POTTER AND PERRY'S
FUNDAMENTALS OF
NURSING
5e

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Preface

To the student

Welcome to the fifth edition of the most successful fundamentals text ever to be published for students of nursing across Australia and New Zealand. In this new edition we have maintained the core format of a fundamentals text that you have told us you enjoy and find easy to navigate, while taking a more active and overt approach to partnership with people and families in decisions about the delivery of nursing care.

In this edition, we welcome a number of academics and clinicians to the experienced writing team, and acknowledge their expert contemporary knowledge and contribution to perspectives on health and health care. We retain an emphasis on the very important basics – the fundamentals of care that are the building blocks on which professional nursing practice is built. The clinical skills sections have been updated to reflect current best practice and are designed to support your preparation for practical learning within the ever-changing and increasingly technological world in which health care is delivered. We also re-emphasise the importance of self-reflection and awareness as important personal fundamentals for delivering quality care to the increasingly diverse populations we work with.

There is a large body of international evidence supporting the position that the quality of nursing care not only influences the way people experience illness, but also impacts on initial and long-term outcomes, quality of life and morbidity. Nurse staffing, education, workload, skill-mix and the context of care are also important determinants of quality in nursing and contribute substantially to the cost of health care. As we move into a time where the cost of hospital-based acute services is becoming unsustainable for many countries, it is the intelligent, agile and creatively competent nurse working across all sectors – including in community and primary healthcare – who will make a difference to keeping people well and cared for, more often in their own homes in the future.

Accepting the invitation to join the editorial team for the fifth edition was an easy decision for me. Not only was I excited to join an experienced and clearly successful group of editors, writers and educators, the concept of emphasising the importance and at the same time, the complexity, of fundamental nursing care, is one that resonates with me. It has been my experience that those things which may seem simple and trivial to others can have the most profound impact on people’s experience of illness and health – cleaning teeth, washing hair, a kind word, a smile, a gentle touch. It has also been personally rewarding to think about, talk about and essentially reconnect with the fundamentals of nursing by working with authors, reviewers and editors on this edition. A seriously impressive bunch!

The editorial team sincerely want you to discover why seemingly routine activities, such as feeding, bathing, toileting, walking or turning patients, are so critically important to your nursing and nursing care. The moments during which you perform these tasks are crucial to forming respectful relationships and partnerships with your patients and their families, and can give powerful insights into the aspects of care, recovery and rehabilitation that are the most valued. As in previous editions, the Clinical examples and Critical reflection points throughout the text underscore how nursing knowledge and skill implemented in practice can mean the difference between effective uncomplicated recovery and independence and costly, life-threatening complications, functional decline and disability.

The fifth edition is presented to you in eight parts. First, we situate nursing within the environments of Australia and New Zealand. Concepts around partnership in care and keeping people safe are important inclusions to this section.

We introduce a new framing for clinical reasoning in Part 2, offering a scaffold for systematic and critically reflective approaches to your practice. What is your first step? Knowing how to gather appropriate information and data is critically important as this will likely be different for every patient and family. What do you do next? What does the research tell you? How does best practice apply within this context and how is it relevant to the needs of your patient and their family? Making appropriate judgements and decisions for the application of relevant, high-quality information to shared decisions about priorities and actions, and the evaluation of outcomes (from the patient’s perspective) are introduced as effective ways of thinking about and embracing the value and meaning of partnerships in care.

The theme of safe and effective partnership in care continues in the third part of the text, but this time it is viewed through the lens of professional responsibility and accountability. Regulation, communication and documentation are key elements of professional and ethical practice.
Parts 4 and 5 discuss human development across the lifespan. In addition to reviewing the theoretical and practical aspects of growth and development, disability, ageing, dying and death, nursing of the developing human is situated within the complex contextual environments that we all live in and share. Here, you are invited to reflect on your own culture and values as a means of discovering personal insight into how these might affect therapeutic relationships throughout your nursing career.

The next section moves into the scientific bases of nursing practice and how these relate to basic human needs – the fundamentals of nursing. Part 6 explores the science behind physical assessment, infection control, therapeutic medication and medication management, including their practical applications. Part 7 emphasises what is at the core of this text – basic human needs, such as breathing, fluid and electrolyte balance, eating and sleeping, and how nursing practice and shared nursing knowledge aims to support people who are temporarily or permanently unable to meet specific needs by themselves.

Finally, Part 8 examines nursing in different contexts. Partly because large sectors of the Australian and New Zealand populations have access to safe food, water, shelter and a stable society; partly because contemporary Western medicine has been successful in developing and delivering treatments for disease; and partly because our world is increasingly complex and pressured – there are growing numbers of people requiring maintenance health care because of chronic conditions, people surviving previously fatal diseases, children with complex congenital and genetic birth defects who will live long and productive lives, and an ever larger group experiencing the normal degenerative conditions of ageing. While the majority of nursing graduates remain likely to commence work in acute care settings, the work of nurses in the future will be very much in demand in other locations.

Ongoing change in health care is the norm. Nursing of the future will be situated in many contexts and we believe it is crucial for you to understand the dynamic and evolving nature of your practice. To remain competent, engaged, agile and effective, having an intelligent, inquiring approach to your own learning and sharing of knowledge with others is vital.

Everyone who has contributed to this text has done so because they want you to be the best nurse you can possibly be. On behalf of the editorial team, I wish you every success in your career in health.

Donna Waters
on behalf of the Editorial Team
Critical questions, action planning, value neutral activities but reflect socio-political contexts recognises that nursing care, education and research are not approach contrasts with individualist biomedical notions cultural position impacted on their work, emphasising change (Ramsden 2002). Ramsden saw cultural safety as colonisation. She challenged this cultural dominance, Ramsden also saw that nursing curricula were devoid embrace. experienced the disruptions of colonisation, they could not of being Māori, which, as urban Māori whose ancestors felt to conform to the dominant institutional culture what about cultural safety?' (Ramsden 2002:1). These Māori safety in clinical practice and a safe knowledge base, but comment: 'You people talk about legal safety, ethical safety, cultural safety model and its focus on the social determinants of health. to grips with these complex issues we introduce you now to the model of cultural safety and discuss more fully the life chances and health. Such concerns are intimately related to the model of cultural safety and discuss more fully the.
assumptions of cross-cultural ethics (Armstrong 2006, 2007). Significant, to therapeutic healing behaviours and the promotion of Virtue ethics than a morally responsible human being (Pence 1991). compassion, kindness, empathy, sympathy, altruism, of ‘characterological excellence’ in determining ethical circumstances, context and culture – in other words, sometimes even within, different cultures and history from which it has emerged also how the person feels about the actions not done. own character, how the person feels about past actions, and implications of cultural and linguistic diversity in healthcare it also involves a systematic examination of the moral domains; for example, the extent to which patients of non-implications of cultural and linguistic diversity in healthcare. In any culturally diverse society it is imperative that a care. They are actively involved in decision-making within and spanning more like a priority programmed counselor than a breach responsible functional family (Pence 2002). These are often family and friends within the community that provide the fulcrum of daily life support for the client. To enhance these, family members are involved in making and critical reflection points are placed at intervals throughout each chapter as a way of inviting students to reflect on what they are reading. • Critical reflection point

Research highlights provide examples of the most up-to-date knowledge, evidence, and practice.

WORKING WITH DIVERSITY

The purpose of the Institute of Medicine’s landmark publication The nation’s patient safety report (IOM) is to ensure that injury and harm do not occur and that any measures be taken to contain costs to levels that countries can afford and sustain. These pressures highlight the need for resources and organisational support. Nursing can be, as with resilience and versatility, while often with minimal direct clinical care time. Nurses continue to provide care and begin to understand what their role is in health care. The International Council of Nurses (2015) states, "the role of the RN will continue to evolve and change. It is their responsibility to maintain their competency and to lead the scope of practice and the standards for services must be directly managed by nurses. The reason therefore must be proactive to maintain this level of influence and involvement. As professional organisations, to achieve this level of responsibility, the nurse–patient relationship should be based on trust, empathy, respect and support and responsibility, and these values should be reflected in the attitudes and behaviours of nurses as well. Nurses find great reward in a nurse–patient relationship. In developing a positive relationship with patients is known to be associated with developing and maintaining a caring relationship between the nurse and patient. The study involved conducting an umbrella review. Wiechula R et al 2015 Umbrella review of the evidence: An exploration of ways taking place affect the nurse–patient relationship of ways perceptions, attitudes and associated behaviours (e.g. nurses’ values and beliefs (e.g. their thoughts, nurses’ and patients’ expectations of the relationship that are associated with developing and maintaining a positive relationship with patients). Evidence-based practice and patient safety concerns when providing care. As can be seen from Table 1, safety is conceptualised as a multidimensional construct with other dimensions such as safety culture and patient safety outcomes.

Safety as one of the fundamentals of care

The nursing profession's well-articulated ethic of care is a problem that has not been formally recognised in the caring relationship between the RN and the patient. The IOM called for fundamental changes to the nurse–patient relationship. As can be seen from Table 1, safety is conceptualised as a multidimensional construct with other dimensions such as safety culture and patient safety outcomes.

Working with diversity encourages students to consider culture, lifestyle, gender and age-related issues and choices in the broadest possible way.

RESEARCH HIGHLIGHT

Research abstract

Research focus

Developing a partnership with patients to improve patient-centered care in the delivery of high-quality nursing care. Nursing leadership and healthcare reformThis chapter considers the value of shared decision making in healthcare. Nurses can have an influence on the decision-making process and can be a catalyst for change. Nurses are in a unique position to advocate for patients and families in all health settings across the health continuum. They help patients and families make informed decisions about their care. The study involved conducting an umbrella review. Wiechula R et al 2015 Umbrella review of the evidence: An exploration of ways taking place affect the nurse–patient relationship of ways perceptions, attitudes and associated behaviours (e.g. nurses’ values and beliefs (e.g. their thoughts, nurses’ and patients’ expectations of the relationship that are associated with developing and maintaining a positive relationship with patients). Evidence-based practice and patient safety concerns when providing care. As can be seen from Table 1, safety is conceptualised as a multidimensional construct with other dimensions such as safety culture and patient safety outcomes.

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Working with diversity encourages students to consider culture, lifestyle, gender and age-related issues and choices in the broadest possible way.
Therapeutic relationship and patient considerations
Reminds students that the person is central to care provision in the therapeutic relationship for each skill.

Steps and rationale
Each skill features the trusted step-by-step approach with rationales to help students understand how and why a skill is performed.

Critical decision points
Alert students to critical steps within a skill to ensure quality and safety in client care.

Images
Support learning and demonstrate how to perform techniques.
Positive ageing refers to maintaining a focus on the healthy and productive lives and working with this age and challenging area of nursing practice. It is important physical, psychological and psychosocial aspects of and personal needs and requirements. Gerontology about older adults, and that is respectful of their cultural and community-based care, as well as residential aged health and welfare services: acute, subacute, rehabilitation systems as they age.

Key concepts provide a summary of each chapter’s key points to reinforce learning outcomes.

Conclusion

In summary, older adults are Bulls in a circus of all facets of physical, psychological, social, and spiritual aspects. The challenges of the demographic changes in the society, the impact of cultural beliefs, the importance of individual, family, and community involvement, and the need for ongoing interdisciplinary care make the care of older adults a complex and rewarding task. Nurses must continue to develop their knowledge and skills to provide high-quality care that meets the needs of older adults. The future of nursing: leading change

The future of nursing: leading change

Through the effective use of the professional and regulatory frameworks, informed through program evaluation and clinical governance, RNs working to their full potential will result in increased quality of life and independence in activities of daily living.

Key concepts

- Positive ageing refers to maintaining a focus on the healthy and productive lives and working with this age and challenging area of nursing practice. It is important physical, psychological and psychosocial aspects of and personal needs and requirements. Gerontology about older adults, and that is respectful of their cultural and community-based care, as well as residential aged health and welfare services: acute, subacute, rehabilitation systems as they age.
- Nurses working to their full potential will result in increased quality of life and independence in activities of daily living.
- The future of nursing: leading change
- Through the effective use of the professional and regulatory frameworks, informed through program evaluation and clinical governance, RNs working to their full potential will result in increased quality of life and independence in activities of daily living.

Online resources contain useful web links to current information on best practice and evidence-based guidelines.

References provide an up-to-date list of evidence-based sources and journal articles.
Learning outcomes

Mastery of content will enable you to:

• understand the value of using a reflective and systematic approach to clinical reasoning
• discuss the ways in which a systematic approach to clinical reasoning enhances nursing knowledge and skill development
• discuss the ways in which nursing knowledge and skill development enhances the process of clinical reasoning
• explain how using a systematic approach to clinical reasoning contributes to the visibility of nursing practice
• explain the relationship between critical thinking and clinical reasoning within nursing practice
• discuss the six basic domains evident within all processes of clinical reasoning
• use critical questioning within each of the six basic domains of the clinical reasoning process.
Introduction

This chapter will introduce you to the process of clinical reasoning, which will support your development as a nurse and make the critical thinking that guides nursing practice more visible to yourself and to others. A major goal in introducing you to a systematic process of clinical reasoning from the beginning of your nursing career is to enable its conscious and automatic use – no matter where you are practising or your level of experience as a registered nurse. We believe that those who establish such a systematic approach to their learning and practice are significantly more likely to have access to their own thinking and be more able to share their thinking and practices with others (Huang et al. 2014), therefore making the complex clinical decisions that form the basis of nursing practice evident to ourselves, our colleagues and to those we care for. Put quite simply, the extent to which we engage in the process of clinical reasoning determines our ability to learn, to share that learning and to use what we have learnt in our day-to-day practice. It also helps us practise competently and confidently.

Sound clinical reasoning does not happen by accident, nor does it occur by simply observing expert RNs practise (Levett-Jones et al. 2010). Learning to think like a nurse requires deliberate practice and a structured approach to working through clinical problems. There is no surprise, then, that the process of clinical reasoning we outline below has several key domains that capture a systematic approach to: (1) gathering relevant information and data; (2) making appropriate judgements and decisions; (3) setting priorities and establishing goals; (4) preparing for and taking action; (5) evaluating impacts and outcomes; and (6) learning from the process to inform future practice. This process forms the first level of inquiry discussed in Chapter 7, and sets the foundation for all other levels of inquiry associated with the production and utilisation of nursing knowledge.

Previous editions of this book have used one specific framework (i.e. the Nursing Process, see Figure 4-1) to illustrate the clinical reasoning process (American Nurses Association 2010). From this edition onwards, however, we have decided to take a more inclusive and descriptive approach for ease of understanding and application. In addition, while the clinical reasoning process is depicted most commonly as a cycle (e.g. Levett-Jones 2013, Figure 4-2; Tanner 2006, Figure 4-3), we have decided to foreground the domains evident within those models, and background the notion of a cycle-like process. Within this chapter we take a generic, descriptive and inclusive approach, so that novices, such as yourselves, can understand how the range of available nursing models seek to achieve the same end, irrespective of specific language or depictions (Box 4-1). While there is indeed a logical process in the ordering of the domains that is cycle-like, we also know that everyday practice is inevitably more complex than starting at the beginning of the cycle, working through the domains of the cycle in a predetermined order and then closing the loop before moving on to the ‘next reasoning process’. Often, nurses need to focus simultaneously on several domains in relation to overlapping issues related to one patient. This chapter seeks to provide fundamental learning in relation to each domain that can be utilised across the range of clinical reasoning models.

So it does not matter which of the many clinical reasoning models you may be asked to use, or you decide you like best, as long as you understand that the basic domains remain constant. And, no matter which models you encounter, the fundamental knowledge, skills and attitudes associated with sound critical thinking will always lie at the heart of clinical reasoning (problem-solving, clinical judgement or diagnostic reasoning).

![Figure 4-1 The nursing process.](ch04-0045-0059-9780729542364.indd 25/07/2016 11:42 am)
**Figure 4-2 Clinical reasoning cycle.**

**Figure 4-3 Clinical judgement model.**
The importance of the clinical reasoning process for effective nursing practice

Our intention across this book overall is to help you build the fundamental knowledge and skills required for your development as a nurse. To do that, you need to engage effectively with the thinking/actions and learning associated with all six of the domains outlined and described across Chapters 4–7.

As you move through your nursing program you will come to realise that all of the chapters making up this book enhance your capacity to take a reflective and critical approach to the process of clinical reasoning. For example, several chapters focus on the accountabilities and responsibilities that need to be considered throughout the clinical reasoning process; these include those that are professional, ethical and legal in nature (e.g. Chapters 9–11). Other chapters provide you with an understanding of healthcare systems; the ways in which nurses, along with other healthcare professionals, work within these systems in general to achieve the best possible experiences and outcomes for patients and their families (e.g. Chapters 1–3, Chapter 8); and the roles and realities of working as nurses within specific healthcare contexts (Chapters 38–41). The knowledge and skills that will enhance your ability to take a person-centred approach in the care you provide to patients and families are outlined in Chapter 12 and across Chapters 14–22. The remaining chapters support your development in relation to specific clinical knowledge and skills. It is, however, the clinical reasoning process that focuses all of the above knowledge and skills, and sits at the heart of effective nursing practice.

There is a great deal of ongoing confusion around the definition, overlap among, and usage of the terms clinical thinking, clinical reasoning, clinical decision-making and clinical judgement (as well as other similar terms). For a thorough description of these constructs, see Lefevre (2013). In this fifth edition we have decided to take a slightly different approach to that of the first four editions. In an attempt to highlight critical thinking within the clinical context – that is, nursing care provided to patients – where the process of reasoning and action are intimately linked, we are using the term critical thinking in relation to the knowledge, skills and attitudes required for sound thinking, and we are using the term clinical reasoning to capture the systematic process demanded in the application of that thinking in the delivery of nursing care.

To begin, let us consider the process of reasoning in relation to one common area of our everyday lives: our dental health. You might, for example, go months without even consciously considering your teeth, how they feel and how they look. One day you may notice a slight pain in a molar and then find yourself actually looking more closely and thinking about what is going on in your mouth. You may see some discolouration and feel a build-up of plaque behind your teeth. You start to worry that your mouth looks unappealing and that you might have some real problems brewing. Then you go into your exam period and forget about your mouth and it might take six months to get back to even thinking about it – unless your toothache worsens to a point where you cannot avoid it. Maybe you get back to thinking about it and even decide that you need to go to the dentist; you make the appointment and then cancel it – no money! Your mother might comment on your dental hygiene, but she is just trying to have a go at you and she doesn’t know what you are going through or understand … It may take several months for you to seek out the advice of a dentist; and then several more months to act on that advice … Or you may never do anything. If you do take some of the advice, such as flossing every day, it may only last a couple of weeks because your teeth don’t look any different, so why bother?

Replace this dental example with ‘eating habits’, ‘exercise’, ‘hygiene’, ‘stress management’, or any of a myriad of areas related to your day-to-day decisions and actions and you will recognise the stop/start, approach/withdraw, cost/benefit type dynamics we all experience at times. You can see from the above example that the critical points in the process of reasoning relate to:

- what we pay attention to or ‘see’, and the extent to which we trust what we ‘see’
- how we make sense of what we ‘see’ (the story we tell ourselves)
- what we decide to do and why
- when we do it
- how we do it
- if we do it
- determining if it worked for us.

### BOX 4-1 Six domains evident within all depictions of the clinical reasoning process

| a | Gathering relevant information and data |
| b | Making appropriate judgements and decisions |
| c | Setting priorities and establishing goals |
| d | Preparing for and taking action |
| e | Evaluating impacts and outcomes |
| f | Learning from the process to inform future practice |
The chaotic and hit-or-miss nature of the approach most of us take in relation to some aspects of our personal lives is, however, simply not acceptable within the context of our nursing practice, where clinical reasoning determines patients' experiences of care as well as minor and major health outcomes. For example, failure to recognise and rescue hospitalised patients at risk of clinical deterioration is related to poor clinical reasoning skills (Levett-Jones et al 2010). We are responsible for providing safe, effective and appropriate nursing care to those we work with, and we have an obligation to ensure we do that to the best of our ability. Decisions concerning what we do and do not notice, and the actions we take (even the action of doing nothing) in response to that will determine both the experiences of care and outcomes achieved for patients. This is as true in relation to relatively ‘mundane or common’ aspects of nursing care (such as administering medications, oral hygiene or patient comfort) as it is for those that are viewed as more dramatic and associated with survival (such as cardiopulmonary resuscitation). One of the challenges nurses face is finding ways of providing care that covers the range of patient needs: from day-to-day care and support to care that is unequivocally life changing (or sustaining). The extensive work on patient safety and focus on patient satisfaction reflects the extent to which these distinctions are far more subjective, complex and interrelated than many think; and providing effective fundamental care can, and does, have a profound impact on patient experiences and outcomes (see Chapters 2 and 3).

Take, for example, a process triggered by an observation that a woman in your care on an acute unit is visibly upset after a visit by her husband. You could tell yourself that she is obviously missing her family and she will get over it, so decide to ignore her distress and stay away from her for an hour so she can calm down. You could tell yourself that she is lonely and work to cheer her up and spend as much time as you can with her, telling jokes and engaging her in superficial chatting. You could just choose to not think about it because it is probably something personal and none of your business. The truth is that you are making assumptions based on nothing you have verified beyond your own perspective/insight. An appropriate response to the observed distress involves a process of seeking additional information concerning the observed distress from the patient, seeking to understand the basis of the distress and the consequences of that distress for the patient, determining what you might do as a nurse in response to the distress, generating some strategies to support the patient and taking related actions, and keeping in touch with the patient to ensure that the actions you took have been helpful. The development of effective nursing practice, then, requires the use of a systematic process of clinical reasoning that maximises the use of all relevant information, leads to sound judgements and decisions, identifies appropriate goals and priorities, and leads to assessable outcome-based actions and learning. 

**Critical Reflection Point**

Now that you have a better understanding of the domains of clinical reasoning, reflect on the following:

1. What existing knowledge bases, skills and experiences can you draw upon to enhance the development of clinical reasoning within your practice?

2. Identify three strategies that you will use to support your development in this area.

**The process of clinical reasoning**

As discussed in the introduction to this chapter, there are a myriad of conceptual models seeking to explicate the process of clinical reasoning; and you will undoubtedly encounter several of these in your studies and across various clinical settings. One thing that everyone does agree on, however, is that clinical reasoning (by any name) is crucial for effective nursing practice (Box 4-2). Australian and New Zealand students are commonly exposed to the nursing process as a problem-solving approach to practice (see Figure 4-1), the clinical reasoning cycle (see Figure 4-2) or Tanner’s clinical judgement model (see Figure 4-3). There is no surprise in this; however, the similarities and differences among such models/cycles can

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**BOX 4-2 Developing clinical reasoning skills**

Developing clinical judgement – clinical reasoning skills – is one of the most important and challenging aspects of becoming a nurse. It’s important because people’s lives depend on it. It’s challenging because thinking in the clinical setting is often fraught with more anxiety and risks than any other situation … It entails things like knowing what to look for, how to recognise when a patient’s status is changing, and what to do about it. For beginners, this is particularly taxing because it requires an ability to recall facts, put them together into a meaningful whole, and apply the information to a current clinical situation (a situation which is often fluid and changing).
be confusing. Just remember that they are all underpinned by a logical structure for working through a thinking process and associated actions: ‘see something’, ‘make some interpretations or judgements concerning what is going on and what might be done about it’, ‘do something’ and ‘look to see if what was done achieved what it was intended to achieve’ (see Box 4-1). And finally: learn from the experience.

**CRITICAL REFLECTION POINT**

Go to your favourite search engine and insert ‘define clinical reasoning’. What will appear – along with the URLs for a myriad of relevant sites – are some images of clinical reasoning models, cycles, stages, etc. Open up some of these and examine the ways in which the particular person, professional group or organisation describes their particular approach.

1. What similarities and differences do you see among the models you examine?
2. Do one or more of these resonate with you and the way you think about nursing?
3. Why do you think so many different approaches have evolved across time, professions and contexts?
4. What do you think is behind our decision to take a more generic and inclusive approach to discussing the process of clinical reasoning?

The starting point of clinical reasoning involves the identification and bringing together of information/data triggered by an observation or insight. For example, the observation that a patient has a high blood pressure reading triggers the gathering of information relevant to that observation: history, previous readings, diagnosis, other assessments of the patient and so forth. This information can be in existence already, or may need to be generated. The goal within this domain is to have all of the information/data required to move into making judgements and decisions concerning the appropriate response or actions. This process is dependent on your ability to obtain clear information from the patient and/or family members, the knowledge you were given at handover or through reading the patient’s notes, and your existing knowledge of the area (e.g. normal range of blood pressure readings, factors that influence readings, etc), local policies and practice guidelines. You will also need to undertake a focused physical assessment of the patient (Chapters 23 and 24).

As the relevant information or data are obtained, the process moves on to making appropriate judgements and decisions concerning what these mean, and what actions may need to be taken. One possible, and very common, outcome at this point is the recognition of the need for more information, or different forms of information/data. There are of course other possible next steps, including the need to involve additional people in the process or the need to act quickly in response to one vital piece of information (e.g. the blood pressure falls well outside the normal range and the patient requires immediate assessment by the appropriate medical team). As a novice, one of the most common steps to be taken at this stage is identifying the best person to assist you in making sense of what is going on and what needs to happen next. Your ability to share your observations/data or information in a clear and concise manner will determine both the quality and quantity of support you receive from more experienced colleagues, as well as the timeliness of that support.

The decisions that are made concerning appropriate action then need to be prioritised and specific goals established. This involves considering options and determining what is likely to be most effective: for example, evidence from previous experience, local guidelines/data or research evidence (Chapter 7), what is possible and what is acceptable. Priorities and goals are of course linked to the impacts or outcomes that are sought through the actions to be taken. And, of course, action planning can uncover the need for either additional information/data or for input from others to gain additional judgements and potentially lead to different decisions.

Remember, the decision not to act is in itself an action. All actions should be preceded by appropriate preparation: this may include getting physical resources together and developing specific skills, or locating someone with those skills. And even if the patient and the family have been closely involved in the decision-making process, it always involves ensuring their input, understanding and agreement.

In order to ensure the effectiveness of nursing practice we need to avoid assumptions that those actions we take will always achieve the intended goal or outcomes. Indeed, you may find that some actions have unexpected or detrimental effects. Nursing practice is complex; human beings are complex; and healthcare environments are complex. A particular practice might work well for one patient but not for another; and the reasons for this may be unclear. Some patients experience straightforward recovery from the same procedure that causes distress in others. ‘Closing the loop’ or assessing the outcomes of your actions or practice is fundamental to both the ongoing development of nursing practice and to your learning.

In summary, the process of clinical reasoning works equally well across contexts and throughout all stages of your development as a nurse. That is, the process remains constant, although in different contexts the focus of each...
domain (e.g. what data are available, what actions are possible or acceptable) may vary dramatically. In addition, as you develop your knowledge and expertise, the nature of your engagement in the process will evolve: as a student nurse you will need to access the support of others as you work through the cycles; as a more experienced and knowledgeable nurse your judgements and decisions will become more autonomous.

**Developing your nursing knowledge and skills through the clinical reasoning process**

What both drives and emerges from the clinical reasoning process is **nursing knowledge**. As your nursing knowledge base develops, the meaning you give to situations changes and learning occurs. You then take this learning with you to the next situation and create new meanings and experiential knowledge. Conway and McMillan (2014) explain this concept well in Figure 4-4 and demonstrate this continual process of learning as an outcome of nursing experience.

However, experience is ‘cheap’, and, as Conway and McMillan (2014) argue, experiential knowledge is not merely accumulated as a result of working as a nurse or nursing student. Experiential knowledge is generated through ongoing learning that comes from critical and reflective approaches to making sense of, and building on, our existing knowledge. Learning, rather than merely experiencing, occurs when we apply concepts to practice, manage complex patient-care situations that trigger uncertainty, and are accountable for our clinical reasoning in practice. Becoming comfortable with questioning and justifying our clinical decisions based on evidence is crucial to developing as a professional (see Box 4-3).

The depth and extent of your nursing knowledge will influence your ability to think critically about and act effectively in different clinical situations. Consider the following **Clinical example**.

**BOX 4-3 Learning from practice**

- Was the clinical management of this patient supported by scientific rationales, research evidence and the patient’s responses to treatment?
- Were there plausible alternatives to the chosen interventions?
- To what extent were my clinical decisions influenced by personal assumptions and beliefs?
- What were the most important personal learning outcomes – including awareness of my personal strengths and weaknesses?
- What actions would I take if presented with a similar situation in the future, and why?

**Figure 4-4 The relationship between situation analysis, learning and professional practice.**


**CLINICAL EXAMPLE**

**Postoperative fever**

You are working on a surgical ward during a clinical placement and are asked by your buddy RN to take routine postoperative observations on a patient who is **continued**
Clinical example

The Clinical example above makes clear that, safely and effectively moving through each domain of clinical reasoning depends on the nurse’s knowledge and critical thinking ability. Determining the most relevant data/information to collect and making appropriate judgements and decisions are difficult skills for beginning nurses, until they have developed enough knowledge and clinical experience to draw upon. Put simply, your ability to recognise abnormal data will be directly related to how much you already know about the problem. In the Clinical example, the RN with postoperative care experience was immediately able to consider the most likely causes of this patient’s elevated temperature: respiratory complication (atelectasis), surgical complication (peritonitis), or a normal variation in response to appendicitis and surgery. In order to confirm or refute these possible explanations, the experienced RN is able to quickly focus assessment and gather additional data. While you might be tempted to jump to a conclusion based on one piece of data (i.e. body temperature 38°C), you can begin to see how this could lead to errors in clinical reasoning. An elevated body temperature in a postoperative patient could have many causes, and without further assessment, a sound clinical judgement cannot be made.

Alfaro-LeFevre (2009-99) states that: ‘using sound clinical judgement means drawing valid conclusions and acting appropriately based on those conclusions (e.g. monitor more closely, begin independent treatment, or contact a more experienced professional to activate the chain of command)’. We can see in the example how, together with the RN, the decision was made to monitor the patient’s temperature more closely before discharge. However, had you clustered further abnormal data along with the patient’s temperature of 38°C, such as increasing abdominal tenderness with ‘guarding’, nausea and absent bowel sounds, this would have suggested the potential complication of peritonitis. In this situation the priorities would have been to notify the medical team and initiate fundamental nursing care and collaborative interventions to manage the complication.

Of course, taking action and determining outcomes in this relatively simple clinical example also required nursing knowledge and skill in a range of areas such as health assessment, medical–surgical nursing and patient teaching. In reality, clinical reasoning is rarely a straightforward or linear process and experienced nurses

24-hours post-laparoscopic appendicectomy, and is to be discharged later in your shift. When you take his body temperature you find it is 38°C. You wonder whether this is significant and whether you need to do anything about it.

You discuss the finding with your buddy RN, who explains that a low-grade fever appearing soon after surgery (24–48 hours) is often part of the body’s inflammatory response. Other common causes of postoperative fever include atelectasis, pneumonia, wound infection, urinary tract infections or infected IV sites. Also, because your patient has had an appendicectomy, he should be observed for evidence of peritonitis. With this information in mind, you return to the patient to complete a focused body systems assessment in order to confirm or rule out these potential causes (see Chapter 24).

On assessment you find:

- Primary survey and vital signs: The patient looks well and appears to be in no acute discomfort or distress. Other vital signs are within normal limits: Respiratory rate 14/min, SpO2 98% on room air, pulse rate 70/min, blood pressure 120/70 mmHg. On the observation chart, the temperature pattern shows a low-grade fever since admission.
- Chest: The patient’s breathing is relaxed. Lungs are clear to auscultation.
- Abdomen: Soft, slight tenderness at wound sites. Bowel sounds present. No guarding.
- Wounds: Port sites are dry and intact.
- Extremities: IV in right hand without redness, oedema or tenderness.

Based on the focused assessment data, you rule out any of the possible complications identified earlier. While the patient’s temperature is elevated, there is no data to suggest a problem at this time. In collaboration with your buddy RN, you decide the appropriate course of action is to monitor the patient’s temperature more frequently before discharge. You explain your findings to the patient, and discuss how and why you will be monitoring his body temperature over this shift.

Later you and your buddy RN determine that there has been no change in temperature, that the patient and his family understand how to monitor for postoperative fever, and are aware of the potential complications. In reflecting on this experience and how it will influence the way you respond to similar situations in the future, you identify the new knowledge you have gained about how to analyse and respond to a patient with postoperative fever as well as further learning needs such as gaps in your knowledge about the possible complication of peritonitis. Finally, the experience of discussing your thinking ‘out loud’ and hearing the way the RN could explain her decision-making and actions helped you develop confidence in discussing nursing practice. You realise that increasing your ability to make your clinical reasoning visible is a critical component of effective nursing practice.

Reference

will move backwards and forwards between domains. However, they will always be able to balance priorities and focus on nursing care that achieves the best experiences and outcomes for the patient. Consider a more complex Clinical example below to see this process in action: where the RN draws on her nursing expertise to work through the same process of clinical reasoning we have been discussing, albeit at a more complex level, to save the patient’s life.

**CLINICAL EXAMPLE**

The overlooked symptom

I came to work that morning and had two patients in our transplant intensive care unit. One was a 22-year-old man who had received a liver transplant about 48 hours earlier. When I was doing my morning head-to-toe check, I found that he was very sleepy, his eyes were closed, he was jaundiced and he wouldn’t respond when I talked to him. When he did try to talk to me, he mumbled incomprehensibly.

I knew these symptoms were a problem. As an experienced transplant nurse, I knew that when you give somebody a liver and it works, they’re not jaundiced and they’re alert. They’re perky, eating, talking and even walking the halls. This young man was doing none of that. So I checked all his vital signs, his blood pressure, pulse, temperature. Everything was where it should have been at that point in time, two days post transplant. Although his urine output was okay, the urine was a dark amber colour – which was a concern. I did his morning lab work, and everything was fine. But I was still worried. As the shift progressed, he became more lethargic and sleepy. I did another set of blood work on him, and it started to document that life in his liver was deteriorating. His urine output was now a very thick sludge that was brown-coloured and basically unmeasurable as a liquid. I paged the resident, who blew me off with some comment which I replied, ‘I am, too.’

A few hours later, when I became more concerned because the patient was even more unresponsive, I paged the resident again and got the same response. ‘Look,’ I told him, ‘I’m sorry, I’m going to call the chief or the surgeon. ’ We have to put him back on the list to get a new liver,’ I told the surgeon. ‘We’re wasting time by not being proactive.’ The surgeon gave the patient a once-over and agreed that I was spot-on. We immediately airlifted the young man. He got a transplant, not that night but the next. Forty-eight hours later, he was sitting up in bed, eating and chatting. Six days later, he went home with his parents and younger brother.

The bottom line is that the process of clinical reasoning is the basis for your practice as a registered nurse. One of the most important goals of nursing education is to develop your clinical reasoning skills so that you can make the transition from student to graduate RN capable of taking action based on sound clinical judgements. As Table 4-1 makes clear, as a beginner encountering new clinical situations, you need to be active in learning and

<table>
<thead>
<tr>
<th>Experienced nurses</th>
<th>Novice nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select relevant and specific cues</td>
<td>Less focused in their selection; tend to ‘over-select cues’</td>
</tr>
<tr>
<td>Select cues that are context dependent</td>
<td>Follow rules when collecting cues, ignoring context</td>
</tr>
<tr>
<td>Collect information on a range of factors in addition to the patient’s presenting symptoms</td>
<td>Concentrate on presenting symptoms only</td>
</tr>
<tr>
<td>Have a way of ‘being with a patient’ and instantly knowing the patient after scanning him/her; they know what to pay attention to and what questions to ask</td>
<td>Focus on task and technology rather than the patient, and often miss important cues</td>
</tr>
</tbody>
</table>

seeking support through this transition. Fundamental to your success in becoming an effective clinical nurse is a commitment to lifelong learning and critical self-awareness. Learning to take a critical approach to your nursing practice will at times challenge your personal assumptions and beliefs. It involves making honest appraisals of your personal strengths and weaknesses. And it means knowing when and where you need to seek support to meet patient needs.

Critical thinking – knowledge, skills and attitudes for sound clinical reasoning

Contemporary neuroscience is providing a range of lenses through which to view the challenges we all face in engaging in sound critical thinking: that is, challenges associated with being a human being, working as, and with, other human beings, being human! Work within one area, cognitive bias, is particularly relevant to our ability to think critically and engage in the process of sound clinical reasoning. Put quite simply, our ‘beliefs, decisions, and actions can be influenced by the unconscious drivers of cognitive bias’ (Lieberman et al, 2014, p 4). It appears that as human beings we need to accept this fact, understand the potential implications for our thinking and decision-making and find ways to minimise these in our day-to-day practice.

Recent work in the area of cognitive bias identified above generated four categories into which the 150-odd biases evident within the literature on cognitive bias may be organised and a range of strategies for mitigating these (Box 4-4). It is a mistake to believe that those of us who have experienced the benefits of higher education and those of us who have accrued a lot of expertise are immune to bias; as it is to believe that the more ‘intelligent’ we are the less likely we are to be biased (Lieberman et al, 2014). However, the more we work in teams, where information is shared and multiple perspectives are taken into consideration as a matter of course, the more ‘bias-proof’ we make our decisions. So teamwork is not simply about different members of the team having different knowledge and skill-sets associated with different aspects of the work of the team; it is also about having multiple sets of eyes and perspectives in play across all of the team’s work (Chapter 8).

Critical thinking is, then, a skill that demands a good deal of self-insight and willingness to challenge our own thinking, as well as that of others. Although critical thinking has many definitions (Huang et al, 2014), there are common factors identified in the literature on critical thinking processes, all of which result in a change in belief or course of action (Riddell, 2007):

- reflection
- identification and appraisal of assumptions
- inquiry, interpretation and analysis, and reasoning and judgement
- consideration of context.

**BOX 4-4 Ways to reduce the impact of bias on critical thinking and clinical reasoning**

As you develop your understanding of cognitive bias and the forms it takes, you will be able to identify a range of strategies to help you minimise the impact of these unconscious biases on your thinking and actions. Here are some that are a useful starting point:

- Seek out the opinions of independent others before making decisions
- Engage with colleagues who you know have different ideas or perspectives in order to challenge your own thinking
- Ask yourself, ‘What would I do if this patient was my grandmother/sister/brother etc?’ in situations where you are making decisions
- Get to know your colleagues and discuss your shared goals and values to maximise your sense of interconnectedness around practice
- After making complex decisions, take some time out and revisit your decision before taking action
- Develop a reflective approach to your practice in order to evaluate critically your actions and the associated outcomes
- Find a clinical supervisor or other more experienced colleagues who can help you think through your practice decisions
- Contribute to a culture where identifying own errors or performance challenges is accepted practice and the level of defensiveness surrounding these processes is low
- Practise becoming more of an objective observer of your own practice and that of your colleagues
- Seek out as much information or data as possible to inform decisions and actions
- Develop the high-level knowledge and skills required to ensure the above, including: critical thinking, critical reflection, high challenge/high support conversations

Taken together, critical thinking is essentially the activity of questioning what is usually taken for granted (Parker 2014). A critical thinker identifies and challenges assumptions, considers what is important in a situation, imagines and explores alternatives, applies reason and logic, and thus makes informed decisions (Alfaro-LeFevre 2013). Critical thinking involves the application of nursing knowledge and experience to identify patient problems and to direct clinical judgements and actions that result in positive patient outcomes (Benner et al 2008).

As a nursing student, critical thinking begins when you start to seriously question what it is you do as a nurse, why you do what you do and how you might do it differently. Critical thinking presupposes a certain basic level of intellectual humility (i.e. acknowledging one’s own ignorance); an understanding of one’s values and possible biases; a commitment to think clearly, precisely and accurately; and the confidence to act on the basis of a well-argued position. When an RN directs critical thinking towards understanding and helping patients to find solutions to their health problems, the process is purposeful and goal oriented. Evaluation of the impact and outcomes achieved allows us to examine the extent to which our critical thinking achieved those goals.

As outlined above, the process of clinical reasoning is systematic and consistent across context and level of development of the nurse using it; however, context and level of expertise does affect the focus of each domain and the nature of the nurse’s engagement within each domain. A student nurse, for example, will require input from a range of people and external resources when seeking to work within each domain; and an experienced RN will inevitably move through the process more quickly than a student nurse (see Box 4-5). And as you saw above, the complexity of the situation at hand will determine whether the process is relatively straightforward – with a logical beginning and end point – or whether it is complex and dynamic.

The contemporary nursing practice environment is characterised by rapid change (Chapter 1). Even new graduates are involved with increasingly complex decisions because of greater acuity and complexity of patient care. Undergraduate nursing programs are designed to develop students’ core critical thinking skills such as those identified by the American Philosophical Association (Table 4-2). Huang and colleagues (2014) suggest potential milestones for the development of critical thinking (Table 4-3). It is clear that sound clinical thinking skills and knowledge, and a positive attitude to

---

**BOX 4-5 Novices and experts – bridging the gap**

Clinical decision-making is a skill that is acquired with experience. The expert has learnt to deal with complexity, be receptive to nuance, to recognise urgency, to predict outcomes, to make decisions based on incomplete information, and to accept that an action may prove to be incorrect but was the ‘most right’ one to make at the time. They also have insight into their own thinking processes and personality, are better able to contain negative emotions and weigh up the opinions of others, and know how to get the team to work effectively.

Novices often feel compelled to make the right decision and want to gather all the information according to ‘the rules’ they have been taught before making the decision. They have a limited knowledge base and are uncomfortable with uncertainty and the negative emotion it may impart. They may have little experience in performing the task that is consequent to their decision, so rationalise against the decision. They are more likely to be influenced by the opinion of others, and defer to others’ ‘expertise’, even if they suspect it is wrong.

Bridging the gap requires both the experts and novices to be aware of these differences. Novices need to recognise their limitations, and understand that they are in training and are not expected to perform like an expert.

Experts need to be aware that the thinking processes of novices are not equivalent to their own and that the information being conveyed by telephone is not the same as being there.

CHAPTER 4  DEVELOPING CLINICAL REASONING FOR NURSING PRACTICE

• CRITICAL REFLECTION POINT

Now that you have been introduced to some basic ideas concerning brain-based imperatives and their potential impact on thinking and behaviour, re-read and reflect on Table 4-3. How does a neuroscience lens help us make sense of the knowledge, skills and attitudes of a ‘novice’ versus a ‘master’?

Conclusion

Sound clinical reasoning processes are the foundation of effective nursing care. Even if it is not at the level of conscious awareness, each clinical action we take as a nurse is the result of a reasoning process. Unless this is made visible and supported during your development as a registered nurse, faulty thinking and decision-making have obvious implications for patient safety and outcomes. We have argued that while there are several frameworks, models or cycles that use slightly different language or descriptions of clinical reasoning, they all seek to capture the same processes: gathering information, making decisions, setting goals, taking action and evaluating the outcomes achieved. Critical thinking is a skill that sits at the heart of sound clinical reasoning processes – and, like all skills, it can be

### TABLE 4-2  Critical thinking skills proposed by the American Philosophical Association

<table>
<thead>
<tr>
<th>Consensus list of CT cognitive skills and sub-skills</th>
<th>Sub-skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interpretation</td>
<td>Categorisation, Decoding significance, Clarifying meaning</td>
</tr>
<tr>
<td>2. Analysis</td>
<td>Examining ideas, Identifying arguments, Analysing arguments</td>
</tr>
<tr>
<td>3. Evaluation</td>
<td>Assessing claims, Assessing arguments</td>
</tr>
<tr>
<td>4. Inference</td>
<td>Querying evidence, Conjecturing alternatives, Drawing conclusions</td>
</tr>
<tr>
<td>5. Explanation</td>
<td>Stating results, Justifying procedures, Presenting arguments</td>
</tr>
<tr>
<td>6. Self-regulation</td>
<td>Self-examination, Self-correction</td>
</tr>
</tbody>
</table>


### TABLE 4-3  Potential milestones for development of critical thinking knowledge, skills and attitudes

<table>
<thead>
<tr>
<th>Stage</th>
<th>Knowledge</th>
<th>Skills</th>
<th>Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>Emphasises content over process.</td>
<td>Has rudimentary ability to compare and contrast information.</td>
<td>Is not self-reflective.</td>
</tr>
<tr>
<td></td>
<td>Lacks knowledge of critical thinking skills.</td>
<td>Is dependent on prompting from others.</td>
<td>Believes that the more facts the better.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uses memorisation to solve problems.</td>
<td>Places priority on memorisation.</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Has basic/emerging knowledge of critical thinking skills.</td>
<td>Has emerging skills – slows down, sees limits of knowledge, asks for help.</td>
<td>Self-reflection is emerging.</td>
</tr>
<tr>
<td></td>
<td>Senses limits of knowledge.</td>
<td>Begins to discriminate facts.</td>
<td>Recognises need for more information.</td>
</tr>
<tr>
<td>Master</td>
<td>Modulates content, process and context well.</td>
<td>Flexibly integrates and applies critical thinking to patient care.</td>
<td>Considers arguments on both sides as well as ‘grey areas’.</td>
</tr>
<tr>
<td></td>
<td>Has intricate knowledge of critical thinking skills.</td>
<td>Uses adaptive expertise (toggles between Systems 1 &amp; 2 thinking).*</td>
<td>Appreciates need to develop critical thinking skills to improve patient outcomes.</td>
</tr>
<tr>
<td></td>
<td>Knows the critical thinking skills related to error.</td>
<td>Uses metacognition routinely.</td>
<td>Embodies intellectual humility.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is able to teach and articulate own thinking process.</td>
<td>Accepts uncertainty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sees self as lifelong learner.</td>
</tr>
</tbody>
</table>

* Rules we make up in our lives either to avoid making complex trade-offs or to remove the need to continuously reassess everyday choices.

* System 1 is fast, instinctive and emotional; System 2 is slower, more deliberative and more logical.

BOX 4-6 Broad questions associated with each of the basic domains within the clinical reasoning process

Gathering relevant information and data
- What information/data exist and can be accessed?
- What additional information/data are needed?
- How reliable are the information/data?
- How confident am I in obtaining relevant information and do I need input from others?

Making appropriate judgements and decisions
- What do the information/data mean?
- What actions are indicated?
- Are the required actions acceptable or possible?
- How confident am I in making these judgements and decisions and do I need input from others?

Setting priorities and establishing goals
- What needs to happen and when?
- How are these goals to be achieved?
- What are the expected outcomes and timeframes?
- How confident am I in setting priorities and establishing goals and do I need input from others?

Preparing for and taking action
- What knowledge/skills do the actions demand?
- What resources are required?
- How will appropriate people become involved?
- How confident am I in my ability to take these actions and do I need input from others?

Evaluating impacts and outcomes
- What has been achieved?
- What is still to be achieved?
- Where do we go from here?
- How confident am I in evaluating the impacts and outcomes and do I need input from others?

Learning from the process to inform future practice
- How might input from others assist me or enhance my learning?
- What have we learnt that can inform future practice – related to the current patient/situation or in general?

RESEARCH HIGHLIGHT

Research focus
The complexity and challenges of contemporary health care mean that critical thinking skills are more important than ever for all healthcare professionals. The centrality of critical thinking is clearly reflected in competency frameworks across the health professions; although many clinicians achieve critical thinking through experience and observation rather than explicit instruction, others never master this skill.

Research abstract
The purpose of the work described here was to bring together experts from across medicine and nursing in order to develop a range of strategies that would support the explicit teaching of clinical thinking across medical and nursing curricula. Participants were selected from North American Medical Schools and met the criteria of a) demonstrated commitment to curricular innovation; b) consideration of the cognitive sciences in curriculum development; and c) quality of the team members. The authors state that the decision to include nursing colleagues in this process was based on the significant contribution of nursing to the literature on critical thinking. Data were derived for this summary from small-group discussion notes, videotape review of large group conference events, and preliminary consensus documents circulated among the participants.

Evidence-based practice
Overall strategies to support the development of critical thinking skills:
- Slowing down the pace of the learning process to enable students to digest and apply knowledge.
- Actively engaging the learner in tasks that require problems to be solved.
- Compelling students to justify how they arrive at decisions.
- Making thinking explicit.
- Requiring self-reflection on the part of the learner.

Reference
enhanced over time through focus and practice. Critical thinking, and therefore clinical reasoning, is susceptible to cognitive bias, and individuals and organisations need to develop appropriate strategies to minimise its impact. Chapters 5 and 6 provide in-depth discussion of a range of factors and issues associated with each domain of the clinical reasoning process; and, Chapter 7 explores the utilisation of the knowledge gained through the reasoning process.

Key concepts

- Each of us engages in a reasoning process in our everyday lives. In a nursing practice context, this is called clinical reasoning and demands a critical approach to ensure patient safety.

- Although you will no doubt encounter many different frameworks or models to explain clinical reasoning, the process involves six basic domains: 1) gathering relevant information and data; 2) making appropriate judgements and decisions; 3) setting priorities and establishing goals; 4) preparing for and taking action; 5) evaluating impacts and outcomes; and 6) learning from the process to inform future practice.

- Asking critical questions at each domain of clinical reasoning helps us to become more aware of our assumptions and cognitive biases, leading to better clinical decisions.

- A commitment to developing as a reflective practitioner – being critical and learning from practice – is the essence of good nursing.

Online resources

Foundation for Critical Thinking – an online model for learning the elements and standards of critical thinking: www.criticalthinking.org/ctmodel/logic-model1.html

References


David Rock provides a comprehensive starting place for anyone seeking to journey into the area of ‘neuroscience meets cognition and human behaviour’: www.davidrock.net/resources/
Monitoring vital signs: using a primary survey approach for patient assessment

Anthony Schoenwald and Clint Douglas

Learning outcomes
Mastery of content will enable you to:
• apply the primary survey (ABCDE approach) as the foundation of any patient assessment
• describe normal parameters for vital signs based on the physiology of respiratory and cardiovascular systems and body temperature regulation
• measure and document vital signs accurately using appropriate equipment
• begin to make clinical judgements and decisions about the meaning of assessment data, including the need to escalate care appropriately.
Introduction

Assessment of airway, breathing, circulation and disability (neurological state) is the crucial first element of clinical assessment in every patient encounter (Considine & Currey 2015). A structured and systematic primary survey (ABCDE approach) provides essential information about patient status in the order of clinical importance, allowing you to identify and correct threats to patient safety before moving on to a focused assessment (discussed in the next chapter). This chapter is organised around the primary survey relevant to general acute care settings (Box 23-1), focusing on basic airway assessment, respirations, oxygen saturation, pulse, blood pressure, level of consciousness, and body temperature (Adam et al 2010, Clarke & Ketchell 2011, Price et al 2016). Collectively, these parameters are known as the vital signs, the ongoing monitoring of which is a primary nursing responsibility.

The importance of nursing assessment for patient safety

Sudden or gradual changes in vital signs can indicate life-threatening clinical states requiring urgent intervention and escalation of care (Cardona-Morrell et al 2015). Although more research is needed on the effectiveness of routine vital signs for early recognition of adverse events in general ward patients (Zeitz & McCutcheon 2006, Storm-Versloot et al 2014), the importance of vital signs to confirm serious illness and predict poor patient outcomes during hospitalisation is well established (Cardona-Morrell et al 2015).

Bleyer and colleagues’ (2011) study of over 1 million vital signs collected from patients over the course of their hospitalisation is one of the largest studies available. You can see in Figure 23-1 the line graphs that show the prevalence of vital signs recorded, which peak around the normal adult ranges as expected. What is interesting here are the bar graphs, which show the proportion (%) of patients who died during hospitalisation with a vital sign recorded in that range. For example, you can see that a normal adult respiratory rate (< 20/min) was associated with a very low mortality. However, as respiratory rates increased outside of the normal range, patient mortality increased in a linear way: 10% of patients died with a respiratory rate of 28 to < 32 breaths/min, 16% with 32 to < 36 breaths/min, 20% with 36 to < 40 breaths/min, and 25% with 40 to < 44 breaths/min (Bleyer et al 2011). Respiratory rate is one of the most neglected vital signs, yet one of the earliest indicators that patients are at risk of clinical deterioration (Cretikos et al 2008).

Having two or more critically abnormal vital signs is also strongly associated with death. Bleyer and colleagues (2011:1387) used the same data set to examine patient outcomes with multiple critical vital signs defined as ‘a systolic blood pressure < 85 mmHg, heart rate > 120 bpm, temperature < 35°C or > 38.9°C, oxygen saturation < 91%, respiratory rate ≤ 12 or ≥ 24, and level of consciousness recorded as anything but alert’. You can see in Table 23-1 that increased simultaneous presence of abnormal vital signs, together with increased age, was strongly associated with higher mortality. Almost 1 in 4 patients died (23.6%) with a trio of critically abnormal vital signs.

The importance of nursing assessment for patient safety cannot be overstated. The bedside RN carries the highest level of responsibility for the accurate measurement and interpretation of clinical data (Considine & Currey 2015). Using the primary survey framework discussed in this chapter can help you organise and communicate clinical findings to others. To improve the recognition of patients at risk of clinical deterioration, most acute care settings in Australia and New Zealand have adopted standardised charts for vital sign monitoring that follow

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**BOX 23-1 ABCDE approach to patient assessment in general wards**

<table>
<thead>
<tr>
<th>Airway</th>
<th>Assess airway patency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>Measure respiratory rate</td>
</tr>
<tr>
<td></td>
<td>Evaluate work of breathing</td>
</tr>
<tr>
<td></td>
<td>Measure oxygen saturation</td>
</tr>
<tr>
<td>Circulation</td>
<td>Palpate pulse rate and rhythm</td>
</tr>
<tr>
<td></td>
<td>Measure manual blood pressure</td>
</tr>
<tr>
<td></td>
<td>Assess urine output</td>
</tr>
<tr>
<td>Disability</td>
<td>Assess level of consciousness</td>
</tr>
<tr>
<td></td>
<td>Evaluate speech</td>
</tr>
<tr>
<td></td>
<td>Assess for pain</td>
</tr>
<tr>
<td>Exposure</td>
<td>Measure body temperature</td>
</tr>
<tr>
<td></td>
<td>Inspect skin integrity</td>
</tr>
<tr>
<td></td>
<td>Inspect and palpate skin for signs of pressure injury</td>
</tr>
<tr>
<td></td>
<td>Observe any wounds, dressings or drains, invasive lines</td>
</tr>
<tr>
<td></td>
<td>Observe ability to transfer and mobilise</td>
</tr>
<tr>
<td></td>
<td>Assess bowel movements</td>
</tr>
</tbody>
</table>

Figure 23-1 Prevalence of admissions in which a vital sign in the given range occurred and proportion of individuals in that given vital sign range who expired (%).

an ABCDE approach (Figure 23-2). The primary survey is also aligned with rapid response systems, which vary across organisations, but also follow an ABCDE approach (Figure 23-3). Rapid response teams are called when ward staff identify patients at risk of clinical deterioration to provide timely assessment and management. However, activation of rapid response systems and rescue of deteriorating patients are primarily dependent on the patient assessment and escalation of care decisions made by ward nurses (Considine & Currey 2015).

### Airway

#### Anatomy and physiology

The primary survey begins with a priority airway assessment. The **airway** supports free exchange of air between the external environment and the lungs. Essentially, the structures involved are the oral cavity, nasal passages, pharynx, larynx, trachea and the left and right main bronchi. Any type of obstruction to one or more of these structures will reduce the diameter of the airway leading to decreased flow of air. Examples include pathological (asthma, infection, abnormal lesions, immunological responses) and/or mechanical obstruction (secretions, airway trauma, foreign objects, aspiration of gastric contents, obstructive sleep apnoea). You may observe coughing and increased respiratory rate and effort. Inadequate compensation will lead to decreased oxygen delivery to tissues (hypoxia) and/or inadequate elimination of carbon dioxide.

#### Basic airway assessment

Basic airway assessment must be a priority before any other assessment because an ineffective airway can be life-threatening within minutes and should be treated immediately (Adam et al 2010). Look at your patient and observe for chest movement. If the patient can talk normally and is conscious and alert, the airway is patent (Adam et al 2010). If an oxygen mask is already in place, it is possible to observe humidification of the plastic mask by the patient’s expirations. Listen closely for air entry and feel respirations with your hand.

Any noisy respirations, such as obstruction from secretions, will need immediate intervention, such as suctioning. Assess the patient’s ability to cough. If warranted, look in the mouth for obvious foreign bodies that could be removed (Figure 23-4). Partial obstruction may be present if you detect snoring (occlusion of the pharynx by the tongue or palate), stridor (obstruction above the level of the larynx), wheezing (obstruction of the lower airway), gurgling sounds (liquid or semi-solid material) or a hoarse voice (Adam et al 2010, Price et al 2016). The patient with a compromised airway may be very anxious, sitting up and drooling. Look, listen and feel for signs of respiratory distress in adults and children (Figures 23-5 and 23-6). Remember, the patient will appear distressed unless a complete obstruction leads to unconsciousness and respiratory arrest (Price et al 2016).

### Breathing

#### Physiology and regulation

Knowledge of the structure and function of the respiratory system facilitates accurate assessment of **breathing**. Human survival depends on the ability of oxygen (O₂) to reach body cells and for carbon dioxide (CO₂) to be removed from the cells. Respiration is the mechanism the body uses to exchange gases between the atmosphere and the blood and between the blood and the cells. Effective respiration requires **ventilation** (the movement of gases into and out of the lungs), **diffusion** (the movement of oxygen and carbon dioxide between the alveoli and the red blood cells) and **perfusion** (the distribution of red blood cells to and from the pulmonary capillaries).

<table>
<thead>
<tr>
<th>Number of simultaneous critical vital signs</th>
<th>All ages</th>
<th>Age &gt; 60 years</th>
<th>Age &gt; 70 years</th>
<th>Age &gt; 80 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.24 (44)</td>
<td>0.40 (32)</td>
<td>0.62 (26)</td>
<td>0.92 (15)</td>
</tr>
<tr>
<td>1</td>
<td>0.92 (174)</td>
<td>1.47 (134)</td>
<td>1.96 (100)</td>
<td>2.09 (44)</td>
</tr>
<tr>
<td>2</td>
<td>6.95 (295)</td>
<td>9.84 (213)</td>
<td>11.5 (148)</td>
<td>13.0 (80)</td>
</tr>
<tr>
<td>3</td>
<td>23.6 (186)</td>
<td>33.1 (128)</td>
<td>42.0 (99)</td>
<td>42.9 (48)</td>
</tr>
<tr>
<td>4 or more</td>
<td>42.4 (61)</td>
<td>57.7 (41)</td>
<td>63.0 (29)</td>
<td>52.4 (11)</td>
</tr>
</tbody>
</table>

The number of patients who expired is noted in parentheses.

### Figure 23-2 Hospital observation chart using the ABCDE approach.

Clinical Excellence Commission 2013 The NSW Health Standard Observation Charts Between the Flags: Keeping patients safe.

<table>
<thead>
<tr>
<th>Category</th>
<th>Date</th>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
<td>36.5°C</td>
</tr>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td></td>
<td></td>
<td>12 R</td>
</tr>
<tr>
<td><strong>SpO₂</strong></td>
<td></td>
<td></td>
<td>98%</td>
</tr>
<tr>
<td><strong>Blood Pressure</strong></td>
<td></td>
<td></td>
<td>120/80</td>
</tr>
<tr>
<td><strong>Heart Rate</strong></td>
<td></td>
<td></td>
<td>70 B</td>
</tr>
<tr>
<td><strong>Blood Glucose</strong></td>
<td></td>
<td></td>
<td>7.2 mEq/L</td>
</tr>
<tr>
<td><strong>尿素氮</strong></td>
<td></td>
<td></td>
<td>20 mg/dL</td>
</tr>
</tbody>
</table>

**Altered Calling Criteria**

All observations must be graphed.
### Figure 23-2 continued

#### Yellow Zone Response

1. Consider the following:
   - **Additional YELLOW ZONE Criteria**
     - \( \text{SpO}_2 \text{ saturation} < 90\% \)
     - Decrease in Level of Consciousness or new onset of confusion
     - \( \text{Serious concern by you or any staff member} \)
     - \( \text{Ketonaemia} > 1.5\text{ mmol/L} \) or \( \text{Ketonuria} 2+ \) or more
     - \( \text{Arterial Blood Gas: } \text{PaO}_2 < 60 \) or \( \text{PaCO}_2 > 60 \) or \( \text{pH} < 7.2 \) or \( \text{BE} < -5 \)
     - \( \text{Venous Blood Gas: } \text{PvCO}_2 > 65 \) or \( \text{pH} < 7.2 \)
   - **Deterioration not reversed within 1 hour of Clinical Review**

2. **Red Zone Response**
   - \( \text{Patient unresponsive} \)
   - \( \text{Patient only responds to Pain (P) on the AVPU scale} \)
   - \( \text{Serious concern by any patient or family member} \)
   - \( \text{Serious concern by you or any staff member} \)

#### Red Zone Response

- **Resuscitation Plan**
- **Fluid Balance**
- **Anticoagulant**
- **Neurological Observation**
- **Insulin Infusion**
- **Neurovascular**
- **Other \( \text{___________} \)**

3. **Red Zone Criteria**

   - **Frequency Required**
     - Twice daily

4. **Red Zone Criteria**

   - **Reasoning for Red Zone Call**
     - Address any alterations to calling criteria or additional criteria
     - \( \text{Increased oxygen requirement} \)
     - \( \text{Increasing oxygen requirements to maintain oxygen saturation} > 90\% \)
     - \( \text{Deterioration not reversed within 1 hour of Clinical Review} \)
     - \( \text{Arterial Blood Gas: } \text{PaO}_2 < 60 \) or \( \text{PaCO}_2 > 60 \) or \( \text{pH} < 7.2 \) or \( \text{BE} < -5 \)
     - \( \text{Venous Blood Gas: } \text{PvCO}_2 > 65 \) or \( \text{pH} < 7.2 \)
     - \( \text{Serious concern by any patient or family member} \)
     - \( \text{Serious concern by you or any staff member} \)

5. **Red Zone Criteria**

   - **Frequency Required**
     - Twice daily

### STANDARD ADULT GENERAL OBSERVATION CHART SMR110.010

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date &amp; Time</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
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<td>Red Zone Criteria</td>
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<td>Red Zone Criteria</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
</tr>
</tbody>
</table>

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**Altered Calling Criteria**

- \( \text{Check the Health Care Record for an End of Life Care Plan which may alter the management of your patient} \)
- \( \text{For Instructions on How to Make a Call to Escalate Care for Your Patient} \)

---

**STANDARD ADULT GENERAL OBSERVATION CHART SMR110.010**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date &amp; Time</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
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<tr>
<td>Red Zone Criteria</td>
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<td>Red Zone Criteria</td>
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<tr>
<td>Red Zone Criteria</td>
<td></td>
</tr>
<tr>
<td>Red Zone Criteria</td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 23-2 continued**
The respiratory centre in the brainstem regulates the involuntary control of respirations. Adults normally breathe in a smooth, uninterrupted pattern 12–20 times per minute. The respiratory drive is regulated by carbon dioxide, oxygen and hydrogen ions (pH) in the arterial blood. The most important factor in the control of ventilation is the level of CO₂ in arterial blood. An elevation in the CO₂ level (hypercapnoea) or hypoxia causes the respiratory control system in the brain to increase the rate and depth of breathing, which removes excess CO₂ by increasing exhalation. Some patients with chronic lung disease have ongoing hypercapnoea and are known as CO₂ retainers. For patients with hypoxaemia (reduced levels of arterial oxygen) in association with chronic lung disease, controlled oxygen therapy is used (see Chapter 35).

### Mechanics of breathing

Although breathing is normally passive, muscular work is involved in moving the lungs and chest wall. Inspiration is an active process. During inspiration the respiratory
centre sends impulses along the phrenic nerve, causing the diaphragm to contract. Abdominal organs move downwards, increasing the volume of the chest cavity to move air into the lungs. The diaphragm moves approximately 1 cm, and the ribs retract upwards from the body's midline approximately 1.2–2.5 cm. During a normal, relaxed breath, an adult inhales approximately 500 mL of air. This amount is referred to as the tidal volume. During expiration, the diaphragm relaxes and the abdominal organs return to their original positions. The lung and chest wall return to a relaxed position (Figure 23-7). Normal breathing should be effortless.

Respirations

The accurate assessment of respirations depends on recognition of normal thoracic and abdominal movements (Skill 23-1). During quiet breathing, the chest wall gently rises and falls. Contraction of the intercostal muscles between the ribs or contraction of the muscles in the neck and shoulders, the accessory muscles of breathing, is not visible. During normal quiet breathing, diaphragmatic movement causes the abdominal cavity to rise and fall slowly. Prior to assessing respiratory rate, observe for difficulty breathing, accessory muscle use, asymmetrical chest movement and central cyanosis, which appears as a blue tinge to mucous membranes and lips (Clarke & Ketchell 2011).

**Figure 23-7** Mechanics of breathing.


**SKILL 23-1**

**Assessing respirations**

**Delegation considerations**

Respiration measurement can be delegated to enrolled nurses who are informed of:

- patient history or risk of increased or decreased respiratory rate or irregular respirations
- frequency of respirations measurement
- the reportable levels for the patient
- the need to report any abnormalities.

**Equipment**

- Watch with second hand or a digital display
- Pen, observation chart

**Therapeutic relationship and patient considerations**

- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assesses patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

Rate

Measurement of respiratory rate can best be done before assessing the pulse with your hand on the patient's wrist as it rests over the chest or abdomen. This approach allows assessment of respiratory rate, pattern and depth without drawing the patient's attention to the assessment. If the patient is aware, they may unintentionally alter their rate and depth of breathing. Observe a full inspiration and expiration.
### STEPS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Determine the frequency of monitoring respirations:</strong></td>
<td><strong>RATIONALE</strong></td>
</tr>
<tr>
<td>a. Consider previous medical conditions for respiratory alterations.</td>
<td>Certain conditions place patient at risk of alterations in ventilation detected by changes in respiratory rate, depth and rhythm.</td>
</tr>
<tr>
<td>b. Assess for signs and symptoms of respiratory alterations such as bluish or cyanotic appearance of nail beds, lips, mucous membranes and skin; restlessness, irritability, confusion, reduced level of consciousness; pain during inspiration; laboured or difficult breathing; adventitious breath sounds (see Chapter 24), inability to breathe spontaneously; thick, frothy, blood-tinged or copious sputum produced on coughing, use of accessory muscles to breathe, grunting sounds.</td>
<td>Physical signs and symptoms may indicate alterations in respiratory status related to ventilation.</td>
</tr>
<tr>
<td>c. Pulse oximetry (SpO₂). Acceptable SpO₂ &gt; 95% on room air. 88–92% may be acceptable for patients with chronic obstructive pulmonary disease.</td>
<td>SpO₂ less than 90% is clinically significant and often accompanied by changes in respiratory rate, depth and rhythm.</td>
</tr>
<tr>
<td>2. <strong>Determine previous baseline respiratory rate (if available) from patient’s record.</strong></td>
<td>Assess for change in condition. Provides comparison with future respiratory measurements.</td>
</tr>
<tr>
<td>3. Be sure patient is in comfortable position, preferably sitting or lying with the head of the bed elevated 45–60 degrees.</td>
<td>Sitting erect promotes full ventilation.</td>
</tr>
<tr>
<td>4. <strong>Perform hand hygiene.</strong></td>
<td>Prevents transmission of microorganisms.</td>
</tr>
<tr>
<td>5. <strong>Draw curtains or close door to the patient’s room prior to exposing the patient.</strong></td>
<td>To ensure privacy during assessment procedure.</td>
</tr>
<tr>
<td>6. Be sure patient’s chest is visible. If necessary, move bedclothes or gown.</td>
<td>Ensures clear view of chest wall and abdominal movements.</td>
</tr>
<tr>
<td>7. Place patient’s arm in relaxed position across the abdomen or lower chest, or place nurse’s hand directly over patient’s upper abdomen (see illustration).</td>
<td>A similar position used during pulse assessment allows respiratory rate assessment to be inconspicuous. Patient’s or nurse’s hand rises and falls during respiratory cycle.</td>
</tr>
</tbody>
</table>

| Step 6  | Position of hands for assessing respirations. |

| 8. **Observe complete respiratory cycle (one inspiration and one expiration).** | Rate is accurately determined only after nurse has viewed respiratory cycle. |
### STEPS

<table>
<thead>
<tr>
<th><strong>STEP</strong></th>
<th><strong>RATIONALE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. After cycle is observed, look at watch’s second hand and begin to count rate: when second hand hits number on dial, begin timeframe, counting 1 with first full respiratory cycle.</td>
<td>Timing begins with count of 1. Respirations occur more slowly than pulse; thus timing does not begin with 0.</td>
</tr>
<tr>
<td>10. If rhythm is regular, count number of respirations in 30 seconds and multiply by 2. If rhythm is irregular, &lt; 12 or &gt; 20, count for 1 full minute.</td>
<td>Respiratory rate is equivalent to number of respirations per minute. Suspected irregularities require assessment for at least 1 minute.</td>
</tr>
</tbody>
</table>

- **Critical decision point:** Respiratory rate < 12 or > 20 requires further assessment (see Chapter 24) and may require immediate intervention.

<table>
<thead>
<tr>
<th><strong>STEP</strong></th>
<th><strong>RATIONALE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Note depth of respirations, subjectively assessed by observing degree of chest wall movement while counting rate. Can also objectively assess depth by palpating chest wall excursion or auscultating the posterior thorax after rate has been counted. Depth is described as shallow, normal or deep.</td>
<td>Character of chest movement may reveal specific disease state restricting volume of air from moving into and out of the lungs.</td>
</tr>
<tr>
<td>11. Note rhythm of respirations. Normal breathing is regular and uninterrupted.</td>
<td>Character of ventilations can reveal specific types of alterations.</td>
</tr>
</tbody>
</table>

- **Critical decision point:** Occasional periods of apnoea, the cessation of respiration for several seconds, are a symptom of underlying disease in the adult and should be reported. An irregular respiratory rate and short apnoic spells are usual in a newborn.

<table>
<thead>
<tr>
<th><strong>STEP</strong></th>
<th><strong>RATIONALE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Perform hand hygiene.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
<tr>
<td>14. Discuss findings with patient as needed.</td>
<td>Promotes participation in care and understanding of health status.</td>
</tr>
<tr>
<td>15. If respirations are assessed for the first time, establish rate, rhythm and depth as baseline if within normal range.</td>
<td>Used to compare future respiratory assessment.</td>
</tr>
<tr>
<td>16. Compare respirations with patient’s previous baseline and normal rate, rhythm and depth.</td>
<td>Allows assessment for changes in patient’s condition and for presence of respiratory alterations.</td>
</tr>
</tbody>
</table>

### RECORDING AND REPORTING
- Record respiratory rate and character in nursing notes and observation chart. Indicate type and amount of oxygen therapy if used by patient during assessment.
- Report abnormal findings to nurse in charge or medical practitioner.
expiration when counting ventilation or respiration rate. The respiratory rate varies with age (Table 23-2).

**Depth**

The depth of respiration is measured by observing the degree of excursion or movement in the chest wall. Respirations are described as **deep**, **normal**, or **shallow**. A deep respiration involves a full expansion of the lungs with full exhalation. Respirations are shallow when only a small quantity of air passes through the lungs and this may be difficult to visualise. You may have to feel the chest rise and fall, or listen with a stethoscope over the central airways, if you observe that respirations are unusually shallow. Table 23-3 summarises types of respiratory alterations.

**Pattern**

Determine breathing pattern by observing the chest or abdomen. Diaphragmatic breathing results from the contraction and relaxation of the diaphragm and is best observed by watching abdominal movements. Men and children usually demonstrate diaphragmatic breathing. Women tend to use thoracic muscles to breathe; movements are observed in the upper chest. Laboured respirations usually involve the accessory neck muscles. When a foreign body or tracheal trauma interferes with the movement of air into the lungs, the intercostal spaces retract during inspiration. A longer expiration phase is evident when the outward flow of air is obstructed (e.g. in asthma).

With normal breathing, a regular interval occurs after each respiratory cycle. Infants tend to breathe less regularly. The young child may breathe slowly for a few seconds and then suddenly breathe more rapidly. While assessing respirations, estimate the time interval after each respiratory cycle. Respiration is **regular** or **irregular** in pattern.

**Respiratory sounds**

An integral part of respiratory assessment is listening to the sounds of breathing. **Snoring**, **stridor**, **wheezing** and **inspiratory grunt** are indicators of a respiratory obstruction. Snoring occurs when parts of the upper airway lose tone and partially block the airway. In some circumstances, this may result in full obstruction such as in obstructive sleep apnoea. Stridor is an inspiratory wheeze or crowing sound occurring with upper airway obstruction (e.g. croup, inhalation of foreign objects, laryngeal oedema after extubation). Wheezing is a high-pitched musical sound occurring when there is a partial obstruction in smaller airways and bronchioles (e.g. bronchiolitis and asthma). Absence of wheezing can only be confirmed by auscultation with a stethoscope (see Chapter 24).

Respiratory monitoring devices that aid your assessment include the apnoea monitor and pulse oximeter. Apnoea monitoring is used frequently with infants in the hospital and at home to observe for prolonged apnoea events. Leads attached to the infant’s chest wall sense movements; the absence of chest wall movement is interpreted by the monitor as apnoea and triggers an alarm.

**Oxygen saturation**

Arterial oxygenation (**oxygen saturation**) can be non-invasively measured using a pulse oximeter (Skill 23-2). Blood flows through the pulmonary capillaries where oxygen attaches to red blood cells. After oxygen diffuses from the alveoli into the pulmonary blood, most of the oxygen attaches to haemoglobin molecules in red blood
Measuring oxygen saturation (SpO₂)

Delegation considerations
Oxygen saturation measurement can be delegated to enrolled nurses, who are informed of:
- the need to notify the registered nurse immediately of any reading lower than SpO₂ of 95%
- appropriate sensor site, probe and patient position for measurement of oxygen saturation
- frequency of oxygen saturation measurements
- factors that can falsely lower SpO₂ (see Box 23-2).

Equipment
- Oximeter
- Oximeter probe appropriate for patient and recommended by manufacturer
- Pen, observation chart

Therapeutic relationship and patient considerations
- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assesses patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

Steps

1. Determine the frequency of monitoring oxygen saturation:
   a. Consider previous medical conditions for alteration of oxygen saturation.

2. Assess for factors that normally influence measurement of SpO₂, such as oxygen therapy, haemoglobin level and temperature.

3. Determine previous baseline SpO₂ (if available) from patient’s record.

4. Explain purpose of procedure to patient and how oxygen saturation will be measured.

Rationale

Certain conditions place patients at risk of decreased oxygen saturation: acute or chronic compromised respiratory function, recovery from general anaesthesia or conscious sedation or traumatic injury to chest wall with or without collapse of underlying lung tissue, ventilator dependence, changes in supplemental oxygen therapy.

Physical signs and symptoms may indicate abnormal oxygen saturation.

Allows for accurate assessment of oxygen saturation variations. Peripheral vasoconstriction related to hypothermia can interfere with SpO₂ determination.

Baseline information provides basis for comparison and helps in assessment of current status and evaluation of interventions.

Promotes patient cooperation and understanding.
5. Assess site most appropriate for sensor probe placement (e.g., digit, earlobe) (see Box 23-3). Site must have adequate local circulation and be free of moisture.

Peripheral vasoconstriction can interfere with SpO$_2$ determination. Dark nail polish and acrylic nails impede sensor detection of emitted light and produce falsely elevated SpO$_2$.

6. Perform hand hygiene.

Reduces transmission of microorganisms.

7. Position patient comfortably. If finger is chosen as monitoring site, support lower arm.

Ensures probe positioning and decreases movement that interferes with SpO$_2$ determination.

8. If finger is to be used, remove any fingernail polish with acetone from digit to be assessed. If earlobe is to be used, remove any earrings. Wash site, swab with alcohol and air-dry.

Ensures accurate readings. Opaque coatings decrease light transmission; nail polish containing blue pigment can absorb light emissions and falsely alter saturation.

9. Attach sensor probe to monitoring site. Explain to patient that clip-on probe feels like a clothes peg on the finger but should not hurt.

Pressure of sensor probe’s spring tension on a peripheral digit or earlobe may be unexpected.

10. Once the sensor probe is attached ask the patient to remain still during the assessment.

Moving the finger during the assessment can affect the sensor probe’s ability to reach a constant value (pulse, SpO$_2$) and will affect accurate monitoring of the patient.

Critical decision point: Do not attach probe to finger, ear or bridge of nose if area is oedematous or skin integrity is compromised. Do not attach probe to fingers that are hypothermic. Select ear or bridge of nose if adult patient has history of peripheral vascular disease. Earlobe and bridge of nose sensors are not used for infants and toddlers because of skin fragility. Disposable adhesive probes contain latex and should not be used if patient has latex allergy.

11. Turn on oximeter by activating power. Observe pulse waveform/intensity display and audible beep. Correlate oximeter pulse rate with patient’s radial pulse. Differences require re-evaluation of oximeter probe placement and may require reassessment of pulse rates.

Pulse waveform/intensity display enables detection of valid pulse or presence of interfering signal. Pitch of audible beep is proportional to SpO$_2$ value. Double-checking pulse rate ensures oximeter accuracy. Oximeter pulse rate, patient’s radial pulse and apical pulse rate should be the same.

12. Leave probe in place until oximeter readout reaches constant value and pulse display reaches full strength during each cardiac cycle. Read SpO$_2$ on digital display. Inform patient that oximeter will sound alarm if the probe falls off or if patient moves the probe.

Reading may take 10–30 seconds, depending on site selected.

13. If continuous SpO$_2$ monitoring is planned, verify SpO$_2$ alarm limits. Limits for SpO$_2$ and pulse rate should be determined as indicated by patient’s condition. Verify that alarms are on. Assess skin integrity under sensor probe and relocate sensor probe at least every 4 hours (every 2 hours for a spring-tension probe).

Alarms must be set at appropriate limits and volumes to avoid frightening patients and visitors. Spring tension of sensor probe or sensitivity to disposable sensor probe adhesive can cause skin irritation and lead to disruption of skin integrity.

14. Discuss findings with patient as needed.

Promotes participation in care and understanding of health status.

15. If intermittent or spot-checking SpO$_2$ measurements are planned, remove probe and turn oximeter power off. Clean probe following manufacturer’s instructions and store in appropriate location.

Batteries can be depleted if oximeter is left on. Sensor probes are expensive and vulnerable to damage.
CHAPTER 23 MONITORING VITAL SIGNS: USING A PRIMARY SURVEY APPROACH FOR PATIENT ASSESSMENT

<table>
<thead>
<tr>
<th>STEPS</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Perform hand hygiene.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
<tr>
<td>18. Compare SpO₂ readings with patient baseline and acceptable values.</td>
<td>Comparison reveals presence of abnormality.</td>
</tr>
<tr>
<td>19. Correlate SpO₂ with SaO₂ obtained from arterial blood gas measurements (see Chapter 35) if available.</td>
<td>Documents reliability of non-invasive assessment.</td>
</tr>
<tr>
<td>20. Correlate SpO₂ reading with data obtained from respiratory rate, depth and rhythm assessment.</td>
<td>Measurements assessing ventilation, perfusion and diffusion are interrelated.</td>
</tr>
</tbody>
</table>

**RECORDING AND REPORTING**

- Record SpO₂ value on patient progress notes and observation chart, indicating type and amount of oxygen therapy used by patient during assessment. Also record any signs and symptoms of oxygen desaturation in progress notes. Measurement of SpO₂ after administration of specific therapies should be documented in narrative form in progress notes.
- Report abnormal findings to nurse in charge or medical practitioner.

---

Cells. Red blood cells carry the oxygenated haemoglobin molecules through the left side of the heart and out to the peripheral capillaries, where the oxygen detaches.

The percentage of haemoglobin bound with oxygen in the arteries is the percentage of saturation of haemoglobin (or SaO₂). For a healthy adult breathing room air it is usually between 95% and 100%. SaO₂ is affected by factors that interfere with ventilation and perfusion (see Chapter 40). Always interpret the measurement in relation to the patient’s oxygen requirement and record the amount of supplemental oxygen being delivered (e.g. a patient who needs supplemental oxygen to maintain oxygen saturation > 90% is hypoxaemic). The pulse oximeter (Figure 23-8) emits light wavelengths that are absorbed by the oxygenated and deoxygenated haemoglobin molecules. The light reflected from the haemoglobin molecules is processed by the oximeter, which calculates peripheral oxygen saturation (SpO₂). SpO₂ is a reliable estimate of SaO₂ when it is over 90%, but is less accurate at saturations below 80%. The measurement of SpO₂ is affected by factors that affect light transmission or peripheral arterial pulsations (Box 23-2). Selecting the appropriate probe is important for reducing measurement error (Box 23-3). Movement is the most common cause of inaccurate readings.

Observing work of breathing, measurement of respiratory rate, pattern and depth, along with oxygen saturation using the pulse oximeter (SpO₂), are critical elements when assessing breathing. Each measurement provides cues in determining the nature of a patient’s problem. It is important to note that pulse oximetry is not a replacement for nursing assessment of respirations.
### BOX 23-2 Factors affecting determination of peripheral oxygen saturation (SpO2)

**Interference with light transmission**
- Outside light sources can interfere with the oximeter’s ability to process reflected light.
- Carbon monoxide (caused by smoke inhalation or poisoning) artificially elevates SpO2 by absorbing light similar to oxygen.
- Movement can interfere with the oximeter’s ability to process reflected light.
- Jaundice may interfere with the oximeter’s ability to process reflected light.
- Intravascular dyes (methylene blue) absorb light similar to deoxyhaemoglobin and artificially lower saturation.

**Reduction of arterial pulsations**
- Peripheral vascular disease (Raynaud’s disease, atherosclerosis) can reduce pulse volume.
- Hypothermia at assessment site decreases peripheral blood flow.
- Pharmacological vasoconstrictors (adrenaline, phenylephrine, dopamine) will decrease peripheral pulse volume.
- Low cardiac output and hypotension decrease blood flow to peripheral arteries.
- Peripheral oedema can obscure arterial pulsation.

### BOX 23-3 Characteristics of pulse oximeter sensor probes and sites

**Reusable probe**
- Digit probe
- Easy to apply, conforms to various sizes
- Yields strong correlation with SaO2

**Earlobe**
- Clip-on is smaller and lighter though more positional than digit probe
- Greater accuracy at lower saturations
- Good when uncontrollable movements (e.g., hand tremors) are present
- Least affected by decreased blood flow

**Disposable sensor pad**
- Can be applied to a variety of sites: earlobe of adult, nose bridge, palm or sole of infant
- Less restrictive for continuous SpO2 monitoring
- Expensive
- Contains latex
- Risk that skin under adhesive may become moist and harbour pathogens
- Available in variety of sizes; can be matched to infant weight

---

**CLINICAL EXAMPLE**

Mrs Winter, a 65-year-old woman, has been admitted to the ward following a stroke 5 days previously, which has left her with a mild but improving right-sided weakness, some dysarthria (disordered speech) and dysphagia (difficulty swallowing). She has also been diagnosed with a chest infection that was believed to be improving with antibiotic therapy. Mrs Winter is known to have chronic obstructive pulmonary disease (COPD) and to sometimes experience angina on exertion.

At afternoon handover, she is reported to have become confused and restless in the last 2 hours. The nurses found it difficult to record vital signs, but oxygen saturations were low and therefore oxygen therapy has been applied with a simple face mask. The ICU outreach nurse has been called to see the patient, but has not arrived yet. You are taking over the patient’s care and so begin an ABCDE assessment:

**AIRWAY:** You see that the patient is partly sitting up, although leaning to one side. She does not answer when you speak to her, but does open her eyes when you touch her on the shoulder. You can hear and feel air entry but there is a rattling sound when she breathes. You ask her to try and cough to clear her throat, but it makes no difference to the rattling sound and she does not seem to clear anything from her airway. You try to reposition her in a more upright position and check to see if there is any material at the back of her mouth. Using a Yankeur sucker, you suction thick yellowy-green secretions, and her breathing seems to become less laboured.

**BREATHING:** You can see the chest moving symmetrically and the respiratory rate is 26 breaths/minute. The patient is still receiving oxygen via a face mask at 8L/min, and the pulse oximeter shows an oxygen saturation of 88% (very low given that she is receiving high-concentration oxygen). Auscultation of the chest reveals breath sounds (and therefore air entry) in both lungs. There are coarse crackles and some expiratory wheeze in the right upper zone, with reduced sounds of air entry in the right lower zone as compared with the left.

Pulse oximetry only gives us half the story about a patient’s oxygenation and ventilation: it determines oxygen saturation and can detect hypoxaemia, but it is not an indicator of adequate ventilation (ability to exhale CO₂).

**Circulation**

**Physiology and regulation**

The pulse is the palpable bounding of blood flow noted at various points on the body. It is an indicator of the fluid wave created by ventricular contraction and therefore of the adequacy of circulatory status (circulation). Electrical impulses originating from the sinoatrial node travel through heart muscle to stimulate cardiac contraction. Approximately 60–70 mL of blood enters the aorta with each ventricular contraction, known as the stroke volume (SV). With each stroke volume ejection, the walls of the aorta distend, creating a pulse wave that travels rapidly towards the distal ends of the arteries. When a pulse wave reaches a peripheral artery, it can be felt by palpating the artery lightly against underlying bone or muscle. The number of pulsing sensations occurring in 1 minute is the pulse rate. The volume of blood pumped by the heart during 1 minute is the cardiac output (CO). The heart’s ability to meet the demands of the body’s tissue for nutrients is determined by palpating a peripheral pulse or by using a stethoscope to listen to heart sounds (apical heart rate).

While several arteries can be assessed for pulse rate (Skill 23-3), the radial artery is usually the most practical site at which to palpate the pulse (Figure 23-9). Other peripheral pulses, such as the brachial or femoral arteries, are assessed when surgery or treatment has impaired blood flow to a body part, there are clinical indications of impaired peripheral blood flow, or when a focused cardiovascular physical examination is conducted (Table 23-4). When CO declines significantly, peripheral pulses weaken and are difficult to palpate. The carotid site is the best in this situation because the heart will continue delivering blood through the carotid artery to the brain as long as possible.

In normal adults, heart rates average 60 to 100 beats per minute. Bradycardia is a heart rate less than 60 per minute and tachycardia is greater than 100 per minute (Talley & O’Connor 2014). If the radial pulse is abnormal, irregular or unattainable because of a dressing, a cast or patient-prescribed medication affecting the heartbeat, the apical pulse is assessed. The brachial or apical pulses are the best sites for assessing an infant’s or young child’s pulse, because other peripheral pulses are deep and difficult to palpate accurately.
### STEPS

<table>
<thead>
<tr>
<th>STEPS</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Discuss findings with patient as needed.</td>
<td>Promotes participation in care and understanding of health status.</td>
</tr>
<tr>
<td>9. If temperature is assessed for the first time, establish temperature as baseline if it is within normal range.</td>
<td>Used to compare future temperature measurements.</td>
</tr>
<tr>
<td>10. Compare temperature reading with patient's previous baseline and acceptable temperature range for patient's age group.</td>
<td>Normal body temperature fluctuates within narrow range; comparison reveals presence of abnormality. Improper placement or movement of thermometer can cause inaccuracies. Second measurement confirms initial findings of abnormal body temperature.</td>
</tr>
</tbody>
</table>

### RECORDING AND REPORTING
- Record temperature in observation chart.
- Report abnormal findings to nurse in charge or medical practitioner.

---

**Figure 23-17** Electronic thermometer. Blue probe is for oral or axillary use. Red probe is for rectal use.


---

**Figure 23-18** Tympanic thermometer with probe cover being inserted into auditory canal.

A recent inclusion to body temperature measurement is the infrared non-touch thermometer (Figure 23-19). Temperature can be ascertained by holding the thermometer near the patient's head and activating the device.

Disposable, single-use thermometers are thin strips of plastic with a temperature sensor at one end. The sensor consists of a matrix of dot-like indentations that contain chemicals which melt and change colour at different temperatures. They are used for oral or axillary temperatures, particularly with children (Figure 23-20). Single-use thermometers are inserted the same way as any oral or axillary thermometer. The thermometer is removed after 3 minutes and read after waiting about 10 seconds for the colour change to stabilise.

Another form of disposable thermometer is a temperature-sensitive patch or tape. Applied to the forehead or abdomen, the patch changes colour at different temperatures. Both forms of disposable thermometers are useful for screening patients, especially infants, for altered
temperature, and are not appropriate for monitoring temperature therapies.

**Fever**

Fever (or pyrexia) occurs as a part of the inflammatory response caused by trauma, surgery, infection, immune responses and tissue damage. For example, in the immediate postoperative period it is common for a patient to develop a fever as part of the normal inflammatory response to surgery. During fever, white blood cell production is stimulated and there is a decrease in the concentration of iron in the blood plasma, suppressing bacterial growth. Fever also stimulates the production of antiviral interferon.

Fever is a host defence response, a *febrile response*, to invasion from exogenous pyrogens, including microbial pathogens such as bacteria, viruses, mycobacteria and fungi as well as non-microbial antigens such as inflammatory agents and drugs. During the febrile response, the set point in the thermoregulatory centre is reset to maintain a higher level of body temperature. This higher temperature is maintained through increased heat production, especially through peripheral vasoconstriction and behavioural measures such as covering oneself with blankets in response to chills even though the body temperature is elevated.

The febrile response is a coordinated series of events to defend the body against these invading organisms through the intentional elevation of the body’s core temperature – a mean 1°C increase in body temperature (for that specific measurement site). Fever is an *adaptive* response, even though it places substantial demands on the body through

---

**Figure 23-19** Infrared thermometer.

**Figure 23-20** Disposable, single-use thermometer strip.


**Figure 23-21** Effect of changing the setpoint of the hypothalamic temperature control during a fever.

increased metabolic demands. Fever has an upper limit ranging from 41°C to 42°C. Most infections produce fevers between 38.5°C and 40.5°C, and an average fever of 39.5°C.

**Three phases of fever**

The cold phase begins as the hypothalamic set point is reset to a higher level (Figure 23-21). This phase lasts approximately 10–40 minutes, during which all heat-producing mechanisms are activated and there is a rapid, steady rise in temperature. Heat production increases oxygen demands by 3–5 times normal resting levels, contributing to a hypermetabolic state. In this state there are associated increases in heart and respiratory rates and thirst. Vasconstriction causes the skin to look pale with cyanotic nail beds, and to feel cool and dry. During this period, the person experiences chills and rigors, and feels cold even though the body temperature is rising.

During the **hot phase** the body has reached a new set point and maintains the body temperature at this new higher temperature. The length of this phase depends on the time it takes to eradicate the pyrogenic cytokines responsible for the raised set point. Higher temperatures in this phase are maintained through a balance in heat production and heat loss. Skin is flushed and warm and the individual feels hot. Basal metabolic rate remains high, so tachycardia and thirst continue. Other symptoms associated with this phase include drowsiness, headache, photophobia, reduced activity and appetite, feelings of weakness and/or restlessness and sometimes convulsions. This phase ends when the underlying cause of fever has been treated and/or eliminated by the body, resulting in a decrease in set point to normal.

The **defervescence phase** or the ‘breaking’ of the fever occurs when there is a sudden decline in circulating pyrogenic cytokines and resetting of the hypothalamic set point back to normal. Heat-loss mechanisms take over and heat production is inhibited. The skin feels warm and is flushed due to vasodilation and sweating, which can exacerbate existing dehydration. Finally, the temperature returns to normal and the patient becomes afebrile.

**Benefits and costs of fever**

Fever is beneficial in a normal healthy person in the home setting, but seriously ill children and adults can become severely compromised by the additional physiological strain of fever. For every 1°C above normal temperature there are associated physiological changes. There is an associated increase in oxygen consumption of 10–12% and an insensible fluid loss of 20%. Increased fluid loss associated with reduced intake leads to dehydration, the most common and dangerous side effect of fever. During the cold stage, blood pressure increases and glomerular filtration rates decrease; this reverses during the hot phase. Increased urine output assists in the removal of the additional metabolic wastes from the catabolic febrile state.

When fever is prolonged, the risk of dehydration increases and anorexia, secondary to generalised weakness and malaise, is common. Psychological effects include apathy, confusion, delirium and withdrawal from people and activities. These physiological and psychological effects of fever are important considerations for nurses and those caring for febrile children and adults. Fever should be reduced in those who are placed at risk due to the additional physiological burden from the febrile response. This includes children and adults who are seriously ill, and those who have cardiopulmonary, neurological or metabolic disorders or are malnourished, dehydrated or have epileptic lesions and may not tolerate the additional physiological demands during fever. In children, fever may trigger convulsions in those with a seizure disorder or a predisposition to febrile convulsions.

**Hypothermia**

Heat loss during prolonged exposure to cold overwhelms the body's ability to produce heat, causing hypothermia or temperature less than 35°C (Talley & O'Connor 2014). In **hypothermia** the body at first increases metabolic rate (to increase heat production), increases vasoconstriction (to decrease heat loss), shunts blood from the peripheral vascular bed to the core (to reduce heat loss) and increases shivering (to increase heat production). Hypothermia is classified by core temperature measurements (Box 23-11). Some people are more prone to hypothermia than others (Box 23-12). Hypothermia may also be intentionally induced during surgical procedures, to reduce metabolic demand and the body’s need for oxygen.

Hypothermia usually develops gradually and may go unnoticed for several hours. When skin temperature drops to 35°C, the person suffers uncontrolled shivering, loss of memory, depression and poor judgement. As the body temperature falls below 34.4°C, cyanosis occurs,

| **BOX 23-11 Classification of hypothermia** |
|-----------------|-----------------|
| Mild            | 33.1–35°C       |
| Moderate        | 30.1–33°C       |
| Severe          | 27–30°C         |
| Profound        | < 27°C          |
and heart and respiratory rates and blood pressure fall. If hypothermia progresses, cardiac dysrhythmias, loss of consciousness and unresponsiveness to painful stimuli occurs. In cases of severe hypothermia, a person may demonstrate clinical signs similar to death (e.g., lack of response to stimuli and extremely slow respirations and pulse). The assessment of core temperature is critical when hypothermia is suspected. A special low-reading thermometer may be required, because standard devices often do not register below 35°C.

**BOX 23-12 Patients at risk of hypothermia**

**Neonates**
Can lose as much as 4.5°C immediately after delivery, as a result of heat evaporation. They also have a larger surface-to-mass ratio and a small amount of subcutaneous tissue.

**Older patients**
Often have a decrease in level of thyroxine and therefore a decreased ability to increase metabolic rate and heat production. Have a decreased ability in vasomotor response, including decreased ability to produce heat through shivering.

**Patients with alcohol problems**
Alcohol increases peripheral vasodilation (increases heat loss), and long-term use may affect the hypothalamic response to cold.

**Surgical patients**
Patients can lose as much as 0.3°C per hour by loss of heat through an open cavity in a theatre where the ambient temperature is less than the body temperature. Anaesthetics block the activity of shivering and decrease the body’s ability to produce heat.

---

**CLINICAL EXAMPLE CONTINUED**

Mrs Winter is acutely unwell and at high risk of further deterioration. Following the ABCDE approach, you take a body temperature and begin a head-to-toe scan for other important assessment data:

**EXPOSURE**
The tympanic body temperature reading indicates Mrs Winter is febrile at 38.9°C and she feels hot and sweaty to touch. You are worried that taken together, the trends in vital signs suggest her chest infection is worsening and she is developing sepsis. Her skin is flushed. There are no wounds, dressings or drains. But you note an IV cannula in the left arm. The ICU outreach nurse arrives and you are able to hand over your assessment and initial interventions using the ABCDE framework.

**Conclusion**
This chapter has introduced you to the ABCDE approach, which forms the foundation of patient assessment in any setting. It provides a simple framework so that clinical problems can be identified and addressed in priority order. Even during complex and stressful situations such as acute patient deterioration, taking time out to work through each step of the ABCDE approach will help you make sense of the situation and guide initial interventions. When patient problems are identified, a focused assessment will be triggered. The next chapter builds on the primary survey by explaining how to perform a focused body systems assessment.

**Key concepts**

- The ABCDE approach to assessment is a simple, structured process to improve the early recognition of clinical deterioration. It is the first element of patient assessment in any setting. The core skills during each step are to look, listen, feel and measure.
- Airway patency is the first priority. Look, listen and feel for any airway obstruction.
- Breathing focuses on assessment of respirations, work of breathing, and measurement of oxygen saturation.
- Circulation focuses on feeling the pulse, checking peripheral perfusion, and measuring blood pressure. Assess urine output if possible.
- Disability (level of consciousness) is quickly assessed from the outset using the AVPU scale. Simple questions can be used to evaluate mental status and speech. Ask about pain.
- Exposure includes measurement of body temperature and a general head-to-toe scan to identify any obvious problems. Assess skin colour, wounds, dressings or drains, invasive lines. Note ability to stand and move. Determine last bowel movement.

**Online resources**


This site describes the ABCDE assessment framework in action and contains learning modules and chapters on recognising patient deterioration. Links to the material are available through the NSW Health Education and Training Institute (HETI). University students have access through ClinConnect.

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Introduction

The third edition of the *Fundamentals of Nursing: Clinical Skills Workbook* has been published with the aim of building on the already established and trusted relationship that exists between nursing students and *Potter and Perry's Fundamentals of Nursing*. Written to align with the fifth edition of *Potter and Perry's Fundamentals of Nursing*, nursing students and lecturers familiar with the nursing skills format in the textbook will benefit from this separate, workbook, which enables students to easily transport the skills content to lectures, labs and clinical practice. Additionally, the workbook provides students with a clear and accessible personal record of achievement and allows an opportunity for reflection to encourage meaningful learning. Nursing students are further supported with *Fundamentals of Nursing Case Studies*, which has been designed for use in conjunction with the *Fundamentals of Nursing* textbook and *Clinical Skills Workbook* to expose students to real-world clinical examples that they will come into contact with in a clinical setting.

**New features**

The checklists in this edition of the workbook have been revised to align with the updated skills in the fifth edition of *Potter and Perry's Fundamentals of Nursing*. Eleven new skills and checklists have been included covering the following areas: health assessment and physical examination; vital signs; mental status assessment; skin integrity and wound care; fluid, electrolyte and acid–base balance; and pain management.

Also featured in this third edition are the New Zealand *Competencies for registered nurses*, 2007, to sit alongside the updated Australian *Registered nurse standards for practice*, 2016. The complete lists of New Zealand and Australian standards are included at the end of this book, and the criteria all students will be working to are referred to under 'Domains' and 'Performance Criteria' within each checklist.

The simple structure of the workbook allows students to work through the book independently, or as a group, and master the skills necessary to become a competent, qualified nurse.

A concise overview precedes each skill set, providing a valuable introduction and an understanding of the clinical context. Each skill from *Potter and Perry's Fundamentals of Nursing* features the favoured step-by-step approach and rationales to help students understand how and why a skill is performed.

**Skills**

The skills encompass the following areas:

- **Delegation considerations** guide students in the delegation of nursing tasks by registered nurses to assistants in nursing and enrolled nurses, where appropriate.
- **Equipment** lists the essential tools required to carry out a skill.
- **Therapeutic relationship and patient considerations** remind students that the person is central to the interaction between the nurse and patient in all things relating to the treatment process.
- **Critical decision points** alert students to the critical steps within a skill to ensure safe and effective client care.
- **Steps in concise, easy-to-understand language** outline each nursing action that needs to be undertaken to complete the skill.
- **Rationale** provides the student with the logic behind each step.
- **Recording and reporting** provides guidelines for what to document and report.
- **Home care considerations** explain how to adapt skills for the home setting.
Checklists

The clinical skill checklists that follow each skill allow students to track their skill development progress, as well as providing assessors with a clear competency assessment tool.

Each checklist includes the following areas:

- **Performance criteria** lists the Australian and New Zealand national competency standards for registered nurses aligned to the skill.
- **Competency criteria** indicate the imperative steps that students must include while carrying out the skill.
- **Performance criteria/evidence** lists the specific steps required to successfully complete that particular skill.
- **The five-point Bondy Rating Scale** provides the backbone of the checklist to clearly indicate the level of competence achieved. The five variants upon which students are graded are: Independent, Supervised, Assisted, Marginal and Dependent.
- **Reflection** provides room for students to detail their experience, whether they master the skill on their first attempt or wish to record notes to assist them in a future attempt.

Videos

A suite of *Clinical Nursing Skills* videos is available online for use with the workbook. Produced in association with Edith Cowan University, the videos are ideal for viewing in class or as a valuable tool for revision prior to assessment, and are available through purchase of the main text, *Potter and Perry’s Fundamentals of Nursing* 5th edition.
The five-point Bondy Rating Scale

The five-point Bondy Rating Scale is a useful tool for assessing professional competency and, subsequently, the amount of supervision needed to successfully master the nursing skills included in this workbook. The scale is also a useful indicator of students’ ability to carry out these skills with accuracy, safety and satisfactory effect.

<table>
<thead>
<tr>
<th>Scale label</th>
<th>Score</th>
<th>Standard of procedure</th>
<th>Quality of performance</th>
<th>Level of assistance required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>5</td>
<td>Safe</td>
<td>Proficient</td>
<td>No supporting cues required</td>
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<td></td>
<td></td>
<td>Accurate</td>
<td>Proficient</td>
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<td></td>
<td></td>
<td>Achieved intended outcome</td>
<td>Confident</td>
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<tr>
<td></td>
<td></td>
<td>Behaviour is appropriate to context</td>
<td>Expedient</td>
<td></td>
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<tr>
<td>Supervised</td>
<td>4</td>
<td>Safe</td>
<td>Proficient</td>
<td>Requires occasional supportive cues</td>
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<td></td>
<td></td>
<td>Accurate</td>
<td>Proficient</td>
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<td></td>
<td></td>
<td>Achieved intended outcome</td>
<td>Confident</td>
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<tr>
<td></td>
<td></td>
<td>Behaviour is appropriate to context</td>
<td>Reasonably expedient</td>
<td></td>
</tr>
<tr>
<td>Assisted</td>
<td>3</td>
<td>Safe</td>
<td>Proficient throughout most of performance when assisted</td>
<td>Requires frequent verbal and occasional physical directives in addition to supportive cues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accurate</td>
<td>Proficient throughout most of performance when assisted</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Achieved most objectives for intended outcome</td>
<td>Unskilled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Behaviour generally appropriate to context</td>
<td>Inefficient</td>
<td>Requires continuous verbal and frequent physical directive cues</td>
</tr>
<tr>
<td>Marginal</td>
<td>2</td>
<td>Safe only with guidance</td>
<td>Unskilled</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Not completely accurate</td>
<td>Inefficient</td>
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<tr>
<td></td>
<td></td>
<td>Incomplete achievement of intended outcome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent</td>
<td>1</td>
<td>Unsafe</td>
<td>Unskilled</td>
<td>Requires continuous verbal and continuous physical directive cues</td>
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<tr>
<td></td>
<td></td>
<td>Unable to demonstrate behaviour</td>
<td>Unskilled</td>
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<tr>
<td></td>
<td></td>
<td>Lack of insight into behaviour appropriate to context</td>
<td>Inefficient</td>
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<td>X</td>
<td>0</td>
<td>Not observed</td>
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</tr>
</tbody>
</table>

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Monitoring vital signs: using a primary survey approach for patient assessment

Vital signs are the most frequent measurements obtained by nurses; they include temperature, pulse, respiratory rate and blood pressure. Vital sign assessment and interpretation are integral in determining a patient's health status. Careful measurement techniques and knowledge of the normal range in vital signs will ensure more accurate findings and interpretation of those findings. The primary indication for assessing a patient's vital signs is to establish a baseline set of values that can be used during ongoing monitoring of a patient in an acute care setting. Ongoing measurement of vital signs is an important aspect of the healthcare professional's ability to detect early signs of patient deterioration.

The use of a standard method for measuring vital signs is essential for accuracy and consistency; varying methods can lead to inaccurate and false monitoring of a patient, impacting on the patient's assessment and need for appropriate interventions. Careful measurement techniques, knowledge of normal ranges and specifications of reportable altered vital signs parameters, and clear and effective communication channels for reporting abnormal patient vital signs and deterioration ensure more accurate interpretation in a timely manner.

Vital signs are routinely collected:
- on patient admission to a healthcare facility
- before and after a surgical or an invasive procedure
- before, during and after the administration of medications that affect cardiovascular, respiratory and temperature-control functions
- as indicated by any significant change in the patient's health status
- before and after nursing interventions that affect vital signs
- if a patient reports non-specific symptoms of physical distress
- on a schedule according to agency policy or the medical practitioner's prescription.

General observation charts exist for recording vital signs. The nurse needs to identify the procedure for documenting information used by the clinical setting where they work. In addition to the actual vital sign values, the nurse records in the patient's case notes any accompanying or precipitating symptoms, such as chest pain and dizziness with abnormal blood pressure, shortness of breath with abnormal respirations, cyanosis with hypoxaemia, or flushing and diaphoresis with elevated temperature. The nurse also documents any interventions initiated as a result of vital sign measurement, such as administration of oxygen therapy or antihypertensive medication.

This chapter explores the psychomotor skills that focus on specific nursing care of the patient requiring measurement and recording of vital signs. The skills addressed include assessing respirations (23-1), measuring oxygen saturation (SpO₂) (23-2), assessing the radial and apical pulses (23-3), measuring blood pressure (23-4) and measuring body temperature (23-5).
Assessing respirations

Delegation considerations
Respiration measurement can be delegated to enrolled nurses who are informed of:
- patient history or risk of increased or decreased respiratory rate or irregular respirations
- frequency of respirations measurement
- the reportable levels for the patient
- the need to report any abnormalities.

Equipment
- Watch with second hand or a digital display
- Pen, observation chart

Therapeutic relationship and patient considerations
- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assesses patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

STEPS

1. Determine the frequency of monitoring respirations:
   a. Consider previous medical conditions for respiratory alterations.

   b. Assess for signs and symptoms of respiratory alterations such as bluish or cyanotic appearance of nail beds, lips, mucous membranes and skin; restlessness, irritability, confusion, reduced level of consciousness; pain during inspiration; laboured or difficult breathing; adventitious breath sounds (see Chapter 24†), inability to breathe spontaneously; thick, frothy, blood-tinged or copious sputum produced on coughing, use of accessory muscles to breathe, grunting sounds.

   c. Pulse oximetry (SpO₂). Acceptable SpO₂ > 95% on room air. 88–92% may be acceptable for patients with chronic obstructive pulmonary disease.

2. Determine previous baseline respiratory rate (if available) from patient’s record.

   a. Consider previous medical conditions for respiratory alterations.

   b. Assess for signs and symptoms of respiratory alterations such as bluish or cyanotic appearance of nail beds, lips, mucous membranes and skin; restlessness, irritability, confusion, reduced level of consciousness; pain during inspiration; laboured or difficult breathing; adventitious breath sounds (see Chapter 24†), inability to breathe spontaneously; thick, frothy, blood-tinged or copious sputum produced on coughing, use of accessory muscles to breathe, grunting sounds.

   SpO₂ less than 90% is clinically significant and often accompanied by changes in respiratory rate, depth and rhythm.

   b. Assess for signs and symptoms of respiratory alterations such as bluish or cyanotic appearance of nail beds, lips, mucous membranes and skin; restlessness, irritability, confusion, reduced level of consciousness; pain during inspiration; laboured or difficult breathing; adventitious breath sounds (see Chapter 24†), inability to breathe spontaneously; thick, frothy, blood-tinged or copious sputum produced on coughing, use of accessory muscles to breathe, grunting sounds.

   c. Pulse oximetry (SpO₂). Acceptable SpO₂ > 95% on room air. 88–92% may be acceptable for patients with chronic obstructive pulmonary disease.

   Assess for change in condition. Provides comparison with future respiratory measurements.

† See Potter and Perry’s Fundamentals of Nursing 5e.
3. Be sure patient is in comfortable position, preferably sitting or lying with the head of the bed elevated 45–60 degrees.  

4. Perform hand hygiene. 

5. Draw curtains or close door to the patient’s room prior to exposing the patient. 

6. Be sure patient’s chest is visible. If necessary, move bedclothes or gown. 

7. Place patient’s arm in relaxed position across the abdomen or lower chest, or place nurse’s hand directly over patient’s upper abdomen (see illustration*). 

8. Observe complete respiratory cycle (one inspiration and one expiration). 

9. After cycle is observed, look at watch’s second hand and begin to count rate: when second hand hits number on dial, begin timeframe, counting 1 with first full respiratory cycle. 

10. If rhythm is regular, count number of respirations in 30 seconds and multiply by 2. If rhythm is irregular, < 12 or > 20, count for 1 full minute. 

Critical decision point: Respiratory rate < 12 or > 20 requires further assessment (see Chapter 24†) and may require immediate intervention. 

11. Note depth of respirations, subjectively assessed by observing degree of chest wall movement while counting rate. Can also objectively assess depth by palpating chest wall excursion or auscultating the posterior thorax after rate has been counted. Depth is described as shallow, normal or deep. 

Character of chest movement may reveal specific disease state restricting volume of air from moving into and out of the lungs. 

12. Note rhythm of respirations. Normal breathing is regular and uninterrupted. 

Character of ventilations can reveal specific types of alterations. 

Critical decision point: Occasional periods of apnoea, the cessation of respiration for several seconds, are a symptom of underlying disease in the adult and should be reported. An irregular respiratory rate and short apnoeic spells are usual in a newborn.

---

* For illustrations, refer to Skill 23-1 in Potter and Perry’s Fundamentals of Nursing 5e. 
† See Potter and Perry’s Fundamentals of Nursing 5e.
### Steps and Rationale

<table>
<thead>
<tr>
<th>Steps</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Discuss findings with patient as needed.</td>
<td>Promotes participation in care and understanding of health status.</td>
</tr>
<tr>
<td>16. If respirations are assessed for the first time, establish rate, rhythm and depth as baseline if within normal range.</td>
<td>Used to compare future respiratory assessment.</td>
</tr>
<tr>
<td>17. Compare respirations with patient's previous baseline and normal rate, rhythm and depth.</td>
<td>Allows assessment for changes in patient's condition and for presence of respiratory alterations.</td>
</tr>
</tbody>
</table>

### Recording and Reporting

- Record respiratory rate and character in nursing notes and observation chart. Indicate type and amount of oxygen therapy if used by patient during assessment.
- Report abnormal findings to nurse in charge or medical practitioner.
### Assessing respirations

**DEMONSTRATES:** The ability to effectively and safely assess respirations

**CLINICAL SKILLS COMPETENCY**

**STANDARD/S (AUS):** Thinks critically and analyses nursing practice; Engages in therapeutic and professional relationships; Develops a plan for nursing practice; Provides safe, appropriate and responsive quality nursing practice; Evaluates outcomes to inform nursing practice

**DOMAIN/S (NZ):** Professional responsibility; Management of nursing care; Interpersonal relationships; Interprofessional healthcare and quality improvement

**PERFORMANCE CRITERIA**

(numbers indicate the Registered Nurse Standards for Practice, 2016 (AUS) and the Competencies for Registered Nurses, 2007 (NZ))

AUS 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 5.1, 5.2, 5.3, 6.1, 6.2, 7.1, 7.3

NZ 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2

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<th>I</th>
<th>S</th>
<th>A</th>
<th>M</th>
<th>D</th>
</tr>
</thead>
</table>
| Identifies indication/rationale              | Confirms patient identity  
Determined need to perform assessment of patient’s respiratory rate and rhythm  
Identifies appropriate timing for measuring respirations  
Identifies any contraindication to measuring respirations                                                                                                                                                  |   |   |   |   |   |
| Therapeutic relationship and person considerations | Initiates communication by introductions and clarification of patient’s immediate needs and problems  
Clarifies patient knowledge and provides education where necessary  
Explains actions at all stages of procedure  
Gains patient consent  
Encourages patient to relax and not to speak during procedure  
Assists patient to comfortable position (e.g. head of bed elevated to 45–60 degrees if not contraindicated)                                                                                   |   |   |   |   |   |
| Assesses person                              | Assesses previous medical conditions for altered respirations  
Assesses for signs and symptoms of altered respirations such as cyanosis, restlessness, irritability, confusion, altered level of consciousness, pain during inspiration, labored or difficult breathing, adventitious breath sounds, inability to breathe spontaneously, productive cough of frothy/bloodstained sputum  
Assesses laboratory values including \( \text{SaO}_2 \), arterial blood gases, full blood count                                                                                     |   |   |   |   |   |
| Performs hand hygiene                        | Performs social handwash  
Adheres to ‘5 moments for hand hygiene’ as outlined by Hand Hygiene Australia  
Wears appropriate PPE                                                                                                                                                                                      |   |   |   |   |   |
| Gathers equipment                            | Observation chart and pen  
Watch with second hand  
Clean non-sterile gloves if appropriate                                                                                                                                                                    |   |   |   |   |   |
<p>| Prepares equipment                           | Draws curtains for privacy                                                                                                                                                                                                    |   |   |   |   |   |</p>
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<thead>
<tr>
<th>COMPETENCY CRITERIA</th>
<th>PERFORMANCE CRITERIA/EVIDENCE</th>
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<th>S</th>
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</thead>
<tbody>
<tr>
<td>Performs clinical procedure</td>
<td>Maintains privacy</td>
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<td></td>
<td>Ensures patient’s chest is visible, removes gown and excess bed linen if required</td>
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<td></td>
<td>Places patient’s arm across abdomen or lower chest or places own hand over abdomen</td>
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<tr>
<td></td>
<td>Observes and counts respiratory cycle (inspiration and expiration)</td>
<td></td>
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<tr>
<td></td>
<td>If respiration is regular, counts for 30 seconds and multiplies by 2; if rhythm is</td>
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<tr>
<td></td>
<td>regular &lt; 12 or &gt; 20 breaths per minute, counts for 60 seconds</td>
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<tr>
<td></td>
<td>If respiration is irregular, counts for 60 seconds and assesses frequency and pattern of</td>
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<td></td>
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<tr>
<td></td>
<td>irregularity</td>
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<tr>
<td></td>
<td>Observes depth, regularity and quality of respirations and chest wall expansion</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Replaces bedclothes/linen that may have been removed for procedure</td>
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<tr>
<td></td>
<td>Assists patient to a comfortable position</td>
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<tr>
<td></td>
<td>Compares respirations with baseline rate, rhythm and depth</td>
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</tr>
<tr>
<td>Cleans and disposes of equipment</td>
<td>Disposes of PPE in appropriate receptacle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriately</td>
<td>Performs hand hygiene</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Cleans and restocks equipment</td>
<td></td>
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<tr>
<td>Completes documentation</td>
<td>Documents observation and associated assessment/complications</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Records respiratory rate and character with date and time of assessment</td>
<td></td>
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<tr>
<td></td>
<td>Records associated treatments including method and concentration of oxygen administration</td>
<td></td>
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<td></td>
<td>Reports abnormal findings</td>
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</tbody>
</table>

**REFLECTION:**

_________________________________________________________________________________________
_________________________________________________________________________________________
_________________________________________________________________________________________

**SUPERVISOR:**

_________________________________________________________________________________________
_________________________________________________________________________________________

**STUDENT NAME:** __________________________  **DATE:** __________________________
Measuring oxygen saturation (SpO₂)

Delegation considerations
Oxygen saturation measurement can be delegated to enrolled nurses, who are informed of:
- the need to notify the registered nurse immediately of any reading lower than SpO₂ of 95%
- appropriate sensor site, probe and patient position for measurement of oxygen saturation
- frequency of oxygen saturation measurements
- factors that can falsely lower SpO₂ (see Box 23-2†).

Therapeutic relationship and patient considerations
- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assesses patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

Equipment
- Oximeter
- Oximeter probe appropriate for patient and recommended by manufacturer
- Pen, observation chart

Steps

1. Determine the frequency of monitoring oxygen saturation:
   a. Consider previous medical conditions for alteration of oxygen saturation.
   b. Assess for signs and symptoms of alterations in oxygen saturation such as altered respiratory rate, depth or rhythm; adventitious breath sounds (see Chapter 24†); cyanotic appearance of nail beds, lips, mucous membranes and skin; restlessness, irritability, confusion; reduced level of consciousness; laboured or difficulty breathing.

2. Assess for factors that normally influence measurement of SpO₂, such as oxygen therapy, haemoglobin level and temperature.

3. Determine previous baseline SpO₂ (if available) from patient’s record.

Rationale

Certain conditions place patients at risk of decreased oxygen saturation: acute or chronic compromised respiratory function, recovery from general anaesthesia or conscious sedation or traumatic injury to chest wall with or without collapse of underlying lung tissue, ventilator dependence, changes in supplemental oxygen therapy.

Physical signs and symptoms may indicate abnormal oxygen saturation.

Allows for accurate assessment of oxygen saturation variations. Peripheral vasoconstriction related to hypothermia can interfere with SpO₂ determination.

Baseline information provides basis for comparison and helps in assessment of current status and evaluation of interventions.

† See Potter and Perry’s Fundamentals of Nursing 5e.
STEPS

4. Explain purpose of procedure to patient and how oxygen saturation will be measured.

RATIONALE

Promotes patient cooperation and understanding.

5. Assess site most appropriate for sensor probe placement (e.g. digit, earlobe) (see Box 23-3†). Site must have adequate local circulation and be free of moisture.

Peripheral vasoconstriction can interfere with \( \text{SpO}_2 \) determination. Dark nail polish and acrylic nails impede sensor detection of emitted light and produce falsely elevated \( \text{SpO}_2 \).

6. Perform hand hygiene.

Reduces transmission of microorganisms.

7. Position patient comfortably. If finger is chosen as monitoring site, support lower arm.

Ensures probe positioning and decreases movement that interferes with \( \text{SpO}_2 \) determination.

8. If finger is to be used, remove any fingernail polish with acetone from digit to be assessed. If earlobe is to be used, remove any earrings. Wash site, swab with alcohol and air-dry.

Ensures accurate readings. Opaque coatings decrease light transmission; nail polish containing blue pigment can absorb light emissions and falsely alter \( \text{SpO}_2 \).

9. Attach sensor probe to monitoring site. Explain to patient that clip-on probe feels like a clothes peg on the finger but should not hurt.

Pressure of sensor probe's spring tension on a peripheral digit or earlobe may be unexpected.

10. Once the sensor probe is attached ask the patient to remain still during the assessment.

Moving the finger during the assessment can affect the sensor probe's ability to reach a constant value (pulse, \( \text{SpO}_2 \)) and will affect accurate monitoring of the patient.

Critical decision point: Do not attach probe to finger, ear or bridge of nose if area is oedematous or skin integrity is compromised. Do not attach probe to fingers that are hypothermic. Select ear or bridge of nose if adult patient has history of peripheral vascular disease. Earlobe and bridge of nose sensors are not used for infants and toddlers because of skin fragility. Disposable adhesive probes contain latex and should not be used if patient has latex allergy.

11. Turn on oximeter by activating power. Observe pulse waveform/intensity display and audible beep. Correlate oximeter pulse rate with patient's radial pulse. Differences require re-evaluation of oximeter probe placement and may require reassessment of pulse rates.

Pulse waveform/intensity display enables detection of valid pulse or presence of interfering signal. Pitch of audible beep is proportional to \( \text{SpO}_2 \) value. Double-checking pulse rate ensures oximeter accuracy. Oximeter pulse rate, patient's radial pulse and apical pulse rate should be the same.

12. Leave probe in place until oximeter readout reaches constant value and pulse display reaches full strength during each cardiac cycle. Read \( \text{SpO}_2 \) on digital display. Inform patient that oximeter will sound alarm if the probe falls off or if patient moves the probe.

Reading may take 10–30 seconds, depending on site selected.

† See Potter and Perry's Fundamentals of Nursing 5e.
### STEPS

13. If continuous SpO₂ monitoring is planned, verify SpO₂ alarm limits. Limits for SpO₂ and pulse rate should be determined as indicated by patient's condition. Verify that alarms are on. Assess skin integrity under sensor probe and relocate sensor probe at least every 4 hours (every 2 hours for a spring-tension probe).

14. Discuss findings with patient as needed.

15. If intermittent or spot-checking SpO₂ measurements are planned, remove probe and turn oximeter power off. Clean probe following manufacturer's instructions and store in appropriate location.

16. Help patient return to comfortable position.

17. Perform hand hygiene.

18. Compare SpO₂ readings with patient baseline and acceptable values.

19. Correlate SpO₂ with SaO₂ obtained from arterial blood gas measurements (see Chapter 35†) if available.

20. Correlate SpO₂ reading with data obtained from respiratory rate, depth and rhythm assessment.

### RATIONALE

Alarms must be set at appropriate limits and volumes to avoid frightening patients and visitors. Spring tension of sensor probe or sensitivity to disposable sensor probe adhesive can cause skin irritation and lead to disruption of skin integrity.

Promotes participation in care and understanding of health status.

Batteries can be depleted if oximeter is left on. Sensor probes are expensive and vulnerable to damage.

Restores comfort and promotes sense of wellbeing.

Reduces transmission of microorganisms.

Comparison reveals presence of abnormality.

Documents reliability of non-invasive assessment.

Measurements assessing ventilation, perfusion and diffusion are interrelated.

### RECORDING AND REPORTING

- Record SpO₂ value on patient progress notes and observation chart, indicating type and amount of oxygen therapy used by patient during assessment. Also record any signs and symptoms of oxygen desaturation in progress notes. Measurement of SpO₂ after administration of specific therapies should be documented in narrative form in progress notes.
- Report abnormal findings to nurse in charge or medical practitioner.

---

† See Potter and Perry’s Fundamentals of Nursing 5e.
# Measuring oxygen saturation (SpO₂)

**DEMONSTRATES:** The ability to effectively and safely measure oxygen saturations

**CLINICAL SKILLS COMPETENCY**

STANDARD/S (AUS): Thinks critically and analyses nursing practice; Engages in therapeutic and professional relationships; Develops a plan for nursing practice; Provides safe, appropriate and responsive quality nursing practice; Evaluates outcomes to inform nursing practice

DOMAIN/S (NZ): Professional responsibility; Management of nursing care; Interpersonal relationships; Interprofessional healthcare and quality improvement

**PERFORMANCE CRITERIA**

(numbers indicate the Registered Nurse Standards for Practice, 2016 (AUS) and the Competencies for Registered Nurses, 2007 (NZ))

AUS 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 5.1, 5.2, 5.3, 6.1, 6.2, 7.1, 7.3

NZ 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2

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<td>Identiﬁes indication/ rationale</td>
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<td>Determines need to perform oxygen saturation measurement</td>
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<td>Identiﬁes appropriate timing for measuring oxygen saturation</td>
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<td>Identiﬁes any contraindication to measuring oxygen saturation</td>
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<td>Therapeutic relationship and person considerations</td>
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<td>Explains actions at all stages of procedure</td>
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<td>Gains patient consent</td>
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<td>Educates patient to relax and not to speak during procedure</td>
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<td>Assists patient to comfortable position (e.g. head of bed elevated to 45–90 degrees if not contraindicated)</td>
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<tr>
<td>Assesses person</td>
<td>Assesses previous medical conditions for altered oxygen saturations</td>
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<td>Assesses for signs and symptoms of altered oxygen saturation such as altered respiratory rate, depth or rhythm; adventitious breath sounds; cyanosis; restlessness; irritability, confusion, altered level of consciousness; laboured or difficult breathing</td>
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<td>Assesses laboratory values including SaO₂, arterial blood gases, full blood count</td>
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<td>Reviews documentation (e.g. medical order, baseline observations)</td>
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<td>Observes level of consciousness</td>
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<td>Performs hand hygiene</td>
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<td>Gathers equipment</td>
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<td>Pulse oximeter</td>
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<td>Oximeter probe</td>
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<td>Clean non-sterile gloves if appropriate</td>
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<td>Prepares equipment</td>
<td>Considers privacy and appropriateness of setting</td>
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<td></td>
<td>Connects pulse oximeter to power source</td>
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<td></td>
<td>Attaches sensor probe cable to pulse oximeter</td>
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<td></td>
<td>Turns pulse oximeter on</td>
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**SCALE**

I Independent

S Supervised

A Assisted

M Marginal

D Dependent
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<th>COMPETENCY CRITERIA</th>
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</table>
| Performs clinical procedure          | Maintains privacy throughout procedure  
If finger to be used, removes nail polish prior to attaching sensor probe  
Attaches sensor probe to finger; leaves in situ until constant value reading is obtained  
If continuous SpO₂ monitoring is required, verifies SpO₂ alarm limits and volume; assesses skin integrity under sensor probe at least every 4 hours; repositions sensor probe  
Compares SpO₂ readings with baseline data and respiratory rate, depth and rhythm  
Correlates SpO₂ and SaO₂ measurements  
Turns off pulse oximeter when procedure finished |   |   |   |   |   |
| Cleans and disposes of equipment appropriately | Disposes of PPE in appropriate receptacle  
Performs hand hygiene  
Cleans and restocks equipment |   |   |   |   |   |
| Completes documentation              | Documents observation and associated assessment/complications  
Records SpO₂ values with date and time of assessment  
Records in progress notes use of intermittent or continuous pulse oximetry monitoring  
Reports abnormal findings |   |   |   |   |   |

**REFLECTION:**

[Blank space for reflection]

**SUPERVISOR:**

[Signature]

**STUDENT NAME:**

[Signature]

**DATE:**

[Date]
Assessing the radial and apical pulses

**Delegation considerations**

Pulse measurement can be delegated to enrolled nurses who are informed of:

- patient history or risk of irregular pulse
- frequency of pulse measurement
- the usual reportable levels for the patient
- the need to report any abnormalities.

**Equipment**

- Stethoscope (apical pulse only)
- Watch with second hand or a digital display
- Pen, observation chart
- Alcohol swab

**SKILL 23-3**

**STEPS**

1. Determine the frequency of monitoring the radial or apical pulse:
   a. Consider previous medical conditions for alterations in apical pulse.
   b. Assess for signs and symptoms of altered cardiac output such as dyspnoea, fatigue, chest pain, orthopnoea, syncope, palpitations (person’s unpleasant awareness of heartbeat), jugular venous distension, oedema of dependent body parts, cyanosis or pallor of skin.

2. Assess for factors that normally influence apical pulse rate and rhythm:
   a. Age
   b. Exercise
   c. Position changes

**RATIONALE**

Certain conditions place patients at risk of pulse alterations. Heart rhythm can be affected by heart disease, cardiac arrhythmias, onset of sudden chest pain or acute pain from any site, invasive cardiovascular diagnostic tests, surgery, sudden infusion of large volume of intravenous fluid, internal or external haemorrhage and administration of medications that alter heart function.

Physical signs and symptoms may indicate alteration in cardiac function.

**Therapeutic relationship and patient considerations**

- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assess patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

**RANGE**

Acceptable range of heart rate changes with age (see Table 23-5). Physical activity requires an increase in cardiac output that is met by an increased heart rate and stroke volume.

Heart rate increases temporarily when changing from lying to sitting or standing position.

---

1 See Potter and Perry’s Fundamentals of Nursing 5e.
### STEPS

<table>
<thead>
<tr>
<th>d. Medications</th>
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<tbody>
<tr>
<td>Anti-arrhythmics, sympathomimetics and cardioselective medications affect rate and rhythm of pulse; opioid analgesics and general anaesthetics slow heart rate; central nervous system stimulants such as caffeine increase heart rate.</td>
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<tr>
<th>e. Temperature</th>
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<tr>
<td>Fever or exposure to warm environments increases heart rate; heart rate declines with hypothermia.</td>
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<th>f. Emotional stress, anxiety, fear</th>
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<td>Results in stimulation of the sympathetic nervous system, which increases heart rate.</td>
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3. Determine previous baseline apical rate (if available) from patient’s record.

4. Explain that pulse or heart rate is to be assessed. Encourage patient to relax and not speak.

5. Perform hand hygiene.

6. If necessary, draw curtains around bed and/or close door.

7. Obtain pulse measurement.

   **A. Radial pulse**

   1. Help patient assume a supine or sitting position.

   2. If supine, place patient’s forearm straight alongside or across lower chest or upper abdomen with wrist extended straight (see illustration*). If sitting, bend patient’s elbow 90 degrees and support lower arm on chair or on nurse’s arm. Slightly flex the wrist with palm down.

   3. Place pads of first 2–3 fingers of hand over groove along radial or thumb side of patient’s inner wrist (see illustration*).

   4. Lightly compress against radius, so pulse becomes easily palpable.

   5. Determine strength of pulse. Note whether thrust of vessel against fingertips is bounding, strong, weak or thready.

* For illustrations, refer to Skill 23-3 in Potter and Perry’s Fundamentals of Nursing 5e.
**STEPS**

(6) After pulse can be felt, look at watch’s second hand and begin to count rate; when second hand hits number on dial, start counting with 0, then 1, 2 and so on.

(7) If pulse is regular, count rate for 30 seconds and multiply total by 2.

(8) If pulse is irregular, count rate for 60 seconds. Assess frequency and pattern of irregularity. Check the apical heart rate with stethoscope.

**RATIONALE**

Rate is determined accurately only after nurse is assured pulse can be palpated. Timing begins with 0. Count of 1 is first beat palpated after timing begins.

A 30 second count is accurate for rapid, slow or regular pulse rates.

Inefficient contraction of heart fails to transmit pulse wave, interfering with cardiac output, resulting in irregular pulse. Longer time ensures accurate count.

**Critical decision point:** If pulse is irregular or rapid, assess for pulse deficit that may indicate alteration in cardiac output. Count apical pulse while palpating radial pulse. If pulse rate differs by more than 2, a pulse deficit exists and should be reported.

**B. Apical pulse**

(1) Help patient into supine or sitting position. Move aside bedclothes and gown to expose sternum and left side of chest. Exposes portion of chest wall for selection of auscultation site.

(2) Locate anatomical landmarks to identify the point of maximal impulse (PMI), also called the apical impulse. Heart is located behind and to left of sternum with base at top and apex at bottom. Find angle of Louis just below supraster nal notch between sternal body and manubrium; can be felt as a bony prominence. Slip fingers down each side of angle to find second intercostal space (ICS). Carefully move fingers down left side of sternum to fifth ICS and laterally to the left mid-clavicular line (MCL). A light tap felt within an area 1–2 cm of the PMI is reflected from the apex of the heart. Use of anatomical landmarks allows correct placement of stethoscope over apex of heart, enhancing ability to hear heart sounds clearly. If unable to palpate the PMI, reposition patient on left side. In the presence of serious heart disease, the PMI may be located to the left of the MCL or at the sixth ICS.

(3) Clean diaphragm of stethoscope prior to use. Reduces transmission of microorganisms and cross-contamination with shared equipment.

(4) Place diaphragm of stethoscope in palm of hand for 5–10 seconds. Warming of metal or plastic diaphragm prevents patient from being startled and promotes comfort.

(5) Place diaphragm of stethoscope over PMI at the fifth ICS, at left MCL, and auscultate for normal S1 and S2 heart sounds (heard as ‘lub-dub’) (see illustration*).

* For illustrations, refer to Skill 23-3 in Potter and Perry’s Fundamentals of Nursing 5e.
### STEPS

<table>
<thead>
<tr>
<th>Steps</th>
<th>Rationale</th>
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<tr>
<td>(6) When S1 and S2 are heard with regularity, use watch's second hand and begin to count rate: when second hand hits number on dial, start counting with 0, then 1, 2 and so on.</td>
<td>Apical rate is determined accurately only after nurse is able to auscultate sounds clearly. Timing begins with 0. Count of 1 is first sound auscultated after timing begins.</td>
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<tr>
<td>(7) If apical rate is regular, count for 30 seconds and multiply by 2.</td>
<td>Regular apical rate can be assessed within 30 seconds.</td>
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<tr>
<td>(8) If heart rate is irregular or patient is receiving cardiovascular medication, count for 1 minute (60 seconds).</td>
<td>Irregular rate is more accurately assessed when measured over longer interval.</td>
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<td>(9) Note regularity of any dysrhythmia (S1 and S2 occurring early or later after previous sequence of sounds; e.g. every third or every fourth beat is skipped).</td>
<td>Regular occurrence of dysrhythmia within 1 minute may indicate inefficient contraction of heart and alteration in cardiac output.</td>
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<tr>
<td>(10) Replace patient’s gown and bedclothes; help patient return to comfortable position.</td>
<td>Restores comfort and promotes sense of wellbeing.</td>
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<tr>
<td>(11) Clean earpieces and diaphragm of stethoscope with alcohol swab as needed (optional).</td>
<td>Controls transmission of microorganisms when nurses share stethoscope.</td>
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</table>

8. Discuss findings with patient as needed. Promotes participation in care and understanding of health status.


10. Compare readings with previous baseline and/or acceptable range of heart rate for patient’s age. Checks for change in condition and alterations.

11. Compare peripheral pulse rate with apical rate and note discrepancy. Differences between measurements indicate pulse deficit and may warn of cardiovascular compromise. Abnormalities may require therapy.

12. Compare radial pulse equality and note discrepancy. Differences between radial arteries indicate compromised peripheral vascular system.

13. Correlate pulse rate with data obtained from blood pressure and related signs and symptoms (palpitations, dizziness). Pulse rate and blood pressure are interrelated.

### RECORDING AND REPORTING
- Record pulse, noting the site used, in observation chart.
- Report abnormal findings to nurse in charge or medical practitioner.
Assessing the radial and apical pulses

DEMONSTRATES: The ability to effectively and safely assess the radial and apical pulses

CLINICAL SKILLS COMPETENCY

STANDARD/S (AUS): Thinks critically and analyses nursing practice; Engages in therapeutic and professional relationships; Develops a plan for nursing practice; Provides safe, appropriate and responsive quality nursing practice; Evaluates outcomes to inform nursing practice

DOMAIN/S (NZ): Professional responsibility; Management of nursing care; Interpersonal relationships; Interprofessional healthcare and quality improvement

PERFORMANCE CRITERIA
(numbers indicate the Registered Nurse Standards for Practice, 2016 (AUS) and the Competencies for Registered Nurses, 2007 (NZ))

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<td>Assesses person</td>
<td>Assesses patient for signs and symptoms of altered stroke volume, such as dyspnoea, fatigue, chest pain, syncope, palpitations, distended jugular veins, dependent oedema, cyanosis, skin pallor</td>
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<td>Assesses factors influencing apical pulse rate and rhythm (e.g. age, recent exercise, medications, body temperature, emotional stress, fear, anxiety)</td>
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<td>Performs hand hygiene</td>
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<td>Stethoscope (apical pulse only)</td>
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<td>Clean non-sterile gloves if appropriate</td>
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<td>Prepares equipment</td>
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<td>Cleans earpieces of stethoscope</td>
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<td>Cleans stethoscope</td>
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<td>Tests diaphragm of stethoscope</td>
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<tr>
<td>Performs clinical procedure</td>
<td><strong>Radial pulse</strong>&lt;br&gt;1. Rests patient’s arm across torso&lt;br&gt;2. Places tips of first two fingers over groove along radial or thumb side of patient’s inner wrist&lt;br&gt;3. Lightly compresses against radius to obliterate pulse then slightly releases pressure to palpate pulse&lt;br&gt;4. Notes quality of pulse (e.g. weak, thready, bounding)**</td>
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<td><strong>Apical pulse</strong>&lt;br&gt;1. Removes patient’s gown to expose chest&lt;br&gt;2. Locates point of maximal impulse (PMI): locates angle of Louis to locate second intercostal space (ICS) and slides fingers down left sternum to fifth ICS and mid-clavicular line&lt;br&gt;3. Cleans stethoscope&lt;br&gt;4. Warms diaphragm of stethoscope in palm of hand for 5–10 seconds&lt;br&gt;5. Places diaphragm of stethoscope over PMI to auscultate S₁ and S₂ (lub-dub)&lt;br&gt;6. Counts the number of S₁ and S₂ beats&lt;br&gt;7. Replaces patient’s gown and bed linen&lt;br&gt;8. If pulse is regular, counts for 30 seconds and multiplies total by 2&lt;br&gt;9. If pulse is irregular or patient is receiving cardiovascular medications, counts for 60 seconds&lt;br&gt;10. Assesses frequency and pattern of irregularity&lt;br&gt;11. Compares peripheral pulse rate with apical pulse rate, noting any discrepancies&lt;br&gt;12. Compares assessment with baseline data including blood pressure and associated signs and symptoms (e.g. dizziness)**</td>
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<td><strong>Cleans and disposes of equipment appropriately</strong>&lt;br&gt;Disposes of PPE in appropriate receptacle&lt;br&gt;Performs hand hygiene&lt;br&gt;Cleans and restocks equipment**</td>
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<td><strong>Completes documentation</strong>&lt;br&gt;Documents observation (including pulse and site used) and associated assessment/complications&lt;br&gt;Records pulse rate with date and time of assessment&lt;br&gt;Reports abnormal findings**</td>
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**Reflection:**


**Supervisor:**


**Student Name:**


**Date:**
Measuring blood pressure (BP)

Delegation considerations
Blood pressure measurement can be delegated to enrolled nurses who are informed of:
- patient’s risk of orthostatic hypotension
- frequency of blood pressure measurement
- reportable levels for the patient
- the need to report any abnormalities.

Equipment
- Aneroid or mercury sphygmomanometer
- Cloth or disposable vinyl pressure cuff of appropriate size for patient’s extremity
- Stethoscope
- Alcohol swab
- Pen, observation chart

Therapeutic relationship and patient considerations
- Confirms patient identity
- Gains patient consent
- Initiates communication by introductions and clarification of patient’s immediate needs and problems
- Identifies how the skill will affect the patient
- Discusses procedure with the patient to clarify understanding
- Provides reassurance
- Assesses patient knowledge and expectations and ensures patient understanding
- Where necessary, provides further clarification
- Explains actions and potential discomfort at all stages of procedure

STEPS

1. Determine the frequency of monitoring BP:
   a. Consider previous medical conditions for alterations in BP.

   b. Observe for signs and symptoms of BP alterations:
      (1) High BP (hypertension) is often asymptomatic until pressure is very high. Assess for headache (usually occipital), flushing of face, nosebleed, and fatigue in older adults.
      (2) Low BP (hypotension) is associated with: dizziness; mental confusion; restlessness; pale, dusky or cyanotic skin and mucous membranes; cool, mottled skin over extremities.

   Certain conditions place patients at risk of BP alteration: history of cardiovascular disease, renal disease, diabetes, circulatory shock, acute pain, rapid intravenous infusion of fluids or blood products, increased intracranial pressure, postoperative conditions, pregnancy induced hypertension.

   Physical signs and symptoms may indicate alterations in BP. (See Table 23-7† for average optimal blood pressure for age.)

† See Potter and Perry’s Fundamentals of Nursing 5e.
<table>
<thead>
<tr>
<th>STEPS</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Determine best site for BP assessment. Avoid applying cuff to extremity when: intravenous fluids are infusing; an arteriovenous shunt or fistula is present; breast or axillary surgery has been performed on that side; extremity has been traumatised, is diseased or requires a cast or bulky bandage. The lower extremities (leg BP) may be used when the brachial arteries are inaccessible.</td>
<td>Inappropriate site selection may result in poor amplification of sounds, causing inaccurate readings. Application of pressure from inflated bladder temporarily impairs blood flow and can further compromise circulation in extremity that already has impaired blood flow.</td>
</tr>
<tr>
<td>3. Select appropriate cuff size.</td>
<td>Improper cuff size results in inaccurate readings (see Table 23-9†). If cuff is too small, it tends to come loose while being inflated or results in false high readings. If the cuff is too large, false low readings may be recorded.</td>
</tr>
<tr>
<td>4. Determine previous baseline BP (if available) from patient’s record.</td>
<td>Allows assessment for change in condition. Provides comparison with future BP measurements.</td>
</tr>
<tr>
<td>5. Have patient assume sitting or lying position. Be sure room is warm, quiet and relaxing.</td>
<td>Maintains patient’s comfort during measurement. The patient’s perception that the physical or interpersonal environment is stressful affects the BP measurement.</td>
</tr>
<tr>
<td>6. Explain to patient that BP is to be assessed and have patient rest at least 5 min before measurement. Ask patient not to speak when BP is being measured.</td>
<td>Reduces anxiety that can falsely elevate readings. Blood pressure readings taken at different times can be objectively compared when assessed with patient at rest. Talking to a patient when the BP is being assessed increases readings by 10–40%.</td>
</tr>
<tr>
<td>7. Perform hand hygiene.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
<tr>
<td>8. With patient sitting or lying, position patient’s forearm or thigh, supported if needed. For arm, turn palm up; for thigh, position with knee slightly flexed.</td>
<td>If extremity is unsupported, patient may perform isometric exercise that can increase diastolic blood pressure.</td>
</tr>
<tr>
<td>9. Consider drawing curtains or closing door to the patient’s room prior to exposing the patient.</td>
<td>To ensure privacy during assessment procedure.</td>
</tr>
<tr>
<td>10. Expose extremity (arm or leg) fully by removing constricting clothing.</td>
<td>Ensures proper cuff application.</td>
</tr>
<tr>
<td>11. Palpate brachial artery (arm) (see illustration*); or popliteal artery (leg). Position cuff 2.5 cm above site of pulsation (antecubital or popliteal).</td>
<td>Inflating bladder directly over artery ensures proper pressure is applied during inflation.</td>
</tr>
</tbody>
</table>

* For illustrations, refer to Skill 23-4 in Potter and Perry’s Fundamentals of Nursing 5e.  
† See Potter and Perry’s Fundamentals of Nursing 5e.
**STEPS**

12. Apply bladder of cuff above artery by centring arrows marked on cuff over artery. If there are not centre arrows on cuff, estimate the centre of the bladder and place this centre over artery. With cuff fully deflated, wrap cuff evenly and snugly around extremity.

13. Position manometer vertically at eye level. Observer should be no further than 1 m away.

14. If you do not know the patient’s baseline BP, estimate systolic pressure by palpating the artery distal to the cuff, i.e. radial artery, with fingertips of one hand while inflating cuff rapidly to pressure 30 mmHg above point at which pulse disappears. Slowly deflate cuff and note point when pulse reappears. Deflate cuff fully and wait 30 seconds.

15. Place stethoscope earpieces in ears and be sure sounds are clear, not muffled.

16. Relocate brachial or popliteal artery and place bell or diaphragm chestpiece of stethoscope over it. Do not allow chestpiece to touch cuff or clothing.

17. Close valve of pressure bulb clockwise until tight. Rapidly inflate cuff to 30 mmHg above palpated systolic pressure.

18. Slowly release pressure bulb valve and allow mercury or needle of aneroid manometer gauge to fall at rate of 2 mmHg/second.

19. Note point on manometer when first clear sound is heard. The sound will slowly increase in intensity.

20. Continue to deflate cuff, noting point at which muffled or dampened sound appears.

**RATIONALE**

Loose-fitting cuff causes false high readings.

Accurate readings are obtained by looking at the meniscus of the mercury at eye level. The meniscus is the point where the crescent-shaped top of the mercury column aligns with the manometer scale. Looking up or down at the mercury results in distorted readings.

Estimating prevents false low readings, which may result in the presence of an auscultatory gap. Maximal inflation point for accurate reading can be determined by palpation. If unable to palpate artery because of weakened pulse, an ultrasonic stethoscope can be used. Deflating cuff prevents venous congestion and false high readings.

Each earpiece should follow angle of ear canal to facilitate hearing.

Proper stethoscope placement ensures optimal sound reception. Stethoscope improperly positioned causes muffled sounds that often result in false low systolic and false high diastolic readings.

Tightening of valve prevents air leak during inflation. Inflation ensures accurate measurement of systolic pressure.

Too rapid or slow a decline in mercury level or aneroid pressure can cause inaccurate readings.

First Korotkoff sound indicates systolic pressure.

Fourth Korotkoff sound involves distinct muffling of sounds and is recommended as indication of diastolic pressure in children.
### STEPS

21. Continue to deflate cuff gradually, noting point at which sound disappears in adults. Listen for 10–20 mmHg after the last sound, and then allow remaining air to escape quickly.

22. Remove cuff from extremity unless measurement must be repeated. If this is the first assessment of patient, it may be necessary to repeat procedure on other extremity.

23. Help patient return to comfortable position and cover upper arm if previously clothed.

24. Clean BP cuff after use.

25. Discuss findings with patient as needed.


27. Compare reading with previous baseline and/or acceptable value of BP for patient’s age.

28. Correlate BP with data obtained from pulse assessment and related cardiovascular signs and symptoms.

### RATIONALE

21. Beginning of the fifth Korotkoff sound is recommended as indication of diastolic pressure in adults.

22. Continuous cuff inflation causes arterial occlusion, resulting in numbness and tingling of patient’s arm. Comparison of BP in both extremities detects circulation problems. (Normal difference of 5–10 mmHg exists between extremities.)

23. Restores comfort and promotes sense of wellbeing.

24. Reduces transmission of microorganisms and cross-contamination with shared equipment.

25. Promotes participation in care and understanding of health status.

26. Reduces transmission of microorganisms.

27. Checks for change in condition and alterations.

28. Blood pressure and heart rate are interrelated.

### RECORDING AND REPORTING

- Inform patient of value and need for periodic reassessment.
- Record blood pressure on observation chart and in progress notes if necessary.
- Report abnormal findings to nurse in charge or medical practitioner.
### Measuring blood pressure (BP)

**DEMONSTRATES:** The ability to effectively and safely measure blood pressure

**CLINICAL SKILLS COMPETENCY**

**STANDARD/S (AUS):** Thinks critically and analyses nursing practice; Engages in therapeutic and professional relationships; Develops a plan for nursing practice; Provides safe, appropriate and responsive quality nursing practice; Evaluates outcomes to inform nursing practice

**DOMAIN/S (NZ):** Professional responsibility; Management of nursing care; Interpersonal relationships; Interprofessional healthcare and quality improvement

**PERFORMANCE CRITERIA**

(numbers indicate the Registered Nurse Standards for Practice, 2016 (AUS) and the Competencies for Registered Nurses, 2007 (NZ))

**AUS:** 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 5.1, 5.2, 5.3, 6.1, 6.2, 7.1, 7.3  
**NZ:** 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2

<table>
<thead>
<tr>
<th>COMPETENCY CRITERIA</th>
<th>PERFORMANCE CRITERIA/EVIDENCE</th>
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<tbody>
<tr>
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<td></td>
<td>Determines need to perform blood pressure measurement</td>
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<td></td>
<td>Identifies appropriate timing for measuring blood pressure</td>
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<td></td>
<td>Identifies any contraindication to measuring blood pressure</td>
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<tr>
<td>Therapeutic relationship and person</td>
<td>Initiates communication by introductions and clarification of patient’s immediate needs and</td>
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<tr>
<td>and person considerations</td>
<td>problems</td>
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<td>Clarifies patient knowledge and provides education where necessary</td>
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<td></td>
<td>Explains actions at all stages of procedure</td>
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<td></td>
<td>Gains patient consent</td>
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<tr>
<td></td>
<td>Asks patient not to engage in physical activity or cigarette smoking for 30 minutes prior</td>
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<td></td>
<td>to BP reading</td>
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<tr>
<td></td>
<td>Assists patient to comfortable position, either sitting or lying</td>
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<tr>
<td>Assesses person</td>
<td>Assesses previous medical conditions for altered blood pressure</td>
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<tr>
<td></td>
<td>Assesses for signs and symptoms of altered blood pressure (e.g. hypertension, hypotension)</td>
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<tr>
<td></td>
<td>Assesses appropriate site for blood pressure measurement; avoids applying cuff to extremity</td>
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<td>when intravenous fluids in situ, breast or axillary surgery, arterial venous fistula in</td>
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<td>Performs hand hygiene</td>
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<td>Performs social handwash</td>
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<td>Adheres to ‘5 moments for hand hygiene’ as outlined by Hand Hygiene Australia</td>
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<td></td>
<td>Wears appropriate PPE</td>
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<tr>
<td>Performs hand hygiene</td>
<td>Gathers equipment</td>
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<td></td>
<td>Observation chart and pen</td>
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<tr>
<td></td>
<td>Sphygmomanometer with appropriate-sized cuff</td>
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<td></td>
<td>Stethoscope (if manual BP reading being performed)</td>
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<td></td>
<td>Clean non-sterile gloves if appropriate</td>
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<tr>
<td>Gathers equipment</td>
<td>Preparers equipment</td>
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<td></td>
<td>Considers privacy and appropriateness of setting</td>
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<tr>
<td></td>
<td>Checks sphygmomanometer is functional</td>
</tr>
<tr>
<td></td>
<td>Checks stethoscope is functional</td>
</tr>
<tr>
<td></td>
<td>Selects appropriate-sized cuff</td>
</tr>
<tr>
<td>COMPETENCY CRITERIA</td>
<td>PERFORMANCE CRITERIA/EVIDENCE</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Performs clinical procedure | Maintains privacy throughout procedure  
Palpates brachial or popliteal artery; positions cuff 25 cm above pulsation  
Applies bladder of cuff above artery and aligns arrows on cuff with artery  
Places stethoscope earpieces in ears; ensures that sounds are clear and not muffled  
Places diaphragm of stethoscope above pulsation; does not allow clothing or cuff to touch stethoscope  
Closes valve of pressure bulb; rapidly inflates cuff to 30 mmHg above systolic pressure  
Slowly releases pressure bulb at rate of 2–3 mmHg/second; notes value on manometer when first sound heard  
Gently deflates cuff and notes point at which dampened/muffled sound disappears; listens to pulse for a further 10–20 seconds after last audible beat  
Removes cuff from extremity and cleans cuff  
Compares BP in both arms or legs  
Correlates BP with data from assessment of the pulse and any other related cardiovascular symptoms  
Removes cuff |   |   |   |   |   |
| Cleans and disposes of equipment appropriately | Disposes of PPE in appropriate receptacle  
Performs hand hygiene  
Cleans and restocks equipment |   |   |   |   |   |
| Completes documentation | Documents observation and associated assessment/complications  
Records BP values with date and time of assessment  
Reports findings to patient  
Reports abnormal findings |   |   |   |   |   |

**REFLECTION:**

[Reflection text]

**SUPERVISOR:**

[Signature]

**STUDENT NAME:**

[Signature]

**DATE:**

[Date]
Measuring body temperature

Delegation considerations
Temperature measurement can be delegated to enrolled nurses who are informed of:
• the frequency of temperature measurement
• the reportable levels for patient
• the need to report any abnormalities that should be reconfirmed by the nurse.

Equipment
• Appropriate thermometer
• Pen, observation chart
• Plastic thermometer sleeve or disposable probe cover

Therapeutic relationship and patient considerations
• Confirms patient identity
• Gains patient consent
• Initiates communication by introductions and clarification of patient’s immediate needs and problems
• Identifies how the skill will affect the patient
• Discusses procedure with the patient to clarify understanding
• Provides reassurance
• Assesses patient knowledge and expectations and ensures patient understanding
• Where necessary, provides further clarification
• Explains actions and potential discomfort at all stages of procedure

STEPS

1. Determine the frequency of monitoring body temperature. Assess for signs and symptoms of temperature alterations and for factors that influence body temperature.

RATIONALE

Physical signs and symptoms may indicate abnormal temperature.

2. Determine any previous activity that would interfere with accuracy of temperature measurement. When taking oral temperature, wait 15–20 minutes before measuring temperature orally if patient has smoked or ingested hot or cold liquids or foods.

RATIONALE

Smoking or oral intake of food or fluids can cause false temperature readings in oral cavity.

3. Determine appropriate temperature site and device for patient.

RATIONALE

Chosen based on patient requirements, advantages and disadvantages of each site (see Box 23-10†).

4. Explain how temperature will be taken and importance of maintaining proper position until reading is completed.

5. Perform hand hygiene.

RATIONALE

Reduces transmission of microorganisms.

6. Help patient assume comfortable position that provides easy access to temperature site.

RATIONALE

Ensures comfort and accuracy of temperature reading.

† See Potter and Perry’s Fundamentals of Nursing 5e.
### STEPS

7. Obtain temperature reading.

   **A. Oral temperature measurement with electronic thermometer**

   1. Put on oral probe cover.  
      - **RATIONALE:** Use of oral probe cover, which can be removed without physical contact, minimises need to wear gloves.

   2. Remove thermometer pack from charging unit. Attach oral probe (blue tip) to thermometer unit. Grasp top of probe stem, being careful not to put pressure on the ejection button.  
      - **RATIONALE:** Charging provides battery power. Ejection button releases plastic probe cover from tip.

   3. Slide disposable plastic probe cover over thermometer probe until cover locks in place (see illustration*).  
      - **RATIONALE:** Soft plastic cover will not break in patient’s mouth and prevents transmission of microorganisms between patients.

   4. Ask patient to open mouth; then gently place thermometer probe under tongue in posterior sublingual pocket lateral to centre of lower jaw.  
      - **RATIONALE:** Heat from superficial blood vessels in sublingual pocket produces temperature reading. With electronic thermometer, temperatures in right and left posterior sublingual pocket are significantly higher than in area under front of tongue.

   5. Ask patient to hold thermometer probe with lips closed.  
      - **RATIONALE:** Maintains proper position of thermometer during recording.

   6. Leave thermometer probe in place until audible signal occurs and patient’s temperature appears on digital display; remove thermometer probe from under patient’s tongue.  
      - **RATIONALE:** Probe must stay in place until signal occurs to ensure accurate reading.

   7. Push ejection button on thermometer stem to discard plastic probe cover into appropriate receptacle.  
      - **RATIONALE:** Reduces transmission of microorganisms.

   8. Return probe to storage position of thermometer unit.  
      - **RATIONALE:** Protects probe from damage. Returning probe automatically causes digital reading to disappear.

      - **RATIONALE:** Reduces transmission of microorganisms.

10. Return thermometer to charger.  
    - **RATIONALE:** Maintains battery charge.

* For illustrations, refer to Skill 23-5 in *Potter and Perry’s Fundamentals of Nursing* 5e.
**STEPS**

**B. Axillary temperature measurement with electronic thermometer**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Draw curtain around bed and/or close door.</td>
<td>Provides privacy.</td>
</tr>
<tr>
<td>(2)</td>
<td>Position patient lying supine or sitting.</td>
<td>Provides easy access to axilla.</td>
</tr>
<tr>
<td>(3)</td>
<td>Move clothing or gown away from shoulder and arm.</td>
<td>Exposes axilla for correct thermometer probe placement.</td>
</tr>
<tr>
<td>(4)</td>
<td>Remove thermometer pack from charging unit. Be sure oral probe (blue tip) is attached to thermometer unit. Grasp top of probe stem, being careful not to apply pressure on the ejection button.</td>
<td>Charging provides battery power. Ejection button releases plastic cover from probe.</td>
</tr>
<tr>
<td>(5)</td>
<td>Slide disposable plastic probe cover over thermometer probe until cover locks in place.</td>
<td>Soft plastic cover prevents transmission of microorganisms between patients.</td>
</tr>
<tr>
<td>(6)</td>
<td>Raise patient's arm away from torso, inspect for skin lesions and excessive perspiration. Insert probe into centre of axilla, lower arm over probe and place arm across patient's chest (see illustration*).</td>
<td>Maintains proper position of probe against blood vessels in axilla.</td>
</tr>
<tr>
<td>(7)</td>
<td>Leave probe in place until audible signal occurs and temperature appears on digital display.</td>
<td>Probe must stay in place until signal occurs to ensure accurate reading.</td>
</tr>
<tr>
<td>(8)</td>
<td>Remove probe from axilla.</td>
<td></td>
</tr>
<tr>
<td>(9)</td>
<td>Push ejection button on thermometer stem to discard plastic probe cover into appropriate receptacle.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
<tr>
<td>(10)</td>
<td>Return probe to storage position of thermometer unit.</td>
<td>Protects probe from damage. Returning probe automatically causes digital reading to disappear.</td>
</tr>
<tr>
<td>(11)</td>
<td>Help patient assume a comfortable position.</td>
<td>Restores comfort and promotes privacy.</td>
</tr>
<tr>
<td>(12)</td>
<td>Perform hand hygiene.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
<tr>
<td>(13)</td>
<td>Return thermometer unit to charger.</td>
<td>Maintains battery charge.</td>
</tr>
</tbody>
</table>

* For illustrations, refer to Skill 23-5 in Potter and Perry’s *Fundamentals of Nursing* 5e.
### STEPS

#### C. Tympanic membrane temperature with electronic thermometer

1. Help patient assume comfortable position with head turned towards side, away from nurse. Right-handed people should obtain temperature from patient's right ear. Left-handed people should obtain temperature from patient's left ear. The less acute the angle of approach, the better the probe seal. Ensures comfort and exposes auditory canal for accurate temperature measurement.

2. Remove thermometer handheld unit from charging base, being careful not to apply pressure on the ejection button. Base provides battery power. Removal of handheld unit from base prepares it to measure temperature. Ejection button releases plastic probe cover from tip.

3. Slide clean disposable speculum cover over otoscope-like lens tip until it locks into place, being careful not to touch lens cover. Lens cover must be unimpeded by dust, fingerprints or earwax to ensure clear optical pathway.

4. Insert speculum into ear canal following manufacturer's instructions for tympanic probe positioning: Correct positioning of the probe with respect to ear canal ensures accurate readings.
   - Pull ear pinna backwards for a child, up and out for an adult. The ear tug straightens the external auditory canal, allowing maximum exposure of the tympanic membrane.
   - Move thermometer in a figure 8 pattern.
   - Fit probe snugly into canal and do not move.
   - Point towards nose.

5. As soon as probe is in place depress scan button on handheld unit. Leave thermometer probe in place until audible signal occurs and patient's temperature appears on digital display. Depression of scan button causes infrared energy to be detected. Otoscope tip must stay in place until signal occurs to ensure accurate reading.


7. Push ejection button on handheld unit to discard plastic probe cover into appropriate receptacle. Lens cover must be free of cerumen to maintain optical path.

8. If a second reading is necessary, replace probe lens cover and wait 2–3 min before inserting the probe tip.

9. Return handheld unit to charging base. Protects sensory tip from damage.
### STEPS

| (10) Help patient assume a comfortable position. |
| (11) Perform hand hygiene. |

<table>
<thead>
<tr>
<th>STEPS</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10) Help patient assume a comfortable position.</td>
<td>Restores comfort and sense of wellbeing.</td>
</tr>
<tr>
<td>(11) Perform hand hygiene.</td>
<td>Reduces transmission of microorganisms.</td>
</tr>
</tbody>
</table>

8. Discuss findings with patient as needed.

9. If temperature is assessed for the first time, establish temperature as baseline if it is within normal range.

10. Compare temperature reading with patient’s previous baseline and acceptable temperature range for patient’s age group.

#### RECORDING AND REPORTING

- Record temperature in observation chart.
- Report abnormal findings to nurse in charge or medical practitioner.

Normal body temperature fluctuates within narrow range; comparison reveals presence of abnormality. Improper placement or movement of thermometer can cause inaccuracies. Second measurement confirms initial findings of abnormal body temperature.
Measuring body temperature

DEMONSTRATES: The ability to effectively and safely measure a patient's body temperature

CLINICAL SKILLS COMPETENCY

STANDARD/S (AUS): Thinks critically and analyses nursing practice; Engages in therapeutic and professional relationships; Develops a plan for nursing practice; Provides safe, appropriate and responsive quality nursing practice; Evaluates outcomes to inform nursing practice

DOMAIN/S (NZ): Professional responsibility; Management of nursing care; Interpersonal relationships; Interprofessional healthcare and quality improvement

PERFORMANCE CRITERIA

(numbers indicate the Registered Nurse Standards for Practice, 2016 (AUS) and the Competencies for Registered Nurses, 2007 (NZ))

AUS 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 5.1, 5.2, 5.3, 6.1, 6.2, 7.1, 7.3

NZ 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 4.1, 4.2

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<td>Explains actions at all stages of procedure</td>
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<td>Gains patient consent</td>
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<td></td>
<td>Assists patient to comfortable position</td>
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<tr>
<td>Assesses person</td>
<td>Assesses for signs/symptoms of altered body temperature</td>
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<td></td>
<td>Assesses for factors that influence body temperature</td>
</tr>
<tr>
<td></td>
<td>Assesses previous activity that interferes with temperature readings</td>
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<tr>
<td>Performs hand hygiene</td>
<td>Performs social hand wash</td>
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<td></td>
<td>Adheres to ‘5 moments for hand hygiene’ as outlined by Hand Hygiene Australia</td>
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<tr>
<td>Gathers equipment</td>
<td>Observation chart and pen</td>
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<tr>
<td></td>
<td>Thermometer (e.g. oral, axillary, tympanic) and thermometer cover</td>
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<tr>
<td></td>
<td>Alcawipes, disinfectant</td>
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<tr>
<td></td>
<td>Clean non-sterile gloves if appropriate</td>
</tr>
<tr>
<td>Prepares equipment</td>
<td>Considers privacy and appropriateness of setting</td>
</tr>
</tbody>
</table>
### COMPETENCY CRITERIA | PERFORMANCE CRITERIA/EVIDENCE | I | S | A | M | D
--- | --- | --- | --- | --- | ---
Performs clinical procedure | **Oral temperature**<br>1. Applies oral probe cover<br>2. Removes thermometer pack from charging unit<br>3. Attaches oral probe to thermometer unit<br>4. Slides and locks thermometer cover into place<br>5. Gently places thermometer in posterior sublingual pocket, lateral to centre jaw; asks patient to close lips around thermometer<br>6. Removes thermometer from under patient’s tongue upon audible signal and visual recording<br>7. Removes thermometer cover and returns thermometer to charging unit |  |  |  |  |  
**Axillary temperature**<br>1. Moves clothing/gown away from shoulder and arm<br>2. Applies oral probe cover<br>3. Removes thermometer pack from charging unit<br>4. Attaches oral probe to thermometer unit<br>5. Slides and locks thermometer cover into place<br>6. Raises patient’s arm away from torso, inserts thermometer into centre of axilla, lowers arm over probe and holds arm across chest<br>7. Removes thermometer from under patient’s arm upon audible signal and visual recording<br>8. Removes thermometer cover and returns thermometer to charging unit |  |  |  |  |  
**Tympanic temperature**<br>1. Removes handheld unit from charging base<br>2. Applies speculum cover to otoscope-like lens<br>3. Inserts speculum into ear canal, holds in situ until audible signal heard, removes speculum from ear canal and ejects speculum cover<br>4. Returns handheld unit to charging base |  |  |  |  |  
Cleans and disposes of equipment appropriately | Disposes of PPE in appropriate receptacle<br>Performs hand hygiene<br>Cleans and restocks equipment |  |  |  |  |  
Completes documentation | Documents observation and associated complications<br>Records temperature with date and time of assessment<br>Reports abnormal findings |  |  |  |  |  

**REFLECTION:**

**SUPERVISOR:**

**STUDENT NAME:**

**DATE:**