

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

Lung and Diaphragm Ultrasound for Physiotherapy

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Syllabus

Purpose:

This unit is designed to cover the theoretical and practical curriculum for lung and diaphragm for acute care physiotherapists.

Prerequisites:

Learners should have completed the ASUM Physics Image Optimisation unit or accredited equivalent.

Training:

Recognised either through attendance at an ASUM accredited Lung and Diaphragm course or equivalent.

Assessments:

Learners are required to perform supervised ultrasound scans with documentation in a logbook.

Unit Objectives

On completing this unit the candidates will be able to:

- Understand the role of lung and diaphragm ultrasound in acute care
- Have an awareness of evidence, use and limitations with lung and diaphragm ultrasound
- Identify and demonstrate practical understanding of:
 - Basic settings of ultrasound scanning equipment
 - High and low frequency probes, uses, limitations
 - Patient and ultrasound probe positioning for lung and diaphragm ultrasound
- Attain basic skills in ultrasound imaging of normal thoracic anatomy (ribs, intercostal space, pleura, diaphragm, heart) and key abdominal organs (liver, spleen, kidneys)
- Attain understanding of key ultrasound findings of: lung, pleural pathologies and diaphragm dysfunction:
 - Normal lung
 - Pleural effusions and types of fluid collections (simple/complex)
 - Pneumothorax and other causes of absent pleural sliding
 - Lung collapse/consolidation
 - Pulmonary oedema
 - Diaphragm movement (normal, dysfunction)

Unit Content

The unit will cover image interpretation and the clinical context of lung and diaphragm ultrasound, including:

- Approaches to scan the lungs/chest wall, and the limitations and the important principle that enough of the lung surface must be scanned to be able to rule in/out the disease that is in question.

- Ultrasound artefacts and equipment settings, probe orientation to optimize visualisation of the relevant thorax artefacts including the role that certain controls (such as gain and depth) have in regards to normal and key lung/pleural diseases.
- Identifying normal:
 - Thorax anatomy (pleura, ribs, heart)
 - Normal lung anatomy and aeration A-lines
 - Key abdominal organs (liver, spleen, kidneys)
 - Normal movement of diaphragm
- Identifying signs of pneumothorax
- Identifying signs of pleural effusion and different types of effusions
- Identifying signs of lung collapse/consolidation
- Identifying signs of pulmonary oedema
- Identifying abnormal movement of diaphragm
- Understanding the role of lung and diaphragm ultrasound in clinical decision making for acute physiotherapy management.

Limitations and Pitfalls

The course will help students to understand the limitations of ultrasound of the lung and diaphragm.

Teaching methodologies

- A pre-test shall be conducted at the commencement of the unit, which focuses on the main learning points.
- An appropriately qualified clinician will be involved in both the development and the teaching of the course and will be present for at least part of the course itself.
- Each course shall comprise at least 4 hours of teaching time, of which at least 1 hour shall be practical teaching, and another hour interpreting images of normal and pathological lung US findings and/or ultrasound phantoms. Stated times do not include the physics, artefacts and basic image optimization which should be provided if delegates are new to ultrasound.
- The lectures presented should cover substantially the same content as the notes in this syllabus.
- The attendees will receive handout materials of all the presentations and practical checklists for the practical sessions.
- The live scanning sessions for this unit will include normal patients and either simulators, mannequins or patients to demonstrate pleural effusions and other pathology. Other lung pathologies not covered will be demonstrated by 'image interpretation' sessions in which the candidates must interpret the images/videos of the relevant pathology.
- A post-test will be conducted at the end of the unit as a formative assessment.

Assessment and Logbook

- Evidence of satisfactory completion of a training course
- Evidence of assessment of competence (summative assessment) signed off by suitably qualified assessor (DDU, Radiographer, DMU or AMS or sonographer registered with NZ MRTB in relevant field, CCPU in the relevant field or other qualification as approved by CCPU board, experience in lung ultrasound). The original completed competence assessment form is to be sent to ASUM with the candidates completed logbook.
- Log books need to be completed and submitted within two years of completing the initial lung ultrasound training course.

Formative assessments

- Two formative assessments, directly supervised by a suitably qualified assessor (see above) with suggestions and advice provided during and after the scan.
- The first formative assessment should be performed after approximately 10-15 scans, second after approximately 20-25 scans to ensure accurate scanning

Summative assessments

- A summative assessment is to be performed by a suitably qualified assessor (see above) using the competence assessment form that is supplied at the end of this document. The original completed assessment is to be sent to ASUM with the candidates completed logbook.
- Summative assessment should be performed after approximately 30-40 scans.

Logbook requirements

- Evidence of completion of logbook signed off by a suitably qualified supervisor (DDU, Radiologist, DMU or AMS or sonographer registered with NZ MRTB in the relevant field who have experience with thoracic ultrasound, CCPU in the relevant field or other qualification as approved by the CCPU Board). We recommend the logbook to include details of any other supportive diagnostic evidence e.g. CT scan, CXR, lung auscultation, chest drain insertion outcome that concurs with the ultrasound findings.
- 40 scans in total (including 3 directly supervised assessments as noted above). All performed and reported by the candidate and reviewed by a suitable assessor/s.
- At least 50% clinically indicated
- 15 positive (demonstrating pathology)

At the discretion of the ASUM CCPU/CAHPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement.

Minimal imaging sets

Record 5 positions per side of video loops (anterior superior, anterior inferior, axillary superior, axillary inferior and posterior inferior +/- posterior superior if they can sit up and add any areas of abnormality).

ASUM CAHPU Competence Assessment Form

Lung and Diaphragm 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

Prepare patient

Position

Informed

Competent Prompted Fail

Prepare Environment

Lights dimmed if possible

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Probe & Preset Selection

Can change transducer

Understands roles of the different transducers

Selects appropriate preset

Discusses & justifies choice of probe orientation

Understands effect of filters (e.g. THI & multibeam / crossbeam) on lung imaging

Data Entry

Enter patient details

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Image Acquisition

Optimisation (depth, freq, focus, gain)

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Images & explains normal structures

Competent Prompted Fail

Chest wall
 Ribs / costal cartilages
 Pleural space
 Pleural sliding
 Able to differentiate lung sliding & cardiac motion on left chest
 Able to use M mode & explain its role & limitations
 Lung
 Diaphragm
 Liver and spleen
 Heart

Images & explains normal artefacts

Lung aeration (pleural) sliding
 Scatter
 Lung curtain
 A lines
 B lines
 Lung pulse

Interprets images of pathology (using library images if necessary)

Pleural thickening
 Pleural fluid
 B-pattern (including differential)
 Consolidated lung (incl differential)
 Absent lung sliding
 Presence of lung point
 Diaphragm dysfunction

Record Keeping

Labels & stores appropriate images
 Documents any pathology identified
 Completes report
Each view adequate / inadequate
Documents focussed scan only

Describe findings briefly

Integrates ultrasound findings with clinical assessment and 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: _____