. Being an involuntary patient
d. The Indigenous health care worker

2. What would be a traditional intervention that could be applied to the current crisis?
   a. Medical therapy
   b. Pharmacological therapy
   c. Narrative therapy
   d. Physical therapy

## Conclusion: Patient outcome

You organise for another Indigenous health care worker to attend that night, who is well received and speaks with Mark. They are able to use cultural knowledge to assess the family issue at home. Mark appears to settle down after being able to tell his story to the Indigenous health care worker in an informal interview setting allowing Roy to be in attendance. The demonstration of cultural sensitivity in this crisis allowed for appropriate interventions such as narrative therapy and allowing a family member to stay with Mark during his admission, as an intervention to support Mark through his agitated state. These interventions recognise Mark's cultural heritage and provide interventions that are appropriate for an Indigenous Australian. They represent the foundation of the development of rapport between yourself and Mark, his family and community, and will enable successful interaction with Mark in the future. The next day Mark has his appointment with Neil in the inpatient unit. They discuss Mark's suicide attempt, which Mark attributes to increasing stress, the theft of his guitar and use of marijuana. Neil feels that Mark is not suicidal but arranges for Mark to stay for a week as a voluntary patient on the condition that Roy or a suitable member of the community stays with Mark. Mark meets with Neil and members of the psychiatric staff over the week and feels better and denies further auditory hallucinations. They work to implement strategies for Mark for when he feels stress, and to stop his marijuana use. They organise for another guitar to be sourced for Mark, and have managed to find a similar music program that Mark can complete, while he waits until next year to be able to commence the original music program.

# Discussion

In Indigenous cultures the term 'health' has a different meaning from other mainstream views. Health as defined by the Indigenous community is 'not just the physical wellbeing of the individual but the social, emotional and cultural wellbeing of the community' (Eckermann et al., 2006, p. 149). Community wellbeing has a significant role to play in the mental health of Indigenous people. Cultural safe nursing practice is the practice of enabling service to be defined by those receiving the service (West et al., 2009), which is appropriate when working in Indigenous communities because it takes in the understanding that the health of the community is perceived to be more important than the health of the individual (Wood et al., 2009). The mortality rates associated with mental health and behavioural disorders due to psychoactive substances were ~12 time higher than in non-Indigenous males and ~20 times higher than in non-Indigenous females (Parker, 2010). Indigenous males are three times more likely to attempt suicide than non-Indigenous males (Parker, 2010). The leading cause of mental health admissions was drug-related with 15% of those admissions secondary to cannabis use (Thomson et al., 2012). The author is a non-Indigenous registered nurse who chose this topic due to the high prevalence of mental health issues in the Aboriginal and Torres Strait Islander communities (almost twice the rate of non-Indigenous people in 2008). The terminology used in the case study is derived from the literature used and the author acknowledges that some terminology may not agree with all members of the overall Indigenous communities.

## REFERENCES

Aderman, J., Cambell, M. (2010) Anxiety and Aboriginal and Torres Strait Islander young people. In: N. Purdie, P. Dudgeon, R. Walker, eds, *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*. Canberra: Commonwealth of Australia, pp. 105–16.

Curtis, J. (2009) Substance-related disorders and dual diagnosis. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 346–69.

Department of Health. (1986) *Mental Health Act 1986* (Vic). Online. Available: http://www.health.vic.gov.au/mentalhealth/mh-act/legislation.htm (accessed 3 July 2012).

Eckermann, A., Dowd, T., Chong, E., Nixon, L., Gray, R., Johnson, S. (2006) *Binan Goonj: Bridging Cultures in Aborignial Health*, 2nd edn. Sydney: Churchill Livingstone Elsevier.

Hunter, E. (2006) Mental health. In: N. Thomson, ed, *The Health of Indigenous Australians*. Melbourne: Oxford University Press, pp. 127–57.

Morrison, P. (2009) Crisis and loss. In: R. Elder, E. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 154–72.

New Zealand Ministry of Health. (1992) *Mental Health (Compulsory Assessment and Treatment) Act 1992*. Online. Available: http://www.legislation.govt.nz/act/public/1992/0046/latest/DLM262176.html (accessed 3 July 2012).

Parker, R. (2010) Australian Aboriginal and Torres Strait Islander mental health: An overview. In: N. Purdie, P. Dudgeon, R. Walker, eds, *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*. Canberra: Commonwealth of Australia, pp. 1–11.

Thomson, N., MacRae, A., Brankovich et al. (2012) *Overview of Australian Indigenous Health Status 2011*. Online. Available: http://www.healthinfonet.ecu.edu.au/overview_2012 (accessed 3 July 2012).

West, R., Park, T., Hakiaha, H. (2009) Indigenous mental health. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 107–18.

Wilkes, E., Gray, D., Saggers, S., Casey, W., Stearne, A. (2010) Substance misuse and mental health among Aboriginal Australians. In: N. Purdie, P. Dudgeon, R. Walker, eds, *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*. Canberra. Commonwealth of Australia, pp. 117–34.

Wood, P., Bradley, P., De Souza, R. (2009) Mental health and wellness in Australia and New Zealand. In: R. Elder, E. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 86–106.

# Case study
## Mental health 2

### Introduction: Presenting condition and symptoms

A mental health nurse working at a community and mental health centre in your local suburb sees a gentleman coming in with a 'friend' requesting to speak with someone about Michael's situation. Michael is a 34-year-old male who presents to the centre in crisis. He is a qualified plumber who works for himself but, due to a recent illness, lost his job 3 months ago. He reports being homeless now and unable to get back 'on his feet.' He had been staying with friends for the past few months but recently was asked to leave under less than favourable circumstances. He reports that he is generally fit and well and has been diagnosed with schizophrenia and had been managing his condition with medication and monthly review sessions with his mental health worker. He has no money for food, board or, more importantly, his medications, which, he alerts the mental health nurse, he has not taken in 3 weeks.

1. What is the most common age group for the onset of schizophrenia?
    a. 18–24 years
    b. 25–30 years
    c. 12–18 years
    d. 30–40 years

2. What is the aetiology of schizophrenia?
    a. Psychological
    b. Unknown aetiology
    c. Neurological
    d. Anatomical

# Phase 1

The mental health nurse agrees to meet with Michael and goes into one of the community centre's interview rooms. The mental health nurse performs a mental health assessment, which reveals that Michael has presented for management of his schizophrenia and emergency housing. He presents in quite a poor state of personal hygiene: his clothes are dirty and wrinkled; he has a back pack with all his belongings stuffed in it. The mental health nurse notices some personal odour. Michael's responses are monosyllabic and he is blunt in affect but is maintaining good eye contact and is engaging with the mental health nurse, although he appears restless and often his gaze quickly deviates and he occasionally mumbles. He has been managed at a mental health centre in the city but, due to recent financial trouble, he is unable to attend his sessions. Michael has been unable to pay for his medications, which include risperidone 5 mg, olanzapine 5 mg BD and benztropine 2 mg PRN, and is feeling the effects of missing his regular medications.

1. What type of medication is risperidone?
    a. Antidepressant
    b. Mood stabiliser
    c. Antipsychotic
    d. Sedative

2. Which is **NOT** an adverse effect of antipsychotic medication?
    a. Akathisia
    b. Dystonia
    c. Aphasia
    d. Tardive dyskinesia

# Phase 2

Michael remains blunt in affect, with poverty of speech, and appears to be having difficulty concentrating on what the mental health nurse is asking him, requiring the mental health nurse to repeat questions occasionally. Michael is orientated to place and person, but is unable to tell the mental health nurse what day it is. He appears drowsy but is able to follow the mental health nurse's directions. He is able to describe his situation and is able to inform the mental health nurse why he was brought to the clinic by a friend. He denies any alcohol

or drug use and informs the mental health nurse he has not been sleeping well because he is homeless and is often having to stay awake all night to protect himself and his possessions. The mental health nurse notices that his attention often turns towards the corner of the room but, when Michael catches the mental health nurse looking, he quickly looks away. The mental health nurse enquires if he has been hearing voices, and he replies that he has and they were saying negative comments about him and his self-worth and that food or drink that is offered by people is poisoned with formaldehyde, preventing him from eating this week. He denies that they are telling him to hurt himself or others. Physically, he states that he is fine, but agrees to be checked out at the local emergency department as long as the mental health nurse goes with him. Michael states that he is originally from interstate and that he does not have ongoing contact with family and, since losing his job, he has lost most of his close friends.

1. What is the correct term for 'hearing voices'?
    a. Visual hallucination
    b. Tactile hallucination
    c. Auditory hallucination
    d. Auxiliary hallucination

2. What is the primary effect 'hearing voices' is having on Michael's wellbeing?
    a. Affecting his ability to enjoy an activity
    b. Affecting his ability to cope
    c. Affecting his ability to work
    d. Affecting his ability to walk

# Phase 3

Michael attends the local emergency department and is seen by the emergency staff and a cubicle is organised for him. A set of vital signs are taken and a routine set of bloods have been taken, including alcohol and drug levels.

His vital signs were taken:

- T – 36.8°C
- HR – 116 beats/minute
- RR – 20 breaths/minute

- BP – 105/60 mmHg
- $SaO_2$ – 96% RA
- Pain score – 0/10
- ECG – normal sinus rhythm

Michael is commenced on intravenous fluids as he is at risk of dehydration from lack of food and fluid intake over the past week. Michael is becoming slightly restless and agitated, not wanting to stay here too long due to the radiation from the nearby TV towers. The mental health nurse is able to use cognitive behavioural therapy, such as reorientation to the current purpose of the visit, to intervene and prevent further delusional thoughts. The emergency team organise for someone from the emergency crisis and assessment team to be present so that they can do a risk assessment of Michael and support the mental health nurse's decision to have Michael admitted as a crisis intervention and for ongoing medical and psychiatric management.

1. What is the purpose of a risk assessment?
    a. To identify relevant past histories
    b. To identify risks of harm to self and others
    c. To classify risk factors
    d. To classify past history risk

2. What is crisis intervention management?
    a. Preventing a crisis from occurring
    b. Preventing violence from occurring
    c. Supporting a violent person
    d. Supporting an overwhelmed person

## Conclusion: Patient outcome

Michael is assessed as being low risk for harming himself or others and is suitable for an admission to the inpatient psychiatric unit for further monitoring and treatments. Michael's blood tests come back normal and free from alcohol or any illicit drugs. He is recommenced slowly on his medication to prevent any adverse effects from the medication and begins regular counselling sessions with the hospital's mental health team. After a few weeks Michael is responding well to the medication regimen and counselling sessions. He appears engaged and emotive when he interacts with staff and other clients

at the inpatient psychiatric unit. He no longer reports hearing voices, he is now feeling positive about himself and his attributes include how he can contribute to society. With the help of the hospital social worker they have located supportive accommodation for Michael to be discharged to, to support his ongoing psychosocial rehabilitation and his personal aim, which is to return to work as a plumber and to get back to where he was in life. Michael continues to progress well and, after a 6-week admission, he is discharged from the hospital to his new home at the supportive accommodation. He has his follow-up appointment made at the community and mental health centre because it is within walking distance of his new home and can be accessed easily by Michael should he feel the need for additional support.

## Discussion

Schizophrenia is the name used to cluster a number of disorders such as paranoid, disorganised, catatonic, residual and undifferentiated schizophrenia (Bardwell & Taylor, 2009). It can be a severe and debilitating illness and it affects 1 in 100 people. It is often diagnosed early during the patient's late teens to early twenties and can lead to major alterations in the person's behaviour, perceptions, moods, thought processes and their ability to function socially with friends or at work with colleagues (Bardwell & Taylor, 2009). Despite the prevalence of schizophrenia in our society, it remains misunderstood. Today's society often makes erroneous associations with other disorders such as 'split personality' or 'multiple personality', leading to feelings of mistrust, fear or discrimination from the community (Bardwell & Taylor, 2009). Local media further contributes to the stigma that all people diagnosed with schizophrenia are violent and dangerous by over-emphasising these behaviours, which further compounds the difficulties faced by these individuals to be accepted in today's society (Bardwell & Taylor, 2009). There are many effective treatments for schizophrenia, which include pharmacological and non-pharmacological treatments. Today's medications include typical and atypical antipsychotic medications that enable a larger proportion of individuals diagnosed with schizophrenia to be able to manage their illness (Bardwell & Taylor, 2009). The use of cognitive behavioural therapies provides a non-pharmacological option to individuals allowing them to learn about the illness and how they can best manage its effects as they go about their daily lives (Bardwell & Taylor, 2009). Nurses play a pivotal role in the return to pre-crisis state of someone experiencing a crisis situation that has been exacerbated

by the effects of their illness and ultimately in assisting them to achieve a pre-crisis level of wellness (Bardwell & Taylor, 2009). The information gathered by nurses during their assessment includes subjective and objective data that, when combined, are used to successfully plan and implement care that is designed to meet the individual needs of the individual with schizophrenia so that they can maintain their safety and the safety of others and can interpret reality (Bardwell & Taylor, 2009)

## REFERENCES

Bardwell, M., Taylor, R. (2009) Schizophrenic disorders. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 248–66.

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Mosby Elsevier.

Morrison, P. (2009) Crisis and loss. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 154–72.

Palmer, C. (2009) Therapeutic interventions. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 429–56.

Usher, K., Foster, K., Luck, L. (2009) Psychopharmacology. In: R. Elder, K. Evans, D. Nizette, eds, *Psychiatric and Mental Health Nursing*, 2nd edn. Sydney: Mosby Elsevier, pp. 457–72.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 45.

# Case study
## Oxygenation 1

## Introduction: Presenting condition and symptoms

Steve is a 32-year-old man who presents to the emergency department with shortness of breath that he states has developed over the past 2 days. He has been feeling a bit dizzy this morning and thought he should see a doctor as he developed what he describes as very mild chest pain, mostly on inspiration, this morning. He also reports his calves are sore and a little swollen. He initially called a medical advice line who suggested he attend the emergency department rather than his general practitioner (GP) clinic. From your observations, it is clear Steve is using accessory muscles to breathe in and he reports that he has been using a lot of extra effort.

Steve's only past history involves sporting injuries. He is not taking any regular medication. He travelled to Thailand on an end-of-season trip with his football team, returning the day before the symptoms appeared.

As the nurse in the emergency department, you conduct a full assessment of Steve. His vital signs are currently:

- BP – 104/74 mmHg
- HR – 105 beats/minute
- RR – 28 breaths/minute
- T – 37.2°C
- $SpO_2$ – 91% with no supplemental oxygen

You apply a simple face mask with 10 L $O_2$ as supplemental oxygen in response to the low $SpO_2$. As Steve has chest pain and is tachycardic, you perform an electrocardiogram (ECG), which shows normal sinus

rhythm and a prominent S wave in lead I and a Q wave and inverted T wave in lead III (S1Q3T3 pattern). Blood tests are taken for urea and electrolytes, full blood examination, cardiac enzymes and d-dimer. A chest X-ray has been arranged.

In these initial stages of Steve's presentation to hospital, it is strongly suspected that he has a pulmonary embolism, given his recent history of a long flight, but he is being investigated for other causes of his chest pain including acute coronary syndrome and respiratory infection.

1. Oxygen moves from the alveoli into the pulmonary capillaries by process of:
   a. Osmosis
   b. Diffusion
   c. Bulk flow
   d. All of the above

2. Which structure of the cardiopulmonary system pumps blood into the pulmonary circulation?
   a. The right ventricle
   b. The pulmonary vein
   c. The left ventricle
   d. The vena cava

# Phase 1

Steve's chest X-ray shows good air entry and lung expansion, with some congestion around the pulmonary hilum. There are small scattered opaque marks throughout the lung fields. He reports he is finding it easier to breathe with the supplemental oxygen applied.

The medical staff have ordered glyceryl trinitrate (GTN) for the chest pain, which was given 10 minutes ago. Steve reports it still hurts to breathe in as much as it did before. The blood test results show normal ranges of cardiac enzymes and a raised d-dimer.

Steve has become hypotensive since his arrival in emergency one hour ago. His current vital signs are:

- BP – 95/72 mmHg
- HR – 110 beats/minute

- RR – 28 breaths/minute
- T – 37.1°C
- $SpO_2$ – 93% with 10 L $O_2$ via simple face mask

It is now determined that Steve most likely has pulmonary embolism secondary to deep vein thrombosis contracted during his long flight yesterday. He is showing the manifestations of the early stages of obstructive shock resulting from the PE.

1. Cardiac output is determined by which of the following?
   a. Heart rate and stroke volume
   b. Heart rate and blood pressure
   c. Blood pressure and peripheral vascular resistance
   d. Preload and afterload

2. Factors affecting stroke volume are:
   a. Preload, afterload and contractility
   b. Preload, afterload and blood pressure
   c. The sinoatrial node, end diastolic volume and afterload
   d. Blood pressure, preload and end diastolic volume

# Phase 2

Steve's chest X-ray indicates several PEs are present and the clinical features of dyspnoea and hypotension motivate medical staff to actively treat the condition. Steve is given a bolus dose of heparin and a continuous infusion is prepared. Steve is placed on continuous ECG and $SpO_2$ monitoring as he remains in persistent chest pain and his 12-lead ECG showed the S1Q3T3 pattern. Further blood tests are taken for arterial blood gas (ABG) analysis to determine the extent of Steve's hypoperfusion and potential lactic acidosis.

Steve's current vital signs are:

- BP – 94/72 mmHg
- HR – 112 beats/minute
- RR – 28 breaths/minute
- T – 37.0°C
- $SpO_2$ – 93% with 10 L $O_2$ via simple face mask

The decision is made to monitor Steve's haemodynamic status and treat the PEs with the current anticoagulant therapy before

determining the need for thrombolytics. Steve is admitted to a high dependency bed in the hospital.

1. A pulmonary embolism is likely to cause which of the following complications?
   a. Stroke
   b. Acute myocardial infarction
   c. Hypotension
   d. Deep vein thrombosis

2. Which of the following does the electrocardiogram show?
   a. The mechanical function of the heart
   b. The electrical activity in the body
   c. The neurological input into the cardiac system
   d. The electrical activity of the cardiac conduction

## Phase 3

Steve has been on the heparin infusion for the past 24 hours and has remained haemodynamically stable with his blood pressure elevating slowly. Treating medical staff have decided against the use of thrombolytic medication, given his haemodynamic stability and the results of the ABG showing he is not in a metabolic acidosis as a result of hypoperfusion. Another chest X-ray has been ordered to determine the extent of the PEs after the anticoagulant therapy.

Steve's oxygen saturation levels remain low and, though his dyspnoea is improving, he is still using accessory muscles to take normal-sized breaths and he reports breathing in still hurts, though not as much as when he arrived. Supplemental oxygen therapy and continuous $SpO_2$ monitoring continues.

His current vital signs are:

- BP – 106/82 mmHg
- HR – 96 beats/minute
- RR – 26 breaths/minute
- T – 36.8°C
- $SpO_2$ – 94% with 10 L $O_2$ via simple face mask

1. What is the most appropriate delivery method for Steve's supplemental oxygen?
    a. Nasal cannula
    b. Venturi mask
    c. Simple face mask/Hudson mask
    d. Endotracheal intubation

2. Supplemental oxygen is being used for Steve for which of the following reasons?
    a. Steve is using his accessory muscles
    b. Steve's ventilation is low due to the pulmonary embolism
    c. Steve's perfusion is low due to the pulmonary embolism
    d. All of the above
    e. Both b and c

## Conclusion: Patient outcome

Steve's chest X-ray showed improvement from the first, with smaller and fewer opaque spots present, indicating the anticoagulant therapy was successful. His dyspnoea began improving after 3 days of treatment with the heparin infusion. The decision was made to cease the infusion at this point in time and continue with subcutaneous administration of heparin as the PEs were resolving.

After 48 hours of treatment, when it was determined Steve was haemodynamically stable, an ultrasound was completed on both Steve's legs as deep vein thrombosis (DVT) was the suspected cause of Steve's PEs. This showed evidence of the presence of DVT that was now resolving, further demonstrating the success of the heparin therapy. Steve was referred to a physiotherapist who gave him some education as well as simple exercises he could do to avoid the recurrence of DVT and subsequent venous thromboembolism resulting in PE in the future.

Steve was also commenced on warfarin while in hospital and discharged home with a prescription for this anticoagulant as he had been assessed as being at risk of further VTE complications. Education on warfarin was given by the discharging nurse as well as the hospital pharmacist. Education was also given to Steve regarding the cause of his DVT and how to reduce the risk for them in the future.

# Discussion

PE is generally the result of the formation of a deep vein thrombosis (DVT), part of a disease process called venous thromboembolism (VTE) (Elliot et al., 2012). Factors contributing to the development of VTE include fractures of long bones, pelvis or spine, close head injury, vessel wall injury, hypercoagulability of the blood and, in the case of Steve, venous stasis (Elliot et al., 2012). Acute pulmonary embolism (PE) presents a major treatment dilemma in emergency departments throughout the world. Approximately 15–21% of patients presenting with pleuritic chest pain to emergency departments are diagnosed with PE (Harris & Meek, 2005; Todd & Tapson, 2009). Clinical consequences resulting from PE range from having little significance to catastrophic, sudden death (Elliot et al., 2012).

Diagnosis of PE can be made from a range of assessment data including the most common presentation of dyspnoea and pleuritic chest pain (Elliot et al., 2012). Tachypnoea, fever, haemoptysis, tachycardia and right ventricular dysfunction may also be present (Elliot et al., 2012). An ultrasound can detect DVT; pathology tests for elevated d-dimer levels, ventilation-perfusion (VQ) scans and computed tomographic pulmonary angiograms (CTPA) can also assist in confirming the diagnosis (Elliot et al., 2012).

Electrocardiography (ECG) is also a useful tool in determining the impact of PE on cardiac function. A prominent S wave in lead I, Q wave and inverted T wave in lead II, known as a S1Q3T3 pattern, on an ECG is a sign of acute cor pulmonale or an acute pressure and volume overload on the right ventricle secondary to an obstruction in pulmonary circulation, such as that caused by a pulmonary embolism (Levis, 2011). Up to 25% of patients presenting with pulmonary embolism will show the S1Q3T3 pattern on an ECG, though diagnosis should be made in conjunction with other clinical signs and symptoms rather than from the ECG alone, as any cause of cor pulmonale can result in the S1Q3T3 pattern (Levis, 2011). Steve's shortness of breath, sore, swollen calves and recent long-haul aeroplane flight together with the S1Q3T3 pattern on his ECG led doctors to suspect pulmonary embolism.

## REFERENCES

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care Nursing*, 2nd edn. Sydney: Elsevier.

Guy, D. (2006) *Pocket Guide to ECGs*, 2nd edn. Sydney: McGraw-Hill.

Harris, T., Meek, S. (2005) When should we thrombolyse patients with pulmonary embolism? *Emergency Medicine Journal* 22(11):766–71.

Levis, J. (2011) ECG diagnosis: Pulmonary embolism. *The Permanente Journal* 15(4):75.

Patton, K., Thibodeau, G. (2012) *Anatomy and Physiology*, 8th edn. Sydney: Elsevier.

Todd, J., Tapson, V. (2009) Thrombolytic therapy for acute pulmonary embolism. *Chest* 135(5):1321–9.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 6, 27, 40.

# Case study
## Oxygenation 2

## Introduction: Presenting condition and symptoms

Glenda is a 59-year-old woman who has presented to the emergency department (ED) with squeezing chest pain. She states it started about an hour ago when she was gardening and got better when she went inside to sit down. She said it came back when she was doing some simple cleaning in the house and, when it didn't get better, she called an ambulance. The paramedics treated her with aspirin, glyceryl trinitrate (GTN), morphine and applied a simple face mask with 10 L $O_2$.

She now describes the pain as 2 out of 10; it started on the left side of her chest and is radiating across to the right, up to her neck and down her right arm. Glenda appears distressed, pale and sweaty. Her vital signs on arrival are:

- BP – 94/54 mmHg
- HR – 115 beats/minute
- RR – 26 breaths/minute
- T – 36.2°C
- $SpO_2$ – 96% with no supplemental oxygen

Glenda is taken directly to a resuscitation bay and placed on a continuous ECG monitor while medical staff make their assessment and treatment begins. You complete a 12-lead ECG, which shows ST segment elevation and T wave inversion in leads V1, V2, V3 and V4. Acute myocardial infarction is suspected and you are directed to take blood tests for cardiac enzymes.

Glenda has a past history of angina, hypertension, hypercholesterolaemia, type 2 diabetes mellitus (T2DM) and had an acute myocardial infarction 12 months ago.

Glenda's husband has attended the ED with her and her three adult children, who are not living at home, have been notified by him. Glenda and her husband live at home and do not receive any help with activities of daily living. Apart from a small amount of gardening she does once per week, she does not exercise. She is 160 cm tall and weighs 87 kg.

Her current medications are perindopril and simvastatin, which her husband says she remembers to take about every second day.

1. Why is Glenda tachycardic?
    a. Sympathetic nervous system involvement
    b. Glenda's blood pressure is low
    c. There is an increased myocardial oxygen demand
    d. All of the above
    e. Both a and b

2. Which of the following explains Glenda's hypotension?
    a. Decreased pulmonary perfusion
    b. Decreased stroke volume
    c. Increased heart rate
    d. Increased afterload

# Phase 1

Results of the blood tests, received 30 minutes later, show elevated levels of troponin, confirming the diagnosis of AMI. You take another ECG, which also shows the same changes as the ECG done on arrival, determining this is an anterior AMI affecting predominantly the left ventricle. Glenda has developed dyspnoea and is coughing up frothy sputum; she remains hypotensive. Her current vital signs are:

- BP – 92/62 mmHg
- HR – 109 beats/minute
- RR – 30 breaths/minute
- T – 37.2°C
- $SpO_2$ – 89% with 10 L $O_2$ via simple face mask

Continuous positive airway pressure (CPAP) is commenced on Glenda to treat the dyspnoea.

1. Recalling normal blood flow through the heart, an infarct to the left ventricle would cause which of the following?
   a. Right ventricular failure
   b. Congestion of blood flow in the systemic circulation
   c. Congestion of blood flow in the pulmonary circulation
   d. Decreased afterload

2. Which of the following explains Glenda's decreased $SpO_2$?
   a. Decreased pulmonary ventilation
   b. Decreased pulmonary perfusion
   c. Increased use of accessory muscles
   d. All of the above
   e. Both a and b

# Phase 2

Preparations are made for Glenda to be transferred for an angioplasty and possible stenting to the affected vessel, when it is identified. While waiting for transport to the catheter laboratory, you ensure continuous ECG monitoring is in place and take repeats of the ECG at 30-minute intervals. Blood tests for repeat troponin levels are arranged at 6-hourly intervals to determine if the troponin levels are still rising.

Glenda is responding well to the CPAP treatment, though she is still hypotensive. Her current vital signs are:

- BP – 93/60 mmHg
- HR – 107 beats/minute
- RR – 26 breaths/minute
- T – 37.2°C
- $SpO_2$ – 91% with 10 L $O_2$ via simple face mask

She reports that she is now pain-free, though her lungs feel quite congested and she is coughing a lot, still producing a small amount of frothy sputum.

1. Repeat 12-lead ECGs are taken along with continuous ECG monitoring for which of the following reasons?
    a. To monitor the progression of the infarct during Glenda's admission
    b. To see the overall functioning of the cardiac conduction system
    c. To determine the success of the prescribed treatment
    d. All of the above
    e. Both b and c

2. Which of the coronary arteries is likely to contain the thrombosis?
    a. Left anterior descending
    b. Right coronary artery
    c. Circumflex artery
    d. Left coronary artery

## Phase 3

Glenda spends a week in hospital after the angioplasty and stent to her left anterior descending artery. Her BP increased over the first 2 days of her admission and stabilised thereafter. Her regular antihypertensive medication, perindopril, was withheld during her stay and she has been directed to attend her general practitioner (GP) for a follow-up appointment in one week to reassess her medication.

Prior to her discharge, the medical staff and the nurse unit manager arrange some time to educate Glenda on why she has experienced an AMI and how she could prevent this happening to her in the future.

1. Which of the following modifiable risk factors has been identified for Glenda?
    a. Hypertension
    b. A raised body mass index (BMI)
    c. Sedentary lifestyle
    d. All of the above

2. Which of the following should be included in Glenda's patient education prior to discharge?
    a. Modifiable risk factors for cardiovascular disease
    b. Importance of regular blood pressure and lipid monitoring
    c. Management strategies including diet and exercise
    d. All of the above

## Conclusion: Patient outcome

Glenda was educated about the contributing factors to her AMI and what risk factors she had, such as her hypertension, cholesterol, her weight and BMI and the amount of exercise she does. Along with the hospital pharmacist, you help Glenda to make plans for her to remember to take her medications every day. You arrange for the nutritionist to visit Glenda to discuss some healthy eating plans to lower her cholesterol levels and reduce her weight and BMI to more healthy levels for her. You also help Glenda make a realistic exercise plan.

At her follow-up visit, the GP assesses Glenda and determines she is making good progress in her recovery. Her BP has remained stable and is now within normal ranges at 132/74 mmHg, though still low given Glenda's history of hypertension. The GP decides to continue to withhold the perindopril while she makes her recovery.

After 3 months, Glenda is still doing well. She reports that she still occasionally forgets to take her simvastatin, but is remembering most days. Supported by her husband, she has begun to eat a more healthy diet and her cholesterol levels are showing some improvement. While she is unable to do a lot of exercise during her recovery, her husband bought her an exercise bike, which she states she tries to use for at least 10 minutes of gentle exercise every day.

Over the next 10 years Glenda had been feeling relatively OK, complying with her medication regimen and practising a healthier lifestyle. In the past few months, she noticed that walking was taking a lot more effort, her legs were slightly swollen and she was needing to sleep with more pillows. Her GP identified these as symptoms of congestive heart failure, a common sequela to multiple AMIs. She was commenced on a diuretic and ACE-inhibitor as standard treatment for this condition.

# Discussion

Acute myocardial infarction (AMI) refers to the death of heart muscle due to the prolonged or total disruption of blood flow to the myocardium resulting in irreversible cellular death (Copstead & Banasik, 2010). Current research evidence suggests the most common cause for myocardial infarction is thrombus formation due to the presence of ischaemic heart disease (IHD), predominantly due to atherosclerotic plaques in the coronary arteries (Dima et al., 2008; Goldstein, 2002). Other causes are vasospasm and haemorrhage of a coronary artery (Copstead & Banasik, 2010). Glenda had suffered an anterior AMI, indicating that the blockage was most likely in the left anterior descending coronary artery, supplying much of the left ventricle (Guy, 2006).

Atherosclerosis is caused by an inflammatory response to injury in the coronary arteries, resulting in fatty deposits and plaque formation and subsequent stenosis of the vessel (Copstead & Banasik, 2010). The initial injury is caused by several risk factors, including hypertension, hyperlipidaemia and T2DM present in Glenda's past history (Dima et al., 2008). Hypertension puts pressure on the endothelial wall of the artery; hyperlipidaemia and complications from poorly controlled T2DM cause endothelial injury, which also increases fatty deposits during the plaque formation (Copstead & Banasik, 2010; Patton & Thibodeau, 2012).

The majority of heart failure cases are associated with ischaemic cardiomyopathy due to coronary artery disease and hypertension (Copstead & Banasik, 2010). Heart failure develops from impaired ability of myocardial fibres to contract or relax, as is seen with the presence of scar tissue from a resolved AMI (Copstead & Banasik, 2010).

The overall mortality rate from heart failure is high, with approximately 50% of patients dying within 5 years of diagnosis (Copstead & Banasik, 2010). As IHD and related coronary syndromes, such as AMI, are responsible for approximately 7 million deaths per year, prevention and management strategies are a priority for public health policy (Dima et al., 2008).

## REFERENCES

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Dima, C., Pershad, A., Desser, K. (2008) Right ventricular infarction. *Emedicine*. Online. Available: http://emedicine.medscape.com/article/157961-overview (accessed 8 September 2012).

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Guy, D. (2006) *Pocket Guide to ECGs*, 2nd edn. Sydney: McGraw-Hill.

Patton, K., Thibodeau, G. (2012) *Anatomy and Physiology*, 8th edn. Sydney: Elsevier.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 36, 40.

# Case study
## Pain management 1

### Introduction: Presenting condition and symptoms

Donna is a 56-year-old woman with a history of osteoarthritis of the left hip for the past 5 years. She has treated her pain with over-the-counter medications including paracetamol, ibuprofen and topical creams. She is a registered nurse, but is not currently practising clinically. She is having difficulty walking and performing a normal range of motion of that hip, which is preventing her from working and sitting for long periods of time. She has spoken with an orthopaedic surgeon who has advised her that she will need to have a total left hip replacement and, without it, she would eventually be unable to walk. She agreed to the surgery and was admitted through a day patient clinic the following week for the surgery. It is 1830 hours, Donna's surgery went well and she is admitted to the ward under your care. She has a drug chart and has no known allergies.

1. What are the three types of pain?
    a. Acute, chronic, visceral pain
    b. Acute, chronic, somatic pain
    c. Acute, chronic, cancer pain
    d. Acute, chronic, continuous pain

2. When should you complete your initial pain assessment?
    a. Before you complete your vital signs
    b. After you complete your vital signs
    c. While you are completing your vital signs
    d. You do not need to complete vital signs

# Phase 1

Donna is transferred to her ward bed. She is slightly drowsy but easily roused when you speak with her. You have completed your primary assessment and complete a set of vital signs for Donna. Her vital signs are:

- T – 37.1°C
- HR –106 beats/minute
- RR –14 breaths/minute
- BP – 175/60 mmHg
- $SpO_2$ – 100% on 10 L $O_2$
- Pain score – Yes (see below)

Donna identifies that she is in pain during your assessment of her. She identifies that she has severe pain at the surgical site and the pain radiates into the groin. She describes the pain as different from her previous pain; it is sharp, stinging pain that increases if her leg is knocked or moved. You ask her to rate her pain using the Numerical Pain Intensity Scale (0 = no pain, to 10 = worst pain possible), to which she responds 8/10 on lying and 10/10 on movement.

1. What is the purpose of the Numerical Pain Intensity Scale?
    a. Rates pain
    b. Quantifies pain
    c. Assesses pain
    d. Diagnoses pain

2. Which best describes the type of pain the patient is describing?
    a. Acute/cancer pain
    b. Acute/chronic/cancer pain
    c. Chronic pain
    d. Acute pain

# Phase 2

Donna becomes very agitated and anxious. You notice her facial expression changes; she is grimacing, has tears in her eyes and has her hand on the surgical site. She tells you that the pain is getting worse and that she cannot take the pain. She is becoming increasingly upset

and, every time she moves, her pain increases, causing her to cry out in pain. Donna's pain assessment has provided you with additional information about the quality of the pain she is experiencing. You immediately respond by organising pain relief. You notice that the surgeon has not charted her for a PCA pump post-surgery; you ask the nurse in charge to page the doctor. You check her drug chart to find prescribed several medications for analgesia. Her medications include: 2.5–5 mg morphine (subcutaneous/intramuscular/intravenous), 50–100 mg tramadol (intravenous), 1 g Panadeine Forte (oral)—paracetamol/codeine, 1 g paracetamol (oral) and 400 mg ibuprofen (oral).

1. Based on your assessment of Donna's pain, which medication would be the most appropriate?
    a. Panadeine Forte
    b. Paracetamol
    c. Morphine
    d. Tramadol

2. Which medication route has the slowest onset?
    a. Oral (O)
    b. Subcutaneous (S/C)
    c. Intravenous (IV)
    d. Intramuscular (IM)

## Phase 3

While the nurse in charge pages the surgeon, you organise for Donna to have some morphine drawn up for pain relief. The dose is double-checked with a second nurse and you complete the seven rights of correct medication administration. Donna informs you she has had morphine before, but that was many years ago. Donna is administered 2.5 mg morphine SC with good effect. Donna responds well and her pain begins to diminish, and she begins to settle and feel more comfortable.

You complete a set of post-morphine administration vital signs:

- T – 37.1°C
- HR – 106 beats/minute
- RR –14 breaths/minute
- BP – 125/60 mmHg

- $SpO_2$ – 100% on 2 L $O_2$
- Pain score – 3/10

Donna states that she is feeling much better and feels like she is buzzing; she denies feeling nauseous but feels warm and fuzzy. She asks you to remind her of the medication she was given; when she is told she is concerned that she could become addicted to this medication. You inform her that you gave her only a small dose and that the risk of addiction is low.

1. Why would you give the lower dose of morphine?
   a. The patient is not used to a higher dose (opioid naïve)
   b. The patient is used to a higher dose (drug dependent)
   c. The patient doesn't need the higher dose
   d. The patient didn't ask for the higher dose

2. Morphine can cause sedation, bradycardia and …?
   a. Hypothermia
   b. Hypotension
   c. Hypothyroidism
   d. Hypoglycaemia

## Conclusion: Patient outcome

Donna's pain is well controlled with the pain management that you have provided. She thanks you for your help with her pain and providing her with adequate pain relief. She tells you a story of how her mother was left in pain when she was in hospital, which had left her scared that she would not receive adequate pain relief and was one of the reasons it took her so long to have her total hip replacement.

Donna begins the process of recovery from her surgery and remains on the ward for several weeks while she recovers. Her pain level is high during the initial few days post-surgery, which you continue to manage with regular 2.5 mg morphine SC as per her drug chart. Donna's demand for strong pain relief medications starts to decrease and, by the end of the second week, you are able to keep Donna pain-free with minimal morphine injection.

The doctor changes Donna's morphine order to OxyContin 10 mg BD and 5 mg OxyNorm (oral forms of morphine), which can be used in conjunction with the medication already prescribed on Donna's

medication chart. She receives assistance from the physiotherapy department who help her to build up the strength in her 'new' hip and walk with the aid of a frame.

You provide care for Donna several times during this process and, by incorporating regular pain assessment into your care plan for Donna, are able to make sure that her pain is well-controlled, which facilitates her rehabilitation and recovery. Donna is eventually discharged from the ward but will continue to have ongoing rehabilitation therapy as an outpatient.

## Discussion

Pain is defined as an 'unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage' (Jarvis, 2008, p. 184). Pain is always subjective; awareness that 'pain' is whatever the patient says that it is is necessary for the provision of appropriate pain management (Jarvis, 2008).

There are many tools that can be used to measure the level or severity of pain that the patient is experiencing. The numeric rating scale (Jarvis, 2008) or the Numerical Pain Intensity Scale (Bryant & Knights, 2011) are tools that quantify the severity of the patient's pain, which can then inform an appropriate approach to pain management such as the World Health Organization (WHO) analgesic ladder (Eisenberg & Shifrin, 2011).

The WHO first developed the analgesic ladder in 1986 to provide a framework for the delivery of analgesia to oncology patients that limits the side effects of opioid medication. The 'ladder' is not limited to the treatment of cancer pain (Pasero et al., 2009). The analgesic ladder uses a three-tier approach to pain management: step 1 – mild pain, the use of non-opioid analgesia such as paracetamol or a non-steroidal anti-inflammatory such as ibuprofen; step 2 – moderate pain, the use of a 'weak' opioid such as paracetamol with codeine or tramadol with or without non-opioid medications (Tassinari et al., 2011); and, finally, step 3 – strong pain, the use of 'strong' opioids such as morphine or fentanyl with or without non-opioid medications (Caraceni, 2012; Eisenberg & Shifrin, 2011). The use of pain management guidelines such as the WHO analgesic ladder provides consistency and effective pain management for patients who are experiencing pain. Pain management is a fundamental human right and core fundamental responsibility of nursing (Kirk, 2011).

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Mosby Elsevier.

Caraceni, A. (2012) Modern insight in the nature and treatment of cancer pain: Focus on opioids. *European Journal of Hospital Pharmacy* 19:29–30.

Eisenberg, E., Shifrin, A. (2011) Reassessing the need for step 2 of the WHO analgesic ladder. *Journal of Pain & Palliative Care Pharmacotherapy* 25:288–90.

Ersek, M., Irving, G., Botti, M. (2008) Pain management. In: D. Brown, H. Edwards (eds), *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Mosby Elsevier, pp. 121–48.

Jarvis, C. (2008) *Physical Examination and Assessment*, 5th edn. Missouri: Saunders Elsevier.

Kirk, T. (2011) The meaning, limitations and possibilities of making palliative care a public health priority by declaring it a human right. *Public Health Ethics* 4(1):84–92.

Kotalik, J. (2012) Controlling pain and reducing misuse of opioids. *Canadian Family Physician* 58:381–5.

Mercadante, S., Porzio, G., Ferrera, P. et al. (2006) Low morphine dose in opioid-naive cancer patients with pain. *Journal of Pain and Symptom Management* 31(3):242–7.

Pasero, C., Puntillo, K., Li, D. et al. (2009) Structured approaches to pain management in the ICU. *American College of Chest Physicians* 135(6):1665–72.

Pattison, K. (2008) Opioids and the control of respiration. *British Journal of Anaesthesia* 100(6):747–58.

Tassinari, D., Drudi, F., Rosati, M., Tombesi, P., Sartori, S., Maltoni, M. (2011) The second step of the analgesic ladder and oral tramadol in the treatment of mild to moderate cancer pain: A systematic review. *Palliative Medicine* 25(5):410–23.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 41.

# Case study
# Pain management 2

## Introduction: Presenting condition and symptoms

Wendy is a 56-year-old oncology patient diagnosed with a 6-cm lump in the left breast 6 years ago. She was not given a good prognosis, but opted to undergo a radical total mastectomy of her left breast and underwent three rounds of chemotherapy. She responded well to the treatment and returned to her usual life as a wife and mother, and was able to return to work. Two years ago, she went to her local general practitioner (GP) for a pain in the leg that would not go away. He ordered her an X-ray of her leg and discovered a fracture of her left fibula. Wendy could not explain the cause of her fracture; she had not fallen or sustained any trauma to her leg. Her GP referred her back to her oncologist. Magnetic resonance imaging (MRI) was ordered and she was subsequently diagnosed with aggressive metastatic bone cancer with the original breast cancer thought to be the primary cancer. She has been admitted to the ward today for a fever, chest infection and pain management.

1. Which is an accurate definition of pain?
   a. Protective physiological mechanism
   b. Neurological physiological mechanism
   c. Subjective physiological mechanism
   d. Objective physiological mechanism

2. Name the four stages for the transmission of nociceptive pain:
   a. Transmission, perception, modulation and transduction
   b. Perception, transmission, transduction and modulation
   c. Modulation, transmission, transduction and perception
   d. Transduction, transmission, perception and modulation

# Phase 1

Wendy is able to transfer herself to her ward bed with help from her family. You help Wendy settle and begin the admission paperwork. Wendy lives with her family and has been managing her cancer pain well over the past 2 years, but in the past few months her current pain management plan has no longer provided her with adequate pain relief, which is the main reason for her admission to the ward. She is no longer able to work, and is unable to perform activities of daily living without support from her husband or carer. She has an advanced care plan and has nominated her husband to be her medical power of attorney should she not be able to make decisions about her care.

Her pain management plan includes

- 80 mg OxyContin BD (oral)
- 20 mg OxyNorm PRN (oral)
- Paracetamol QID (oral)
- Ibuprofen TDS PRN (oral)
- Additional: 1 g ceftriaxone IV and 200 mg roxithromycin (oral)—chest infection

Wendy's family inform you that it is very important that Wendy's pain is well controlled as she gets very depressed if she is unable to get out of bed or can't move around. Her oncologist has said that he has looked after Wendy for several years and is happy for her to have an additional 10–20 mg OxyNorm (oral) if the above pain management plan does not provide sufficient pain relief. You perform a set of vital signs and a pain assessment:

- T – 38.8°C
- HR – 126 beats/minjute
- RR –22 breaths/minute
- BP – 180/85 mmHg
- $SaO_2$ – 96% RA
- Pain score – 2/10

1. Pain assessment identifies the following …?
    a. Location, onset, characteristic, severity, patterns
    b. Location, object, characteristic, severity, patterns
    c. Location, onset, colour, severity, patterns
    d. Location, object, colour, severity, patterns

2. Which best describes the type of pain associated with this scenario?
    a. Acute/cancer pain
    b. Acute/chronic/cancer pain
    c. Chronic/cancer pain
    d. Acute/chronic pain

## Phase 2

You help Wendy to settle in on the ward; she is there with her husband and three children who are very supportive of Wendy. Wendy has been on the ward for 4 hours when her son approaches you and lets you know that his Mum's pain is coming back and asks you to give her something. You assess Wendy's pain and find that she is complaining of pain in her legs and back: the pain started suddenly in her back and has migrated down to her legs; the pain is sharp, severe (9/10) and eases off slightly if she lies on her side. Wendy needs urgent pain relief; her medication chart shows that she was given her morning medication before coming to hospital, which included paracetamol and ibuprofen. She is able to have an additional 10–20 mg OxyNorm (oral), which you decide to give her. 10 mg OxyNorm is checked out with another nurse and the five rights of correct administration are adhered to prior to administering the medication to Wendy. You provide Wendy with a heat pack for her back to help with the pain. After 30 minutes the pain dulls slightly, but does not go away. You inform the oncologist who is happy for you to give an additional 10 mg OxyNorm. Wendy's pain eventually subsides with the administration of the second OxyNorm tablet. She thanks you for your help, exhausted; she tells you she has had enough of this pain. You make sure that the nurse call bell is near her and let her know that you'll check in on her regularly to make sure her pain is under control. You decide that you will speak with the oncologist about having her breakthrough medication changed from an oral medication to an IM or S/C route.

1. Why would changing the route of administration benefit Wendy?
    a. IM or S/C medications are stronger
    b. IM or S/C medications have a faster onset time
    c. IM or S/C medications should be used for cancer pain
    d. IM or S/C medications are quicker to administer … you are busy

2. Which definition best describes adjuvant medication?
    a. Superior analgesic medication
    b. Inferior analgesic medication
    c. Partial analgesic medication
    d. Co-analgesic medication

# Phase 3

Wendy has been on the ward for 3 weeks and once again you have been rostered to provide care for her. You begin your shift with an assessment of Wendy:

- T – 37.8°C
- HR – 116 beats/minute
- RR – 22 breaths/minute
- BP – 180/85 mmHg
- $SaO_2$ – 90% RA
- Pain score – 4/10

She doesn't appear to be in good spirits. Her pain has not been well controlled this morning, and you discover that her recent MRI has shown that the cancer has spread through her body, invading her brain, lungs and bowel. She is concerned that her pain is not being controlled well enough and, with her new prognosis, that it is only going to get worse. She asks to speak with her oncologist. Following a conversation with Wendy, the oncologist organises a family meeting with Wendy and her family. During the family meeting, Wendy's treatment options are discussed with her and the family. Wendy and her family have asked for some time together alone to discuss how Wendy would like to proceed. You offer to page the social worker or pastoral care worker to provide psychological support for Wendy and her family while they are discussing Wendy's treatment options. Wendy thanks you for the offer and would like to speak with the pastoral care worker. Later in the shift, the oncologist approaches you and informs you that Wendy has decided that she does not want to undergo another course of chemotherapy or radiation and has asked for palliative care. He informs you that he will be ceasing all unnecessary medications and would like you to set up a PCA for Wendy with 5 mg morphine bolus for breakthrough pain. Wendy is to be made comfortable and should still receive appropriate nursing care.

1. What does PCA stand for?
    a. Patient centred analgesia
    b. Patient controlled analgesia
    c. Patient centred assessment
    d. Patient controlled assessment

2. What are the two basic principles of good analgesia in cancer pain?
    a. Regular administration and concentration of medication dose
    b. Regular administration and management of medication dose
    c. Regular administration and titration of the medication dose
    d. Regular administration and assessment of the medication dose

## Conclusion: Patient outcome

The PCA is commencing that evening and Wendy appears comfortable with her decision and her pain relief. The next time you see Wendy you are working on night shift over the weekend. It has been nearly a week since you last saw Wendy; you are handed over that Wendy's pain has been very bad lately. The nurses initially struggled to control Wendy's pain, but eventually they were successful in relieving her pain and once again she is comfortable. You find out during handover that Wendy slipped into a coma last night and has not been responsive during the day. You begin your nursing rounds and check on Wendy and provide her with appropriate mouth care, 2/24-hour pressure area checks and personal care. You monitor Wendy's respiration rate and observe facial expression to guide you with Wendy's pain relief needs. Her respirations are 10 breaths per minute and she is not grimacing or showing signs of agitation and is lying comfortably. You check the PCA with a second nurse and confirm that it has been running according to the doctor's orders and that there is sufficient volume in the infusion to last the shift. Wendy's family have started to stay overnight to spend time, so you make sure that they are comfortable and they settle in for the night. The family buzz at 0030 hours: Wendy appears restless, moving around in the bed and making slight groaning noises, and you can see her face is grimacing. You administer a 5-mg morphine bolus S/C per

the medication chart with success; you reposition her gently. Wendy settles and is comfortable as she was before. At 0445 hours, Wendy's daughter comes out of the room, visibly upset. She approaches you and informs you that Wendy has passed away.

## Discussion

Pain management is the core focus of nursing care no matter what specialty is practised. The expectation of effective pain management is a basic human right; however, in developed countries and in developing countries pain is often poorly controlled (Brennan et al., 2007; Kirk, 2011). Studies conducted in the community found that 15–25% of adults suffered from chronic pain (Brennan et al., 2007). For cancer patients up to 70% of the pain is caused by tissue damage and treatment; however, the location and psychological state of the patient are additional factors that can impact on the severity of cancer pain (Brennan et al., 2007; Ersek et al., 2008). A wider study of cancer patients found that up to 50% did not receive adequate pain relief, with a further 30% that were not prescribed the appropriate pain relief medication (Brennan et al., 2007). Strong pain relief medication such as morphine is commonly used to treat cancer pain, but common adverse effects including sedation, respiratory depression, nausea and vomiting (Ersek et al., 2008) provide a barrier to health professionals prescribing or administering opioid medication (Pattison, 2008). Regular or high-dose morphine has the ability to suppress respiratory function, leading to hypercapnia or hypoxia (Pattison, 2008); however, fatality due to opioid administration is rare (Pattison, 2008). Palliative care is a holistic approach to patient care when their condition is no longer curative (McLean Heitkemper & Ross Staats, 2008). Pain diagnosis, assessment, classification and treatment are fundamental responsibilities of nurses when providing care for a patient with advanced cancer or an incurable condition (Caraceni, 2012).

### REFERENCES

Brennan, F., Carr, D., Cousins, M. (2007) Pain management: A fundamental human right. *Anesthesia & Analgesia* 105(1):205–21.

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Mosby Elsevier.

Caraceni, A. (2012) Modern insight in the nature and treatment of cancer pain: Focus on opioids. *European Journal of Hospital Pharmacy* 19:29–30.

Ersek, M., Irving, G., Botti, M. (2008) Pain management. In: D. Brown, H. Edwards, eds, *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Mosby Elsevier, pp. 121–48.

Gärtner, R., Jensen, M., Nielsen, J., Ewertz, M., Kroman, N., Kehlet, H. (2009) Prevalence of and factors associated with persistent pain following breast cancer surgery. *Journal of the American Medical Association* 302(18):1985–1992.

Graber O'Brien, P. (2008) Substance abuse and dependency. In: D. Brown, H. Edwards, eds, *Lewis's Medical-surgical Nursing: Assessment and Management of Clincial Problems*, 2nd edn. Sydney: Mosby Elsevier, pp. 168–99.

Jarvis, C. (2008) *Physical Examination and Assessment*, 5th edn. Missouri: Saunders Elsevier.

Kirk, T. (2011) The meaning, limitations and possibilities of making palliative care a public health priority by declaring it a human right. *Public Health Ethics* 4(1):84–92.

McLean Heitkemper, M., Ross Staats, C. (2008) Palliative care. In: D. Brown, H. Edwards, eds, *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Mosby Elsevier, pp. 153–67.

Pattison, K. (2008) Opioids and the control of respiration. *British Journal of Anaesthesia* 100(6):747–58.

Weber, J., Kelley, J. (2007) *Health Assessment in Nursing*, 3rd edn. Philadelphia: Lippincott Williams & Wilkins.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapter 41.

# Case study
## Skin integrity 1

## Introduction: Presenting condition and symptoms

Penny is an 86-year-old lady who has presented to her general practitioner (GP) with a skin tear on her right shin. She states she bumped her leg on the coffee table at home 3 days ago. The wound is superficial and approximately 7 cm long and 6 cm in width on her mid shin. The skin flap is intact and covering the wound, but it is clear there has been a lot of bleeding as there is a lot of dried blood surrounding the wound. Penny says she cleaned it with some water and put some tissues over it when it happened, but hasn't touched it since.

Penny lives alone and gets help once a week with cleaning. She attends to her own activities of daily living, including hygiene, which she says she manages fine, showering approximately 4 times per week. She says she has a low appetite and 'doesn't usually eat much'.

Penny has a past history of type two diabetes mellitus (T2DM), diagnosed 40 years ago. She says she only has her blood glucose level checked when she attends her GP on a monthly basis and that it is usually high. Her other history consists of angina, hypertension, asthma and osteoporosis. Her current medications are: atorvastatin, metformin, losartan and alendronate.

1. A superficial wound penetrates the surface to which segment of the integument:
    a. Epidermis
    b. Dermis
    c. Subcutaneous
    d. Muscle

2. How would you classify this wound?
    a. Closed
    b. Open
    c. Perforating
    d. Clean

# Phase 1

The doctor sends Penny into the nurse's room at the GP practice for treatment, where you meet her and confirm the initial assessment of the wound. You also take a set of vital signs, which are:

- BP – 182/86 mmHg
- HR – 84 beats/minute
- RR – 22 breaths/minute
- T –37.4°C
- $SpO_2$ – 94% on room air.

Her BGL is 14.5 mmol/L.

You use aseptic technique to clean the skin tear and remove some of the clotted blood. You position the skin flap to approximate the edges of the wound. You finish by covering the entire wound bed with a sterile non-stick dressing and bandage.

You give Penny instructions to come back to the GP in one week for reassessment of the wound. As she is happy to care for the wound herself at home, you instruct her on how to protect the area, the importance of keeping it clean and dry and signs of infection she needs to be aware of. She demonstrates a reasonable understanding of your instructions.

1. This initial management strategy for the skin tear is an example of:
    a. Proliferation
    b. Maturation
    c. Healing by primary intention
    d. Healing by secondary intention

2. Potential for infection during your initial treatment of this wound is likely to come from which of the following sources:
    a. Patient's normal flora/opportunistic infection

b. Improper aseptic technique used in cleaning and dressing the wound
c. The patient's high blood pressure
d. The patient's history of T2DM

## Phase 2

Four days after Penny has attended the GP, she presents to the emergency department complaining of throbbing pain in her right leg at the location of the skin tear but radiating up and down the whole leg. She rates her pain as 8 out of 10.

Examination of the wound reveals inflammation in the surrounding tissue and a moderate amount of thick yellow exudate being discharged from the wound. The steri-strips are no longer present – Penny states they were hurting so she took them off the day after they were applied. The skin flap has also been torn and no longer covers the wound bed.

Penny's vital signs are taken which are:

- BP – 189/92 mmHg
- HR – 92 beats/minute
- RR – 24 breaths/minute
- T – 38.2°C
- $SpO_2$ – 95% on room air

Her BGL is 20.3 mmol/L.

Medical staff suspect her T2DM is poorly controlled and has contributed to the state of her wound. She is admitted to hospital for more active treatment of her wound, including antibiotics, and further investigation and treatment of her T2DM.

1. How might this patient's past medical history of T2DM contribute to poor healing of this skin tear?
   a. By weakening the dermal–epidermal junction
   b. By inhibiting the growth of new tissue
   c. By introducing microorganisms into the wound bed
   d. By compromising peripheral blood supply

2. Which of the following is the likely exudate from this wound bed?
    a. Serous
    b. Purulent
    c. Haemoserous
    d. Sanguinous

# Phase 3

Penny has been in hospital for a week. Her wound is being cleaned and dressed using aseptic technique every second day and she is being treated with antibiotics. Her T2DM has been monitored closely throughout her stay and her medication adjusted to better control her BGL. For the past 3 days, her BGL has ranged from 6.7 mmol/L to 10.2 mmol/L, taken before each meal. Her wound is not showing signs of improvement with current treatment thus far. She is requesting to go home and the plan is for a referral to community nurses to manage Penny at home, rather than keep her in hospital. Discharge is being planned for Penny.

Currently her vital signs are:

- BP – 172/85 mmHg
- HR – 76 beats/minute
- RR – 20 breaths/minute
- T – 36.8°C
- $SpO_2$ – 94% on room air

Her BGL is 8.4 mmol/L. She states the pain still feels the same as when she arrived in hospital, but only rates it 4 out of 10 in intensity now. Medical staff suspect the systemic infection is under control, but the presence of small amounts of purulent exudate and mild inflammation in the surrounding skin indicate the ongoing presence of localised wound infection.

1. As this initially minor wound has escalated into a chronic ulcer, this patient's quality of life will be affected. Which of the following is the patient most likely to experience?
    a. Disfigurement
    b. Chronic pain
    c. Disability
    d. All of the above

2. Which of the following is the most important element of education for this patient upon discharge to avoid future ulcers from forming?
    a. Nutrition
    b. General hygiene
    c. Measures to reduce development of wounds
    d. Control of her T2DM

## Conclusion: Patient outcome

Penny was discharged from hospital to home under the care of community nurses. She was treated for 2 weeks, with visits every second day, having dressing changes at each visit. She was also prescribed oral antibiotics, to be taken twice per day for 2 weeks, to both treat the infected wound and prevent re-infection. Penny was given education on how to test her BGL and to monitor this regularly to ensure it remains stable. A dietitian also spoke to Penny prior to discharge to ensure she was aware of an appropriate diabetic diet and an occupational therapist assessed her ability to prepare meals and take care of herself at home. She was also given education on how to prevent future skin tears and to regularly check her skin, especially extremities, to ensure prompt treatment.

Three months later, Penny attends the GP for a check-up. It is noted that the wound no longer has purulent discharge and granulating tissue has formed. Fortunately, Penny's wound did not require surgical debridement as the initial treatment was undertaken well and has prevented formation of necrotic tissue.

Penny also states that her BGL is usually less that 12 mmol/L and she is checking every Sunday afternoon. She reports that she is eating reasonably well with the odd 'special treat'. She has not experienced any more skin tears or minor cuts and abrasions.

## Discussion

A skin tear is a traumatic wound resulting in the separation of the dermal and epidermal layers of skin, usually due to shearing forces, friction or, as in Penny's case, blunt trauma (Lopez et al., 2011). Skin tears are common in the elderly population, with the most prevalent sites being the extremities, back and buttocks (Lopez et al., 2011). Skin tears are often viewed as minor or inconsequential, compared with more complex wounds; however, as seen in this case study, skin

tears are painful, can cause stress and lead to infection and form into chronic wounds, especially in the presence of comorbidities such as T2DM (Lopez et al., 2011).

T2DM is characterised by a resistance to insulin; as a result, BGL can rise and remain elevated if appropriate treatment and management are not undertaken. Persistently elevated BGLs lead to the formation of advanced glycosylation end-products (AGEs) (Copstead & Banasik, 2010). It is thought that these AGEs are responsible for the microvascular changes occurring in T2DM (Copstead & Banasik, 2010). Microvascular pathophysiology involves the thickening of capillary basement membranes and the disruption of blood flow, meaning vital oxygen and nutrients are hindered from reaching cells (Copstead & Banasik, 2010). Common complications of microvascular changes are retinopathy and nephropathy, as well as affecting the rate of wound healing (Copstead & Banasik, 2010).

The cost of treating complex wounds can be very high, illustrating the importance of primary and secondary prevention strategies. Penny was given education as a primary prevention measure to avoid future skin tears. Early identification, patient education and treatment are important secondary prevention strategies to halt progression into complex ulcers, such as the one she has experienced. When standard treatment of complex diabetic ulcers proves unsuccessful, adjuncts including topical growth factors, bioengineered skin, hyperbaric oxygen therapy and negative pressure wound therapy are part of current treatment recommendations (Dinh et al., 2011). Future treatments currently under investigation include the use of shock-wave therapy, platelet-rich plasma and laser treatment (Dinh et al., 2011). The cost of these adjunct treatments can prove quite high, further illustrating the importance of primary and secondary prevention.

Stephen-Haynes (2011) provides interesting and pertinent evidence surrounding the current practices of assessment, classification and treatment of skin tears. This author provides a practical guide to management of skin tears and is recommended as further reading on this topic (Stephen-Haynes, 2011).

## REFERENCES

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Dinh, T., Elder, S., Veves, A. (2011) Delayed wound healing in diabetes: Considering future treatments. *Diabetes Management* 1(5):509–19.

Lopez, V., Dunk, A., Cubit, K. et al. (2011) Skin tear prevention and management among patients in acute aged care and rehabilitation units in the Australian Capital Territory: A best practice implementation project. *International Journal of Evidence-Based Healthcare* 9(4):429–34.

Stephen-Haynes, C. (2011) Skin tears made easy. *Wounds International* 2(4):1–6.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 29, 30.

# Case study
## Skin integrity 2

## Introduction: Presenting condition and symptoms

Albert is a 65-year-old man who works as a farmer on a rural property one hour away from the nearest hospital. He was out on his property on a quad bike when he hit a large hole and the bike tipped over onto him. He was trapped under the bike for an hour before his son found him. It then took another 2 hours to get to the emergency department.

After an initial assessment and preliminary X-rays, it was determined Albert had a mid-shaft fracture of his right femur. His vital signs on arrival were:

- BP – 102/63 mmHg
- HR –120 beats/minute
- RR – 18 breaths/minute
- T – 36.6°C
- $SpO_2$ – 96% with no supplemental oxygen

Albert was treated with analgesia for severe pain, which he rated as 9 out of 10, localised to his proximal right leg. His right leg was immobilised in a splint and he was put in traction awaiting transport to a tertiary hospital where he would undergo an open reduction and internal fixation of the injury.

Albert has a past medical history of angina, and he sustained a broken arm 3 years ago. He has a prescription for glyceryl trinitrate tablets, which he takes when he experiences angina pain. He has a BMI of 31. Albert states he gets a good amount of exercise while on the farm, but 'doesn't eat as well as he should'. Albert lives with his wife and three adult children.

1. Which of the following pressure area risk factors does Albert have?
   a. Albert has a fractured femur
   b. Albert's BMI is 31
   c. It took over an hour for Albert to attend hospital
   d. All of the above
   e. Both a and b

2. Which of the following nursing interventions can assist in preventing pressure areas?
   a. Twice daily massage of any areas under pressure
   b. Monitoring the patient's nutrition and hydration
   c. Administering the patient's medications
   d. All of the above

# Phase 1

Albert has been treated on the ward for the past month. He has been immobilised with a plaster of Paris cast on his right leg and restricted to bed rest with a few hours sitting out of bed each day. He states he is unable to manoeuvre himself well in the bed as the cast makes movement awkward and there is still pain in the right leg, up to 6 out of 10 on movement.

Over the past month, a pressure area has been developing on Albert's sacrum. Nursing staff noticed the sacral area becoming redder over time. Approximately 2 weeks ago, the area began to bleed and it was noted the skin was broken. The area was cleaned and dressed with a simple wound dressing. Nursing staff planned to undertake pressure area care every 2 hours on Albert; however, when investigation was undertaken into the care of the patient, it was found that this was only done once or twice per shift.

The wound is now 3 cm in diameter, circular in shape and 2 mm deep, and the wound bed appears pink-red in colour with no black or yellow tissue present. The wound has a small amount of serous exudate; there is no purulent discharge. The surrounding skin is intact with no signs of inflammation.

His vital signs are:

- BP – 138/77 mmHg
- HR – 82 beats/minute

- RR – 18 breaths/minute
- T – 36.9°C
- $SpO_2$ – 97% with no supplemental oxygen

A full blood count was undertaken showing normal levels of white blood cells (WBCs); other blood tests show no elevation in other inflammatory markers.

1. When assessing Albert's pressure area, which of the following should be considered?
    a. Aetiology of the wound
    b. Patient's past medical history
    c. The length, depth and width of the wound
    d. The surrounding skin
    e. All of the above

2. How would you classify Albert's pressure area?
    a. Stage 1
    b. Stage 2
    c. Stage 3
    d. Stage 4

# Phase 2

Assessment has identified Albert's immobility as the primary cause of the pressure area. Prevention strategies, such as daily assessment and frequent pressure area care, were found lacking and this was identified as a secondary cause of the pressure area development.

His current vital signs are:

- BP – 142/76 mmHg
- HR – 86 beats/minute
- RR – 20 breaths/minute
- T – 36.9°C
- $SpO_2$ – 97% with no supplemental oxygen

A full blood count showed normal levels of WBCs.

It is determined that the goals of care for this pressure area on Albert's sacrum will be to prevent expansion of the pressure area and protect the surrounding skin, to prevent infection and to prevent

further pressure areas from developing in other vulnerable areas such as Albert's heels and scapula regions.

Pressure area care involving a rigorous schedule of turning the patient at 90-minute intervals is included in the care plan. An appropriate support surface is ordered for Albert's bed in an effort to reduce the amount of weight placed on body prominences.

Albert's wound is dressed with an appropriate dressing. The dressing promotes moist wound healing, removes excess exudate and provides an occlusive outer barrier. The importance of maintaining excellent aseptic technique when undertaking wound cleaning and dressing is also reinforced to the treating team.

1. Which of the following is achieved by providing Albert with an appropriate support surface on his bed?
    a. Reduction in body weight
    b. Reduction in pain in the pressure area
    c. Assistance in repositioning
    d. Reduction in friction and shear

2. What is the main aim of the dressing for Albert's pressure area? Select the most appropriate answer.
    a. To reduce pain
    b. To prevent expansion of the pressure area
    c. To protect from infection
    d. To encourage healing by primary intention

# Phase 3

Albert has been treated for this pressure area for one week. Current assessment of the wound shows it is still a stage 2 pressure area. This indicates current management of the patient and the wound is positive as the wound is not expanding. It is determined that this current management should continue.

His vital signs are:

- BP – 141/72 mmHg
- HR – 81 beats/minute
- RR – 16 breaths/minute
- T – 37.2°C
- $SpO_2$ – 97% with no supplemental oxygen

A full blood count was taken showing normal levels of WBCs.

Alfred's fractured femur has been X-rayed again today and is found to be healing well. Discharge is planned in 2 weeks' time. He will go home in the care of his wife and youngest daughter, who is 19 and living at home. Education is given to Alfred and his family on how to avoid pressure areas from developing, signs and symptoms to assess to identify a pressure area early and how to safely change the dressing on the current wound.

1. Albert's wound is likely to cause which of the following?
   a. Infection
   b. Dehiscence
   c. Evisceration
   d. Fistula formation

2. Which of the following health care personnel should be involved in the care of Albert's pressure area?
   a. Doctor
   b. Nutritionist
   c. Pharmacist
   d. Occupational therapist
   e. All of the above
   f. Both a and b

## Conclusion: Patient outcome

Albert spent 3 more weeks in hospital before being discharged home. The management plan developed when his stage 2 pressure ulcer was assessed continued through to his discharge. As Albert's leg healed, he stated that he was experiencing less pain when he tried to manoeuvre around the bed himself; hence, he was able to undertake some of his own pressure area care. The importance of this movement was explained to Albert and his family while he was in hospital and prior to discharge.

Albert's sacral wound at discharge had reduced to 1 cm in diameter and 1 mm in depth. It still had a red-pink base with healthy connective tissue forming around the perimeter of the wound. The surrounding tissue was a mild pink colour, with no other signs of inflammation. Albert reported mild localised pain in the region as 3 out of 10 in intensity. His vital signs on departure were:

- BP – 135/76 mmHg
- HR – 83 beats/minute
- RR – 19 breaths/minute
- T – 36.9°C
- $SpO_2$ – 97% with no supplemental oxygen

A full blood count showed normal levels of WBCs.

Albert had not developed any further pressure areas while in hospital. When he attended the outpatients' clinic a month after he was discharged from hospital, a further integumentary assessment was completed. This examination found his sacral pressure area had now healed, leaving a small scar; the area was slightly red, with no other signs of inflammation.

## Discussion

A pressure ulcer is a localised injury to the integumentary system, sometimes involving underlying tissue, as a result of prolonged pressure to the area causing ischaemia and eventual tissue breakdown (Stephen-Haynes, 2011). Pressure ulcers are a common, costly and physically debilitating occurrence in both acute and long-term care facilities (Shahin et al., 2009; Graves et al., 2005). Pressure ulcers are a source of intense and constant pain, restrict movement and ultimately affect the quality of life of the patient in addition to prolonging hospital stays and increasing the cost of their stay (Stephen-Haynes, 2011; Graves et al., 2005). This illustrates the importance of preventing pressure area development.

Multiple risk factors for pressure area development have been identified. Initial assessment of all patients for these risk factors is an important screening process in the prevention of pressure areas, a factor reflected in many health services' protocols for patient management. In addition to strategies for the prevention of pressure areas in clinical practice, it is also necessary to educate health professionals in the prevention and management of pressure areas (Stephen-Haynes, 2011). Education of health professionals ensures that they have the current evidence-based knowledge and skills to manage this issue and also builds awareness of the problem, enhancing compliance with patient management strategies.

Treatment of pressure area wounds is complex. Many individual health services have developed guidelines for dressing selection and wound care. In addition to treating the wound, a comprehensive

patient assessment should be undertaken. The management of a patient at high risk as well as those with developed pressure areas requires a multidisciplinary, team approach to achieve the best outcome for the patient (Stephen-Haynes, 2011; Shahin et al., 2009).

## REFERENCES

Crisp, J., et al., (2012) Potter and Perry's *Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Graves, N., Birrell, F., Whitby, M. (2005) Modeling the economic losses from pressure ulcers among hospitalised patients in Australia. *Wound Repair and Regeneration* 13(5):462–7.

Shahin, E., Dassen, T., Halfens, R. (2009) Incidence, prevention and treatment of pressure ulcers in intensive care patients: A longitudinal study. *International Journal of Nursing Studies* 46(4):413–21.

Stephen-Haynes, J. (2011) Wound expo: The challenges of pressure area care. *British Journal of Community Nursing* 16(3):6–12.

# Case study
# Urinary elimination 1

## Introduction: Presenting condition and symptoms

Catherine is a 30-year-old single female. She presents to the clinic nurse for abdominal pain and urinary symptoms that have progressively become worse over the past few days. Catherine is complaining of suprapubic pain, which increases on movement. Catherine is generally fit and healthy; she admits to not exercising but tries to eat healthily when she can. She has begun to notice an increase in the number of times that she needs to void and it burns when she urinates. She denies being pregnant, and states her last sexual partner was over 2 years ago. She has not noticed any discharge from her vagina. Only relevant past history: smoker, 15 per day.

Her vital signs are:

- T – 37.9°C
- HR – 75 beats/minute
- RR – 14 breaths/minute
- BP – 132/71 mmHg
- $SaO_2$ – 96% RA
- Pain score – 2/10 at rest; NB – 6/10 on urination

1. Which of these is **NOT** a problem with the urinary system?
   a. Cystitis
   b. Urethritis
   c. Trigonitis
   d. Prostatitis

2. What is the most likely cause of her pain?
    a. Pyelonephritis
    b. Urinary tract infection
    c. Pregnancy
    d. Cystitis

## Phase 1

Catherine is assessed by the clinic nurse and she informs the nurse that the abdominal pain has progressively worsened over the last day and she is having trouble sleeping because of the frequency that she needs to urinate. She also informs the nurse that she has been feeling unwell lately and believes that she may have had a temperature last night because she woke up during the night feeling hot and sweaty. The nurse informs Catherine that her temperature is elevated at the moment but her other vital signs appear within normal range. The clinic nurse assesses Catherine's abdomen and documents the follow assessment data: no scars, bruising or discolouration; no obvious signs of injury or trauma to the abdomen. Bowel sounds can be heard on auscultation in all four quadrants; the nurse palpates Catherine's abdomen, which is soft and mildly tender with normal percussive sounds. Catherine again denies being pregnant and states that she does not have a partner and is not currently sexually active. The nurse asks Catherine if she is happy to provide a urine sample, which Catherine agrees to provide.

1. Which of the following are indicators of infection on a urinalysis?
    a. pH
    b. Ketones
    c. Nitrites
    d. Glucose

2. What urine test would be appropriate, given the presenting complaint?
    a. Sodium osmolality
    b. hCG
    c. Oestrogen levels
    d. Specific gravity

# Phase 2

Catherine provides the nurse with a urine sample and notices a cloudy appearance to her urine, which she has never noticed before when she has provided other urine samples in the past. The nurse completes her assessment of Catherine and plans to send the urine sample off to the lab for further analysis. Catherine is asked to return tomorrow to get the results of her urine sample, which will probably indicate the signs of an infection in her urine. Before she leaves Catherine asks what she can do to prevent a UTI from reoccurring. The clinic nurses have a dual role, which includes both assessment and providing health information and health promotion strategies for the clinic's patients to support their recovery.

1. What strategies could be suggested to prevent the reoccurrence of a UTI?
   a. Emptying bladder and bowel regularly
   b. Cleaning the perianal area front-to-back
   c. Drinking an adequate amount of fluid
   d. All of the above

2. How much fluid should she be drinking per day if she weighs 96 kg?
   a. 2550 mL
   b. 2000 mL
   c. 2880 mL
   d. 3110 mL

# Phase 3

Catherine has an appointment for the next day to receive the results of her urine test. When she finally arrives, the nurse notices that she appears uncomfortable, flushed and is mildly perspiring. She brings Catherine in early for her appointment because she looks unwell. Catherine informs the nurse that she progressively got worse overnight and did not sleep well due to the onset of lower back pain. Catherine informs the nurse that she went straight home after her appointment; she denies any trauma or injuries and says she had the 'shakes' in bed last night.

Her vital signs are:

- T – 38.6°C
- HR – 110 beats/minute

- RR – 14 breaths/minute
- BP – 105/71 mmHg
- $SaO_2$ – 96% RA
- Pain score – 3/10; 6/10 (on urination)

The urinalysis test results are:

- Specific gravity: 1.015
- pH: 7
- Leucocytes: +++
- Nitrites: +
- Glucose: –
- Protein: +
- Bilirubin: –
- Urobilirubin: –
- Ketones: +
- Blood: ++

1. What could be the cause of her temperature?
   a. Urological instrumentation
   b. Urosepsis
   c. Nephritis
   d. Urethritis

2. What would be an appropriate treatment plan for Catherine?
   a. Antibiotics
   b. Adequate fluid intake
   c. Urinary alkaliniser
   d. All of the above

## Conclusion: Patient outcome

Catherine was treated medically by her GP for a UTI and subsequent urosepsis. The delay in medical intervention allowed the bacteria in the urinary tract to migrate up the ureter into the kidney and into the blood stream, leading to early signs of urosepsis. Catherine is treated with a 3-day course of antibacterial medication to control the spread of the infection and is compliant with increasing her fluid intake.

Previously Catherine did not drink enough water. Working in a busy coffee shop she mainly drank coffee and Coke but has changed her habits and now consumes water at work. Catherine has managed to increase her intake of water and is averaging approximately 2.5 L of water per day.

She has also introduced natural adjunct therapy into her management of her UTI. She has begun to drink cranberry juice in the mornings. Cranberry juice has an enzyme that is believed to prevent bacteria from being able to adhere to the epithelium of the bladder wall, thus preventing colonisation (Newman & Bonner, 2008).

The urinary frequency and burning ceased after completing her course of antibiotics. She aims to continue with her lifestyle changes to prevent a reoccurrence of a UTI.

## Discussion

UTIs remain the second most common bacterial disease, with a third of all women experiencing one before the age of 24 years (Newman & Bonner, 2008). Depending on the location of the infection, a UTI can be defined as upper (above the bladder) or lower (below the bladder).

Lower UTIs occur more commonly in women due to anatomical location and length of the urethra (Newman & Bonner, 2008; Pisani et al., 2009; Reid-Searl, 2010). The common cause of a UTI is the introduction of bacteria into the urethra; however, it is important to note nosocomial causes such as a catheter that account for 31% of all nosocomial infections (Newman & Bonner, 2008). It is best practice to remove a catheter within 3 days to minimise the chance for infection.

Although a UTI is seen as a common infection that affects most women, left untreated the infection is able to enter the circulation via the kidney and become systemic, resulting in urosepsis and the risk of hypovolaemic shock due to overwhelming sepsis (Newman & Bonner, 2008).

Nursing intervention begins with a focused patient history and abdominal and urinary assessment to identify the location, duration, intensity and frequency of the patient's symptoms (Schmelzer & Morcom, 2008; Weber & Kelley, 2007). The main priorities include management of presenting symptoms, such as abdominal pain, dysuria and frequency with burning, prevention of the infection progressing into an upper UTI and prevention of a reoccurrence of UTI (Newman & Bonner, 2008).

## REFERENCES

Bryant, B., Knights, K. (2011) Chapter 44: Antibacterial drugs. In: B. Bryant, K Knights, *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier Australia.

Cole, L. (2009) New discoveries on the biology and detection of human chorionic gonadotropin. *Reproductive Biology and Endocrinology* 7:8.

Newman, D., Bonner, A. (2008) Chapter 45: Nursing management: Renal and urological problems. In: D. Brown, H. Edwards, eds, *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Elsevier Australia, pp. 1242–85.

Pisani, H., Partridge, F., Taylor, C., Porter, T. (2009) Chapter 44: Urinary elimination. In: J. Crisp, C. Taylor, et al., Potter & Perry's *Fundamentals of Nursing*, 3rd edn. Sydney: Elsevier Australia, pp. 1177–224.

Reid-Searl, K. (2010) Chapter 48: Urinary elimination. In: A. Berman, S. Snyder, B. Kozier et al., *Kozier and Erb's Fundamentals of Nursing, 1st edn.* Sydney: Pearson Australia.

Tortora, G., Derrickson, B. (2006) *Principles of Anatomy and Physiology.* New Jersey: John Wiley & Sons, Inc.

# Case study
# Urinary elimination 2

## Introduction: Presenting condition and symptoms

Stephen is a 36-year-old man brought into the emergency room this morning with severe abdominal pain. He is uncomfortable, moaning and occasionally swearing due to the pain. The ambulance officer handover reveals that last night Stephen had been training in mixed martial arts (MMA) and had sustained a front kick to the lower abdomen/groin during the session. When he returned home he reported some abdominal tenderness but no other symptoms. He last voided before he went to bed at 2030 hours and has not voided this morning. He has been given 10 mg morphine by the ambulance officers but without relief. His only past history is ex-smoker 5 years ago. He describes himself as fit and healthy, attends the gym and trains in martial arts. He eats healthy meals and carries a drink bottle with him everywhere. He is married with four children and self-employed.

Vital signs on arrival:

- T – 37.5°C
- HR – 136 beats/minute
- RR – 32 breaths/minute
- BP – 191/89 mmHg
- $SaO_2$ – 98% RA
- Pain score – 10/10
- Weight – 72 kg

1. What do you think is the most likely cause for his pain?
   a. Urinary tract infection
   b. Pyelonephritis
   c. Urinary retention
   d. Perforated bowel

2. After completing your primary survey, what is your next nursing priority?
   a. Secondary survey
   b. Pain relief
   c. Abdominal assessment
   d. Tea break

## Phase 1

Stephen is taken into the emergency department to a cubicle and is seen urgently by a doctor. The primary nurse performs an assessment of Stephen's abdomen while the consulting doctor and a second nurse prepare for catheterisation. The primary nurse documents the following assessment data: no scars or obvious signs of injury to the abdomen; however, noted bruising in the suprapubic region of the abdomen. Further inspection of this region shows abdominal distension rising above the symphysis pubis; bowel sounds can be heard on auscultation in all four quadrants. Stephen is reluctant at first to allow the nurse to palpate or percuss his abdomen due to pain, but eventually allows the nurse to palpate his abdomen, which is firm to the touch. The doctor asks the second nurse to perform a bladder scan to determine if there is urine in the bladder prior to the insertion of the catheter.

1. What would be the maximum volume that the bladder can hold in an average adult?
   a. 500–1000 mL
   b. 1000–1500 mL
   c. 1500–2000 mL
   d. 2000–3000 mL

2. What is the normal urine output per hour for an adult?
   a. 30–40 mL/h
   b. 35–45 mL/h

c. 40–50 mL/h
d. 45–55 mL/h

## Phase 2

The bladder scan performed by the second nurse records a reading of >1500 mL of urine in Stephen's bladder. This new evidence confirms the diagnosis of urinary retention most likely secondary to trauma sustained last night during his MMA training. The doctor proceeds and inserts a 16 Fr indwelling catheter (IDC) under sterile conditions and attaches the IDC to a volumetric draining catheter bag so that the amount of urine can be measured. The catheter bag begins to fill immediately and Stephen begins to settle down and starts to relax; he is very apologetic for swearing when he first arrived. The doctor sends off a urinary specimen to investigate the cause of Stephen's retention. The nurse reassesses Stephen and notes that the suprapubic abdominal distension is resolving; bowel sounds can still be heard on auscultation is all four quadrants; abdomen is softer and mildly tender on palpation over the suprapubic region with normal percussive sounds across the abdomen. IDC remains in situ and is draining well.

Vital signs are:

- T – 36.3°C
- HR – 72 beats/minute
- RR – 12 breaths/minute
- BP – 110/80 mmHg
- $SaO_2$ – 98% RA
- Pain score – 0/10
- IDC – patent and draining well

The urinalysis shows the following:

- Specific gravity: 1.015
- pH: 7
- Leucocytes: –
- Nitrites: –
- Glucose: –
- Protein: +
- Bilirubin: –
- Urobilirubin: –

- Ketones: –
- Blood: +++

1. What is the most common adverse outcome from IDC insertion?
   a. Urethral trauma
   b. Infection
   c. False passage formation
   d. Non-compliance

2. When does the risk of complications increase due to a long-term IDC?
   a. Immediately
   b. < 30 days
   c. 30 days
   d. > 30 days

## Phase 3

Stephen is admitted to the short stay unit for overnight monitoring and for removal of the IDC and a trial of void in the morning. The nurses help Stephen transfer to his new bed before receiving handover from the cubicle nurse. The short-stay nurse notes bruising in the suprapubic region of the abdomen, but finds the abdominal distension completely resolved; bowel sounds can be heard on auscultation in all four quadrants and his abdomen is soft and mildly tender but Stephen reports that he is comfortable. The short-stay nurses check the IDC and make sure that it is still draining well. They inform Stephen they will be monitoring his urine output overnight with the aim of removing the IDC in the morning. The nurses will be responsible for making sure that Stephen's IDC remains patent and drains well overnight or urinary retention could reoccur. The doctor writes the following orders: observe overnight, strict fluid balance chart, IDC for hourly empties and measure, report urine output <30 mL per hour or obvious signs of retention, pain relief as required, remove catheter at 0600 hours and commence a trial of void including post void residuals after he has voided.

Morning observations:

- T – 36.3°C
- HR – 62 beats/minute

- RR – 12 breaths/minute
- BP – 110/79 mmHg
- $SaO_2$ – 98% RA
- Pain score – 0/10
- IDC – patent and draining well (urine output >30 mL/h overnight)

At 0600 hours, urine output has been >30 mL/h overnight, nil pain, nil complication. IDC removed and trial of void commenced.

1. What is a trial of void?
   a. Urinalysis
   b. Ability to urinate
   c. 24/24 hour urine collection
   d. Nosocomial infection

2. What is a post void residual (PVR)?
   a. Residual amount of urine left in the catheter after removal
   b. The difference between total fluid input and total fluid output
   c. Residual amount of urine left in the bladder after removal
   d. The difference between the 12-hourly fluid balance and the 24-hourly fluid balance

## Conclusion: Patient outcome

Stephen was monitored overnight by the nurses in the short-stay unit for any signs of urinary retention without incident. Stephen was awoken the next morning by the short-stay nurse at 0600 hours. The nurse informed Stephen that overnight his urine output has been >30 mL/h and that they would be able to remove his IDC and commence the trial of void. The IDC is removed using aseptic technique and Stephen is then allowed to settle and eventually falls back to sleep. Stephen wakes up at 0730 hours with the urge to void. The nurses assess Stephen's ability to void by measuring the amount of urine excreted into a urinary bottle (Reid-Searl, 2010). Stephen is able to pass 256 mL of urine without any pain or difficulty and the nurses perform a PVR and find 34 mL of urine remaining in his bladder. Stephen's urinary output is monitored for a few more hours

before the doctor is satisfied that the risk of urinary retention is minimal. The doctor speaks with Stephen and informs him that the most likely cause for his sudden urinary retention was trauma from the front kick to his abdomen/groin resulting in a spasm of the bladder or swelling in the urethra that caused his inability to pass urine (Newman & Bonner, 2008; Pisani et al., 2009; Reid-Searl, 2010). The doctor suggests that Stephen invest in a groin guard if he is going to participate in a contact sport, to protect his genitourinary system from further trauma and risk of permanent damage to his urinary or reproductive system. Stephen is discharged in the early afternoon into the care of his wife.

## Discussion

Urinary retention is considered a medical emergency and is characterised by the sudden inability to pass urine despite having the urge and willingness to void (Newman & Bonner, 2008; Zief & Subramonian, 2009). The rates of urinary retention vary from 0.4%–25% annually. The standard treatment for a patient presenting with urinary retention is to insert an IDC and drain the bladder of urine (Zief & Subramonian, 2009). The pressure that builds up in the bladder can lead to the urine being forced back into the kidneys, leading to hydronephrosis, kidney failure or even sepsis (National Institute of Diabetes and Digestive and Kidney Diseases, 2012). Urinary retention has a large impact on the quality of life of the patient with reoccurring retention (Zief & Subramonian, 2009). When patients have chronic urinary retention it is important that they are educated about strategies that can help prevent urinary retention. Strategies that have been shown to minimise the risk of urinary retention include: minimising the intake of large quantities of fluid within a short time frame (Newman & Bonner, 2008); warming up prior to urination (having a shower)—it is difficult to urinate when the body is cold; and avoiding large quantities of alcohol. Excessive alcohol not only leads to polyuria but can diminish the sensation to void, resulting in a urological emergency (Newman & Bonner, 2008). The intake of tea or coffee (caffeine) can be used to stimulate the patient's urge to urinate. Encouraging the patient to urinate when in the shower or bath has also been shown to prevent urinary retention; however, the nurse will need to reassure the patient and make sure they are able to clean themselves post urination (Newman & Bonner, 2008).

## REFERENCES

Jarvis, C. (2008) *Physical Examination and Assessment*, 5th edn. Missouri: Saunders Elsevier.

National Institute of Diabetes and Digestive and Kidney Diseases. (2012) *National Kidney and Urologic Diseases*. Online. Available: http://kidney.niddk.nih.gov/kudiseases/pubs/UrinaryRetention/ (accessed 10 April 2012).

Newman, D., Bonner, A. (2008) Chapter 45: Nursing management: Renal and urological problems. In: D. Brown, H. Edwards, *Lewis's Medical-surgical Nursing: Assessment and Management of Clinical Problems*, 2nd edn. Sydney: Elseiver Australia, pp. 1242–85.

Pisani, H., Partridge, F., Taylor, C., Porter, T. (2009) Chapter 44: Urinary elimination. In: J. Crisp, C. Taylor, et al., Potter and Perry *Fundamentals of Nursing*, 3rd edn. Sydney: Elsevier Australia, pp. 1177–224.

Reid-Searl, K. (2010) Chapter 48: Urinary elimination. In: A. Berman, S. Snyder, B. Kozier et al., *Fundamentals of Nursing*, 2nd edn. Sydney: Pearson Australia.

Zief, H., Subramonian, K. (2009) Alpha blockers prior to removal of a catheter for acute urinary retention in adult men. *Cochrane Database of Systematic Reviews 2009*, Issue 4. Art. No.: CD006744. DOI: 10.1002/14651858.CD006744.pub2.

# Case study
## Vital signs 1

## Introduction: Presenting condition and symptoms

Giuseppe is a 67-year-old man. He has arrived at the emergency department via ambulance after being involved in a motor vehicle incident. Giuseppe was the driver of a medium-sized sedan—he was travelling at approximately 50 km/h when his car was struck in the driver's side rear section by a vehicle travelling at approximately 50 km/h.

The paramedics report the front and curtain airbags deployed on the driver's side of the car. Giuseppe was trapped in the car for approximately 30 minutes while the ambulance arrived and the paramedics assessed him and extracted him from the vehicle.

Giuseppe reports pain in his right upper leg and right arm. He states he feels dizzy and nauseated. He states there is no pain in his neck or back, though the paramedics have applied a cervical spine collar and observed spinal precautions given the mechanism of Giuseppe's injuries.

His vital signs taken at the site of the accident by the paramedics are:

- BP – 99/54 mmHg
- HR – 105 beats/minute
- RR – 22 breaths/minute
- T – 36.5°C
- $SpO_2$ – 94% with no supplemental oxygen

Giuseppe reports he has a past medical history of type 2 diabetes mellitus (T2DM) and depression. His current medications are venlafaxine (Effexor) and metformin.

You begin your emergency department assessment and management of Giuseppe.

1. Which of the following should be included in taking the patient's history before vital sign measurement?
   a. Recent activity
   b. Medication use
   c. Previous medical history
   d. All of the above

2. Which of the following health care professionals are in the best position to analyse and interpret vital sign measurements?
   a. Nurse
   b. Doctor
   c. Physiotherapist
   d. Pharmacist

# Phase 1

Giuseppe arrived in the emergency department on an ambulance trolley and was transferred to a bed. He was still in his blood-stained clothes—they were cut from him so that a complete visual assessment could be made of Giuseppe's body.

Giuseppe is confused and you are finding it difficult to take his account of the incident. He has begun to shiver considerably and his skin is cool to touch and clammy. Giuseppe's lips are beginning to take on a bluish tinge since his arrival at the emergency department.

His initial vital signs on arrival to emergency are:

- BP – 100/52 mmHg
- HR – 90 beats/minute
- RR – 12 breaths/minute
- T – 34.3°C
- $SpO_2$ – 92% with no supplemental oxygen; increased to 96% with 10 L $O_2$ via face mask

As intravenous fluids have been ordered for this patient, you nurse initiate a fluid warmer after observing signs and symptoms of significant hypothermia. You also nurse initiate the application of a Bair Hugger device to actively warm this patient.

1. Why is it important to actively warm this patient?
   a. To maintain basal metabolic rate
   b. To improve the functioning of the hypothalamus
   c. The patient's temperature is 34.3°C
   d. To prevent diaphoresis

2. What complication may occur if hypothermia is not treated and temperature continues to decrease?
   a. Headache
   b. Dysrhythmia
   c. Hypotension
   d. Increased intracranial pressure

# Phase 2

Giuseppe's cyanosis is resolving after the commencement of active warming techniques.

X-rays have been taken of Giuseppe's limbs, revealing an incomplete closed fracture of his right humerus and a complete closed fracture of his right femur.

Further information from the paramedics reveals significant blood loss at the scene, as well as a large amount of blood on his clothes. There is also a large laceration approximately 20-cm long on the lateral aspect of his right upper leg. This was dressed with gauze and a crepe bandage by the paramedics and was significantly blood stained on arrival to the emergency department. When you removed this dressing to apply a new one, the laceration was still actively bleeding—you have applied pressure to the area and medical staff are preparing to suture the wound and potentially any affected blood vessels.

Giuseppe reports ongoing dizziness and some nausea. He remains in a mildly confused state and is becoming anxious. His current vital signs are:

- BP – 89/76 mmHg
- HR – 132 beats/minute
- RR – 32 breaths/minute
- T – 35.8°C
- $SpO_2$ – 97% with 10 L $O_2$ via face mask

1. Which of the following can explain the patient's tachycardia?
   a. Hypotension
   b. Hypothermia
   c. Hypoxia
   d. Tachypnoea

2. Which of the following pulse sites is the most appropriate to use in the initial assessment of this patient to ensure accurate heart rate measurement?
   a. Radial
   b. Brachial
   c. Dorsalis pedis
   d. Carotid

## Phase 3

Blood tests are taken for a cross match as well as urea, electrolytes and haemoglobin. Two 16-g cannulas have been placed and isotonic saline is being administered while an order for packed red blood cells (PRBC) is placed with the blood bank. An indwelling urinary catheter with a thermal probe is inserted to monitor urine output and temperature.

Giuseppe's conscious state begins to improve—he is now able to give an account of the incident without confusion, though he remains quite anxious.

His vital signs after he has received 2 litres of normal saline are now:

- BP – 102/74 mmHg
- HR – 112 beats/minute
- RR – 24 breaths/minute
- T – 35.9°C
- $SpO_2$ – 98% with 10 L $O_2$ via face mask

You have made provision to check Giuseppe's vital signs, especially his blood pressure, at 5- to 10-minute intervals in his nursing care plan while he remains hypotensive and tachycardic.

1. Which of the following is the most likely cause of the patient's hypotension?
   a. Tachycardia

b. Decreased GCS
c. Decreased afterload
d. Decreased venous return

2. Which of the following considerations should the nurse be aware of when measuring blood pressure for this patient?
   a. Cuff is too wide
   b. Cuff deflating too quickly
   c. Stethoscope pressed too firmly against the skin
   d. The arm is above the level of the heart
   e. All of the above

## Conclusion: Patient outcome

The laceration on Giuseppe's leg contained a small ruptured artery requiring suturing before the wound itself could be sutured closed—this significantly reduced further blood loss. He remained in a supine position, with his legs tilted slightly upwards, with spinal precautions being observed while in the emergency department to ensure optimal venous return, given his hypotensive state.

His right arm and right leg were splinted and immobilised—this reduced both pain and potential blood loss from the fractures. He was taken to the operating room from the emergency department for surgical open reduction and internal fixation of the fractures. He was nursed on the post-operative surgical ward in traction for his right leg to maintain alignment of the fractured femur.

With the administration of 4 litres of normal saline and initially 4 units of PRBC, Giuseppe's condition began to improve while he was in the emergency department. Postoperatively, Giuseppe's Hb was monitored daily to ensure his hypovolaemia was resolved adequately and he did not become anaemic. He remained on IV therapy to ensure adequate hydration after his blood pressure stabilised. He was also placed on a continuous electrocardiogram (ECG) monitor when being nursed on the ward until his blood pressure stabilised.

Giuseppe was able to be discharged after an 8-week hospital stay. Though his hypovolaemia had been significant, initial assessment of his condition and management had been optimal and his shocked state resolved without ongoing effects. The initial hypothermia was also corrected rapidly with good nursing interventions such that complications did not arise.

# Discussion

Hypovolaemic shock is the result of inadequate circulating volume to perfuse tissues and meet metabolic demand (Copstead & Banasik, 2010). The aetiology of hypovolaemic shock can be internal blood loss, such as internal haemorrhage, long bone fracture or leakage of fluid into interstitial spaces; or external loses, such as major external haemorrhage, burns or large diuresis (Copstead & Banasik, 2010). Giuseppe has fractures in his right humerus and femur and also has a large laceration that was actively bleeding on arrival to the emergency department. These injuries, combined with the report from the paramedics of blood at the scene of the injury, indicate large blood loss. The decreased intravascular volume results in decreased preload and, in turn, a decrease in cardiac output, manifested as hypotension, a symptom evident in this patient (Copstead & Banasik, 2010). His clinical signs and symptoms, including confusion, anxiety, hypotension, narrow pulse pressure, tachycardia and tachypnoea, indicate his blood loss could be up to 40% of his total blood volume (ACS, 2004). Clinical manifestations of hypovolaemic shock can be seen in the changes in vital signs, demonstrating the importance of accurate measurement.

There are a number of compensatory mechanisms activated in the early stages of shock to restore and maintain tissue perfusion and oxygenation. Insufficient cardiac output and a drop in blood pressure are detected by baroreceptors and the kidneys. Baroreceptors, located in the aortic arch and carotid sinus, activate the sympathetic nervous system, which triggers beta 1 receptors in the heart to elevate heart rate and alpha receptors to raise blood pressure (Copstead & Banasik, 2010). The kidneys detect a low glomerular filtration rate resulting from low blood pressure and activate the renin–angiotensin–aldosterone cascade to increase circulating volume and raise blood pressure (Copstead & Banasik, 2010). The compensatory mechanisms are seen in changes in the patient's vital signs, hence the importance of ongoing regular monitoring.

Management of shock is primarily focused on assessment and treatment of the underlying cause, in this case blood loss, and the restoration and optimisation of perfusion and oxygen therapy (Elliot et al., 2012). There is debate over the use of colloid versus crystalloid solutions in the treatment of hypovolaemia, though many studies have shown that both options are effective for initial fluid resuscitation (Finfer et al., 2004; Alderson et al., 2009; Lighthall & Pearl, 2003). Where severe blood loss has occurred, as in the case of Giuseppe, and anaemia is evident, the use of blood products is

warranted as a volume expander but also to improve oxygen carrying capacity (Elliot et al., 2012). The success of fluid resuscitation in hypovolaemic shock is reflected in the patient's vital signs, further illustrating the importance of accurate, regular monitoring.

## REFERENCES

Alderson, P., Bunn, F., Lefebvre, C., Li, W.P., Li, L., Pearson, M., Roberts, I., Schierhout, G. (2004) Human albumin solution for resuscitation and volume expansion in critically ill patients. *Cochrane Database Syst Rev* (4):CD001208.

American College of Surgeons (ACS) (2004) *American College of Surgeons: Advanced trauma life support course for physicians.* Chicago: ACS.

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Caroselli, C., Gabrieli, A., Pisani, A., Bruno, G. (2009) Hypothermia: An under-estimated risk. *Internal Emergency Medicine* 4(3):227–30.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Elliot, D., Aitken, L., Chaboyer, W. (2012) *ACCCN's Critical Care Nursing*, 2nd edn. Sydney: Elsevier.

Finfer, S., Bellomo, R., Boyce, N., French, J., Myburgh, J., Norton, R. (2004) A comparison of albumin and saline for fluid resuscitation in the intensive care unit. *New England Journal of Medicine* 350(22):2247–56.

Ireland, S., Endacott, R., Cameron, P., Fitzgerald, M., Paul, E. (2011) The incidence and significance for accidental hypothermia in major trauma: A prospective observational study. *Resuscitation* 82(3):300–6.

Lighthall, G., Pearl, R. (2003) Volume resuscitation in the critically ill: Choosing the best solution: How do crystalloid solutions compare to colloids? *Journal of Critical Illness* 18(6):252–60.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 28, 40.

# Case study
## Vital signs 2

## Introduction: Presenting condition and symptoms

Salvatore is a 48-year-old man who has been feeling feverish with a cough and generally unwell for 2 weeks. Today his wife has brought him to his general practitioner (GP) as he stated he felt much worse and was feeling quite breathless when he woke up this morning; his cough has also become productive of a green-coloured sputum. He states he had thought he had a bad cold initially, but decided to see the doctor this morning as the sputum he was coughing up was worrying him.

The GP found that Salvatore was lethargic but oriented, and auscultated coarse crackles in the right lower lobe (RLL) of his lung. He was coughing up green sputum, which the doctor took a sample of for culturing. His vital signs were:

- BP – 134/86 mmHg
- HR – 102 beats/minute
- RR – 26 breaths/minute
- T – 38.9°C
- $SpO_2$ – 92% with no supplemental oxygen

The GP gives Salvatore a prescription for oral antibiotics to commence today. He sends Salvatore for a chest X-ray as he is suspecting bacterial pneumonia.

Salvatore has a past history of Raynaud's disease, hypertension and hypercholesterolaemia. His current medications are: atorvastatin and spironolactone. He is a smoker, reporting he smokes approximately one pack per day and has done so for the past

28 years. He states he normally has an intermittent cough, sometimes productive of clear sputum.

1. Which of the following features of fever are pertinent to this patient?
   a. Increased metabolic rate
   b. Increased insensitive fluid loss
   c. Increased blood pressure
   d. All of the above

2. Which of the following interventions is/are aimed at reducing the patient's temperature?
   a. Paracetamol
   b. Blood culture collection
   c. Antibiotic administration
   d. All of the above
   e. Both a and c

# Phase 1

The results of Salvatore's further investigations confirm the presence of RLL pneumonia. The chest X-ray shows extensive infiltration of the infection throughout the RLL. When Salvatore presents back to the GP, he is noticeably more lethargic and feverish and he states his cough has been getting much worse over the past 3 days and he is not sleeping well. His current vital signs are:

- BP – 141/82 mmHg
- HR – 106 beats/minute
- RR – 30 breaths/minute, with very shallow breaths
- T – 39.2°C
- $SpO_2$ – 90% with no supplemental oxygen

The GP arranges for Salvatore to be admitted to hospital for treatment as his condition is deteriorating and he requires intravenous (IV) antibiotics and supplemental oxygen.

1. A diagnosis of RLL pneumonia is likely to cause which of the following complications?
   a. Decreased respiratory rate
   b. Decreased tidal volume

c. Increased blood pressure
d. Increased expiration time

2. Which of the following is most likely to be related to the patient's shallow, rapid breathing?
   a. Increased accessory muscle use
   b. Decreased ventilation
   c. Coarse crackles
   d. All of the above

## Phase 2

Salvatore has been admitted to hospital and is being treated on a medical ward; he has been there for 2 days. Blood culture tests were completed and, after initially commencing IV cephazolin as a broad spectrum approach to treatment, today he was commenced on IV benzylpenicillin after results of the blood culture indicate this is more effective.

Salvatore is more alert now, though he still reports being quite feverish. He states he has some mild pain in his chest—an electrocardiogram (ECG) is performed showing normal sinus rhythm and bloods taken to test cardiac enzymes show normal levels. It is determined that the pain is pleuritic in nature, related to his rapid, shallow breathing. He is given paracetamol to treat his temperature and pain.

Salvatore is perspiring and appears flushed and agitated. He still has a productive cough; a sample of the green-coloured sputum was collected for culturing. Supplemental oxygen is being given at 6 L via a simple face mask. His oxygen saturations are being continuously monitored via a pulse oximeter. His vital signs are now:

- BP – 112/62 mmHg
- HR – 109 beats/minute
- RR – 26 breaths/minute, with shallow breaths
- T – 39.0°C
- $SpO_2$ – 95% with 6 L $O_2$ via simple face mask

1. The measurement taken with a pulse oximeter gives which of the following readings?
   a. $SaO_2$

b. Capillary perfusion
c. $SpO_2$
d. $SvO_2$

2. Which of the following should be considered for this patient when using the pulse oximeter?
   a. Skin pigment
   b. Radial pulse strength
   c. Jaundice
   d. Temperature

## Phase 3

On day 3 of Salvatore's admission, you arrive for your shift and are assigned his care. The nurses from the previous shift report he has become progressively hypotensive, dizzy and flushed. He remains febrile and the chest X-ray performed that morning shows his pneumonia has not improved. Concerned at his appearance and the report from the nurses, you immediately perform a full assessment of your patient. You find he has coarse crackles to most of the right lung; he is severely hypotensive, febrile, tachypnoeic with low $SpO_2$, flushed and tachycardic. He also has intermitted episodes of rigoring. His current vital signs are:

- BP – 91/50 mmHg
- HR – 123 beats/minute
- RR – 32 breaths/minute, with very shallow breaths
- T – 40°C
- $SpO_2$ – 93% with 6 L $O_2$ via simple face mask

You notify the treating medical team who attend to review to patient, suspecting he has sepsis secondary to pneumonia. He is treated with hypertonic and isotonic IV fluid to raise his blood pressure. His supplemental oxygen is increased to 10 L via simple face mask; you are asked to prepare the continuous positive airway pressure (CPAP) machine for use if his respiratory status deteriorates further. He is given IV paracetamol and you apply ice packs to his axillae and groin to reduce his temperature.

1. Which of the following can be explained by the development of systemic infection?
   a. Tachypnoea

b. Tachycardia
c. Hyperthermia
d. All of the above

2. Which of the following of the patient's medications is likely to compound the hypotension?
   a. Spironolactone
   b. Atorvastatin
   c. Paracetamol
   d. Benzylpenicillin

## Conclusion: Patient outcome

It was determined that Salvatore had developed a sepsis and was exhibiting the symptoms of SIRS secondary to the bacterial pneumonia, most likely as he had not sought initial treatment for 2 weeks. The fluid resuscitation he received after your initiation of a medical review was sufficient to prevent Salvatore from progressing into septic shock. His blood pressure remained low, but stabilised after receiving initial rapid hypertonic and isotonic IV treatment and continuous isotonic IV therapy. His vital signs 3 hours after the medical review were:

- BP – 105/61 mmHg
- HR – 99 beats/minute
- RR – 26 breaths/minute, with shallow breaths
- T – 39.1°C
- $SpO_2$ – 95% with 10 L $O_2$ via simple face mask

IV antibiotic treatment continued for a week after this incident, during which time Salvatore's cough ceased producing green sputum. He reports that it felt like his usual intermittent cough, though he felt like he was coughing more often than normal. He had another X-ray done at this time, showing moderate improvement in his RLL pneumonia. He was no longer hypotensive and his temperature and respiratory rate were decreasing. His vital signs at this time were:

- BP – 110/72 mmHg
- HR – 91 beats/minute
- RR – 22 breaths/minute, with very shallow breaths
- T – 37.7°C
- $SpO_2$ – 95% with 6 L $O_2$ via simple face mask

After 10 days of IV antibiotic treatment, Salvatore was switched onto oral antibiotic treatment. He was discharged 2 days later, having shown no signs of deterioration. Counselling and education were given to Salvatore regarding his smoking and the development of his pneumonia to prevent a recurrence of his condition.

## Discussion

Pneumonia is an inflammatory reaction in the alveoli and interstitial tissue in the lungs, generally caused by an infective agent; in Salvatore's case, a bacterium (Copstead & Banasik, 2010). Normally, the pulmonary defence mechanisms, including cough, sneezing and mucociliary clearance, protect from microbial invasion and colonisation (Copstead & Banasik, 2010). Salvatore has contracted 'community-acquired pneumonia', distinguished from 'hospital-acquired pneumonia', which occurs when these normal pulmonary defence mechanisms are compromised (Copstead & Banasik, 2010). Salvatore's long history of heavy smoking makes him vulnerable to respiratory infection as cigarette smoke can affect many of these defence mechanisms, notably the mucociliary clearance (Herr et al., 2009).

Consolidation present in the right lower lobe of the lung, shown on the chest X-ray and heard as coarse crackles on chest auscultation, represents the blockage of the alveoli in that area. This reduced the lung volume and surface area available for gas exchange, seen in the low $SpO_2$ measurement. Reduction in circulating oxygen is further compromised for Salvatore given his history of smoking as the carbon monoxide he inhales has a higher affinity for haemoglobin than oxygen, reducing the oxygen carrying capacity of his red blood cells (Herr et al., 2009). The increased respiratory rate is in response to this in an attempt to improve oxygenation of the blood.

Salvatore's body temperature rises above 38°C in response to the infection as a physiological means of fighting infection, a non-specific defence mechanism (Patton & Thibodeau, 2012). Sepsis and the development of SIRS can also be detected from elevated temperature, as well as tachycardia, tachypnoea and hypotension (Copstead & Banasik, 2010). As Salvatore's pneumonia was reasonably severe by the time he was admitted to hospital and treated with the correct antibiotics, it progressed to this systemic infection. Without appropriate treatment, sepsis can progress to septic shock and multiple organ dysfunction syndrome (MODS), which can result in significant morbidity or death (Copstead & Banasik, 2010).

## REFERENCES

Bryant, B., Knights, K. (2011) *Pharmacology for Health Professionals*, 3rd edn. Sydney: Elsevier.

Copstead, L., Banasik, J. (2010) *Pathophysiology*, 4th edn. Sydney: Elsevier.

Crisp, J., Taylor, C. (2012) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier.

Herr, C., Beisswenger, C., Hess, C. et al. (2009) Suppression of pulmonary innate host defence in smokers. *Thorax* 64(2):144–9.

Patton, K., Thibodeau, G. (2012) *Anatomy and Physiology*, 8th edn. Sydney: Elsevier.

## FURTHER READING

Crisp, J., Douglas, C., Rebeiro, G. (2013) *Potter and Perry's Fundamentals of Nursing*, 4th edn. Sydney: Elsevier, Chapters 6, 27, 28, 40.

# Answers and rationales

## Case study
## Acute care 1

### INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

#### Question 1

Which of the following health care workers are involved in the treatment of a patient in an acute care setting?

a. Physiotherapists
b. Nurses
c. Occupational therapists
d. All of the above

**Answer:** d

**Why:** The acute care setting requires a multidisciplinary approach to patient care. Patients are admitted with complex problems requiring acute medical, surgical and nursing intervention as well as collaborative care from allied health professions to ensure the patient receives holistic care. Discharge planning can present challenges requiring referrals to allied health professionals to ensure safe and optimal function when the patient returns home.

#### Question 2

Which of the following from Jeanette's past medical history is likely to have led to her current condition?

a. Hypertension
b. Appendicectomy
c. T2DM
d. Obesity

**Answer:** b

**Why:** Following abdominal surgery, adhesions may form in the small bowel (Leung et al., 2009). Adhesions are the result of scar tissue formation and an accumulation of fibrin in the lining of the small bowel (Copstead & Banasik, 2010). This is the most likely element in Jeanette's past history to contribute to a small bowel obstruction.

## PHASE 1

### Question 1

Establishing rapport with patients anticipating surgery is important for which of the following reasons?

a. Understanding why the patient is having surgery
b. Being able to listen to and alleviate their concerns
c. Completing the pre-operative check list
d. Educating the patient about their surgery

**Answer:** b

**Why:** Patients anticipating surgery, as well as their families, can experience anxiety and fear as this experience is often associated with pain, possible disfigurement, loss of autonomy over their body and potential for death. It is important for the nurse to establish good rapport with a patient to enable them to understand their concerns and assist them to discuss and alleviate them.

### Question 2

When taking Jeanette's medication history, which of the following should be identified as having the potential for complication as Jeanette anticipates surgery?

a. Simvastatin
b. Digoxin
c. Warfarin
d. Mylanta

**Answer:** c

**Why:** Warfarin is an anticoagulant agent, depleting the vitamin K dependent clotting factors to prolong clotting time (Bryant & Knights, 2011). Patients undergoing surgery who are currently taking anticoagulant medications are at a greater risk for serious haemorrhage (Bryant & Knights, 2011). Anticoagulant medications, such as warfarin, should be discontinued at least 48 hours prior to surgery or, if possible, have their actions reversed (Bryant & Knights, 2011).

# PHASE 2

## Question 1

Which classification fits best for Jeanette's surgery?

a. Urgent surgery
b. Major surgery
c. Diagnostic surgery
d. Restorative surgery

**Answer:** a

**Why:** Urgent surgeries are necessary for the patient's health and may prevent additional problems from developing. Jeanette's condition did not spontaneously resolve and her vital signs were indicating she could be developing the early stages of hypovolaemic shock, resulting from her small bowel obstruction. The decision was made to perform surgery to remove the obstruction before her condition deteriorated.

## Question 2

Which of the following anaesthesia methods is likely to be used in Jeanette's case?

a. Epidural anaesthesia
b. General anaesthesia
c. Conscious sedation
d. Local anaesthesia

**Answer:** b

**Why:** Jeanette's operation, though using the laproscopic technique, involves the manipulation of a significant amount of abdominal tissue. General anaesthesia is the most appropriate form here as it both renders the patient immobile and ensures Jeanette is completely unconscious and pain-free for the duration the operation. This acts as a protective measure for the patient from the unpleasant events involved in the procedure.

# PHASE 3

## Question 1

Which of the following should be monitored closely in the 24 hours after Jeanette's surgery?

a. Urine output

b. Passing of flatus or faeces
c. Pain
d. All of the above

**Answer:** d

**Why:** General anaesthetic agents can cause paralysis of the bladder after use, causing urinary retention (Bryant & Knights, 2011). Urine output should be monitored and an ultrasound of the bladder should be performed if the patient fails to pass urine in the 8 hours following surgery as excess urinary retention can lead to complications including urinary tract infection, pain and pelvic floor muscle damage. As Jeanette's surgery was performed to relieve her bowel obstruction, the ability to pass flatus and/or faeces indicates the success of the procedure (Tierris et al., 2011). Pain levels should be monitored to determine both recovery from surgery and the condition of the bowel obstruction.

## Question 2

Which of the following conditions in Jeanette's past history is likely to impact on her recovery from surgery?

a. Hypertension
b. Appendicectomy
c. Angina
d. T2DM

**Answer:** d

**Why:** A common complication of T2DM is peripheral vascular disease (Copstead & Banasik, 2010). This can mean the extremities experience low blood flow, which can significantly affect healing time (Copstead & Banasik, 2010). Delayed wound healing can lead to increased potential for infection and longer hospital stay. Fluctuating blood glucose levels during surgery may cause central nervous system malfunction during anaesthesia.

# Case study
# Acute care 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of the following is considered an acute care setting?

a. Hospital ward
b. Emergency department
c. Hospital in the home
d. All of the above

**Answer:** d

**Why:** Acute care facilities treat patients for various reasons, including emergency or unplanned admission, elective surgery and review of management for a current illness or for ongoing treatment in their own home. The treatment of any acute illness or acute exacerbation of a chronic illness can occur in the hospital, emergency department or through the hospital-in-the-home service.

### Question 2

Which of the following comprises an acute illness?

a. A condition developed a year ago
b. A condition contracted 2 months ago
c. A congenital condition
d. A disease persisting for more than 3 months

**Answer:** b

**Why:** An acute illness is generally recognised to be an illness that lasts for less than 3 months. Examples include pneumonia and appendicitis. Those experiencing chronic illnesses (those lasting for 3 or more months) can experience acute exacerbations of their condition, referred to as 'acute-on-chronic', in which signs and symptoms of the disease worsen to the extent that the patient needs treatment in an acute care setting.

# PHASE 1

## Question 1

The application of the nursing process is necessary because:

a. The nurse is able to direct the doctor in treatment priorities
b. It prevents the doctor form being disturbed unnecessarily
c. The nurse can individualise strategies to ensure the patient has a successful admission
d. All of the above

**Answer:** c

**Why:** The nursing process provides a basis for the nursing management of a patient in the acute care setting. It allows the nurse to plan the care and create an individualised management strategy for each patient and ensure a smooth course from admission to discharge.

## Question 2

After gathering this assessment data on Rod, the next step in the nursing process ensures you do which of the following with the information you have?

a. Identify nursing interventions for Rod, accompanied by rationales for each
b. Evaluate the care provided to Rod up to this point
c. Cluster cues from the assessment data and form nursing diagnoses
d. Identify appropriate and realistic outcomes of care for Rod

**Answer:** c

**Why:** Using the information gathered from a comprehensive patient assessment on admission to the ward, the nurse clusters relevant cues of this data and uses them to form nursing diagnoses to guide the care plan to be individualised for each patient (Seidel et al., 2006). This involves identifying actual and potential problems the patient is/is not likely to experience during their admission.

# PHASE 2

## Question 1

Which of the following has contributed to the development of deep vein thrombosis (DVT) in Rod's right leg?

a. His past history of sporting injuries
b. Rod was performing his leg exercises twice per day
c. Rod's temperature is 35.6°C
d. All of the above

**Answer:** b

**Why:** DVT is one form of venous thromboembolism (VTE), which occurs at a frequency more than 100 times greater in hospitalised patients than in people in the community. The nature of Rod's injuries means he has been relatively immobile for a significant amount of time, leading to stasis of venous blood flow: a contributing factor in the formation of DVT (Copstead & Banasik, 2010). Prophylactic measures available include the application of compression stockings, administration of anticoagulants, compression pumps applied to the legs and leg exercises to encourage venous blood flow. These leg exercises should be performed every 2 hours while awake to promote venous return of blood and reduce the risk of clot formation. As the compression pumps were not available, these exercises become more important for Rod to increase blood flow. As he is only performing them twice per day, stasis of venous blood is more likely to occur.

## Question 2

Which of the following interventions is aimed at reducing the potential for post-operative pneumonia?

a. Deep breathing and coughing exercises
b. Leg and foot exercises
c. Elastic compression stockings
d. Administration of enoxaparin

**Answer:** a

**Why:** Coughing assists in the removal of retained mucus in the airways. By instructing Rod to breathe deeply before coughing, a more effective cough is produced and more mucus is able to be cleared. The use of bronchodilators can also assist in this process as well as the administration of adequate analgesia to prevent pain from inhibiting a deep breath (Bryant & Knights, 2011). The retention of mucus can increase the potential for microbial colonisation in the respiratory tract, leading to the development of infection (Copstead & Banasik, 2012).

# PHASE 3

## Question 1

Now that Rod's IV infusion has been ceased and he is able to be commenced on oral food and fluids, which of the following is best to encourage Rod to start with?

a. A light diet of soup and sandwiches
b. His regular diet pre-surgery
c. Water and clear fluids
d. Vitamised meals

**Answer:** c

**Why:** Once oral food and fluids can be taken by the patient, it is best to begin with water and simple clear fluids in small quantities, and then progress to larger, more substantial meals. An overload of fluids or large volume of bulky foods has a greater potential for leading to nausea and vomiting after a general anaesthetic.

## Question 2

Which of the following interventions is aimed at promoting wound healing?

a. The nurse's use of aseptic technique during dressing changes
b. Ensuring the patient receives adequate nutrition
c. Checking Rod's vital signs every 4 hours
d. All of the above.

**Answer:** d

**Why:** The skin provides a physical barrier to microbial infection; the surgical incision has created a portal for infection. By using aseptic technique, the nurse promotes wound healing by keeping the wound free of utensils and dressings carrying microbes with the potential to infect the wound. By ensuring the patient's nutritional status is adequate, the nurse can provide suitable nutrients needed for the body to repair the wound (Copstead & Banasik, 2010). Checking Rod's vital signs ensures adequate circulation, a factor that allows relevant materials to be transported to the wound site and allow the healing process to occur (Copstead & Banasik, 2010).

# Case study
# Adolescent mental health

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What is the function of a mental health assessment?

a. To identify the mental state of the client
b. To identify if there is a mental health problem
c. To identify current mental thought processes
d. To identify if the patient has a mental health history

**Answer:** b

**Why:** A mental health assessment can be used to discover multiple sources of subjective data. The primary function is to identify if the client has a mental problem or if the behaviour could be associated with other concurrent social issues or potential underlying problems (Barling, 2009). The mental health assessment will identify the problem and can be used to construct a suitable treatment plan for the patient to support their recovery during the acute phase of their mental health presentation (Barling, 2009). A mental health assessment can be completed several times during the client's recovery; an initial mental health assessment provides a baseline that can be used to evaluate the response to mental health interventions.

### Question 2

Mental health assessments occur in conjunction with …?

a. Comprehensive neurological assessment
b. Complete Glasgow Coma Scale
c. No other assessment is required
d. Complete systematic assessment

**Answer:** d

**Why:** The complete systematic review is a comprehensive assessment and evaluation of the physiological, psychological and social factors that may affect the presenting complaint of the patient (Barling, 2009). The mental health assessment is documented at the end of the systematic review and will also include client demographics and clinical history.

# PHASE 1

## Question 1

When interviewing an adolescent client, it is important NOT to …?

a. Consider your attitude
b. Communicate honestly
c. Speak in language that the client uses
d. Use ice breakers

**Answer:** c

**Why:** It is important when interviewing adolescents that you stay in character and avoid using language that is not appropriate for your age or your professional role (Jarvis, 2008). Open-honest communication should be used. At this age adolescents are highly tuned and can sense phoniness or when you are not being truthful (Jarvis, 2008). It is helpful to understand the jargon used but do not use this as a method to try and bond with your client (Jarvis, 2008).

## Question 2

In order to develop rapport, what questions could you ask?

a. Open-friendly questions
b. Closed-friendly questions
c. Direct questions
d. Indirect questions

**Answer:** a

**Why:** When interviewing an adolescent it is important to remember that they want to be adults but lack the appropriate cognitive skills to be able to process information as an adult would (Jarvis, 2008). By asking open-friendly questions about the client and not the problem, you are showing an interest in the client generally and asking questions about hobbies, friends or other activities that may be important to the client (Jarvis, 2008). Later in the interview, once rapport has been developed, you can approach topics that could emotionally charge such as home life, alcohol and drug use, sexual behaviours, depression or suicidal thoughts (Jarvis, 2008).

# PHASE 2

## Question 1

What mnemonic could assist you in performing a mental health assessment?

a. COLDSPA
b. BATOMI
c. QRST
d. IAPP

**Answer:** b

**Why:** BATOMI: Behaviour and appearance, Affect and mood, Thought and speech, Orientation, Memory and Insight and judgement.

## Question 2

What specific assessment would be appropriate?

a. Mini-Mental Examination
b. Cognitive Examination
c. Mental Status Examination
d. Mental Cognitive Examination

**Answer:** c

**Why:** The Mental Status Examination (MSE) is used in this situation to assess a client's current neurological and psychological status (Barling, 2009). The MSE is a semi-structured interview that assesses several components of a client's mental status, namely appearance and behaviour, speech, mood and affect (focusing on internal emotions that influence behaviour), form of thought (rate or number of thoughts formed, logical flow of thought processes), thought content (delusion, suicide thoughts or other), perception, sensory and cognition and client's insight (awareness of their current situation) (Barling, 2009). Mini-Mental Examinations are commonly used for assessing cognitive impairment such as dementia or head injury (Barling, 2009).

# PHASE 3

## Question 1

The presenting symptoms displayed throughout the assessment are common of what condition?

a. Suicide

b. Schizophrenia
c. Depression
d. Bipolar disorder

**Answer:** c

**Why:** Depression is a mood disorder that affects the functioning capacities of individuals, resulting in sudden disruption in activities of daily living, social interaction and enjoyment in activities that previously have given them feelings of happiness. Depression affects all age groups, sexes and cultures and can be brought about by stressful events, especially relating to feelings of identify or a recent loss. Non-acceptance is acknowledged as a risk factor of suicide in adolescents. However, suicides are rare in adolescents under the age of 15, accounting for only 2% of all suicides in most societies. This should, however, not be discounted and the nurse should be ever vigilant to identify risk factors for suicide (Nizette, 2009).

## Question 2

With this new information how can you best support Jaime?

a. Ask him to leave
b. Provide education
c. Provide support
d. Provide education and support

**Answer:** d

**Why:** A holistic approach is required to encourage clients to discuss their personal emotions, thoughts and feelings while helping them to understand what is happening and enabling them to express themselves (multiple self-schema) (Nizette, 2009). The discovery of an adolescent's identity is a stressful event. Adolescents initially model themselves on someone that they admire, usually a parent, relative or close friend of the family. During the teenage years this stress level is augmented as they form cliques, wear the same clothes and develop the same interests. This is further complicated during puberty by feelings of attraction; the development of a personal identity is especially important during adolescence. The ability to integrate feelings and needs leads to positive experiences and they learn to develop intimate relationships (Jarvis, 2008; Moore & Rosenthal, 2006).

# Case study
# Bowel elimination 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

After completing your primary survey, what is your next nursing priority?

a. Secondary survey
b. Pain management
c. Abdominal assessment
d. Tea break

**Answer:** b

**Why:** Acute pain can impair a patient's recovery and should be seen as a priority in patient care, as it can be an indicator of actual or potential tissue damage. Pain management is an important assessment that is not routinely performed. Pain can have a sympathetic response resulting in elevation of temperature, pulse, respiration, blood pressure (Pisani et al., 2009a).

In some hospitals pain score is considered a fifth vital sign, as a way to encourage regular pain assessment and management.

### Question 2

Using the information provided by Gary, what is the most likely cause of his pain?

a. Irritable bowel syndrome
b. Constipation
c. Paralytic ileus
d. Small bowel obstruction (SBO)

**Answer:** d

**Why:** A small bowel obstruction (SBO) is a mechanical obstruction that commonly forms due to surgical adhesions. An obstruction due to adhesions can form within days of the surgery or may take many years. Patients with an SBO present with gradual onset nausea/vomiting and intermittent 'colicky' cramp-like pain due to peristalsis action of the bowel as well as a low-grade temperature

(<37.8°C) and foul-smelling vomitus (faecally smelling) usually orange-brown in colour as a result of an overgrowth of bacteria in the small bowel, a backlog of chyme and digested food waste products and subsequent peristaltic spasm causing vomiting (Schmelzer & Morcom, 2008; Pisani et al., 2009b).

## PHASE 1

### Question 1

Gary reports that he has not gone to the toilet in over a week. How often should Gary be opening his bowels?

a. Daily
b. Depends how much he eats
c. 3–4 times per day
d. It varies depending on the individual

**Answer:** d

**Why:** The frequency of defecation varies with each individual ranging from several times a day up to 2–3 times a week (Pisani et al., 2009b). The variation is a result of peristalsis action of the sigmoid colon and rectum leading to sensory nerves giving the urge to defecate (Reid-Searl & Hewerdine, 2010).

### Question 2

What is the significant meaning of diminished or absent bowel sounds in this patient?

a. Impaired bowel function
b. Your patient hasn't eaten
c. Healthy bowel function
d. Your patient has eaten

**Answer:** a

**Why:** Bowel sounds represent the movement of bowel content (chyme) through the process of peristalsis. Peristalsis in the small bowel is rapid to prevent bacterial growth; however, forward peristaltic movement periodically ceases to allow for nutrient absorption. Diminished or absent bowel sounds and peristalsis indicate impaired bowel function as a result of inflammation, surgical intervention or obstruction (Schmelzer & Morcom, 2008; Pisani et al., 2009b).

# PHASE 2

## Question 1

In what order should you assess his abdomen?

a. Inspection, palpation, percussion, auscultation
b. Auscultation, inspection, palpation, percussion
c. Inspection, auscultation, percussion, palpation
d. Percussion, palpation, inspection, auscultation

**Answer:** c

**Why:** When examining the abdomen the correct order for gathering objective data is: inspection, auscultation, percussion, palpation (Weber & Kelley, 2007). Performing percussion or palpation on the abdomen can alter the physical findings of the assessment, such as altering bowel sounds (Weber & Kelley, 2007).

## Question 2

What type of percussive sounds would you expect to hear during percussion over the area of the small bowel obstruction?

a. Dull
b. Tympany
c. Accentuated tympany
d. Hyper-resonance

**Answer:** a

**Why:** Percussion is an assessment tool that uses percussive sound (tapping the patient) to identify underlying structures of the body (Weber & Kelley, 2007). Percussing the abdomen should produce tympany bowel sounds due to the high gas content of the bowel. Dull percussive sounds are heard when percussing solid masses formed by an obstruction or can be a normal sound when percussing over a solid organ (Weber & Kelley, 2007).

# PHASE 3

## Question 1

What is the clinical rationale for inserting a nasogastric tube?

a. To inflate the stomach
b. To feed the patient through

c. To remove gastric content
d. To measure the stomach pressure

**Answer:** c

**Why:** A nasogastric tube (NGT) can be inserted for many reasons. When an NGT is inserted for an SBO the aims are to remove the gastric content build-up within the stomach, minimise bacterial growth in the bowel and remove gas and fluid from the small bowel proximal to the obstruction. The NGT provides a pathway for the evacuation of the faecally-smelling vomitus and decreases the risk of it entering the mouth. After inserting an NGT, mouth care and pressure area care around the tube on the nose need to be attended to.

## Question 2

What are the major concerns for this patient?

a. Malnutrition
b. Fluid and electrolyte imbalance
c. Perforation of the bowel
d. Peritonitis

**Answer:** b

**Why:** The SBO causes the pressure within the lumen of the bowel to increase, resulting in greater permeability of the capillaries allowing extravasation of fluid into the peritoneal cavity (Weber & Kelley, 2007). The location of the blockage can indicate the extent of fluid, electrolyte or acid–base imbalance that may occur. The loss in circulating volume can lead to hypotension and hypovolaemic shock in a patient. Blood flow to the bowel may become insufficient leading to infarction, necrosis and potential bowel rupture (Weber & Kelley, 2007). The blockage also prevents electrolyte-rich fluid from being absorbed by the small bowel, resulting in an imbalance in the main electrolytes such as sodium and potassium leading to electrolyte imbalance (Tortora & Derrickson, 2006).

# Case study
# Bowel elimination 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What are the common classifications of the causes of diarrhoea?

a. Decreased fluid absorption, increased fluid secretion, motility disturbance
b. Increased fluid absorption, increased fluid secretion, motility disturbance
c. Decrease fluid absorption, decreased fluid secretion, motility disturbance
d. Increased fluid absorption, decreased fluid secretion, motility disturbance

**Answer:** a

**Why:** The causes of diarrhoea can be classified as: decreased fluid absorption, increased fluid secretion, motility disturbance. Decreased fluid absorption can be caused by the inability to absorb oral intake (use of a laxative), mucosal damage (Crohn's disease) or a decrease in the surface area of the bowel (resection) (Pisani et al., 2009). Bacterial endotoxins such as cholera and salmonella as well as hormone imbalances and tumours can lead to an increase in the production of bowel secretions (Pisani et al., 2009). Motility disturbances such as irritable bowel syndrome increase the rate at which the bowel contents move through the lower gastrointestinal tract (Pisani et al., 2009).

### Question 2

Which of these are **not** common causes of diarrhoea?

a. Psychological
b. Antibiotics
c. Codeine
d. Iron

**Answer:** c

**Why:** Codeine is a 3-methyl ether of morphine and is classed in the same family as opioids. Constipation is common with codeine as it

suppresses the stimulation of gastric motility of the bowel, leading to hard formed stools rather than loose stools (Bryant & Knights, 2011; Pisani et al., 2009).

## PHASE 1

### Question 1

What could be a cause of Margo's episodes of dizziness?

a. Age
b. HR
c. BP
d. Gender

**Answer:** c

**Why:** Having diarrhoea for over one week puts Margo at risk of dehydration and acid–base and electrolyte imbalances that can become potentially life-threatening. The loss of fluid via the bowel can lead to dehydration and postural hypotension, which could be the cause of dizziness (Schmelzer & Morcom, 2008; Reid-Searl & Hewerdine, 2010).

### Question 2

Severe diarrhoea can cause a significant loss of which electrolyte?

a. Sodium
b. Potassium
c. Calcium
d. Phosphorus

**Answer:** b

**Why:** Severe diarrhoea can lead to extreme fluid loss, electrolyte imbalance or acid–base imbalance and is potentially life-threatening to the individual (Pisani et al., 2009). Potassium is an electrolyte that is vital to neuromuscular and cardiac function (Walker, 2010). Potassium is lost from the body during episodes of extreme diarrhoea and vomiting, which can lead to cardiac instability as evidenced by Margo's complaint of palpitations and subsequently the abnormal findings (ST-depression) on Margo's ECG (Walker, 2010).

# PHASE 2

## Question 1

Which of the following charts would you use to document Margo's bowel motions on her bowel chart?

a. Glasgow Coma Scale
b. Bristol Stool Chart
c. Wong-Baker Scale
d. Snellen Chart

**Answer:** b

**Why:** The Bristol Stool Chart was designed in 1997 as a medical aid to classify faeces and can be used to identify the gastrointestinal transition during digestion (Heaton & Lewis, 1997). The Bristol Stool Chart has seven categories that are used to identify potential problems in the bowel (Heaton & Lewis, 1997), in addition to the colour, odour and bowel patterns that are also recorded (Weber & Kelley, 2007).

## Question 2

What is the function of a stool specimen?

a. Diagnostic tool
b. Bodily function tool
c. Monitoring tool
d. Faecal collection

**Answer:** a

**Why:** A stool sample is a diagnostic tool used to identify the viral, bacterial or parasitic source of the diarrhoea (Schmelzer & Morcom, 2008). The stool can also identify fluid absorption or fluid secretion problems of the bowel by analysis of the electrolytes, pH or osmolality of the specimen (Schmelzer & Morcom, 2008). Large quantities of fat or undigested muscle fibre can indicate a malabsorption problem related to pancreatic insufficiencies (Schmelzer & Morcom, 2008).

# PHASE 3

## Question 1

What intervention could be used to prevent Margo's skin from breaking down?

a. Pressure area care

b. Toilet hygiene
c. Regular inspection
d. All of the above

**Answer:** d

**Why:** There are multiple interventions that can be applied here to prevent a patient's skin from breaking down. Regular inspection of the area to monitor skin integrity can be supported by using a non-alkaline soap and bathing the patient so that the circulation can be stimulated and the perianal area cleansed (Schmelzer & Morcom, 2008). If the patient is incontinent, a pad can be placed in situ to absorb the liquid away from the skin and regular toilet hygiene can be instituted to remove bacteria and provide comfort (Schmelzer & Morcom, 2008).

## Question 2

Why should antidiarrhoeal medication be used sparingly when nursing a patient with diarrhoea?

a. It interferes with bowel function
b. It is expensive to manufacture
c. It causes constipation
d. It is contraindicated in infective diarrhoea

**Answer:** d

**Why:** Antidiarrhoeal medications are used to coat mucous membrane, inhibit gastrointestinal motility or decrease intestinal secretions (Bryant & Knights, 2011). Acute diarrhoea episodes generally resolve within 3 days and are self-limiting (Bryant & Knights, 2011). Symptoms usually resolve once the irritant has been completely evacuated. Antidiarrhoeal medications are contraindicated in infectious diarrhoea because they can prolong the exposure, and should be used sparingly with inflammatory bowel disease (Schmelzer & Morcom, 2008).

# Case study
# Community-based nursing care of the older person 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Primary health care includes activities to:

a. Treat illness and promote recovery
b. Promote hospital admission
c. Encourage health and wellbeing
d. Protect from disability after treatment

**Answer:** c

**Why:** Primary health care is the provision of activities that encourage health and wellbeing (McMurray, 2011). The community nurse works in partnership with the community and their primary care providers to achieve the overall goal of primary health care, which is the development of a sustainable community that is able to maintain health and wellbeing of the community (McMurray, 2011).

### Question 2

The Ottawa Charter is a health promotion …?

a. Guide
b. Act
c. Law
d. Occupation

**Answer:** a

**Why:** Promotion of health in the community in most countries is guided by the Ottawa Charter for Health Promotion (WHO, Health and Welfare Canada & CPHA, 1986). The Ottawa Charter emphasises the promotion of health as a global issue and identifies fundamental characteristics and resources that can be used to improve or maintain community health (McMurray, 2011).

# PHASE 1

## Question 1

What is the purpose of the community nurse's visit?

a. Health assessment and financial assessment
b. Needs assessment and financial assessment
c. Health assessment and needs assessment
d. Needs assessment and spiritual assessment

**Answer:** c

**Why:** When a patient care is 'stepped-down' (from a higher acuity to a lower one), a health assessment is required to provide individual information that focuses on the physical wellbeing, cognitive development and psychosocial development (Jarvis, 2008). Bradshaw's typology (1972) is a useful framework that is used by community nurses to assist in understanding the various types of needs that are current in the community. The framework developed four basic need types: normative, expressed, felt and comparative (St John & Keleher, 2007).

## Question 2

What type of basic need would the community nurse identify?

a. Expressed
b. Felt
c. Normative
d. Comparative

**Answer:** b

**Why:** A felt need is defined by 'what a community member or a service provider says are the health issues that need to be assessed' (St John & Keleher, 2007, p. 81). This need type identifies the health issues that need to be addressed prior to the transition from facility-based care to home (St John & Keleher, 2007).

# PHASE 2

## Question 1

What is the benefit of providing community-based care to Lise in this situation?

a. Model of care
b. Amount of care

c. Type of care
d. Price of care

**Answer:** a

**Why:** Community nursing is not limited to the hospital setting. Care is provided by community nurses in a variety of places such as homes, schools, community centres and drop-in centres. The model of care provided by community nurses provides holistic and individualised care in an environment where the client is in control of their care. The scope of practice for a community nurse allows them to observe their clients in a broader community context while they provide care (Bender et al., 2007).

### Question 2

What is the focus of community-based services?

a. Health management and promotion
b. Health information and promotion
c. Health education and promotion
d. Health maintenance and promotion

**Answer:** d

**Why:** Health maintenance and promotion remains the primary focus of community-based services (Langley Moneyham et al., 1998; McMurray, 2011). The establishment of wellness programs provides examples of nursing initiated programs that are used for the early detection of disease (Aranda & Jones, 2008).

## PHASE 3

### Question 1

What would the community nurse report to the police? Lise is allegedly …?

a. Not being abused or neglected
b. Being neglected
c. Being abused
d. Being abused and neglected

**Answer:** d

**Why:** District nursing staff are able to identify elder abuse in the community setting (Day, 2007). Elder abuse is often associated with neglect, which can be evident by withholding food or fluid from the

elderly person as well as medications and other basic necessities such as personal care, financial stability, socialisation and community access (Jarvis, 2008).

### Question 2

Are the community nursing staff required to report their suspicions?

a. Yes, reporting of suspected elder abuse is mandatory
b. No, reporting of suspected elder abuse is not mandatory
c. Sometimes, reporting of suspected elder abuse is decided on a case-by-case basis
d. Never, reporting of suspected elder abuse is not a nursing responsibility

**Answer:** a

**Why:** A direct care worker should not keep this information to themselves and has a duty of care to report all suspicions to the appropriate authority. In the case of suspected elder abuse, reports can be made to the Civil and Administration Tribunal Guardianship List (Aged Care in Victoria, 2012; Mandatory Reporting Guide, 2010).

# Case study
# Community-based nursing care of the older person 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

The Declaration of Alma Ata is important because it was the first declaration of …?

a. A primary health care model by an international delegation
b. The importance of primary health care by an international delegation
c. The importance of community nursing by an international delegation
d. A primary health promotion model by an international delegation

**Answer:** b

**Why:** The Declaration of Alma Ata was the first time that the importance of primary health care was identified by an international gathering. The declaration was essentially a commitment to embrace primary health care goals within the framework of primary health care philosophies (McMurray, 2007).

### Question 2

Which are the primary health care principles?

a. Accessibility, advocacy, intersectional collaboration, public participation
b. Accessibility, appropriate technology, increased emphasis on health information management, intersectional collaboration, public participation
c. Accessibility, appropriate technology, increased emphasis on health promotion, intersectional collaboration, public participation
d. Accessibility, appropriate technology, increased emphasis on health promotion, international collaboration, public participation

**Answer:** c

**Why:** Primary health care principles represent how the term 'primary health care' has been interpreted from the Declaration of Alma Ata. Most recent interpretations incorporate the following principles: **accessibility**, health for all, regardless of race, age, gender, language or functional capacity; **appropriate technology**, technology should be used in an appropriate way to benefit the community; **increased emphasis on health promotion**, focuses on community empowerment with support of the health care system; **intersectional collaboration**, includes cooperation between different community sectors; and **public participation**, the encouragement and empowerment of the community to be able to support and maintain the health of the community (McMurray, 2007)

## PHASE 1

### Question 1

What is an essential element when working in an interdisciplinary team?

a. Education
b. Experience

c. Control
d. Communication

**Answer:** d

**Why:** Good communication skills are an essential element for the successful interaction between interdisciplinary team members (Graber O'Brien, 2008). All members of the interdisciplinary team need to be able to communicate the needs of the client and hand over tasks that have been completed or are yet to be actioned, and to prevent interdisciplinary rivalry and power struggles (Graber O'Brien, 2008).

### Question 2

What is the responsibility of the community nurse?

a. PEG management, PEG feeds and medication administration
b. Home improvement to assist independence, including shower, over-toilet chairs
c. Organising a single-pronged stick and elastic knee supports to support mobility around the home
d. EACH (extended acute care at home) funding

**Answer:** a

**Why:** When in an interdisciplinary team, each member of the health care team (usually from different fields) works with the others to coordinate the provision of care that meets the common goal of satisfying the patient's needs. In this scenario the community nurses are responsible for PEG management, PEG feeds and medication administration (Graber O'Brien, 2008).

## PHASE 2

### Question 1

What is the goal of a health promotion initiative?

a. To prevent the community from having resources to make informed health decisions
b. To promote self-directed learning to make informed health decisions
c. To provide the client with resources to make informed health decisions
d. To provide the community with resources to make informed health decisions

**Answer:** d

**Why:** Health promotion projects or initiatives provide education, interventions and strategies that can be used by the community to make healthy choices that will achieve a satisfactory level of health (as defined by the individual), and ensure that support systems are in place to make sure that the interventions are sustainable (McMurray, 2007). The goal of health promotion initiatives is to prevent illness or injury and promote successful rehabilitation from illness (McMurray, 2007).

### Question 2

What is a major factor the community nurses should be aware of when preparing the health promotion initiative?

a. Cultural insensitivity
b. Cultural sensitivity
c. Cultural identity
d. Cultural de-identify

**Answer:** b

**Why:** Cultural sensitivity is not only an understanding of how to interact with clients from different cultural backgrounds but is also the ability to be able to recognise cultural behavioural patterns or social roles of cultures such as sharing or women dealing with 'women's business' and the importance of kinship and the community in Indigenous Australian communities (Johnston & Thomas, 2008; McMurray, 2007).

## PHASE 3

### Question 1

What are the criteria for successful community engagement in community health projects?

a. Information about cultural identity, human population movements and primary health theories
b. Information about primary health as it relates to the particular community, involving clarity of purpose, ability to sustain health outcomes, imparting cultural awareness, sensitivity and safety
c. Information relating to community engagement, cultural purpose and educational outcomes
d. Information pertaining to health, workforce planning and education

**Answer:** c

**Why:** The importance of engaging the local Indigenous community group is vital to both an understanding of health concepts and optimal health outcomes and includes the concepts of cultural awareness, cultural sensitivity and cultural safety (Taylor & Guerin, 2010). Research demonstrates that ownership enhances and strengthens ideas and outcomes in health, particularly as it relates to Indigenous groups. The subgroup of Indigenous elders, who are esteemed by their community, are thus ideally placed to govern health education and decision making, supporting and sustaining positive health outcomes into the future (Lalonde, 2006).

## Question 2

Which grouping of modifiable risk factors assists in the prevention of chronic disease and is of major benefit in preventative education program planning?

a. Stress, genetic predisposition and lifestyle
b. Health inequity, living and working conditions, genetics
c. Living and working conditions, health inequity, cultural and lifestyle factors
d. Lifestyle factors, health inequity, genetics, stress and microorganisms

**Answer:** d

**Why:** Chronic disease prevention and management affect all Australians. In particular, chronic disease affects the Indigenous population. Generally, the Indigenous population is affected in a more severe way and at a younger median age compared to the general population (Larsen et al., 2007). Therefore, an understanding of modifiable and non-modifiable risk factors has been shown to be beneficial in the prevention of chronic disease, adopting a social framework of health.

# Case study
# Fluid, electrolyte and acid–base balance 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of the following explains the patient's hypotension and diuresis?

a. Increased extracellular fluid
b. Increased osmotic pressure
c. Hyperkalaemia
d. Increased vascular tonicity

**Answer:** b

**Why:** The patient has a very high BGL. The large amount of glucose passing into the urine increases the osmotic pressure, drawing a large amount of fluid into the renal tubules, which is then excreted in urine (Copstead & Banasik, 2010). This extra circulating fluid loss means a decreased venous return, stroke volume, cardiac output and ultimately decreased blood pressure.

### Question 2

Which of the following intravenous fluids is appropriate to treat this patient's dehydration?

a. Isotonic
b. Hypertonic
c. Hypotonic
d. All of the above

**Answer:** a

**Why:** Hypertonic solution has a higher osmotic pressure than the blood, drawing fluid from the cells. A hypotonic solution has a lower osmotic pressure than the blood, shifting more fluid into the cells, making them swell. An isotonic solution has the same osmolarity as the blood. As the goal of treatment for this patient is to replace the circulating volume lost in the diuresis, isotonic solution is appropriate here. Generally, a crystalloid solution is used in the initial stages of

treatment, such as normal saline or Hartmann's solution (DeBeer et al., 2008).

## PHASE 1

### Question 1

Which of the following has activated the renin–angiotensin–aldosterone mechanism?

a. Low pH/acidosis
b. Hyperkalaemia
c. Hypotension
d. Osmotic diuresis

**Answer:** c

**Why:** Decreased renal perfusion results in a decreased glomerular filtration rate (Copstead & Banasik, 2010). Renin is an enzyme that is released, which converts angiotensinogen to angiotensin I; angiotensin converting enzyme converts angiotensin I into angiotensin II, which causes vasoconstriction, elevating the BP, and releases aldosterone (Copstead & Banasik, 2010). Aldosterone reabsorbs sodium and water from the renal tubules to improve circulating volume. Hence, the trigger for this mechanism is hypotension.

### Question 2

Which of the following can explain the patient's tachypnoea?

a. Respiratory acidosis
b. Metabolic acidosis
c. Respiratory alkalosis
d. Metabolic alkalosis

**Answer:** b

**Why:** This patient is experiencing diabetic ketoacidosis as a result of poorly controlled T1DM. The patient produces insufficient insulin to draw the large amount of glucose from the blood into body cells to utilise for energy; this leads to lipolysis (Copstead & Banasik, 2010). As the metabolism of fats continues, fatty acids are produced, which form keto acids in the liver (Copstead & Banasik, 2010). These keto acids are responsible for this patient's reduced pH, making this a metabolic acidosis. The raised respiratory rate is a compensatory mechanism responding to this metabolic acidosis. The body is attempting to expel

carbon dioxide from the lungs to reduce the amount of carbonic acid present in an effort to correct the pH (Copstead & Banasik, 2010).

## PHASE 2

### Question 1

Which of the following is shown in the ABG results?

a. Metabolic acidosis
b. Metabolic alkalosis
c. Respiratory acidosis
d. Respiratory alkalosis

**Answer:** a

**Why:** The pH is lower than the normal range, hence the patient is acidotic. The $PaCO_2$ is within the normal range, indicating the problem is most likely metabolic (Elliot et al., 2012). The $HCO_3^-$ and the BE are both lower than the normal ranges, indicating bases are being utilised to buffer metabolic acids being produced (Elliot et al., 2012). We know from the patient's situation that she has uncontrolled T1DM, which as covered above leads to the formation of keto acids. Therefore, this ABG result indicates a metabolic acidosis.

### Question 2

Which of the following can explain the dysrhythmia experienced by the patient?

a. Hyperkalaemia
b. Hypotension
c. Intravenous fluid administration
d. Acidosis

**Answer:** a

**Why:** Potassium, along with sodium and calcium, is integral to the correct functioning of the myocardial action potential and, hence, the electrical activity in the heart (Mushiyakh et al., 2011). Concentration gradients of these ions need to be strictly maintained as any imbalance can affect the ability of the myocardium to maintain a normal sinus rhythm (Mushiyakh et al., 2011). When potassium levels rise, this decreases the resting membrane potential, affecting the depolarisation sequence and resulting in dysrhythmia (Mushiyakh et al., 2011).

# PHASE 3

## Question 1

Which of the following should be monitored throughout the patient's hospital stay?

a. Jugular venous pressure
b. Chest auscultation
c. Potassium levels
d. Oxygen saturations

**Answer:** c

**Why:** Potassium ions comprise part of the cardiac action potential. Regulation of potassium ion concentration is important to maintain normal myocardial conduction and regular cardiac rhythm, as explained above (Mushiyakh et al., 2011). Imbalance of potassium can lead to dysrhythmias, as this patient has already experienced, hence it is important to monitor potassium levels regularly throughout admission to hospital.

## Question 2

Why is it important to maintain an accurate fluid balance record for this patient?

a. To note trends in intake and output
b. To identify a change in the patient's condition early
c. The patient is receiving IVT
d. All of the above

**Answer:** d

**Why:** The patient has presented and been treated for diabetic ketoacidosis, a condition that causes osmotic diuresis. Excessive diuresis can lead to dehydration, necessitating the monitoring of the patient's intake and output. This fluid balance record should be maintained throughout the patient's hospital stay to monitor the success of treatment and identify any deterioration in the patient's condition early. All patients receiving IVT should be placed on a fluid balance chart. It is also important to note that the commencement of a fluid balance record is a nurse-initiated action.

# Case study
# Fluid, electrolyte and acid–base balance 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Given that burns cause extensive cellular damage, which of the following should be closely monitored?

a. $K^+$
b. $Ca^{2+}$
c. $Na^+$
d. $Mg^{2+}$

**Answer:** a

**Why:** $K^+$ is the prominent intracellular ion (Patton & Thibodeau, 2012). The cellular damage occurring with burn injuries breaks down cell membranes, allowing $K^+$ to leak out into the bloodstream, initially causing hyperkalaemia (Copstead & Banasik, 2010). Hyperkalaemia can result in serious dysrhythmias and should be monitored closely (Copstead & Banasik, 2010).

### Question 2

Why is Hartmann's the intravenous solution of choice for this patient?

a. Because the patient is hypotensive
b. Because of the extracellular fluid (ECF) shift
c. Because it is a colloid
d. Because it is a crystalloid

**Answer:** d

**Why:** When the goal of IVF therapy is to correct or prevent fluid and electrolyte disturbances, crystalloid solutions, such as Hartmann's, are an appropriate choice. Hartmann's is also an isotonic solution, possessing the same osmolarity as the body fluids, allowing for even distribution. Hartmann's is also an appropriate choice for this patient as it contains physiological concentrations of major electrolytes, making it more similar to circulating fluid than other crystalloid solutions (Perel & Roberts, 2011).

# PHASE 1

## Question 1

Which of the following is shown in this patient's ABG?

a. Respiratory acidosis
b. Respiratory alkalosis
c. Metabolic acidosis
d. Metabolic alkalosis

**Answer:** c

**Why:** The pH is lower than normal, showing the patient has an acidosis. The $PaCO_2$ is within normal limits, indicating the primary problem is most likely a metabolic cause. The $HCO_3^-$ and base excess are both lower than normal, indicating there are acids being produced that are being buffered. The case history is that of extensive burn injuries, which have an initial stage of burn shock (Copstead & Banasik, 2010). Burn shock involves pathophysiological changes in the cardiovascular system, causing it to change from a closed, semi-permeable system to an open system, a phenomenon known as 'capillary leak' (Copstead & Banasik, 2010). The patient's circulating volume leaves the circulatory system, causing hypotension and reduced cardiac output, which result in poor cellular perfusion, anaerobic glycolysis and the production of metabolic acids (Copstead & Banasik, 2010).

## Question 2

Which of the following should be monitored in hyperkalaemia?

a. ECG
b. BP
c. ICP
d. RR

**Answer:** a

**Why:** $K^+$ is a major intracellular ion involved in the action potential and is integral to the correct functioning of the electrical activity in the heart (Mushiyakh et al., 2011; Patton & Thibodeau, 2012). Hyperkalaemia causes a decrease in the resting membrane potential, affecting the depolarisation sequence, resulting in dysrhythmia, meaning the patient should have continuous ECG monitoring (Mushiyakh et al., 2011).

# PHASE 2

## Question 1

Ongoing need for IVT means potential for infection from numerous sources. Which of the following management strategies reduce this risk?

a. Re-site cannula every 48–72 hours
b. Adhering to the 'five moments for hand hygiene'
c. Using aseptic technique when coming in contact with the site
d. All of the above

**Answer:** d

**Why:** Phlebitis, the inflammation of a vein caused by irritation and infection of the IV site, can potentially be avoided by the removal and rotation of IV sites every 48–72 hours to prevent microbes from colonising the site. The World Health Organization developed the 'five moments for hand hygiene', adopted by Hand Hygiene Australia, from evidence determining critical times hand hygiene should be performed to reduce hospital-acquired infections (Sax et al., 2007; HHA, 2012). Aseptic, non-touch technique is used to prevent opportunistic infection and the transmission of pathogens from healthcare workers to patients when coming in contact with open wounds, such as cannula insertion sites.

## Question 2

Which of the following complications of IVF is the patient experiencing?

a. Phlebitis
b. Infiltration
c. Infection
d. Erythema

**Answer:** b

**Why:** The patient has noticeable swelling and pallor around the IV site and reports mild pain. There are no other signs of inflammation at the venepuncture site. These signs and symptoms suggest the infiltration of the IV fluid, also known as tissuing or extravasation, which occurs when the IV fluid enters the subcutaneous tissue around the IV site, not from infection or irritation.

# PHASE 3

## Question 1

The ongoing care of this patient is most likely to include which of the following?

- Fluid restriction
- Daily weigh
- ICP measurement
- $K^+$ monitoring

**Answer:** d

**Why:** Cellular destruction from the burn injury can initially result in high serum potassium levels, which can be exacerbated by the metabolic acidosis as a result of burn shock (Elliot et al., 2012; Copstead & Banasik, 2010). As the serum levels return to normal over time, the intracellular levels can still be low, affecting the resting membrane potential, resulting in dysrhythmias, necessitating the close monitoring of $K^+$ levels (Copstead & Banasik, 2010).

## Question 2

This amount of burns will result in which ongoing fluid balance problem?

a. Increased insensitive loss
b. Decreased intracellular fluid volume
c. Decreased osmotic pressure
d. Increased hydrostatic pressure

**Answer:** a

**Why:** One of the skin's many functions is the regulation of fluid loss by evaporation, known as insensitive loss. With extensive burns, skin integrity is severely impaired, significantly affecting this function. Increased insensitive fluid loss means an overall reduction in circulating volume, a problem necessitating nursing and medical management strategies for this patient.

# Case study
# Health assessment and physical examination

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What is the primary purpose of a health assessment?

a. To gather information
b. To cluster information
c. To analyse information
d. To evaluate information

**Answer:** a

**Why:** A health assessment is a method of data collection used by health professionals to gather information from their patients (Weber & Kelley, 2007). The information helps to paint a picture of the patient the health professional can use to start to plan further investigations and assessment (Jarvis, 2008). The gathered information is clustered into relevant groups, and any abnormal findings noted. This process is the beginning of the clinical reasoning process that informs nursing interventions, which is used to develop a nursing care plan (Alfaro-LeFevre, 2009).

### Question 2

Before the nurse starts, does she need to gain parental consent prior to commencing the health assessment and physical examination?

a. Yes, he is a student, regardless of his age
b. No, he is of legal age to give consent for himself
c. Yes, he is unable to give consent for himself
d. No, he is mentally incompetent to make medical decisions for himself

**Answer:** b

**Why:** Anyone 18 years or over is considered an 'adult' by Australian law and is legally able to give consent to treatment without parental consent (Bird, 2011). The person needs to be able to demonstrate that they have the capacity to understand and retain any information that has been provided to them, so that they are informed and can make educated

decisions about their care (Medical Consent, 2010). In the case of a minor, the parents will generally provide consent; however, in the event of a medical emergency, the *Children and Young Persons (Care and Protection) Act 1998* (NSW) allows for medical and nursing personnel to provide emergency medical treatment without the consent of the patient or in the absence of a parent or guardian. The school nurse needs to be aware of their legal obligations when treating minors because there are some Acts that allow for medical treatment to be provided without the parent's consent. The *Minors (Property and Contracts) Act 1970* (NSW), Section 49, states that a medical officer who commences treatment with the consent of a minor 14 years or over will be protected from charges of assault or battery (Bird, 2011). Another example is the *Consent to Medical Treatment and Palliative Care Act 1995* (SA), which allows for a minor 16 years or over to provide consent as an adult (Bird, 2011).

## PHASE 1

### Question 1

When conducting an interview of a patient, what type of question will elicit the best response?

a. Closed-ended question
b. Direct question
c. Open-ended question
d. Indirect question

**Answer:** c

**Why:** Open-ended questions are an effective method of gathering information from the patient during an assessment. The design of an open-ended question encourages the patient to express themselves in detailed, short answer format, which is preferable to the lack of information that can be gathered with 'yes' or 'no' responses (Jarvis, 2008). Open-ended questioning is an important skill that a nurse must develop to elicit spontaneous answers, and it helps the development of rapport between the nurse and the patient during the assessment process (Jarvis, 2008).

### Question 2

What type of data/evidence is found during the interview phase of the assessment?

a. No data or evidence
b. Objective data

c. Subjective data
d. Both subjective and objective

**Answer:** c

**Why:** When gathering a health history from your patient you need to ask a series of explorative questions. The information that is gathered from the patient directly is called subjective data. The main objective of subjective data collection is to identify areas of concern that the patient reports or the nurse identifies. Any area of concern will need to be investigated further by asking the patient to provide more details, such as: onset—when it started/was first noticed; location—exactly where it is on the body; duration—how long the patient has been aware of the complaint; severity—how bad it is; any patterns—whether there is a particular time or activity that makes it better or worse; and other factors that might be associated with the presenting complaint (Jarvis, 2008; Weber & Kelley, 2007). Subjective data highlight areas of concern that will need to be investigated further during the physical examination.

## PHASE 2

### Question 1

When completing a physical examination, in what order should you undertake your assessment?

a. Alphabetical order
b. Random order
c. Systematic order
d. General order

**Answer:** c

**Why:** When commencing a physical assessment of a patient, the nurse should follow a systematic order. The systematic approach requires the nurse to conduct a head-to-toe assessment of all the body systems (central nervous system, respiratory, cardiovascular, gastrointestinal, renal, musculoskeletal, skin, social, other) (Jarvis, 2008). The head-to-toe approach allows for the assessment and evaluation of each body system in relation to past and present medical history (Jarvis, 2008). This approach also acts as a secondary check list for any relevant information that may have been omitted by the patient during the initial assessment and as a means of evaluating the patient's understanding of health, any overt gaps in their knowledge and how they manage any current health issues (Jarvis, 2008).

## Question 2

What type of data/evidence is found during a physical examination?

a. No data or evidence
b. Objective data
c. Subjective data
d. Both subjective and objective

**Answer:** b

**Why:** Objective data is collected during the physical examination by using the following assessment techniques: inspection, palpation, percussion and auscultation (Jarvis, 2008). Unlike subjective data, objective data is **NOT** gathered from interviewing the patient but through investigation and research. Once the physical examination is completed, the information gathered during the assessment is used to identify which body system is affected and to inform how to best manage the patient. There are various different types of objective data, which can be used to support the finding of the assessment. Clinical file notes, patient histories, pathology, haematology and medical imagery such as CXR, MRI and ultrasound are all common forms of objective data that can be seen in clinical practice to provide initial evidence.

# PHASE 3

## Question 1

What is the nurse's responsibility after completing each stage of the health assessment?

a. Document all of her findings
b. Document some of her findings
c. Document only the findings that the patient wants documented
d. Document? This is a high school, not a hospital

**Answer:** a

**Why:** The school nurse needs to provide care following the domains set out in the School Nurses Professional Practice Standard (Ward, 2009), which includes the accurate documentation of all information pertaining to this assessment. Accurate documentation is a nurse's best defence against a legal claim of negligence associated with care that has been provided (Astell & Bourke, 2009). The patient records serve as a description of the events, interventions, treatment and

management that have occurred during the patient's presentation to a health care service (Astell & Bourke, 2009). Common areas that pose a risk for legal actions include: documenting the incorrect time an intervention has occurred; recording the information so that it is not legible, succinct and accurate; documenting prior to completing a nursing duty such as medication administration; and documentation of information that you know is inaccurate (Astell & Bourke, 2009).

Remember: document, document, document!!!

### Question 2

If you make an error when documenting patient information, you should …?

a. Scribble out the error
b. Liquid paper out the error
c. Single line through the error
d. Double line through the error

**Answer:** c

**Why:** Do **NOT** scribble out, use liquid paper or scratch out any errors made during documentation. Draw a single line through the error, write the word 'error' above and then continue to document as you would normally (Astell & Bourke, 2009). By documenting an error in this format, it means that the documentation is legible and neat and prevents any accusations that you were trying to hide information or destroy the record of an event (Astell & Bourke, 2009).

# Case study
# Medication therapy 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

From the information Roseanne has given, what is the most prominent risk factor exhibited for improper use of medications?

a. Lack of knowledge regarding the actions of the prescribed medications
b. Bringing her medications with her to hospital

c. Admitting to having financial difficulties at home
d. Living at home alone

**Answer:** a

**Why:** Health literacy is a complex concept involving the capacity to obtain and understand basic health information; it also incorporates the cognitive and social skills that determine the motivation and ability of people to make use of the information and health services (Clement et al., 2009). Roseanne is an example of a person with a chronic illness, meaning her need to access information relating to her condition and its treatment is paramount to positive outcomes. Exhibiting a lack of knowledge about the medications she is taking demonstrates high risk for non-compliance with her medication regimen.

## Question 2

Polypharmacy involves the concurrent use of five or more medications by a client at one time. What are some potential problems Roseanne is facing?

a. The drugs may interact with each other producing toxic effects.
b. The client may become confused about the medication regimen and uses.
c. It can become costly for the client.
d. All of the above.

**Answer:** d

**Why:** Chronic medical conditions and age-related organ pathophysiology can necessitate the concurrent use of multiple medications (Fulton & Allen, 2005). Polypharmacy is an issue that encompasses many factors including coexistence of multiple medical conditions, concurrent use of over-the-counter medications patients may be using to self-medicate, utilisation of multiple prescribers, the use of more than one pharmacy, patient compliance with regimens and knowledge of their medical condition and reasons for taking medications (Fulton & Allen, 2005; Frazier, 2005). The consumption of multiple medications by the one client can mean medications interact with each other. This, as well as the considerable demand that the client understand the reasons for taking the medications, can lead to discontinuation of use if adverse outcomes ensue. Given the patient is required to purchase several medications, this can become a financial burden, also jeopardising the quality use of medications.

# PHASE 1

## Question 1

The prescriber has both increased Roseanne's dosage of frusemide and changed from oral administration to intravenous. What is the most likely reason for this?

a. The oral medication is contraindicated for Roseanne.
b. Oral frusemide is not available in this hospital.
c. Intravenous administration is more convenient and ensures the patient receives the medication.
d. The medication is absorbed faster.

**Answer:** d

**Why:** By administering the medication directly into the blood, the plasma concentration peaks as it is administered. Oral medication must be absorbed in the gastrointestinal tract before passing into the blood, meaning it takes longer to reach peak plasma concentration levels. The hepatic first-pass effect also impacts on the bioavailability of the medication at plasma level (Bryant & Knights, 2011). Due to the inability to easily retrieve the medication once administered and the potential for infection when administered through the intravenous route, convenience should never be considered as the prime reason for this route over oral options.

## Question 2

Which of Roseanne's vital signs should the nurse monitor closely when administering the IV frusemide?

a. Heart rate
b. Blood pressure
c. Respiratory rate
d. Temperature

**Answer:** b

**Why:** Frusemide is a loop diuretic, increasing the urinary excretion of sodium and water (Bryant & Knights, 2011). By administering frusemide IV and removing some of the circulating volume, venous return to the heart is reduced, meaning the amount of blood available for the heart to pump is lower. Cardiac output is determined by heart rate and stroke volume; by administering frusemide, her stroke volume is decreased and, hence, cardiac output and blood pressure are also lowered. Roseanne has also been diagnosed with

CHF, meaning her heart is not pumping her blood around her body effectively. This reduced contractility also contributes to a lower stroke volume. Therefore, Roseanne's blood pressure should be monitored closely with the administration of this medication.

## PHASE 2

### Question 1

Benzylpenicillin is available on the ward in 2-g vials, to be drawn up with sterile water for injection to a total of 10 mL. What is the amount to be administered to Roseanne?

a. 9.6 mL
b. 8 g
c. 8 mL
d. 10 mL

**Answer:** c

**Why:** The dose required is 1.6 g, the stock strength is 2 g and the volume is 10 mL. Using the following calculation:

$$\text{Required volume} = \frac{\text{Stock required}}{\text{Stock strength}} \times \frac{\text{Volume}}{1}$$

the required volume to be administered is 8 mL of the solution. The calculation and the resultant solution are required to be checked by a second Registered Nurse before administering to Roseanne.

### Question 2

During your shift caring for Roseanne, you notice that a dose of the benzylpenicillin due on the previous shift was not signed for, nor is there any indication in the progress notes that this dose was given or withheld. Which of the following 'rights' of medication administration has been overlooked here?

a. The right time
b. The right documentation
c. The right dose
d. The right reason

**Answer:** b

**Why:** Part of the nursing responsibilities in medication administration is to record clearly the details of timing and dosage. The progress notes are legal documents. The nurse is required to sign the document

when the medication is given; if the medication is withheld, appropriate documentation and reasons must be reported to ensure effective communication and avoid medication misadventure.

## PHASE 3

### Question 1

When assessing Roseanne's learning needs prior to discharge, which element of her history will most alert the nurse to engage in further education for the client?

a. She is taking numerous medications.
b. She has a complex past history.
c. She says she was simply getting tired, which was why she brought herself to hospital.
d. She had a low blood pressure on admission.

**Answer:** c

**Why:** Roseanne states that she only came to hospital because she was getting tired. When questioned further as part of the nursing and medical history, she was unable to connect her history of angina and AMI to the development of her current condition. This shows a lack of understanding of how her current condition has developed. Lack of insight into personal health has been identified as a major predictor of complications and subsequent readmission to hospital (Harris & Zwar, 2007).

### Question 2

Which of the following is the most important referral for the nurse to make upon Roseanne's discharge?

a. Pharmacist
b. Dietitian
c. Occupational therapist
d. All of the above

**Answer:** a

**Why:** Roseanne demonstrated a lack of understanding regarding the reason for taking her medications when she presented to hospital and many of them were not being administered at the correct times. She also exhibits a poor understanding of her presenting condition and how her past history contributed to its development. By ensuring a pharmacist referral, the nurse can be sure that Roseanne is discharged

with a good understanding of why she is taking her medications and when she needs to be taking them. The nurse's responsibility in educating Roseanne regarding her discharge medications extends beyond making the referral to engaging in health promotional activities and providing further education to the patient, such as leaflets.

# Case study
# Medication therapy 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

The nurse's role and accountability in administering medication are:

a. Knowledge of the medication, therapeutic and non-therapeutic effects and education needs of the client
b. Knowledge of the correct dosage
c. Knowledge of the pharmacokinetics of each medication administered
d. Knowledge of the pharmacodynamics of each medication administered

**Answer:** The most correct answer is a.

**Why:** Administration of medications is a fundamental part of nursing practice and nurses draw on their scientific knowledge base to ensure safe, effective and appropriate medication outcomes for the client. Regardless of whether clients receive their health care in hospitals, clinics or the home, the nurse plays an essential role in medication therapy. The nurse administering a medication has legal accountability for the effects of that medication on the client and other consequences of the administration of the medication.

In the acute care setting the nurse also ensures that clients are adequately prepared to administer their medications when they leave hospital. In addition, a nurse teaches clients about their medications and their side effects, encourages clients to adhere to their medication regimen and oversees client self-administration of medications. The nurse assesses the effects of medications in restoring or maintaining health.

## Question 2

When the rate of drug administration is equal to the rate of drug excretion, this is referred to as:

a. The medication's half-life
b. Bioavailability of the medication
c. The peak rate of absorption of the medication
d. The peak plasma concentration

**Answer:** d

**Why:** The peak plasma concentration occurs when the drug is being administered and its plasma concentration meets the rate at which the drug is metabolised and excreted. This requires regular fixed doses to reach a steady-state concentration.

# PHASE 1

## Question 1

When administering a subcutaneous injection of heparin, the nurse should consider which of the following:

a. Using the abdomen as the preferred site of administration
b. Inject at a 45° angle into the subcutaneous tissue anywhere on the body
c. Use the deltoid region of the patient's arm for administration
d. Always select a site based on patient preference

**Answer:** a

**Why:** While patient preference is a factor to be considered when undertaking any nursing intervention for a patient, this should not be the only factor when selecting a site for the administration of a subcutaneous heparin injection. The abdomen is recommended as the site of choice for administration of heparin as there is generally sufficient subcutaneous tissue here for the injection as well as the fact that this site is reasonably well protected and potential for excess bruising is minimal.

## Question 2

You are having a very busy shift on your ward and delegate the preparation of your patient's heparin subcutaneous injection to another nurse who has offered to help. She has drawn up the medication and hands you the syringe and the heparin vial to check.

You administer the subcutaneous injection. Which of the following 'rights' have you overlooked?

a. Right time
b. Right route
c. Right medication
d. Right client

**Answer:** c

**Why:** When administering medications, the nurse is responsible for checking the medication container and comparing this to the chart before preparation. Nurses should only administer the medications they have prepared themselves because, if an error has occurred, the nurse who administers the medication is responsible for its effects. Although the helpful nurse has drawn up the heparin and shown you the vial, you are only able to fully verify that the medication in the syringe came from that vial if you prepare the medication yourself.

## PHASE 2

### Question 1

The doctor orders amiodorone 300 mg to be given now to correct the ventricular tachycardia. This is an example of:

a. a standing order
b. a 'stat' (statim) order
c. a single dose (one time) order
d. a PRN order

**Answer:** b

**Why:** A stat order signifies the immediate and once-only administration of a single dose of a medication. Stat orders are often written for emergencies when the client's condition changes suddenly. This client has experienced a sudden onset of transient VT and the administration of 300 mg of amiodorone as a stat order after the administration of the third defibrillation follows the Australian Resuscitation Council's guidelines for treatment (Elliott et al., 2012).

### Question 2

After the VT episode, the doctor ceases the subcutaneous heparin administration and orders a heparin infusion. You prepare the infusion by mixing heparin with a compatible intravenous fluid

and affix a medication additive label to the IV bag. The use of the medication additive label adheres to which 'right' of administration?

a. Right medication
b. Right dose
c. Right patient
d. Right documentation

**Answer:** d

**Why:** In preparing the heparin infusion, the nurse works through the right medication, dose and patient. By affixing a medication additive label, the nurse demonstrates right documentation by recording what has been added to the IV fluids and which patient it has been prepared for; therefore, it is an example of right documentation.

## PHASE 3

### Question 1

After setting up and commencing the IV heparin infusion, it is important to regularly monitor which of the following:

a. Blood pressure
b. Check patient for bruising
c. Conscious state and GCS
d. Pain scale

**Answer:** b

**Why:** Heparin is an anticoagulant agent, acting by binding to antithrombin III and augmenting the action of this compound (Bryant & Knights, 2011). The result is the inhibition of several clotting factors, including thrombin factor IIa, preventing the formation of fibrin and hence the formation of a stable clot (Bryant & Knights, 2011). It is therefore paramount that the patient be assessed thoroughly and often for bruising and bleeding and interventions potentially causing these complications are kept to a minimum.

### Question 2

You are concerned about your patient's ongoing nausea after the arrhythmia episode, that vomiting might lead to further demands on the heart. You phone the treating medical officer for an antiemetic. Who is able to take a phone order?

a. Two Registered Nurses must hear the order
b. A Registered Nurse and an Enrolled Nurse

c. A final year medical student and a Registered Nurse
d. Both a and b
e. All of the above

**Answer:** a

**Why:** There is a possibility of verbal orders being misunderstood as well as difficulty verifying verbal orders, hence the need for two qualified personnel to receive the order. Although institutional policies vary regarding the personnel who can take verbal and telephone orders, of the above options, option a—two Registered Nurses—comprises the only health professionals legally qualified in medication administration to receive this order over the telephone.

# Case study
# Mental health 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Mark's presentation can best be described as a …?

a. Stressful event
b. Behaviour issues
c. Crisis situation
d. Over-protected family

**Answer:** c

**Why:** A crisis situation is the result of a sudden unexpected change to an individual's life that can cause feelings of distress and loss (Morrison, 2009). These feelings can exacerbate preexisting feelings of lack of control in the client's life or disrupt their normal daily routines and can end with feelings of uncertainty about their future (Morrison, 2009). Crisis situations occur over an extended period of time (2 weeks to 6 weeks), whereas a stressful event usually passes quickly (an interview, exam or other possible event) (Morrison, 2009).

### Question 2

What should be the first intervention during a crisis situation?

a. Call the police

b. Care plan development
c. Medication
d. Assessment

**Answer:** d

**Why:** There are two broad approaches to a crisis assessment, one of which is the generic approach that is based on the theory that there are certain common themes that emerge during a crisis and that these themes need to be addressed if the client is to adapt in a healthy way (Morrison, 2009). This approach however, is not appropriate; nurses need to acknowledge that Aboriginal and Torres Strait Islanders have different cultures and histories resulting in different languages, kinships, tribes and approaches to living (West et al., 2009). Therefore, the second approach (individual approach) is preferable as it provides depth and human focus in a holistic approach that supports self-determination of the individual and cultural understanding of the needs of the community and can identify potential risks to the client or to others in the family or community (Morrison, 2009; West et al., 2009).

## PHASE 1

### Question 1

What could be the cause of Mark's silence?

a. Unable to develop rapport
b. Unable to modify his behaviour
c. Unable to understand the question
d. Unable to speak English

**Answer:** a

**Why:** During the interview process of the assessment it is important that the nurse be aware of the history of colonisation of Australia and note that those memories continue to affect therapeutic communications between nurses and Aborigines and Torres Strait Islanders (West et al., 2009). Colonisation caused the formation of a new ecological niche that led to the physical segregation of Indigenous communities on reserves, in missions and on government-owned stations, usually on the edge of town (Eckermann et al., 2006). These experiences explain why the development of trust and rapport needs to be considered essential prior to the commencement of an interview with an Indigenous client (West et al., 2009).

## Question 2

Under what Act of Parliament are patients made involuntary?

a. Mental Health and Community Health Act 1986
b. Mental Health Act 1986
c. Mental Health and Assessment Act 1986
d. Mental Health and State Health Act 1986

**Answer:** b

**Why:** The *Mental Health Act 1986* (Vic) or the *Mental Health (Compulsory Assessment and Treatment) Act 1992* (New Zealand) allows health care professionals to provide treatment to a client or patient without their consent if it is deemed in the best interest of the client or patient (Department of Health, 1986; New Zealand Ministry of Health, 1992).

Criteria for involuntary treatment

Section 8(1) Mental Health Act 1986:

**(a)** the person appears to be mentally ill (a person is mentally ill if he or she has a mental illness, being a medical condition that is characterised by a significant disturbance of thought, mood, perception or memory); and **(b)** the person's mental illness requires immediate treatment and that treatment can be obtained by the person being subject to an involuntary treatment order; and **(c)** because of the person's mental illness, involuntary treatment of the person is necessary for his or her health or safety (whether to prevent a deterioration in the person's physical or mental condition or otherwise) or for the protection of members of the public; and **(d)** the person has refused or is unable to consent to the necessary treatment for the mental illness; and **(e)** the person cannot receive adequate treatment for the mental illness in a manner less restrictive of his or her freedom of decision and action (Mental Health Act 1986).

# PHASE 2

## Question 1

Why do you think that Mark is unresponsive to the Indigenous health care worker?

a. Gender
b. Time
c. Attitude
d. Community status

**Answer:** d

**Why:** The presence of an Indigenous health care worker is not sufficient to guarantee a positive interaction (Wood et al., 2009). Not all Indigenous health care workers are from a traditional background or are senior enough to advise the patient or family members with the required level of authority (Wood et al., 2009). In these situations cultural respect will contribute to an appropriate intervention such as family consultation and direction from the elders (Wood et al., 2009).

### Question 2

What new information discovered during the interview would be the most relevant to Mark's admission?

a. Age
b. Anti-social behaviour
c. Substance use
d. Alcohol use

**Answer:** c

**Why:** The most prevalent substance used in the Indigenous community is alcohol; however, in this situation the use of cannabis has exacerbated Mark's symptoms. Fifty percent of Indigenous Australians have been reported to have used cannabis, which is higher than in the non-Indigenous community (40%), leading to an increase in the admission of Indigenous people with problems associated with cannabis misuse and drug-induced psychosis (Curtis, 2009; Hunter, 2006). A study in 2005 has shown a correlation between mental health and cannabis use in remote communities and found that an increase in cannabis use is proportional to the number of mental health presentations (Wilkes et al., 2010).

## PHASE 3

### Question 1

What could be the source of Mark's agitation?

a. Family issues
b. Auditory hallucination
c. Being an involuntary patient
d. The Indigenous health care worker

**Answer:** a

**Why:** Having an understanding of cultural safety is important when supporting an Indigenous Australian (West et al., 2009). The nurse

needs to be aware that in Indigenous Australian communities the community takes importance over an individual's health (Wood et al., 2009). If there is a crisis in the family or community, the priority will be to focus on the community, and the current crisis will take precedence over any form of health care intervention (Wood et al., 2009). With this in mind, the nurse needs to demonstrate flexibility when developing a care plan for an Indigenous Australian (Wood et al., 2009).

### Question 2

What would be a traditional intervention that could be applied to the current crisis?

a. Medical therapy
b. Pharmacological therapy
c. Narrative therapy
d. Physical therapy

**Answer:** c

**Why:** Narrative therapy is a traditional intervention that may be used in anxiety management (Aderman & Cambell, 2010). Narrative therapy employs the use of personal story telling, anecdotal and yarning, and is a suggested therapy of Indigenous authors (Aderman & Cambell, 2010). A direct focused interview or assessment would not be conducive to gathering further information in this situation, as direct eye contact can be seen as a hostile act and can lead to silence or evasion of any direct questioning (West et al., 2009). Narrative therapy reflects the Indigenous tradition of oral transmission of information through storytelling and empowers the individual storyteller (Aderman & Cambell, 2010).

# Case study
# Mental health 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What is the most common age group for the onset of schizophrenia?

a. 18–24 years
b. 25–30 years

c. 12–18 years
d. 30–40 years

**Answer:** a

**Why:** Schizophrenia is a disorder of the mind that is characterised by disturbances in thought process, perceptions, cognition and psychosocial function (Bardwell & Taylor, 2009). The onset occurs most commonly in people aged 18–24 years, although some sources indicate that onset could be as early as 15 years (Bryant & Knights, 2011).

### Question 2

What is the aetiology of schizophrenia?

a. Psychological
b. Unknown aetiology
c. Neurological
d. Anatomical

**Answer:** b

**Why:** Mental illnesses are classified as having organic and non-organic causes. Schizophrenia is classified as non-organic; however, the exact cause of schizophrenia remains a mystery. The common theory is that the cause is neurobiological rather than psychodynamic (Bardwell & Taylor, 2009). Schizophrenia is regularly seen as a neurological illness rather than a disturbance of the mind (Bardwell & Taylor, 2009).

## PHASE 1

### Question 1

What type of medication is risperidone?

a. Antidepressant
b. Mood stabiliser
c. Antipsychotic
d. Sedative

**Answer:** c

**Why:** Antipsychotic medication has been a favoured medication for the treatment of psychotic disorders since it was discovered in 1950 (Usher et al., 2009). Risperidone is classed as an atypical antipsychotic medication and has dopamine receptor subtype 2 ($D_2$) and serotonin receptor subtype 2 ($5HT_2$) blocking actions. It acts on the positive

symptoms (e.g. delusional thinking) and negative symptoms (e.g. blunting of affect) associated with schizophrenia (Usher et al., 2009).

### Question 2

Which is **NOT** an adverse effect of antipsychotic medication?

a. Akathisia
b. Dystonia
c. Aphasia
d. Tardive dyskinesia

**Answer:** c

**Why:** Aphasia is not an adverse effect of this medication. An important group of adverse effects are called extrapyramidal effects and include **akathisia** (motor restlessness; person is unable to sit still), **dystonia** (muscle spasms in the upper body including face, tongue, neck, jaw and hyperextension of the neck, chest and back), **parkinsonism** (Parkinson-like symptoms; slow, shuffling gait) and **tardive dyskinesia** (abnormal lip smacking, tongue movement, chewing motion) (Bryant & Knights, 2011). Should these symptoms be present, an anticholinergic medication such as benztropine (Cogentin) should be administered to reduce the effect and motor stimulation (Bryant & Knights, 2011).

## PHASE 2

### Question 1

What is the correct term for 'hearing voices'?

a. Visual hallucination
b. Tactile hallucination
c. Auditory hallucination
d. Auxiliary hallucination

**Answer:** c

**Why:** Auditory hallucination is the term used to describe hearing voices, sounds or commands from people, sources or objects that are false or do not exist.

### Question 2

What is the primary effect 'hearing voices' is having on Michael's wellbeing?

a. Affecting his ability to enjoy an activity

b. Affecting his ability to cope
c. Affecting his ability to work
d. Affecting his ability to walk

**Answer:** b

**Why:** Many individuals with a mental health diagnosis may report hearing voices of known people such as dead family members or may hear voices that become a part of life and are not negative or impact their ability to live in the community. The hearing of unpleasant, negative or condescending voices can impact on an individual's ability to cope with a stressful situation or make appropriate decisions in everyday life due to constant negative voices or thoughts.

## PHASE 3

### Question 1

What is the purpose of a risk assessment?

a. To identify relevant past histories
b. To identify risks of harm to self and others
c. To classify risk factors
d. To classify past history risk

**Answer:** b

**Why:** The purpose of a risk assessment is to determine whether the individual poses a risk either to themselves or to others (Palmer, 2009). The risk assessment is designed to be able to prevent self-harm or harmful acts towards others rather than predict that these violent behaviours will manifest and, therefore, is a critical skill to develop when becoming a mental health nurse (Palmer, 2009).

### Question 2

What is crisis intervention management?

a. Preventing a crisis from occurring
b. Preventing violence from occurring
c. Supporting a violent person
d. Supporting an overwhelmed person

**Answer:** d

**Why:** The definition of 'crisis' will vary among people depending on their life experiences, behaviour and coping strategies (Morrison, 2009). Crisis intervention is the support required by a person who,

due to their definition of a crisis, feels overwhelmed and is unable to correct their situation (Palmer, 2009). The goal of crisis management is to locate and develop resources and strategies that can be used to help the person return to their pre-crisis level of functioning (Palmer, 2009).

# Case study
# Oxygenation 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Oxygen moves from the alveoli into the pulmonary capillaries by process of:

a. Osmosis
b. Diffusion
c. Bulk flow
d. All of the above

**Answer:** b

**Why:** When the partial pressure of oxygen in the alveoli is higher than the partial pressure of oxygen in the pulmonary capillaries, oxygen moves into the pulmonary capillaries to create an equilibrium of oxygen partial pressures across the membrane (Patton & Thibodeau, 2012). This process is diffusion (Patton & Thibodeau, 2012).

### Question 2

Which structure of the cardiopulmonary system pumps blood into the pulmonary circulation?

a. The right ventricle
b. The pulmonary vein
c. The left ventricle
d. The vena cava

**Answer:** a

**Why:** Blood flows from the capillary beds of the body through veins reaching the vena cava which delivers the deoxygenated blood to

the right side of the heart (Patton & Thibodeau, 2012). Blood travels through the right atrium to the right ventricle (Patton & Thibodeau, 2012). From there it is pumped into the pulmonary circulation through the pulmonary artery to the pulmonary capillaries (Patton & Thibodeau, 2012).

## PHASE 1

### Question 1

Cardiac output is determined by which of the following?

a. Heart rate and stroke volume
b. Heart rate and blood pressure
c. Blood pressure and peripheral vascular resistance
d. Preload and afterload

**Answer:** a

**Why:** The equation for determining cardiac output is:

Cardiac output = Heart rate × Stroke volume

It is a measure of the amount of blood the heart pumps in one minute, hence the use of counting the number of times the heart beats in one minute (the heart rate) and the amount of blood pumped out with each heart beat (the stroke volume).

### Question 2

Factors affecting stroke volume are:

a. Preload, afterload and contractility
b. Preload, afterload and blood pressure
c. The sinoatrial node, end diastolic volume and afterload
d. Blood pressure, preload and end diastolic volume

**Answer:** a

**Why:** Stroke volume refers to the amount of blood ejected from the left ventricle with each contraction (Patton & Thibodeau, 2012). It can be affected by: the preload, that is the volume of blood present at the end of diastole immediately before systole; the afterload, that is the amount of pressure the left ventricle must pump against in order to eject blood (equivalent to aortic blood pressure); and myocardial contractility, that is the ability of the heart to effectively contract during systole (Patton & Thibodeau, 2012).

# PHASE 2

## Question 1

A pulmonary embolism is likely to cause which of the following complications?

a. Stroke
b. Acute myocardial infarction
c. Hypotension
d. Deep vein thrombosis

**Answer:** c

**Why:** By blocking part of the pulmonary circulation, a pulmonary embolism inhibits the flow of oxygenated blood from the pulmonary capillaries to the left side of the heart (Patton & Thibodeau, 2012). The left ventricle receives this oxygenated blood and pumps it out through the aorta to the body tissues (Patton & Thibodeau, 2012). A reduction in the amount of blood the left ventricle receives results in a lower end diastolic volume, or preload, which in turn reduces stroke volume (Patton & Thibodeau, 2012). Cardiac output is measured by heart rate and stroke volume, hence a reduction in stroke volume results in reduced cardiac output, reflected in a lower blood pressure (Patton & Thibodeau, 2012). Compensatory mechanisms, such as the sympathetic nervous system, can increase heart rate in an attempt to maintain cardiac output and raise blood pressure.

## Question 2

Which of the following does the electrocardiogram show?

a. The mechanical function of the heart
b. The electrical activity in the body
c. The neurological input into the cardiac system
d. The electrical activity of the cardiac conduction

**Answer:** d

**Why:** The cardiac conduction system generates action potentials that transmit an electrical current across the cardiac muscle (Elliot et al., 2012; Guy, 2006). This is necessary for the rhythmic mechanical event of the heart: systole and diastole. The electrocardiogram (ECG) is an illustration of this electrical activity occurring in the heart (Guy, 2006). It is an important diagnostic tool in determining the health of this conduction system and can give an indication of the mechanical functioning of the heart (Guy, 2006).

# PHASE 3

## Question 1

What is the most appropriate delivery method for Steve's supplemental oxygen?

a. Nasal cannula
b. Venturi mask
c. Simple face mask/Hudson mask
d. Endotracheal intubation

**Answer:** c

**Why:** The simple face mask is appropriate for Steve as it is indicated for short-term oxygen therapy and delivers concentrations from 30% to 60%. Steve has no underlying conditions, such as chronic obstructive pulmonary disease (COPD), which would predispose him to carbon dioxide retention and contraindicate the use of a simple face mask (Copstead & Banasik, 2010). This mask is able to deliver the 6 L $O_2$ at an $FiO_2$ of 50%.

## Question 2

Supplemental oxygen is being used for Steve for which of the following reasons?

a. Steve is using his accessory muscles
b. Steve's ventilation is low due to the pulmonary embolism
c. Steve's perfusion is low due to the pulmonary embolism
d. All of the above
e. Both b and c

**Answer:** c

**Why:** The pulmonary embolism is partially blocking Steve's pulmonary capillary circulation. For optimal oxygenation to occur, the body requires adequate ventilation, the flow of inhaled air into the alveoli, and perfusion, blood flow through the pulmonary capillaries to the alveoli in order to reach the inhaled air in order for diffusion to occur and the blood to become oxygenated (Patton & Thibodeau, 2012). By blocking the pulmonary capillary circulation, Steve's perfusion is low. This means the oxygen levels in his blood will be lower, as reflected in his $SpO_2$. The air Steve inhales requires an optimal amount of oxygen in order to optimise the amount that is able to be diffused into the blood.

# Case study
# Oxygenation 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Why is Glenda tachycardic?

a. Sympathetic nervous system involvement
b. Glenda's blood pressure is low
c. There is an increased myocardial oxygen demand
d. All of the above
e. Both a and b

**Answer:** e

**Why:** Glenda has experienced an acute myocardial infarction located at her left ventricle. The resultant reduced pumping ability produces reduced stroke volume, which lowers cardiac output and blood pressure (Patton & Thibodeau, 2012). The sympathetic nervous system produces a compensatory mechanism to normalise cardiac output (Patton & Thibodeau, 2012). As cardiac output is determined by heart rate and stroke volume, a decrease in stroke volume requires an increase in heart rate. Hence Glenda's tachycardia is a result of low blood pressure and a sympathetic nervous system response.

### Question 2

Which of the following explains Glenda's hypotension?

a. Decreased pulmonary perfusion
b. Decreased stroke volume
c. Increased heart rate
d. Increased afterload

**Answer:** b

**Why:** The diagnosis of left ventricular myocardial infarction means the contractility of the left ventricle is likely to have been compromised, as infarcted and ischaemic tissue does not transmit electrical impulses easily and hence mechanical function can be affected (Copstead & Banasik, 2010). Stroke volume is affected by: preload, the volume of blood present in the left ventricle prior to systole; afterload, the

pressure the heart must pump against to eject blood; and myocardial contractility, the ability of the heart to contract effectively to eject blood. The infarcted tissue has affected the contractility of the left ventricle resulting in decreased stroke volume (Copstead & Banasik, 2010). The reduced volume of blood being pumped with each heart beat results in decreased blood pressure.

## PHASE 1

### Question 1

Recalling normal blood flow through the heart, an infarct to the left ventricle would cause which of the following?

a. Right ventricular failure
b. Congestion of blood flow in the systemic circulation
c. Congestion of blood flow in the pulmonary circulation
d. Decreased afterload

**Answer:** c

**Why:** Blood flow through the heart normally proceeds from the vena cava to the right atrium and ventricle to the pulmonary artery and pulmonary capillaries before returning to the heart through the pulmonary vein, to the left atrium and ventricle and being pumped out through the aorta to the rest of the body (Patton & Thibodeau, 2012). Any damage to the left ventricle caused by the infarct would mean a decreased pumping ability, causing congestion of blood flow backward of the left ventricle (Copstead & Banasik, 2010). This means congestion would occur through the pulmonary circulation as the left ventricle is unable to pump the volume of blood that is delivered to it.

### Question 2

Which of the following explains Glenda's decreased $SpO_2$?

a. Decreased pulmonary ventilation
b. Decreased pulmonary perfusion
c. Increased use of accessory muscles
d. All of the above
e. Both a and b

**Answer:** a

**Why:** The pulmonary congestion caused by the infarct to the left ventricle raises the pulmonary capillary hydrostatic pressure; this

forces fluid into the pulmonary interstitial space and in turn into the alveoli (Copstead & Banasik, 2010). With fluid present in the alveoli, inhaled air is unable to reach the respiratory membrane, resulting in a VQ mismatch with decreased pulmonary ventilation.

## PHASE 2

### Question 1

Repeat 12-lead ECGs are taken along with continuous ECG monitoring for which of the following reasons?

a. To monitor the progression of the infarct during Glenda's admission
b. To see the overall functioning of the cardiac conduction system
c. To determine the success of the prescribed treatment
d. All of the above
e. Both b and c

**Answer:** d

**Why:** Continuous cardiac monitoring is necessary as any acute changes in conduction are identified immediately. The continuous monitoring allows the viewing of Glenda's heart in one lead only. The 12-lead ECG gives a picture of the electrical activity of the heart as a whole (Guy, 2006). The intermittent 12-lead ECG recordings give information on the progression of Glenda's condition, the overall electrical activity of the heart and, ultimately, allow for health care staff to determine the success of the treatment received (Guy, 2006).

### Question 2

Which of the coronary arteries is likely to contain the thrombosis?

a. Left anterior descending
b. Right coronary artery
c. Circumflex artery
d. Left coronary artery

**Answer:** a

**Why:** The initial 12-lead ECG and subsequent ones showed significant changes in the ST segment and T waves of the left side of the heart and the anterior wall. As the left coronary artery supplies blood flow to this region, if this were blocked ECG changes would have been

evident in the septal area (Patton & Thibodeau, 2012; Guy, 2006). The left anterior descending supplies the anterior wall of the left ventricle, making this the most likely coronary artery to contain the thrombosis.

## PHASE 3

### Question 1

Which of the following modifiable risk factors has been identified for Glenda?

a. Hypertension
b. A raised body mass index (BMI)
c. Sedentary lifestyle
d. All of the above

**Answer:** d

**Why:** It was stated that Glenda has a BMI of 34 kg/m$^2$, indicating her increased risk for cardiovascular disease as well as diabetes and hypertension, which also independently contribute to the development of cardiovascular disease and complications thereof. Glenda has mentioned she does not do much exercise other than walking the short distance to her book club meeting once per month. This indicates a sedentary lifestyle, which is a determinant of poor health in general but also an independent modifiable risk factor for cardiovascular disease.

### Question 2

Which of the following should be included in Glenda's patient education prior to discharge?

a. Modifiable risk factors for cardiovascular disease
b. Importance of regular blood pressure and lipid monitoring
c. Management strategies including diet and exercise
d. All of the above

**Answer:** d

**Why:** Glenda should be comprehensively assessed prior to discharge to identify her personal modifiable risk factors, which would then form part of her education. Blood pressure and blood lipid levels should be monitored regularly to determine if management strategies are effective and her ongoing risk for future cardiac events. Glenda also needs to be included in a management plan that includes information about appropriate diet and realistic exercise to reduce

modifiable risk factors and avoid future complications. Education should also have a multidisciplinary, team approach to ensure Glenda receives the best information possible.

# Case study
# Pain management 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What are the three types of pain?

a. Acute, chronic, visceral pain
b. Acute, chronic, somatic pain
c. Acute, chronic, cancer pain
d. Acute, chronic, continuous pain

**Answer:** c

**Why:** The three types of pain are described as: **acute pain**, pain that is sudden and initiates a protective mechanism to prevent further injury; **chronic pain**, pain that last longer than 6 months; and **cancer pain**, pain that is caused by the growth of the tumour and any related pathology.

### Question 2

When should you complete your initial pain assessment?

a. Before you complete your vital signs
b. After you complete your vital signs
c. While you are completing your vital signs
d. You do not need to complete vital signs

**Answer:** c

**Why:** Pain is considered the fifth vital sign. A pain assessment can be completed at any stage in the patient's management; however, the initial pain assessment should be completed as part of your vital signs. Once you have established that the patient has pain, a more in-depth assessment of the patient's pain can be completed to gather further information, including various assessment methods such as aetiology, time of onset, duration, type, severity (Jarvis, 2008).

# PHASE 1

## Question 1

What is the purpose of the Numerical Pain Intensity Scale?

a. Rate pain
b. Quantifies pain
c. Assesses pain
d. Diagnoses pain

**Answer:** b

**Why:** Pain rating scales are uni-dimensional and are designed to quantify pain so that it reflects the intensity of the pain that the patient is reporting (Jarvis, 2008). A numeric pain rating scale can be used to establish a baseline and track changes in patient pain levels and provides an evaluation tool to assess the effectiveness of a pain management intervention (Jarvis, 2008).

## Question 2

Which best describes the type of pain the patient is describing?

a. Acute/cancer pain
b. Acute/chronic/cancer pain
c. Chronic pain
d. Acute pain

**Answer:** d

**Why:** Acute pain is defined by the sudden onset of severe discomfort, with protective function and an obvious source (cause of injury) (Bryant & Knights, 2011). Acute pain can cause behavioural changes such as withdrawing from the source of the pain, guarding or trying to protect the body from the source of the injury or subsequent injury of the affected area and verbal response such as crying or screaming (Bryant & Knights, 2011). Visual effects of acute pain can be seen by changes in facial colour—pale face or pallor, obvious signs of agitation and restlessness, perspiration despite actual room temperature and tachycardia (Bryant & Knights, 2011).

# PHASE 2

## Question 1

Based on your assessment of Donna's pain, which medication would be the most appropriate?

a. Panadeine Forte

b. Paracetamol
c. Morphine
d. Tramadol

**Answer:** c

**Why:** The provision of pain medication is a fundamental responsibility for nurses providing care to patients reporting that they are in pain (Kotalik, 2012). Morphine is describes as the 'gold standard' in analgesia (Bryant & Knights, 2011; Pattison, 2008) and is commonly used in clinical practice for the treatment of moderate to severe pain (Bryant & Knights, 2011). Morphine is the main opioid used for the treatment of pain in surgical and oncological patients (Pattison, 2008).

### Question 2

Which medication route has the slowest onset?

a. Oral (O)
b. Subcutaneous (S/C)
c. Intravenous (IV)
d. Intramuscular (IM)

**Answer:** a

**Why:** Medication can be administered through a variety of different methods. The oral route is the preferred method of medication administration but is the slowest route for the administration of medication (Bryant & Knights, 2011). Oral medication can take 30–60 minutes for the medication to be metabolised and for the patient to feel the effects of the medication (Bryant & Knights, 2011). Furthermore, oral medications can require higher doses (30 mg of oral morphine is thought to be equivalent to 10 mg morphine IV) and, after they are metabolised, they may not be as strong compared to other routes of medication and may not ameliorate moderate to severe pain (Bryant & Knights, 2011; Ersek et al., 2008).

## PHASE 3

### Question 1

Why would you give the lower dose of morphine?

a. The patient is not used to a higher dose (opioid naïve)
b. The patient is used to a higher dose (drug dependent)

c. The patient doesn't need the higher dose
d. The patient didn't ask for the higher dose

**Answer:** a

**Why:** Morphine has several adverse effects when administered. These effects can include drowsiness, nausea, vomiting, tachycardia and making a patient feel worse (Bryant & Knights, 2011). Morphine when used in low doses has the advantage of allowing the patient to tolerate the dose, and the medication is titrated to provide analgesic effect (Mercadante et al., 2006). It minimises the adverse effects when the dose is titrated according to the patient's previous exposure to opioid medication and pain level (Bryant & Knights, 2011).

### Question 2

Morphine can cause sedation, bradycardia and …?

a. Hypothermia
b. Hypotension
c. Hypothyroidism
d. Hypoglycaemia

**Answer:** b

**Why:** Morphine is a strong agonist analgesic that causes physiological responses when it activates mu (μ) and kappa (κ) opioid receptors (Bryant & Knights, 2011). When the μ-receptor and κ-receptor are activated by morphine, it can lead to sedation, respiratory depression and, in 'higher' doses (or normal doses when considering an opioid naïve patient), cause hypotension and bradycardia when modulated by the medulla (Bryant & Knights, 2011).

# Case study
# Pain management 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which is an accurate definition of pain?

a. Protective physiological mechanism
b. Neurological physiological mechanism

c. Subjective physiological mechanism
d. Objective physiological mechanism

**Answer:** a

**Why:** Pain is a protective physiological mechanism that prevents further damage to the body. The protective physiological response results in a change in behaviour, such as not walking on an injured ankle or guarding an injured limb, and prevents knowingly harming yourself.

### Question 2

Name the four stages for the transmission of nociceptive pain:

a. Transmission, perception, modulation and transduction
b. Perception, transmission, transduction and modulation
c. Modulation, transmission, transduction and perception
d. Transduction, transmission, perception and modulation

**Answer:** d

**Why:** Nociceptive pain is the physiological pain that is experienced as a result of stimulation of superficial or deep 'pain' receptors (nociceptors) by noxious stimuli (Bryant & Knights, 2011). The transmission of nociceptive pain is identified by the following stages: **transduction** begins at the peripheries when the nociceptors in the sensory nerve fibres respond to a painful stimulus; neuroregulators effect the **transmission** of the pain stimulus and play a key role in the pain process; **perception** is the point at which you become aware that you have been injured—the painful stimulus has reached the spinal cord and is transmitted to the thalamus and the midbrain; and **modulation** occurs when neurons in the spinal cord that originate in the brain stem release serotonin, noradrenaline and endogenous opiates that inhibit the transmission of pain and provide an analgesic effect (Jarvis, 2008).

## PHASE 1

### Question 1

Pain assessment identifies the following …?

a. Location, onset, characteristic, severity, patterns
b. Location, object, characteristic, severity, patterns
c. Location, onset, colour, severity, patterns
d. Location, object, colour, severity, patterns

**Answer:** a

**Why:** When performing a set of vital signs, nurses include a pain score as part of that assessment process (Jarvis, 2008). A pain score provides some information about the severity of the pain, but does not provide detailed information that could be used to diagnose the patient or inform the care you will provide (Jarvis, 2008). In order to gather further details from the patient, a pain assessment needs to be completed. The following areas should be considered when assessing pain: **location**—the source of the pain?; **onset**—the time the pain started?; **characteristic**—what does the pain feel like?; **severity**—how bad is the pain?; **patterns**—is there a particular time or activity that causes the pain? (Jarvis, 2008; Weber & Kelley, 2007).

### Question 2

Which best describes the type of pain associated with this scenario?

a. Acute/cancer pain
b. Acute/chronic/cancer pain
c. Chronic/cancer pain
d. Acute/chronic pain

**Answer:** c

**Why:** Cancer pain can be combined with either acute or chronic pain. The past history of 2 years of oncological related pain identifies that the pain currently being managed for this patient is described as chronic/cancer pain. The two separate types of pain may have separate causes, which the nurse will need to be aware of when planning and implementing care for this patient (Jarvis, 2008).

## PHASE 2

### Question 1

Why would changing the route of administration benefit Wendy?

a. IM or S/C medications are stronger
b. IM or S/C medications have a faster onset time
c. IM or S/C medications should be used for cancer pain
d. IM or S/C medications are quicker to administer … you are busy

**Answer:** b

**Why:** The use of medications is based on administering the medication so that it will have the desired effect, with minimal adverse effects (Bryant & Knights, 2011). Breakthrough pain relief

medication is designed to provide analgesia when the regular analgesia (usually slow release) medication is not therapeutic. Breakthrough medications need to take effect quickly. Oral medication can take over 30 minutes to take effect; however IM, IV or S/C medications have a quicker onset time and will treat the pain faster and more efficiently (Bryant & Knights, 2011).

### Question 2

Which definition best describes adjuvant medication?

a. Superior analgesic medication
b. Inferior analgesic medication
c. Partial analgesic medication
d. Co-analgesic medication

**Answer:** d

**Why:** Adjuvant medication, also called co-analgesic medication, can be used to enhance pain relief and to treat pain symptoms (Bryant & Knights, 2011). It can be used in combination with opioids and includes medications such as non-steroidal anti-inflammatories (NSAIDs), anti-convulsants, tricyclic antidepressants and corticosteroids (Bryant & Knights, 2011). Adjuvant treatments or adjuvant care can refer to a number of interventions that are prescribed in conjunction with surgical interventions to treat cancer-related pain (Gärtner et al., 2009). Adjuvant radiotherapy and chemotherapy have been shown to provide relief from chronic pain post breast cancer surgery; often, neuropathic pain can be reported which is most likely to be related to an intraoperative injury of the intercostal-brachial nerve (Gärtner et al., 2009).

## PHASE 3

### Question 1

What does PCA stand for?

a. Patient centred analgesia
b. Patient controlled analgesia
c. Patient centred assessment
d. Patient controlled assessment

**Answer:** b

**Why:** Patient controlled analgesia (PCA) is a term used for the administration of pain relief medications that are provided by either

continuous infusion, on demand or both. Wendy's pain has started to become difficult to control because of the irregular changes in severity. Using continuous infusion provides her with a constant therapeutic dose (pain relief) of morphine that limits the episodes of uncontrolled pain due to peaks and troughs in the pain that Wendy experiences (Ersek et al., 2008). Should the demand for pain relief exceed the analgesic effect of the PCA, then an additional 5 mg bolus of morphine should provide her with pain relief (Bryant & Knights, 2011).

### Question 2

What are the two basic principles of good analgesia in cancer pain?

a. Regular administration and concentration of medication dose
b. Regular administration and management of medication dose
c. Regular administration and titration of the medication dose
d. Regular administration and assessment of the medication dose

**Answer:** c

**Why:** The two basic principles include regular administration of medication over a 24-hour period and titration of the medication dose so that it meets the needs of the patient (Ersek et al., 2008). The selected method of analgesia, such as a PCA infusion or syringe driver, should provide adequate pain relief and maintain therapeutic blood levels (therapeutic window) so that the patient is provided with continuous analgesia, and not on an as-needs basis (Ersek et al., 2008), that will prevent withdrawal symptoms due to irregular administration (Graber O'Brien, 2008).

# Case study
# Skin integrity 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

A superficial wound penetrates the surface to which segment of the integument:

a. Epidermis
b. Dermis

c. Subcutaneous
d. Muscle

**Answer:** a

**Why:** Superficial wounds are contained in the upper region of the skin; the epidermal layer is generally the only section affected. Blood supply to the area comes from the dermal capillary bed and is hence unaffected, meaning healing can be viewed optimistically provided the wound is managed effectively.

### Question 2

How would you classify this wound?

a. Closed
b. Open
c. Perforating
d. Clean

**Answer:** b

**Why:** Given the options here, this wound should be classified as 'open'. There is obvious tissue trauma and, though the ends of the wound are able to be approximated, there is a definite break in the skin and mucosal membranes. There are many ways of classifying wounds; this should be reviewed as one wound can be classified in several ways. Stephen-Haynes (2011) discusses the specific classification of skin tears according to the Skin Tear Audit Research (STAR) classification system that is emerging in current practice.

## PHASE 1

### Question 1

This initial management strategy for the skin tear is an example of:

a. Proliferation
b. Maturation
c. Healing by primary intention
d. Healing by secondary intention

**Answer:** c

**Why:** There is no evidence of tissue loss here and the skin flap resulting from the skin tear is able to cover the entire wound base. This means the wound is healing by primary intention as the edges of the wound are approximated.

## Question 2

Potential for infection during your initial treatment of this wound is likely to come from which of the following sources:

a. Patient's normal flora/opportunistic infection
b. Improper aseptic technique used in cleaning and dressing the wound
c. The patient's high blood pressure
d. The patient's history of T2DM

**Answer:** b

**Why:** Aseptic technique refers to the practices that keep a patient free from infection of microorganisms, including wound cleaning and dressing using the 'non-touch technique'. Poor adherence to this in the management of wounds is a major contributor to infection.

# PHASE 2

## Question 1

How might this patient's past medical history of T2DM contribute to poor healing of this skin tear?

a. By weakening the dermal–epidermal junction
b. By inhibiting the growth of new tissue
c. By introducing microorganisms into the wound bed
d. By compromising peripheral blood supply

**Answer:** d

**Why:** Consistently high or unstable blood glucose levels lead to macrovascular and microvascular complications (Copstead & Banasik, 2010). Hyperglycaemia has been shown to disrupt platelet function, affecting the clotting cascade, and inhibit the growth of basement membranes, essential for optimal wound healing (Copstead & Banasik, 2010). The presence of advanced glycosylated end products, as a result of poorly controlled diabetes, also contributes to the thickening of capillary basement membranes and the compromise of peripheral blood supply (Copstead & Banasik, 2010).

## Question 2

Which of the following is the likely exudate from this wound bed?

a. Serous
b. Purulent

c. Haemoserous
d. Sanguinous

**Answer:** b

**Why:** The exudates from this wound are described as thick and yellow. This indicates an infection and the presence of pus in the discharge as a means of the body fighting the infection present. Discharge containing pus in an infected wound is called purulent exudates.

## PHASE 3

### Question 1

As this initially minor wound has escalated into a chronic ulcer, this patient's quality of life will be affected. Which of the following is the patient most likely to experience?

a. Disfigurement
b. Chronic pain
c. Disability
d. All of the above

**Answer:** d

**Why:** This patient initially sought treatment for a small skin tear to the right shin, which has now developed into a chronic ulcer complicated by infection and poorly controlled T2DM. Given the location of this wound, the patient is likely to experience some level of disability compared with the activities she was able to undertake prior to the development of the wound. As the wound has become an open, infected wound, the patient is likely to experience pain in the area with potentially elevated pain levels during dressing changes. Finally, this patient's past history of T2DM has the potential to impair wound healing, meaning this patient will experience disfigurement for the duration of the wound's presence. The formation of scar tissue as a result of the wound also has the potential to cause disfigurement. These issues impact on the quality of life the patient is able to experience and also have implications for the patient's mental health.

### Question 2

Which of the following is the most important element of education for this patient upon discharge to avoid future ulcers from forming?

a. Nutrition
b. General hygiene

c. Measures to reduce development of wounds
d. Control of her T2DM

**Answer:** c

**Why:** While all topics listed here should be included in the education given to this patient when she is discharged from hospital, acquiring skills and knowledge on how to avoid the development of wounds is paramount to the prevention of further ulcers. All patients with T2DM have the potential for developing microvascular complications that can result in the development of ulcers and complex wounds (Copstead & Banasik, 2010). By working with the patient to assist them in developing skills, such as assessing their skin condition and protecting vulnerable areas of their skin, skin tears and minor injuries can be prevented, thus avoiding the initial trigger in the ulcer formation.

# Case study
# Skin integrity 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of the following pressure area risk factors does Albert have?

a. Albert has a fractured femur
b. Albert's BMI is 31
c. It took over an hour for Albert to attend hospital
d. All of the above
e. Both a and b

**Answer:** e

**Why:** Albert is immobilised and restricted to bed rest while he in is traction with his fractured femur. Decreased mobility and activity are high risk factors for the development of pressure areas. If the patient remains in the same position with pressure on that area, especially over bony prominences, they are at risk of tissue breakdown due to inhibited blood flow. Albert's BMI is in the overweight range, meaning he has a larger amount of weight pressing down, which increases the potential for skin breakdown and pressure area development.

This BMI also puts him at risk of cardiovascular disease, diabetes and hypertension, which can also increase the risk of pressure area development due to impaired perfusion.

### Question 2

Which of the following nursing interventions can assist in preventing pressure areas?

a. Twice daily massage of any areas under pressure
b. Monitoring the patient's nutrition and hydration
c. Administering the patient's medications
d. All of the above

**Answer:** b

**Why:** By monitoring the nutrition and hydration of the patient, the nurse can ensure appropriate intake of vitamins and nutrients to preserve skin integrity. Referral should be made to a dietitian if there are any concerns about the patient's nutritional status.

## PHASE 1

### Question 1

When assessing Albert's pressure area, which of the following should be considered?

a. Aetiology of the wound
b. Patient's past medical history
c. The length, depth and width of the wound
d. The surrounding skin
e. All of the above

**Answer:** e

**Why:** All wounds, including pressure areas, should have a comprehensive assessment made. This includes attempting to determine the cause of the pressure area, which usually involves the completion of a risk assessment tool. Assessing the patient's past medical history can identify contributing risk factors for pressure area development as well as potential complicating factors in the healing process. The dimensions of the wound should be assessed to determine staging, which impacts treatment. A close assessment of the surrounding skin is valuable in determining treatment and dressing choices as well as the potential for expansion of the pressure area.

## Question 2

How would you classify Albert's pressure area?

a. Stage 1
b. Stage 2
c. Stage 3
d. Stage 4

**Answer:** b

**Why:** The wound is open and the bed is a pink-red colour; there is no sloughy tissue present. There is no obvious subcutaneous tissue visible. There is a small amount of serous exudate from the wound. This indicates a stage 2 pressure ulcer, with some loss of dermal tissue.

# PHASE 2

## Question 1

Which of the following is achieved by providing Albert with an appropriate support surface on his bed?

a. Reduction in body weight
b. Reduction in pain in the pressure area
c. Assistance in repositioning
d. Reduction in friction and shear

**Answer:** d

**Why:** An optimal support surface relieves pressure, shear and friction and also maintains a stable skin temperature to reduce perspiration and moisture. The support surfaces, while not reducing body weight, distribute the weight over a larger surface area, thus relieving pressure on common body prominences. It is important to remember that providing optimal support surfaces alone does not eliminate the risk of pressure areas and should be included in a comprehensive plan to prevent pressure area formation.

## Question 2

What is the main aim of the dressing for Albert's pressure area? Select the most appropriate answer.

a. To reduce pain
b. To prevent expansion of the pressure area
c. To protect from infection
d. To encourage healing by primary intention

**Answer:** c

**Why:** The location and classification of Albert's wound increase his risk for infection—the sacrum is in close proximity to faeces and urine, which can cause and encourage opportunistic infection. The dressing chosen is an adhesive, occlusive dressing designed to stay in place until removed at the time of dressing change and wound cleaning. While other treatment measures are aimed at reducing pain and preventing expansion of the pressure area, the main aim of the dressing chosen is to protect the wound area from infection.

## PHASE 3

### Question 1

Albert's wound is likely to cause which of the following?

a. Infection
b. Dehiscence
c. Evisceration
d. Fistula formation

**Answer:** a

**Why:** As Albert has an open pressure area on his sacral region, the most likely complication (in the short term) is infection. Open wounds are more susceptible to infection than closed wounds due to the fact that the skin integrity is compromised and the barrier for infection lost. This sacral wound is also in close proximity to a source of bacteria known to cause opportunistic infection.

### Question 2

Which of the following health care personnel should be involved in the care of Albert's pressure area?

a. Doctor
b. Nutritionist
c. Pharmacist
d. Occupational therapist
e. All of the above
f. Both a and b

**Answer:** e

**Why:** The treatment of patients with pressure areas requires a holistic and multidisciplinary approach. Nurses are responsible for several aspects of care, including bedside care, patient management,

dressings, positioning and hygiene. In addition to this many other assessments and interventions may become necessary including medical intervention such as surgery, adequate nutrition and hydration ensured, medications reviewed, mobility, cognition and the patient's ability to care for themselves.

# Case study
# Urinary elimination 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of these is **NOT** a problem with the urinary system?

a. Cystitis
b. Urethritis
c. Trigonitis
d. Prostatitis

**Answer:** d

**Why:** Prostatitis refers to inflammation of the prostate. The prostate is a donut-shaped gland that surrounds the urethra in men only and, although it can impair urinary function, the prostate gland is not part of the urinary system. It plays a role in reproduction (Tortora & Derrickson, 2006).

### Question 2

What is the most likely cause of her pain?

a. Pyelonephritis
b. Urinary tract infection
c. Pregnancy
d. Cystitis

**Answer:** b

**Why:** Approximately 250,000 Australian women develop a urinary tract infection (UTI) each year (Newman & Bonner, 2008). Bacteria enter the urethra via the meatus and travel up the urethra to the mucosal layers of the bladder (Pisani et al., 2009; Newman & Bonner,

2008). UTIs are common in women due the close proximity of the urethral meatus to the anus, and the shortness of the urethra in women is another cause that makes women more susceptible to infections (Newman & Bonner, 2008; Pisani et al., 2009; Reid-Searl, 2010).

## PHASE 1

### Question 1

Which of the following are indicators of infection on a urinalysis?

a. pH
b. Ketones
c. Nitrites
d. Glucose

**Answer:** c

**Why:** Dipstick urinalysis is performed to identify if there are any signs of infection. The presence of nitrites (bacteria that cause UTIs make enzymes that change urinary nitrates to nitrites) is found in the presence of bacteriuria. Leucocytes (the leucocyte esterase enzyme is present in white blood cells) are also present, indicating pyuria (pus in the urine) (Pisani et al., 2009).

### Question 2

What urine test would be appropriate, given the presenting complaint?

a. Sodium osmolality
b. hCG
c. Oestrogen levels
d. Specific gravity

**Answer:** b

**Why:** hCG or human chorionic gonadotrophin is a hormone that is released during embryo development that can be detected on urinalysis to establish if the patient is pregnant (Cole, 2010). When a woman of child-bearing age presents with abdominal pain, it is vital that an hCG test or pregnancy test is performed to rule out that the patient is pregnant. An ectopic pregnancy can be a differential diagnosis to consider for abdominal pain. Women also suffer from urinary frequency during their first trimester (Weber & Kelley, 2007).

# PHASE 2

## Question 1

What strategies could be suggested to prevent the reoccurrence of a UTI?

a. Emptying bladder and bowel regularly
b. Cleaning the perianal area front-to-back
c. Drinking an adequate amount of fluid
d. All of the above

**Answer:** d

**Why:** The urinary tract is a sterile system that utilises a series of physiological and mechanical defence mechanisms designed to maintain the sterility of the area and prevent colonisation by foreign microorganisms (Pisani et al., 2009). Microorganisms usually enter through the urethral meatus and migrate up the urethra into the bladder. By emptying your bladder and bowel the natural process of urination flushes the urethra with acidic urine propelled by urethral peristalsis (Pisani et al., 2009). Cleaning the perianal area by wiping front-to-back after urination and defecation prevents bacteria and faecal matter from entering the urethra, and adequate fluid intake promotes regular urination, limiting the time for bacterial colonisation in the bladder epithelium (Pisani et al., 2009).

## Question 2

How much fluid should she be drinking per day if she weighs 96 kg?

a. 2550 mL
b. 2000 mL
c. 2880 mL
d. 3110 mL

**Answer:** c

**Why:** The recommended fluid intake for an adult who weighs 96 kg is calculated as approximately 30 mL per kilogram of body weight per day ($30 \times 96 = 2880$ mL) (Pisani et al., 2009). Catherine obtains 20% of her daily fluid intake from the foods that she will ingest. This amount (576 mL) will leave approximately 2304 mL of fluids that Catherine should be drinking (approximately nine 250-mL glasses) per day to reach her required daily fluid intake (Pisani et al., 2009).

# PHASE 3

## Question 1

What could be the cause of her temperature?

a. Urological instrumentation
b. Urosepsis
c. Nephritis
d. Urethritis

**Answer:** b

**Why:** Urosepsis is the result of bacteriuria (bacteria in the urine) that enters the blood stream and kidneys (Pisani et al., 2009). The past history of a recent UTI worsens to include new symptoms such as fever, chills and lower back or flank pain (Pisani et al., 2009).

## Question 2

What would be an appropriate treatment plan for Catherine?

a. Antibiotics
b. Adequate fluid intake
c. Urinary alkaliniser
d. All of the above

**Answer:** d

**Why:** A collaborative approach to treatment would be appropriate. Trimethoprim–sulfamethoxazole for 1–3 days to treat the infection is the antibiotic commonly prescribed for UTIs (Bryant & Knights, 2011). By increasing the fluid intake, the natural process of urination provides regular 'flushes' of the urethra removing colonising bacteria and preventing recolonisation (Pisani et al., 2009). Infection leads to inflammation of the bladder epithelium. A urinary alkaliniser, such as Ural, decreases the acidity of the urine so that the inflamed area does not come into contact with pH levels <6 (Bryant & Knights, 2011).

# Case study
# Urinary elimination 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

What do you think is the most likely cause for his pain?

a. Urinary tract Infection
b. Pyelonephritis
c. Urinary retention
d. Perforated bowel

**Answer:** c

**Why:** Urinary retention caused by a urethral obstruction most likely secondary to trauma. The urine accumulates in the bladder, eventually stretching the wall of the bladder, increasing pressure, discomfort and tenderness of the suprapubic region of the abdomen (Pisani et al., 2009).

### Question 2

After completing your primary survey, what is your next nursing priority?

a. Secondary survey
b. Pain relief
c. Abdominal assessment
d. Tea break

**Answer:** b

**Why:** Pain relief would be the next priority. When a patient is in severe pain, it can prevent or impair further assessments from occurring (Jarvis, 2008). The pain in this case is the result of an obstruction in the urinary system resulting in the inability to pass urine. Providing analgesia may not be effective in this situation; instead, the obstruction needs to be resolved and the bladder drained. Urinary retention is a medical emergency; urgent insertion of an indwelling catheter by appropriately trained medical or nursing staff is required (Newman & Bonner, 2008).

# PHASE 1

## Question 1

What would be the maximum volume that the bladder can hold in an average adult?

a. 500–1000 mL
b. 1000–1500 mL
c. 1500–2000 mL
d. 2000–3000 mL

**Answer:** d

**Why:** The bladder is a hollow organ responsible for the collection of urine prior to excretion. The normal capacity of the bladder is between 300 mL and 600 mL (Reid-Searl, 2010). However, in extreme cases of urinary retention the bladder can stretch to accommodate 2000–3000 mL (Pisani et al., 2009).

## Question 2

What is the normal urine output per hour for an adult?

a. 30–40 mL/h
b. 35–45 mL/h
c. 40–50 mL/h
d. 45–55 mL/h

**Answer:** a

**Why:** The kidneys produce 30–40 mL of urine per hour (0.5 mL/kg/h) in an average size adult. Depending on the amount of fluid intake an adult can produce 1500–1600 mL in a 24-hour period. The length of time between the time that the patient last voided and presentation is important to document when assessing a patient with potential urinary retention (Pisani et al., 2009).

# PHASE 2

## Question 1

What is the most common adverse outcome from IDC insertion?

a. Urethral trauma
b. Infection
c. False passage formation
d. Non-compliance

**Answer:** b

**Why:** The most common adverse outcome is infection. The insertions of an IDC increases the incidence of nosocomial infection in patients and potentially can increase their length of stay and, therefore, should not be used routinely or to ease the workload of the nurse or family but when clinically indicated. Best practice states that an IDC should not remain in situ for longer than 3 days in order to prevent infection (Pisani et al., 2009).

### Question 2

When does the risk of complications increase due to a long-term IDC?

a. Immediately
b. < 30 days
c. 30 days
d. > 30 days

**Answer:** d

**Why:** The risk of complication increases when an IDC has been in situ for over 30 days. The position of the catheter breaches the body's natural defence mechanism and allows a port of entry into the body for microorganisms, leading to nosocomial urinary infections or urosepsis (Newman & Bonner, 2008). The nurse monitoring Stephen overnight will be responsible for his safety and comfort and prevention of infection by keeping the area clean (Newman & Bonner, 2008).

## PHASE 3

### Question 1

What is a trial of void?

a. Urinalysis
b. Ability to urinate
c. 24/24 hour urine collection
d. Nosocomial infection

**Answer:** b

**Why:** A trial of void is the ability to urinate once an IDC is removed. The potential for urinary retention to reoccur is common once the catheter has been removed (Pisani et al., 2009). If the cause of the initial obstruction is not resolved (e.g. a benign prostatic hyperplasia) or trauma to the urinary sphincter/bladder spasms occur the patient is likely to fail the trial of void and another catheter will need to be inserted, potentially causing more urethral trauma and increasing the risk of infection (Pisani et al., 2009).

### Question 2

What is a post void residual (PVR)?

a. Residual amount of urine left in the catheter after removal
b. The difference between total fluid input and total fluid output
c. Residual amount of urine left in the bladder after removal
d. The difference between the 12-hourly fluid balance and the 24-hourly fluid balance

**Answer:** c

**Why:** The PVR is the amount of fluid left in the bladder after urination. PVRs are checked after the removal of a catheter to discover whether the patient is adequately emptying their bladder (Reid-Searl, 2010). After the nurse has removed the IDC they need to assess the patient's ability to void, taking note of the amount of fluid that is excreted (Reid-Searl, 2010). The PVR is the amount that is remaining in the bladder after this initial void post IDC removal and will need to be documented. The time and the amount need to be recorded for at least 24 hours and the nurse must report PVRs that are >100 mL as this alerts to the potential reoccurrence of urinary retention (Newman & Bonner, 2008; Pisani et al., 2009; Reid-Searl, 2010).

# Case study
# Vital signs 1

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of the following should be included in taking the patient's history before vital sign measurement?

a. Recent activity
b. Medication use
c. Previous medical history
d. All of the above

**Answer:** d

**Why:** Recent physical activity increases metabolic rate. This necessitates a rise in heart rate, blood pressure and respiratory rate to meet the oxygen demands of the tissues. It is vital to include

questions about recent activity in the patient's history interview. Many medications, such as antihypertensives, can affect vital signs. This information must be taken into account, along with the patient's past medical history, to ensure accurate interpretation of the vital sign measurements relative to that particular patient.

### Question 2

Which of the following health care professionals are in the best position to analyse and interpret vital sign measurements?

a. Nurse
b. Doctor
c. Physiotherapist
d. Pharmacist

**Answer:** a

**Why:** The nurse is generally responsible for the regular assessment of the patient's vital signs, possessing both the responsibility and the knowledge of the accuracy of the measurements. The nurse is also responsible for the management of the patient and is at the patient's bedside for a longer period of time than other health care workers listed here. This gives the nurse a clear understanding of the patient's condition and the ability to analyse and interpret vital sign measurements in context.

## PHASE 1

### Question 1

Why is it important to actively warm this patient?

a. To maintain basal metabolic rate
b. To improve the functioning of the hypothalamus
c. The patient's temperature is 34.3°C
d. To prevent diaphoresis

**Answer:** c

**Why:** The low temperature of this patient indicates the patient is hypothermic. Warmed IVT and external warming methods such as warmed blankets and devices such as a 'Bair Hugger' should be used to raise core temperature. Serious sequelae such as coagulopathies, acidosis, decreased myocardial contractility and higher risk of mortality have been associated with trauma patients who are hypothermic (Ireland et al., 2011).

### Question 2

What complication may occur if hypothermia is not treated and temperature continues to decrease?

a. Headache
b. Dysrhythmia
c. Hypotension
d. Increased intracranial pressure

**Answer:** b

**Why:** It has been found that cardiac dysrhythmias begin to develop with increasing hypothermia, becoming critical when core temperature approaches 30°C, with ventricular fibrillation the most serious complication of untreated hypothermia (Caroselli et al., 2009).

## PHASE 2

### Question 1

Which of the following can explain the patient's tachycardia?

a. Hypotension
b. Hypothermia
c. Hypoxia
d. Tachypnoea

**Answer:** a

**Why:** The patient's cardiac output is determined by heart rate and stroke volume, represented in the formula:

Cardiac output = Heart rate × Stroke volume

Cardiac output is reflected in the patient's blood pressure; if cardiac output drops, blood pressure will decrease. The patient's large blood loss has resulted in decreased venous return to the heart and decreased preload, resulting in a reduced stroke volume. Hence, to maintain cardiac output, the heart rate must increase.

### Question 2

Which of the following pulse sites is the most appropriate to use in the initial assessment of this patient to ensure accurate heart rate measurement?

a. Radial
b. Brachial

c. Dorsalis pedis
d. Carotid

**Answer:** d

**Why:** The blood loss and hypotension in this patient mean that the more peripheral pulses can give an inaccurate measurement of heart rate (Elliot et al., 2012). The carotid pulse is a central pulse, likely to give the most accurate heart rate measurement, given the patient's current condition.

## PHASE 3

### Question 1

Which of the following is the most likely cause of the patient's hypotension?

a. Tachycardia
b. Decreased GCS
c. Decreased afterload
d. Decreased venous return

**Answer:** d

**Why:** Cardiac output is a measure of heart rate multiplied by stroke volume and is reflected in the patient's blood pressure: the lower the cardiac output, the lower the blood pressure. Stroke volume is affected by preload, afterload and contractility of the heart. The patient has lost a lot of blood, meaning venous return to the heart is low; this decreases preload and, in turn, stroke volume. Therefore, the decreased venous return caused by the bleeding is the most likely cause of the patient's hypotension.

### Question 2

Which of the following considerations should the nurse be aware of when measuring blood pressure for this patient?

a. Cuff is too wide
b. Cuff deflating too quickly
c. Stethoscope pressed too firmly against the skin
d. The arm is above the level of the heart
e. All of the above

**Answer:** e

**Why:** All of these considerations can result in low systolic blood pressure readings and are common mistakes made in the measurement of blood pressure. These are considerations to apply to any patient scenario, but are imperative to this patient, given the status of hypovolaemic shock. It is essential to have regular, accurate blood pressure measurement to monitor the patient's condition and the degree of success of treatment.

# Case study
# Vital signs 2

## INTRODUCTION: PRESENTING CONDITION AND SYMPTOMS

### Question 1

Which of the following features of fever are pertinent to this patient?

a. Increased metabolic rate
b. Increased insensitive fluid loss
c. Increased blood pressure
d. All of the above

**Answer:** a

**Why:** In an otherwise healthy person, the development of a fever for a patient with pneumonia can be beneficial in fighting the infection. For every 1°C above average, there are associated physiological changes. For this patient, the increased metabolic rate allows for an increased cellular metabolism, which allows the body to fight infection as well as creating a hostile environment for the microbe.

### Question 2

Which of the following interventions is/are aimed at reducing the patient's temperature?

a. Paracetamol
b. Blood culture collection
c. Antibiotic administration
d. All of the above
e. Both a and c

**Answer:** e

**Why:** Paracetamol is classified as a non-steroidal anti-inflammatory drug (NSAID). Due to its inhibition of prostaglandin synthesis in the central nervous system, one of its actions is an antipyretic effect (Bryant & Knights, 2011). Antibiotic therapy is aimed at suppressing the growth of or destroying microorganisms (Bryant & Knights, 2011). Microorganisms, in the process of causing infection in the body, release pyrogens that trigger the immune system to raise body temperature. Therefore the administration of antibiotics is also aimed at reducing temperature.

## PHASE 1

### Question 1

A diagnosis of RLL pneumonia is likely to cause which of the following complications?

a. Decreased respiratory rate
b. Decreased tidal volume
c. Increased blood pressure
d. Increased expiration time

**Answer:** b

**Why:** Tidal volume is the volume a person inhales in a normal, relaxed breath. Pneumonia means there is an infectious agent and associated inflammatory reaction present in a section of the lung tissue, blocking alveoli and interstitial tissue in the area (Copstead & Banasik, 2010). This means a decrease in alveoli available for ventilation of the lungs and potentially a decrease in tidal volume.

### Question 2

Which of the following is most likely to be related to the patient's shallow, rapid breathing?

a. Increased accessory muscle use
b. Decreased ventilation
c. Coarse crackles
d. All of the above

**Answer:** d

**Why:** As explained above, pneumonia reduces lung capacity, meaning tidal volume is reduced. Compensatory physiological response to a decreased tidal volume is to raise respiratory rate to meet the oxygen demands of the body, explaining the tachypnoea. The shallow

breaths are likely to be due to muscle fatigue as a result of the raised respiratory rate. Accessory muscle use increases as the effort to breathe becomes greater. The presence of coarse crackles is a clinical indication of infection and the presence of pneumonia (Copstead & Banasik, 2010).

## PHASE 2

### Question 1

The measurement taken with a pulse oximeter gives which of the following readings?

a. $SaO_2$
b. Capillary perfusion
c. $SpO_2$
d. $SvO_2$

**Answer:** c

**Why:** The pulse oximeter measures the light reflected by the haemoglobin molecules in the red blood cells; this gives pulse saturation or $SpO_2$. $SaO_2$ is the percentage of oxygen bound haemoglobin in the arteries and can only be accurately measured with an arterial blood gas analysis. The $SpO_2$ is a reliable estimate of $SaO_2$ when $SaO_2$ is above 70%. $SvO_2$ is a measure of venous oxygen saturation.

### Question 2

Which of the following should be considered for this patient when using the pulse oximeter?

a. Skin pigment
b. Radial pulse strength
c. Jaundice
d. Temperature

**Answer:** b

**Why:** This patient has a medical history of Raynaud's disease, an example of a peripheral vascular disease. Raynaud's causes vasoconstriction and limited blood flow to the extremities (Copstead & Banasik, 2010). Radial pulse strength should therefore be a consideration for this patient when taking $SpO_2$ readings with a pulse oximeter as this measurement relies on a good blood supply to extremities.

# PHASE 3

## Question 1

Which of the following can be explained by the development of systemic infection?

a. Tachypnoea
b. Tachycardia
c. Hyperthermia
d. All of the above

**Answer:** d

**Why:** When bacteria enter the bloodstream, resulting in bacteraemia, the body can respond with widespread inflammation; this is termed systemic inflammatory response syndrome (SIRS). Clinical signs of this include hyperthermia (temperature above 38°C), heart rate above 90 beats/minute and respiratory rate over 20 breaths/minute (Copstead & Banasik, 2010).

## Question 2

Which of the following of the patient's medications is likely to compound the hypotension?

a. Spironolactone
b. Atorvastatin
c. Paracetamol
d. Benzylpenicillin

**Answer:** a

**Why:** Spironolactone is a diuretic medication that acts as an aldosterone antagonist (Bryant & Knights, 2011). This can lower blood pressure by reducing the reabsorption of sodium and water in the renal tubules, causing diuresis and lowering circulating fluid volume and, hence, reducing blood pressure (Bryant & Knights, 2011).