

## POSITION STATEMENT

## Thoracic ultrasound recognition of competence: A position paper of the Thoracic Society of Australia and New Zealand

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### ABSTRACT

The ability to perform bedside thoracic ultrasound is increasingly recognized as an essential skill for thoracic clinicians, extending the clinical examination and aiding diagnostic and therapeutic procedures. Thoracic ultrasound reduces complications and increases success rates when used prior to thoracentesis or intercostal chest tube insertion. It is increasingly difficult to defend performing these procedures without real or near-real time image guidance. To assist thoracic physicians and others achieve and demonstrate thoracic ultrasound competence, the Interventional Pulmonology Special Interest Group (IP-SIG) of the Thoracic Society of Australia and New Zealand (TSANZ) has developed a new pathway with four components: (i) completion of an approved thoracic ultrasound theory and hands-on teaching course. (ii) A log of at least 40 relevant scans. (iii) Two formative assessments (following 5–10 scans and again after 20 scans) using the Ultrasound-Guided Thoracentesis Skills and Tasks Assessment Tool (UG-STAT). (iv) A barrier assessment (UG-STAT, pass score of 90%) by an accredited assessor not directly involved in the candidate's training. Upon completion of these requirements a candidate may apply to the TSANZ for recognition of competence. This pathway is intended to provide a regional standard for thoracic ultrasound training.

**Key words:** assessment, competence, education, pleural disease, ultrasound.

**Abbreviations:** ASUM, Australasian Society of Ultrasound in Medicine; IP-SIG, Interventional Pulmonology Special Interest Group; TSANZ, Thoracic Society of Australia and New Zealand; UG-STAT, Ultrasound-Guided Thoracentesis Skills and Tasks Assessment Tool.

### INTRODUCTION

Pleural procedures are common and performed in many hospital settings including medical wards, emergency departments, operating theatres, outpatient clinics and radiology departments. Although frequently performed, the magnitude and rate of pleural procedural complications can be high, are under-recognized and they carry significant risk of serious injury and death.

The ability to perform bedside thoracic ultrasound is increasingly recognized as an essential skill for thoracic clinicians, extending the clinical examination and aiding diagnostic and therapeutic procedures in the evaluation of pleural and parenchymal lung disorders. Thoracic ultrasound has been shown to reduce complications and increase success rate when used at the bedside prior to thoracentesis or intercostal chest tube insertion<sup>1–6</sup>; in addition, its use is cost-effective.<sup>7</sup> Many local guidelines either strongly recommend or mandate the use of bedside thoracic ultrasound to guide thoracic procedures and it is increasingly difficult to defend performing these procedures without real or near-real time image guidance.<sup>8–10</sup>

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As misinterpretation of ultrasound images acquired at the bedside may lead to serious procedural complications, the skilful acquisition and interpretation of such images is critical. Training and supervision pathways are therefore needed to assist clinicians achieve and demonstrate ultrasound competence. Other diagnostic imaging modalities such as echocardiography have formal guidelines requiring logbook documentation of a minimum number of prescribed cases in order to demonstrate and maintain procedural competence.<sup>11,12</sup> However, there are no universally accepted training regimens for thoracic ultrasound.

Internationally, the Royal College of Radiologists (UK) has accreditation pathways for pleural ultrasound, but these are tailored to the local clinical environment.<sup>13</sup> Within Australia and New Zealand, the Australasian Society of Ultrasound in Medicine (ASUM) offers certificates in pleural and lung ultrasound, but their uptake has been low among thoracic physicians possibly due to cost or access considerations. Further, no existing programme incorporates a validated tool to evaluate competence; rather assessment of clinical competence is at the discretion of assessors or trainers.

Among Thoracic Society of Australia and New Zealand (TSANZ) physician members, overall access to bedside ultrasound increased between 2011 and 2016 from 53 to 90%, suggesting that thoracic ultrasound is already established as the standard of care.<sup>14,15</sup> In 2016 however, only 21% of physicians were demonstrably competent in thoracic ultrasound (holding a higher degree or attendance at an ultrasound course followed by supervision). This highlights the need for a suitable pathway to recognize thoracic ultrasound competence.

To meet the need of thoracic physicians and other specialities, the Interventional Pulmonology Special Interest Group (IP-SIG) of the TSANZ has developed a new pathway for the recognition of thoracic ultrasound competence.

## PROCESS

### Expert panel

In August 2015, the TSANZ executive commissioned the IP-SIG to prepare a position paper outlining a pathway for achieving competence in thoracic ultrasonography. A co-convenor of the IP-SIG (J.P.W.) was appointed to chair a panel of 10 clinicians, who were selected for their expertise in performing and teaching thoracic ultrasound (the authors). The expert panel had a combined record of conducting 56 pleural/ultrasound workshops in six countries and publishing 1 book, 1 book chapter and 15 original articles on thoracic ultrasound. The panel convened four teleconference meetings between September 2015 and February 2016. Secretarial support was provided by TSANZ. The committee did not receive any commercial sponsorship and all panel members worked on an honorary basis.

### Recognition of competence

The expert panel and the TSANZ board agreed that the pathway would result in 'recognition of competence' rather than a 'certificate of accreditation'. It was deemed that an individual's accreditation to practice a particular skill, such as thoracic ultrasound, was the responsibility of the clinician's workplace (e.g. hospital), but that providing evidence of procedural competence upon which this decision could be based was a valid role of specialist societies such as the TSANZ.

### Guiding principles

- 1 The pathway would be aligned with the goals and values of the TSANZ.
- 2 The pathway would be affordable, including to physicians-in-training.
- 3 The pathway would be widely accessible.
- 4 Assessments would be undertaken using validated tools (where available).
- 5 Formative assessments would be incorporated to provide teaching and feedback, in line with the educational concept of mastery learning in which the student gradually works towards an accepted high standard, punctuated by repeated assessments which focus on key learning points and allow defined moments of feedback.<sup>16-20</sup>

### Literature review

A review of thoracic ultrasound training programmes and of other organizations ultrasound accreditation pathways was undertaken to derive an acceptable benchmark for competence. The literature was searched for validated tools to assess thoracic ultrasound skills. Accreditation programmes from other disciplines including cardiology and gastroenterology were also reviewed for generalizable principles of training and assessment.

### Course attendance, logbook requirements and choice of assessment tool

The panel agreed that the theoretical basis of thoracic ultrasound would require attendance at an accredited course with specified syllabus and delivery requirements.

An assessment based purely on numbers of scans was viewed as insufficient to confirm competence, in a modern era where tools such as direct assessment,<sup>21</sup> simulation technology and the ready electronic transfer of images and logbooks exists. Nonetheless, a minimum number of cases were deemed desirable. The panel agreed on 40 cases, in line with other current pathways.<sup>13</sup> However, given the lack of evidence that achieving a target number of cases ensures competence, the panel recommended objective formative assessments supervised by credentialed assessors during training, followed by a final barrier assessment. The Ultrasound-Guided Thoracentesis Skills and Tasks Assessment Tool (UG-STAT) was chosen as the formative and summative assessment tool, because of its ease of administration and direct applicability to thoracic clinical practice.<sup>21</sup>

The UG-STAT was developed and validated as a tool to differentiate beginner, intermediate and experienced groups of thoracic ultrasound practitioners. It is freely available online.<sup>22</sup>

### Discussion and ratification

The panel called for comments on a draft document from members of the IP-SIG of the TSANZ, following which open discussion occurred at the TSANZ annual scientific meeting in April 2016. Feedback was incorporated into a final document, which was approved by the Education and Training Subcommittee of the TSANZ in September 2016 and ratified by the Executive Committee in October 2016.

## OUTCOME

The full recognition of competence pathway can be accessed via the Supplementary Information. Key points are provided here.

### Definition of competence

'Competence in thoracic ultrasound' is defined as the ability to accurately and safely use bedside ultrasound to evaluate a pleural effusion, determine a safe site for thoracentesis or chest tube insertion, to assess pleural pathology or parenchymal lung disease and rule out a pneumothorax.

The level of competence of a thoracic clinician may not equate to that of an experienced radiologist and it is expected that thoracic clinicians maintain close relationships with such individuals in their practice.

### Target group

Recognition of competence is directed at thoracic physicians and trainees of the TSANZ. Non-TSANZ members including clinicians in other relevant specialities are also encouraged to apply for recognition of competence in thoracic ultrasound using this pathway.

### Initial competence assessment

There are four components to achieving competence:

- 1 Attendance and successful completion of an approved thoracic ultrasound training course.
- 2 Maintenance of logbook (minimum 40 scans) including at least 10 scans in each of the following categories:
  - a 'normal' scans
  - b successful ultrasound-assisted thoracenteses or intercostal catheter insertions
  - c intrapulmonary pathologies
- 3 Two formative assessments (UG-STAT, no pass score) after the first 5–10 and 20 scans by a local assessor.
- 4 One barrier assessment (UG-STAT, pass score 90%) by an assessor not directly involved in the candidates training. If a pass is not achieved, assessment can be repeated after each 10 additional scans.

### Re-certification of competency

Submission of a logbook every 3 years with a minimum of 15 bedside thoracic ultrasound procedures performed (or supervised) each year.

### Recognition of existing experience

Clinicians with existing thoracic ultrasound accreditation with other recognized ultrasound or radiology colleges may apply for recognition of competence. Clinicians with existing skills and experience in thoracic ultrasound but no formal qualification will be able to apply for recognition of competence by submitting a description of their training, courses attended, teaching experience and logbooks and completing a summative UG-STAT with 90% pass score. To allow sufficient time for those with existing thoracic ultrasound experience to apply for recognition of their experience, this pathway will be available for a 24-month period commencing at the Annual Scientific Meeting of the TSANZ in March 2017.

### Supervisors and assessors

Radiologists and ultrasonographers are qualified to be supervisors and assessors for the pathway, as are clinicians who have held thoracic ultrasound qualifications for a minimum of 2 years.

### Dissemination plan and review

The pathway document will be disseminated by publication in *Respirology*, by direct emailing to TSANZ members and on the TSANZ website. The clinical currency of the document will be reviewed after 5 years by the IP-SIG.

## DISCUSSION

A major limitation when drafting competency pathways of this nature is the paucity of evidence on which to base recommendations, that is, there are no tested pathways indicating a better outcome for one method compared to another. This lack of evidence results in a pathway based, to a large extent, on the expertise and experience of the panel members. Panel members were therefore selected based on their track record of providing ultrasound education across many geographic regions including Australia, New Zealand and further afield.

Where possible, evidence-based tools were employed for assessment. However, when evidence was absent, such as for target numbers for logbooks and a pass mark for barrier examinations, consensus agreement was achieved through discussion. The pass mark for the barrier assessment was ultimately set at 90%, on the basis that competence to perform thoracic ultrasound, recognize a pleural effusion and select a safe site for thoracentesis should be performed without error, but that an inevitable degree of subjectivity exists in any assessment tool.

This competency pathway requires supporting infrastructure; both accredited courses and training supervision. These would appear to be available within Australia and New Zealand. In 2012, sufficient courses were available to accommodate the entire TSANZ

membership within 2 years.<sup>14</sup> A recent survey of TSANZ members indicated that 67% of consultant physicians and 80% of advanced trainees reported adequate workplace supervision for ultrasound training, making it highly feasible for most TSANZ members to undertake this competency pathway with existing infrastructure and personnel.<sup>15</sup>

Finally, it is important to note that whilst trainees as well as established thoracic physicians will have access to this programme, it is not anticipated that the pathway will become compulsory, neither is it intended to become a vehicle for licencing or accreditation purposes.

## CONCLUSION

In summary, we have presented the pathway for recognition of competence in thoracic ultrasound of the TSANZ and detailed the steps taken by expert consensus to develop this pathway. The pathway has been designed with the intention of assisting thoracic clinicians achieve and demonstrate competence in thoracic ultrasound. We believe this will promote the provision of appropriate ultrasound guidance for pleural procedures and mitigate the inherent risk of such invasive procedures. This pathway also serves as a template upon which recognition of competence of other thoracic procedures such as chest tube insertion, fibre-optic bronchoscopy and endobronchial ultrasound, can be developed.

Whilst the current pathway has been developed primarily by expert consensus, we envisage that future iterations will be guided by an expansion in the literature on procedural competence and validated methods to develop and assess such competence.

## Disclosure Statement

The authors of this article certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership or other equity interest and expert testimony or patent/licencing arrangements) or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript. Although no personal conflict of interest exists, all authors have taught on or directed thoracic ultrasound courses that have been supported either by direct funding or indirectly by provision of equipment by manufacturers of ultrasound equipment including Fujifilm Holdings, GE Healthcare, Siemens Healthcare, Philips Healthcare, Toshiba Medical Systems Corporation, M4 Healthcare Pty Ltd and Carestream Health.

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## Supplementary Information

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Society Position Paper

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## ABSTRACT

The ability to perform bedside thoracic ultrasound is increasingly recognized as an essential skill for thoracic clinicians, extending the clinical examination and aiding diagnostic and therapeutic procedures. Thoracic ultrasound reduces complications and increases success rates when used prior to thoracentesis or intercostal chest tube insertion. It is increasingly difficult to defend performing these procedures without real or near-real time image guidance. To assist thoracic physicians and others achieve and demonstrate thoracic ultrasound competence, the Interventional Pulmonology Special Interest Group (IP-SIG) of the Thoracic Society of Australia and New Zealand (TSANZ) has developed a new pathway with four components: (i) completion of an approved thoracic ultrasound theory and hands-on teaching course. (ii) A log of at least 40 relevant scans. (iii) Two formative assessments (following 5–10 scans and again after 20 scans) using the Ultrasound-Guided Thoracentesis Skills and Tasks Assessment Tool (UG-STAT). (iv) A barrier assessment (UG-STAT, pass score of 90%) by an

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