

**Certificate in Allied Health Performed Ultrasound
(CAHPU)**

Syllabus

Vascular Access (venous (peripheral and central) and arterial)

Syllabus

Certificate in Allied Health Performed Ultrasound (CAHPU)

Vascular Access (venous (peripheral and central) and arterial)

- Purpose:** This unit is designed to cover the theoretical and practical curriculum for the procedural use of ultrasound for the purpose of securing peripheral vascular access, both venous and arterial. It also covers the principles of using ultrasound to guide central venous access.
- Prerequisites:** Learners should have completed the ASUM CAHPU Physics Online Tutorial unit or accredited equivalent unit. Prior to this unit, practitioners are expected to know the specific details, indications and contraindications for the range of procedures that they perform. This should include: Aseptic technique and use of the various cannulation equipment including the Seldinger technique. This unit is suite to paramedics and all nurses.
- Training:** Learners should attend an ASUM accredited Vascular Access unit or equivalent.
- Assessments:** Learners are required to provide evidence of satisfactory completion of training sessions, supervised ultrasound scans and documentation in a logbook.

Please note that separate modules exist for pleural aspiration and hepatic procedures.

Unit Objectives

On completing this unit learners should be able to demonstrate:

- A greater understanding of the ultrasound techniques and physical principles of peripheral and central venous access, and of arterial access.
- Proficiency in image optimisation in order to enable appropriate procedural guidance.
- An understanding of the anatomy (and common variations) of the following structures, including their relationships to adjacent structures and surface anatomy:

Veins of the upper limb including:

- Brachial veins
- Basilic vein
- Cephalic vein

Arteries of the upper limb including:

- Brachial artery
- Radial artery
- Ulnar artery

Nerves of the upper limb including:

- Radial nerve
- Ulnar nerve
- Median nerve

Structures in the neck including:

- Internal and external jugular veins
- Carotid arteries
- Thyroid
- Trachea
- Strap and sternocleidomastoid muscles

Structures in the femoral triangle including:

- Femoral nerve
- Common femoral artery
- Common femoral vein
- Long saphenous vein

Structures in the subclavian region including:

- Subclavian and axillary veins
- Subclavian and axillary arteries
- Pleural surface
- Ribs
- Clavicle

The ability to image the above vessels in transverse and longitudinal planes using:

- B-mode compression US
- Colour Doppler US

Understanding of the sonographic characteristics of peripheral veins and arteries in various physiological states including:

- Normal
- Tourniquetted limb
- Hypovolaemic patient
- Hypotensive patient
- Venous thrombosis

Understand the sonographic appearance of a needle in:

- Transverse view
- Longitudinal view

Have the technical understanding and ability to guide a needle under real-time ultrasound guidance into a target vessel using:

- In-plane technique
- Out-of-plane technique

Unit Content

- Anatomy as described above
- Ultrasound techniques and physical principles
- Linear probe and scanner settings
 - Preset, depth, frequency, focus, gain
- Important artefacts including relevant examples
 - Reverberation artefact
 - Long path
 - Between skin and horizontal fascial planes
 - Short path
 - Comet tail deep to needle

- Beam width artefact
 - Either side of needle
- Slice thickness artefact
 - Vein in longitudinal with needle outside vessel but appearing within

Preparation for the procedure

- Equipment including:
 - Sterile probe covers (and how to apply them)
 - Aseptic technique
 - Local anaesthesia
 - Variety of longer cannulae (to reach and cannulate deeper targets)
- Patient, operator, machine and equipment position
 - Patient comfortable and in appropriate position for procedure being performed
 - Limb rotated and supported so target vessel is at 12 o'clock with no important structures either directly superficial, or directly deep to the vessel
 - Operator comfortable, usually seated
 - Operator, target and US screen should be in a straight line - screen will often need to be on other side of patient.
 - All equipment within reach and readily accessible
 - Optimise vessel appearance / size with tourniquette (for vein)
 - Perform preliminary scan to determine optimal target / site for attempt

Technical skills

- Aseptic technique
- Administration of local anaesthetic
- Decide on in-plane or out-of-plane technique
- Optimise image of vessel
- Optimise image of needle
- Hit target with needle and perform cannulation
- Confirm correct position

Limitations and Pitfalls

- Patient body habitus
- Variable anatomy
- Avoiding adjacent structures
- Losing (and finding) the needle in both in-plane and out-of plane techniques
- When to abandon peripheral venous access and move to central venous access (or PICC line)

Teaching Methodologies

All training that include unit curriculum accredited toward the CAHPU will be conducted in the following manner:

- A pre-test shall be conducted at the commencement of the training which focuses learners on the main learning points
- Each vascular access unit shall comprise at least 2 hours of teaching time of which at least 1 hour shall be practical teaching. Stated times do not include the physics, artefacts and basic image optimization which should be provided if delegates are new to ultrasound.
- Learners will receive reference material covering the unit curriculum.
- The lectures presented should cover substantially the same material as contained in this curriculum document.
- An appropriately qualified clinician will be involved in both the development and delivery of the unit and training (they do not need to be present for the full duration the training).
- The live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate has the opportunity to scan and explore the normal vascular anatomy and adjacent anatomical relationships. Vascular access phantoms shall be used for participants to practice both in plane and out of plane cannulation techniques.
- A post-test will be conducted at the end of the training to ensure the required learning objectives are met.

Assessment and Logbook

- Candidates are only required to provide a logbook of procedures that fall within their scope of practice.
- Evidence of satisfactory training completion
- Evidence of assessment of competence (summative assessment) signed off by a suitably qualified assessor (DDU, Radiologist, DMU or AMS or be a sonographer registered with NZ MRTB in relevant field, CCPU in the relevant field or other qualification as approved by the CCPU board). The original completed competence assessment form

is to be sent to ASUM with the candidate's completed log book.

- Logbook requirements need to be completed, and logbooks need to be submitted within two years of completing accredited unit training.

Formative Assessments

- 2 supervised (marked and interactive) ultrasound guided vascular access procedures.

Summative Assessment

- A third procedure as a summative assessment is to be performed, and signed off by a suitably qualified assessor (see above) using the competence assessment form supplied at the end of this document.

Logbook Requirements

- Evidence of completion of logbook signed off by a suitably qualified supervisor (DDU, Radiologist, DMU or AMS or be a sonographer registered with NZ MRTB in relevant field, CCPU in the relevant field or other qualification as approved by the CCPU board). Evidence of ultrasound guided vascular access procedures supervised by a qualified clinician
- In those already competent at peripheral cannulation techniques, 3 successful directly supervised scans should be performed prior to independent practice
- In those who are new to cannulation, at least 5 successful directly supervised procedures should be performed.
- For those undertaking central venous cannulation, 5 successful, directly supervised procedures are required.
- Those cases that involve a procedural component must be signed off by a suitable assessor who performs those procedures themselves.
- At the discretion of the ASUM CCPU/CAHPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement.

Created: January 2013 by James Rippey, Adrian Goudie and Justin Bowra. For review 2018.

ASUM CAHPU Competence Assessment Form
Vascular Access Ultrasound

Candidate: _____
 Assessor: _____
 Date: _____

Assessment type: Formative (feedback & teaching given during assessment for education)
 Summative (prompting allowed but teaching not given during assessment)

To pass the summative assessment, the candidate must pass all components listed

	Competent	Prompted	Fail
Prepare patient			
Position			
Informed			
Prepare Environment			
Prepares equipment			
Probe & Preset Selection			
Can change transducer			
Selects appropriate transducer			
Selects appropriate preset			
Image Acquisition			
Optimisation (depth, freq, focus, gain)			
Target Vessel			
<i>Identifies</i>			
Relevant anatomy			
Optimal insertion site			
Performs Procedure			
Performs procedure competently			
Artefacts			
Identifies and explains the basis of common artefacts			

Competent Prompted Fail

Record Keeping

Labels & stores appropriate images
 Documents any pathology identified
 Completes report
 Describes findings briefly
 Integrates ultrasound findings with clinical assessment & explains how the findings might change management

Machine Maintenance

Cleans / disinfects ultrasound probe
 Stores machine and probes safely and correctly

Competent Prompted Fail

For Formative Assessment Only:

Feedback of particularly good areas: _____

Agreed actions for development _____

Examiner Signature: _____ Candidate Signature: _____

Examiner Name: _____ Candidate Name: _____

Date: _____