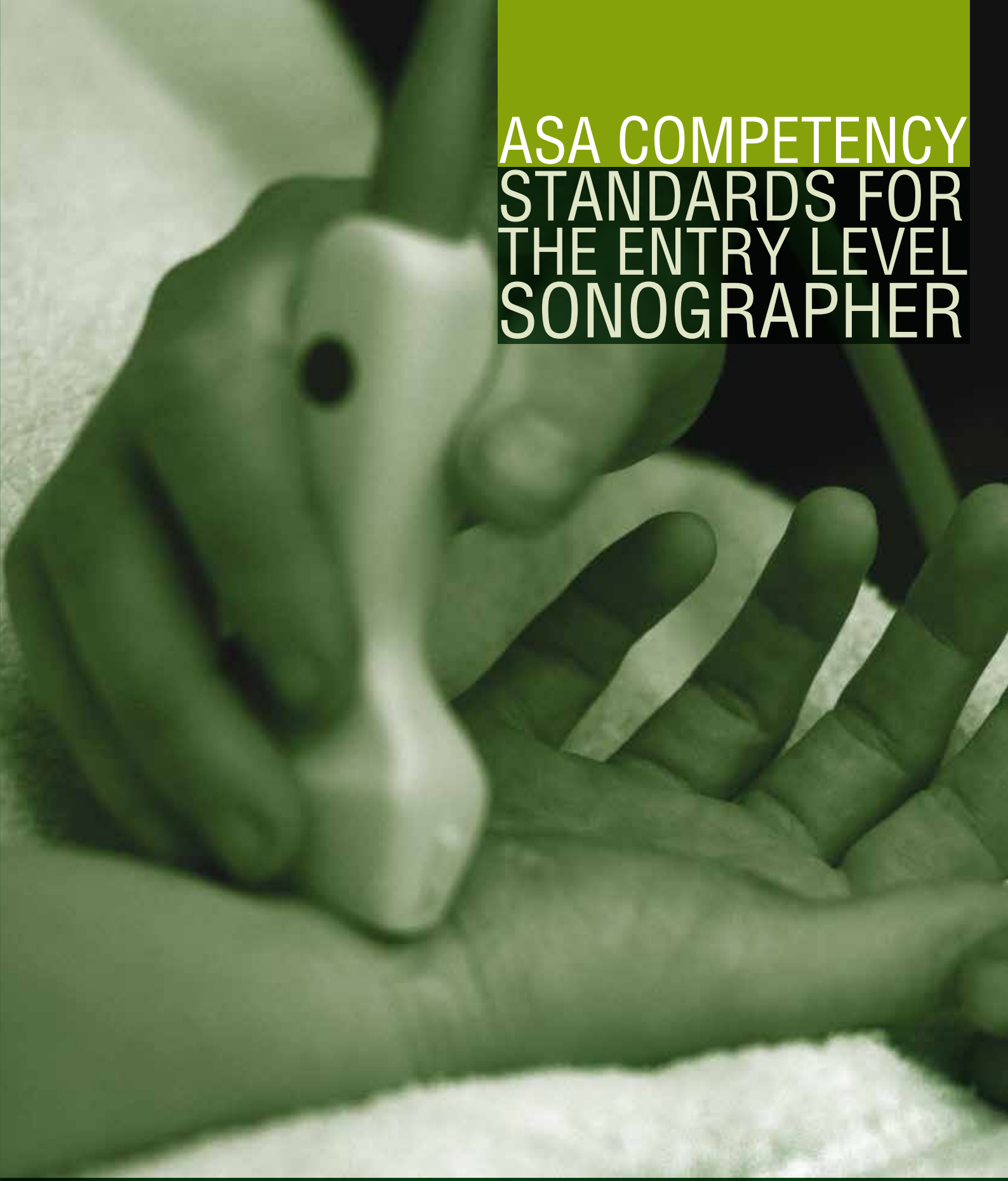


# ASA COMPETENCY STANDARDS FOR THE ENTRY LEVEL SONOGRAPHER

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OCTOBER 2011

# ASA COMPETENCY STANDARDS FOR THE ENTRY LEVEL SONOGRAPHER

Competency Standards for the Entry Level Sonographer

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**For further information, please contact:**

Australian Sonographers Association
PO Box 709
Moorabbin VIC 3189
Australia

P: 03 9585 2996
F: 03 9585 2331
W: www.a-s-a.com.au

asa
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sonographers
association

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# Competency Standards for the Entry Level Sonographer

As the peak body and leading voice for sonographers, the Australian Sonographers Association (ASA) has a clear mandate to set standards of professional practice which ensure patients receive quality sonographic services. Development of the ASA Competency Standards for entry level accredited medical sonographers ensures the sector has access to a detailed framework setting out the current expectations and requirements for professional competence. These Competency Standards define the skills, knowledge and attributes that an entry level sonographer requires to undertake their work.

The Competency Standards for entry level accredited medical sonographers are the first element in a suite of resources under development by the ASA for use by sonographers, employers, educators and regulators. The ASA's work plan currently includes assessment guidelines, clinical supervision guidelines and clinical training resources to reinforce the content of these Standards and support the education, training and assessment of entry level sonographers; as well as development of Standards to define other levels of sonographic practice along the career pathway continuum.

Broad consultation with members, academics, stakeholders and competency standards experts has been undertaken throughout the development phase of these Competency Standards. We thank the many contributors who have provided valuable input to previous drafts of the competency framework.

The ASA acknowledges that these Competency Standards, the clinical training resources and assessment guides will be further developed and that the content of these Competency Standards will require review during and at the conclusion of their implementation. Contributions to these reviews are welcomed and should be directed to the CEO.

These Competency Standards play a vital role in further advancing the sonography profession and we encourage you to become familiar with these Standards and ensure they are used in your workplace.

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Competency Standards for the Entry Level Sonographer



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# The role of sonographers in Australia

A sonographer is a highly skilled medical imaging professional who utilises ultrasound imaging systems to undertake diagnostic medical sonographic examinations across a range of contexts.

The sonographer interprets the sonographic findings and tailors the examination, selectively recording anatomical images, physical data and real time physiological information. The outcome of a sonographic examination is reliant on the medical knowledge as well as the technical skills of the sonographer, who exercises decisional latitude during examinations to determine the breadth of the investigation each patient requires.

There are currently over 4,150 active sonographers in Australia who practise across a range of disciplines, with an additional 588 students. Around seventy-four per cent of these sonographers obtain a general diagnostic medical sonography qualification, working across the disciplines of abdomen, musculoskeletal, obstetric, pelvic, paediatric, superficial parts and vascular sonography.

Also within the profession, a number of discipline-specific sonographers practise in one or more disciplines. Nineteen per cent of sonographers practise in the cardiac discipline and the remaining seven per cent work solely in the sub-sets of vascular, cerebrovascular, obstetrics and gynaecology or breast sonography.

# Sonographer accreditation

Sonographer accreditation is mandatory for all sonographers and student sonographers working in practices which provide Medicare-eligible sonographic services. The sonographer accreditation process is maintained by the Australasian Sonographer Accreditation Registry (ASAR).

On completion of an accredited postgraduate sonography course, which includes completion of minimum clinical training requirements, entry level sonographers are eligible for entry onto the Registry of Accredited Medical Sonographers. This document will assist ASAR to identify the standards for education and clinical training required to practise as an accredited medical sonographer.

# Competency framework uses

These competency standards provide a formal description of the skills, knowledge and attributes a sonographer would normally be expected to demonstrate in their workplace. The sonographic competency standards have been designed to address the following needs:

## Sonographers

- Describe the required skills, knowledge and attributes for a sonographer to enter or return to practise
- Outline career pathways and development opportunities
- Improve consistency of education and clinical practice outcomes

## Course and professional accreditation body (ASAR)

- Provide guidance for the accreditation of university courses
- Inform the eligibility requirements for entry onto the Registry of Accredited Medical Sonographers
- Inform the processes used to assess the suitability of overseas qualifications
- Provide a basis for developing an articulated career pathway

### Employers

- Describe the performance standards appropriate to sonographers at the entry level of professional development
- Assist in developing appropriate position descriptions and support performance appraisal
- Support employers to identify their role in developing competence in partnership with universities
- Improve consistency of education and clinical practice outcomes

### Universities

- Define professional requirements to underpin course design
- Improve rigour and consistency of assessment to confirm outcomes of both academic learning and clinical placements
- Support the continual review of guidelines for course accreditation

### Patients

- Reinforce quality service provision by defining minimum skills, knowledge and attributes required to practise as a sonographer

## Sonographer career path

These entry level standards are the first in a set of advice about competency standards and career development pathways for sonographers.

The competency framework is loosely aligned to the learning taxonomy developed by Dreyfus and Dreyfus that defines five stages of learning[1]. The entry level competency standards align to Level 3 of the Dreyfus model and outline requirements for a competent graduate.

Clinical practice is an integral part of developing competence. Forthcoming guidance on clinical practice will provide advice on structuring this component of learning.

As in many professions, deepening of skills and knowledge comes with application and experience. Levels 4 and 5 of the Dreyfus model describe these further levels of learning. The ASA's future work agenda includes developing more detailed guidance on how these levels apply within the sonography profession, in particular, as they relate to advanced practice.

| Dreyfus learning stages | Sonographer | Pathways |
|---|---|---|
| 1. Novice | Student | University |
| 2. Advanced beginner | | |
| 3. Competent | Entry level sonographer | Graduate |
| 4. Proficient | Experienced practitioner | Continuing professional development |
| 5. Expert | Advanced practitioner | Further study |

1 (Dreyfus, Stuart E.; Dreyfus, Hubert L. *A Five-Stage Model of the Mental Activities Involved in Directed Skill Acquisition*. Washington, DC: DTIC. 1980)

# Competency framework development, implementation and review

The Australian Sonographers Association (ASA) was formed in 1992 to represent the nation's diagnostic medical sonographers. The ASA is the peak body and leading voice for Australia's sonographers and has more than 3100 members, representing almost 70% of the profession.

The ASA has developed this competency framework to identify the skills, knowledge and attributes that a competent diagnostic medical sonographer requires to perform their role as an entry level sonographer. In developing the standards, the ASA has endeavoured to ensure that the depth and breadth of entry level sonographer practice has been represented.

Implementation of these competency standards will be staged, enabling providers of education programs and clinical training to incorporate the expectations inherent in the standards into program delivery and providing existing students with options and continuity to complete their learning program. At the conclusion of the implementation process, it is expected that all new entry level sonographers will need to demonstrate competence as a condition of acceptance onto the Registry of Accredited Medical Sonographers.

As the practice of sonography evolves, so will the competency standards. A formal review of the framework will be conducted following implementation, and formal reviews will be conducted at least every five years following the initial implementation review. This commitment to regular review signals the ASA's commitment to maintaining and improving quality and professionalism.

# Competency framework overview

For the purpose of documentation, competency standards are organised under headings that describe specific areas of skills and knowledge. All sonographers need to be competent in the essential foundation units of competence. Sonographers also need to be competent in each of the specific domains required for discipline-specific accreditation.

Guidelines on the selection of domains required for discipline-specific accreditation are determined from time to time by the Australasian Sonographers Accreditation Registry. ASAR also determines the selection of domains for general diagnostic medical sonographers. The discipline-specific domains currently identified by ASAR are reflected in Units 6–14 below.

## National Competency Standards for Entry Level Sonographers in Australia

<table>
<tr><td colspan="10">Foundation Units of Competence<br>Competence must be demonstrated in all foundation units</td></tr>
<tr><td colspan="5">Unit 1<br>Deliver safe, patient-centred services</td><td colspan="5">Unit 2<br>Practice within professional and ethical frameworks</td></tr>
<tr><td colspan="4">Unit 3<br>Locate, analyse and synthesise information to support evidence-based practice</td><td colspan="4">Unit 4<br>Contribute to workplace health and safety and quality assurance</td><td colspan="2">Unit 5<br>Communicate effectively</td></tr>
<tr><td colspan="10">Critical Practice<br>Competence must be demonstrated in relevant domains according to accreditation sought</td></tr>
<tr><td colspan="10">Units 6–14<br>Plan and conduct examinations</td></tr>
<tr><td>Domains</td><td>Unit 6<br>Abdominal</td><td>Unit 7<br>Breast</td><td>Unit 8<br>Cardiac</td><td>Unit 9<br>Musculoskeletal</td><td>Unit 10<br>Obstetric and Gynaecologic</td><td>Unit 11<br>Paediatrics</td><td>Unit 12<br>Superficial Parts</td><td>Unit 13<br>Vascular (general)</td><td>Unit 14<br>Vascular (discipline specific)</td></tr>
</table>

# Understanding the Competency Standards

Units of competence are expressed in terms of observable outcomes or behaviours and can be used to measure actual performance against an expected standard of performance. Although the units within this framework are written as discrete standards, they are designed to be integrated and are ideally co-assessed. This recognises that competent professional practice is more than a sum of each discrete part. It requires an ability to draw on and integrate the breadth of competencies to support holistic performance.

Assessment of competence differs from assessment of academic learning in that it requires the candidate to demonstrate holistic application of knowledge in a practical work environment. Guidance on assessment will be provided in a separate document as part of the suite of tools to support professional learning and development.

## Format

Each unit consists of elements, performance criteria and cues.

## Elements

Elements are a sub-set of a unit of competence. They describe in more detail a specific, discrete component of the unit and identify the actions and knowledge which a sonographer is expected to demonstrate. Elements provide the context for the performance criteria.

## Performance criteria

Each element is defined by a set of performance criteria which specifies the required level of performance to be considered competent. Performance criteria must always be viewed within the context of the entirety of the element.

Performance criteria describe the required standard or level of performance in the relevant task, role or skill and incorporate applied knowledge. They describe the critical level of skills and knowledge to be demonstrated, rather than providing a detailed operating procedure or sequence of steps.

## Cues

Cues provide further detail on scope and context and illustrate how performance criteria can apply. Cues may provide examples of what may be included. For example, the cue in Unit 1 provides further information on safety hazards: *Critical safety hazards include confirming correct patient, correct side, correct examination; infection control; patient emotional stress; equipment-related hazards.*

This information should be understood as illustrative rather than definitive and may need to be adjusted to suit specific conditions and work environments.

# Competency Standards for the Entry Level Sonographer

## Unit 1. Deliver safe, patient-centred services

### Element 1.1: Ensure patient safety

*Performance criteria*

1.1.1 Identify the safety hazards of the examination
*Cues:* Critical safety hazards include confirming correct patient, correct side, correct examination; infection control; patient emotional stress; equipment-related hazards.

1.1.2 Determine appropriate methods of control

1.1.3 Implement control methods to ensure patient safety

### Element 1.2: Respect patient diversity

*Performance criteria*

1.2.1 Prepare for and conduct examinations in ways that recognise and respect personal and cultural values, beliefs, preferences and expectations of individual patients

1.2.2 Consult with the patient to assess physical capacity to ensure the examination strategy is appropriate

1.2.3 Explain and negotiate the examination strategy with the patient and make any appropriate modifications

1.2.4 Obtain and act within the scope of patient consent
*Cues*: Patient consent may require obtaining consent from parents, guardians and carers.

## Unit 2. Practice within professional and ethical frameworks

### Element 2.1: Practice meets legal requirements

*Performance criteria*

2.1.1 Identify and describe legal requirements for practice
*Cues*: Legal requirements include relevant legislation relating to privacy, negligence, occupational health and safety, anti-discrimination, professional misconduct.

2.1.2 Understand professional implications of non-compliance with legislation

### Element 2.2: Practice within professional and ethical standards

*Performance criteria*

2.2.1 Identify relevant ethical and professional standards
*Cues*: This includes working within appropriate scope of practice, and complying with organisational protocols and professional protocols such as the Australian Sonographers Association code of conduct.

2.2.2 Understand the implications of ethical and professional standards for practice
*Cues*: This includes understanding responsibility and requirement for professional indemnity insurance.
Implications include impact on professional reputation and on organisations.

2.2.3 Understand the consequences of non-conformance with ethical and professional standards

# Unit 3. Locate, analyse and synthesise information to support evidence-based practice

## Element 3.1: Identify and retrieve information

### *Performance criteria*

3.1.1 Identify information requirement
*Cues*: Includes identifying the purpose or question to be answered and determining the nature and urgency of information requirement.

3.1.2 Identify and access current credible sources of information

3.1.3 Apply a systematic search strategy to locate information required

## Element 3.2: Review, interpret and synthesise information

### *Performance criteria*

3.2.1 Assess adequacy and appropriateness of research methodology and outcomes

3.2.2 Assess the adequacy of information to address requirements

3.2.3 Interpret the information as it applies to the question

3.2.4 Determine implications of information for clinical practice

## Element 3.3: Engage in research

### *Performance criteria*

3.3.1 Follow research protocols consistent with research ethics

3.3.2 Develop a research project plan
*Cues*: Research projects can include case studies and reviewing available evidence to test hypotheses.
Requires an understanding of analytical and statistical methodologies.

3.3.3 Collect and analyse evidence

3.3.4 Formulate and document evidence-based findings

3.3.5 Integrate research findings into professional practice

## Unit 4. Contribute to workplace health and safety and quality assurance

### Element 4.1: Promote a safe and healthy workplace

*Performance criteria*

4.1.1 Identify safety hazards in the workplace
*Cues*: Safety hazards may include: ergonomics, trip hazards, equipment-related hazards, and patient interaction, staff interaction.
Relevant guidelines may include ASA Guidelines for Reducing Injuries to Sonographers; organisation protocols and procedures.

4.1.2 Determine appropriate methods of control
*Cues*: Includes an awareness of workplace procedures.

4.1.3 Implement control methods to ensure a safe work environment

### Element 4.2: Maintain and improve quality

*Performance criteria*

4.2.1 Identify relevant quality standards, requirements and protocols

4.2.2 Implement quality assurance procedures and protocols
*Cues*: Implementation of quality assurance requires an understanding of risk management; methods to confirm that equipment meets specifications.

4.2.3 Participate in quality audits
*Cues*: Requires an understanding of audit processes, roles and responsibilities.

4.2.4 Identify, report and take action to rectify non-conformance

# Unit 5. Communicate effectively

## Element 5.1: Communicate with patients

### *Performance criteria*

5.1.1 Use communication techniques appropriate to the audience

*Cues*: Communication includes verbal, non-verbal, appropriate language, appropriate use of terminology.
Communication is culturally appropriate and may require access to interpreters.
Audience may include patients, carers and guardians.
Communication techniques are suited to diverse audiences and contexts e.g. diverse socio-economic and cultural backgrounds, levels of first language and English literacy, religions, values and beliefs.

5.1.2 Confirm patient understanding of information provided

*Cues*: Includes information regarding procedures, pre-examination directions, methods for receiving formal results and timeframes.

5.1.3 Answer patient queries appropriately

*Cues*: Requires use of appropriate language and terminology suited to audience.

5.1.4 Deliver relevant information to patients in an appropriate manner

*Cues*: Information may be confidential or sensitive.
Includes tactfully responding to requests for details that cannot be provided.
Interacting with people who may be anxious or distressed.

5.1.5 Interact in ways that recognise patient/professional boundaries

## Element 5.2: Communicate with other professionals

### *Performance criteria*

5.2.1 Use communication techniques appropriate to the audience

*Cues*: Communication includes written, verbal, non-verbal, appropriate language, and appropriate use of terminology.
Audience may include colleagues, managers, medical practitioners and academics.

5.2.2 Recognise and act according to professional roles and responsibilities of health care and other service providers

5.2.3 Communicate information appropriately to other health care and relevant service providers

*Cues*: Appropriate use of language, technical terminology, provision of appropriate level of detail.
Written reports are prepared in the required format and meet legal and organisational requirements.
Information is assessed in terms of urgency and communicated in a timely manner.
Patient confidentiality is ensured.

# Unit 6. Plan and conduct examinations (Abdominal)

## Element 6.1: Apply underpinning knowledge to plan and implement an examination

### *Performance criteria*

6.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, embryology, pathophysiology and sonographic appearances of pathology.
Includes, but not limited to, abdominal organs and glands, male pelvis and prostate, major vessels, retroperitoneum, urinary and gastrointestinal tracts and paediatric abdomen.

6.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation and image optimisation.

## Element 6.2: Develop an examination strategy

### *Performance criteria*

6.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

6.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback and may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

6.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

## Element 6.3: Implement the examination strategy

### *Performance criteria*

6.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, embryology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

6.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, embryology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

6.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 6.4: Document examination findings

### *Performance criteria*

6.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

6.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

## Unit 7. Plan and conduct examinations (Breast)

### Element 7.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

7.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of female and male breast anatomy, physiology, embryology, pathophysiology and sonographic appearances of pathology.

7.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation, image optimisation and mammographic/ultrasound image correlation.

### Element 7.2: Develop an examination strategy

*Performance criteria*

7.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

7.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

7.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 7.3: Implement the examination strategy

*Performance criteria*

7.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of female and male breast anatomy, physiology, embryology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

7.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of female and male breast anatomy, physiology, embryology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

7.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 7.4: Document examination findings

### *Performance criteria*

7.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

7.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

## Unit 8. Plan and conduct examinations (Cardiac)

### Element 8.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

8.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of cardiac and thoracic anatomy, physiology, embryology, pathophysiology, haemodynamics and sonographic appearances of pathology.

8.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation, image optimisation and duplex (Doppler) instrumentation and waveforms.

### Element 8.2: Develop an examination strategy

*Performance criteria*

8.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

8.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

8.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 8.3: Implement the examination strategy

*Performance criteria*

8.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of cardiac and thoracic anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

8.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of cardiac and thoracic anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

8.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 8.4: Document examination findings

### *Performance criteria*

8.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

8.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

# Unit 9. Plan and conduct examinations (Musculoskeletal)

## Element 9.1: Apply underpinning knowledge to plan and implement an examination

### *Performance criteria*

9.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology and sonographic appearances of pathology.
Includes, but is not limited to, muscles, joints, tendons, nerves and other musculoskeletal structures.

9.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation and image optimisation.

## Element 9.2: Develop an examination strategy

### *Performance criteria*

9.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

9.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

9.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

## Element 9.3: Implement the examination strategy

### *Performance criteria*

9.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

9.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology, ultrasound physics, instrumentation and examination techniques. Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

9.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 9.4: Document examination findings

### *Performance criteria*

9.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

9.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

## Unit 10. Plan and conduct examinations (Obstetric and Gynaecologic)

### Element 10.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

10.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of obstetric, gynaecologic, fetal and paediatric anatomy, physiology, embryology, pathophysiology and sonographic appearances of pathology.
Includes, but not limited to, female pelvis, embryonic and fetal development.

10.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation, scanning techniques and image optimisation.

### Element 10.2: Develop an examination strategy

*Performance criteria*

10.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

10.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

10.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 10.3: Implement the examination strategy

*Performance criteria*

10.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of obstetric, gynaecologic, fetal and paediatric anatomy, physiology, embryology and pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

10.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of obstetric, gynaecologic, fetal and paediatric anatomy, physiology, embryology and pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

10.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 10.4: Document examination findings

### *Performance criteria*

10.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

10.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

# Unit 11. Plan and conduct examinations (Paediatric)

## Element 11.1: Apply underpinning knowledge to plan and implement an examination

### *Performance criteria*

11.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of paediatric anatomy, physiology, embryology, pathophysiology and sonographic appearances of pathology.

11.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation and image optimisation.

## Element 11.2: Develop an examination strategy

### *Performance criteria*

11.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

11.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

11.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

## Element 11.3: Implement the examination strategy

### *Performance criteria*

11.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of paediatric anatomy, physiology, embryology and pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

11.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of paediatric anatomy, physiology, embryology and pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

11.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 11.4: Document examination findings

### *Performance criteria*

11.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

11.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

## Unit 12. Plan and conduct examinations (Superficial Parts)

### Element 12.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

12.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology and sonographic appearances of pathology.
Includes, but not limited to, breast, scrotum, eye, thyroid and anterior neck.

12.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation and image optimisation.

### Element 12.2: Develop an examination strategy

*Performance criteria*

12.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

12.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

12.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 12.3: Implement the examination strategy

*Performance criteria*

12.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology, ultrasound physics, instrumentation and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

12.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of anatomy, physiology, pathophysiology, ultrasound physics, instrumentation and examination techniques. Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

12.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 12.4: Document examination findings

### *Performance criteria*

12.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

12.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.

## Unit 13. Plan and conduct examinations (Vascular: general)

### Element 13.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

13.1.1 Apply knowledge of pathologies relevant to the examination

*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics and sonographic appearances of pathology.

13.1.2 Apply knowledge of ultrasound imaging systems

*Cues*: Requires comprehension of ultrasound physics, instrumentation image optimisation and duplex (Doppler) instrumentation and waveforms.

### Element 13.2: Develop an examination strategy

*Performance criteria*

13.2.1 Review relevant information and records to determine examination requirements

*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

13.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements

*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

13.2.3 Develop the examination strategy

*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 13.3: Implement the examination strategy

*Performance criteria*

13.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images

*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

13.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

13.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 13.4: Document examination findings

### *Performance criteria*

13.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

13.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner.


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## Unit 14. Plan and conduct examinations (Vascular: discipline specific)

### Element 14.1: Apply underpinning knowledge to plan and implement an examination

*Performance criteria*

14.1.1 Apply knowledge of pathologies relevant to the examination
*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics and sonographic appearances of pathology.
Includes arterial and venous systems of upper and lower limb, cerebrovascular and visceral.

14.1.2 Apply knowledge of ultrasound imaging systems
*Cues*: Requires comprehension of ultrasound physics, instrumentation image optimisation and duplex (Doppler) instrumentation and waveforms.

### Element 14.2: Develop an examination strategy

*Performance criteria*

14.2.1 Review relevant information and records to determine examination requirements
*Cues*: Relevant information could consist of examination requests, patient records and patient feedback.
Includes questioning the patient to elicit and confirm information.

14.2.2 Select the appropriate examination method/s and settings to match clinical question and patient requirements
*Cues*: Examination strategy takes account of patient records, history and feedback. It may also require seeking clarification or further information from other health practitioners.
Patient requirements may include considering patient preferences and mobility.

14.2.3 Develop the examination strategy
*Cues*: Examination strategy is developed in accordance with organisational procedures, professional standards and evidence-based practice.

### Element 14.3: Implement the examination strategy

*Performance criteria*

14.3.1 Undertake the examination according to the determined strategy; selecting, interpreting and recording appropriate images
*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to apply knowledge of ultrasound imaging system to optimise image settings; effective use of transducers; selection of appropriate windows.
Requires ability to perform examinations in an efficient and timely manner whilst delivering quality examination outcomes.
Involves the ability to distinguish between technical artefacts and misleading appearances from pathology.
Requires real time assessment to acquire diagnostic sonographic information and optimal windows.

14.3.2 Extend or modify the examination according to sonographic findings and clinical presentation

*Cues*: Requires application of underpinning knowledge of vascular anatomy, physiology, embryology, pathophysiology, haemodynamics, ultrasound physics, instrumentation, duplex (Doppler) instrumentation and waveforms and examination techniques.
Includes ability to interpret images, assess the clinical significance of unexpected findings and revise the examination strategy, in response to sonographic appearances.

14.3.3 Review examination findings to confirm thoroughness

*Cues*: Includes confirming the examination addresses the clinical question.

## Element 14.4: Document examination findings

### *Performance criteria*

14.4.1 Document the examination in accordance with organisational protocols

*Cues*: Documentation must provide sufficient information to state conclusions on the patient's condition.
Documentation includes reports, worksheets and images that may include real time information not able to be otherwise demonstrated.

14.4.2 Communicate findings to reporting practitioner

*Cues*: Reporting practitioner is the person responsible for overseeing the conduct of the examination.
Use appropriate terminology to describe clinical presentation and findings.
Includes documentation, written worksheets, provisional reports and oral summary, where appropriate.
Requires an awareness of the limits of candidate knowledge to make judgments within their level of expertise and seek expert advice, where appropriate.
Requires ability to identify issues requiring urgent attention and reporting in a timely manner

asa
australian
sonographers
association

PO Box 709
Moorabbin
Victoria 3189

T: 03 9585 2996
F: 03 9585 2331
E: ceo@a-s-a.com.au
w: www.a-s-a.com.au