

A UK wide survey on attitudes to point of care ultrasound training amongst clinicians working on the Acute Medical Unit

N Smallwood, R Matsa, P Lawrenson, J Messenger & A Walden

Abstract

The use of point of care ultrasound (POCU) is increasing across a number of specialties, becoming mandatory within some specialist training programmes (for example respiratory and emergency medicine). Despite this, there are few data looking at the prevalence of use or the training clinicians have undertaken; this survey sought to address this. It shows that the majority of POCU undertaken on the Acute Medical Unit (AMU) is without formal accreditation, with significant barriers to training highlighted including a lack of supervision, time and equipment. For those who undertook POCU, it was shown to regularly speed up clinical decision making, while 76.3% respondents believed a lack of access to POCU out of hours may affect patient safety. The data provide support to the concept of developing AMU specific POCU accreditation, to ensure robust and safe use of this modality on the AMU.

Keywords

Point of care ultrasound, ultrasound, training, echocardiography

Key points

- 87% respondents feel that POCU is an essential skill to be used in the AMU
- POCU is used widely on the AMU, often without formal accreditation/training
- POCU regularly speeds up or alters clinical decision making for those who undertake it
- 76% AMU clinicians feel lack of access to ultrasound out of hours may compromise patient care
- 95% respondents believe every AMU should have a dedicated ultrasound machine for the use of appropriately trained individuals
- These data will be used to help inform the development of AIM specific ultrasound training and accreditation standards

Background

Point of care ultrasound has not only been shown to improve patient safety during a variety of invasive procedures but also to add invaluable complementary information to the objective clinical examination, thus facilitating effective patient management.¹⁻³ In recognition of this role in patient safety, NICE have included POCU in guidance for insertion of central venous catheters⁴ and it is recommended during chest drain insertion for pleural effusion⁵. Furthermore, improvements in technology have led to an increasing availability of relatively cheap, portable ultrasound machines able to generate good quality images. This has resulted in several specialties developing training accreditation pathways to ensure competence and robust governance around the use of POCU (Royal College of Radiologists,⁶ Royal College of Emergency Medicine,⁷ Intensive Care Society).⁸ In addition, specialties such as respiratory⁹ and emergency medicine⁷ have included POCU within their higher specialist training curricula.

Within Acute Internal Medicine (AIM) the role of POCU is less well established, although recognised

as an important part of the management of patients on the AMU. Therefore this national survey was conducted to assess the prevailing status of the use of ultrasound among clinicians working on the AMU in order to ascertain the training, experience and use of POCU in clinical practice. The objective is to develop a framework for training and governance of POCU use within the AMU.

Methods

An electronic survey was created using a 6 member focus group (one AIM trainee [corresponding author], one Consultant radiologist and four Consultant physicians) using SurveyMonkey™ software and distributed to members of the Society for Acute Medicine (SAM) via their mailing list. In addition, it was distributed to AIM trainees at the discretion of the regional training programme directors (TPDs) and reminders sent via social media. A copy of the survey is available at <https://www.surveymonkey.com/r/SAMultrasound>. The questionnaire was designed so that no question required a 'forced answer'.

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Brief demographic data were collected on clinical role, stage of training and enrolment in AIM training. Further information was then collected regarding:

- Ultrasound training, experience and use in practice
- Echocardiography training, experience and use in practice
- Potential barriers to ultrasound/ echocardiography training
- Views on the role of point of care ultrasound within the AMU

Results

Response rates

A total of 994 members were e-mailed the survey through the SAM website, and all higher specialist trainees (HSTs) could have received invites through their TPD (a majority of which will be registered with SAM). A total of 276 people completed the survey meaning an overall response rate of 27.8% people registered on the SAM database. It is not possible to determine how many more may have received the invitation via social media.

The responses included 151 St3-7 equivalents, making a response rate among SAM registered Higher Specialty Trainees of approximately 43.1%. Of the 100 Consultant responses, 48 (48%) held a CCT in AIM and 51 (51%) did not; one (1%) respondent was not sure. A summary of all the respondents and their grades is shown in table 1.

Practical experience in ultrasound

Respondents were asked what experience, if any, they had in the use of ultrasound on the AMU. 40/272 (14.7%) had no previous experience of ultrasound.

Formal experience

48 (17.7%) had completed level 1 thoracic ultrasound, seven (2.6%) had completed level 2 thoracic ultrasound and 12 respondents (4.4%) had completed the Royal College of Emergency Medicine (RCEM) level 1 or 2 standards. Seven (2.6%) respondents had some form of postgraduate qualification in ultrasound. A total of five respondents had at least one Royal College of Radiologist (RCR) focussed ultrasound standard signed off.

Informal experience

The majority of respondents – 157 (57.7%) – had informal experience of ultrasound but no signed competencies. When combined with those with no ultrasound experience, this equates to a total of (72.4%) people working within the AMU with no accredited ultrasound experience.

Table 1. Response rate according to job specification

Role	Respondents (%age)
Medical Student	2 (0.7)
Nurse	3 (1.1)
Physiotherapist	1 (0.4)
Physician associate	3 (1.1)
Foundation Year 1	1 (0.4)
Foundation Year 2	1 (0.4)
Core Medical Trainee (or equivalent senior house officer grade)	8 (2.9)
Specialist Trainee year 3-4 (or equivalent)	73 (26.4)
Specialist Trainee year 5-7 (or equivalent)	78 (28.3)
Consultant	100 (36.2)
Medical, grade not specified	6 (2.1)

Practical experience in echocardiography

270 people responded to this question. Of those, 116 (43.0%) had no practical experience in echocardiography.

Formal experience

Focussed Echo Evaluation in Life Support (FEELTM)/Echocardiography in Life Support (ELS) was found to be the most common accreditation achieved (6.3%), followed by full British Society of Echocardiography (BSE) accreditation (4.8%), Focussed Intensive Care Echocardiography (FICE), 2.6%, and Focussed Acute Medical Echocardiography (FAME), 0.7%. Five respondents (1.9%) had completed the logbook for BSE accreditation but were not signed off.

Informal experience

103 (38.1%) respondents had informal experience of echocardiography but no signed competencies, making an overall total of 219 (81.1%) without any accredited experience of echocardiography.

Barriers to achieving competencies

Respondents were asked whether they had experienced any barriers to achieving competencies in either echocardiography or ultrasound; a total of 184 (66.7%) people answered this question. Of these, 166 (90.2%) stated they had come across barriers within their training.

The most common difficulty was of a lack of dedicated supervision for 133 (72.3%), followed by a lack of dedicated time for 102 (55.4%). For 66 (35.9%) respondents there was a lack of equipment available which hindered training. 29 (15.8%) of

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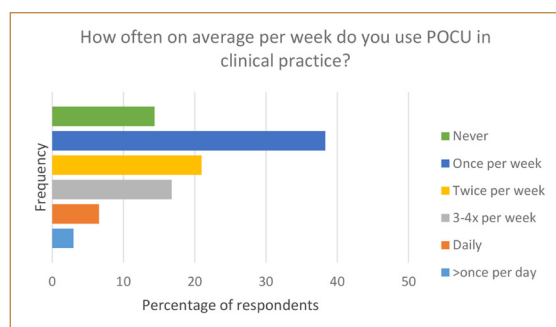


Figure 1. Ultrasound and echocardiography use in clinical practice

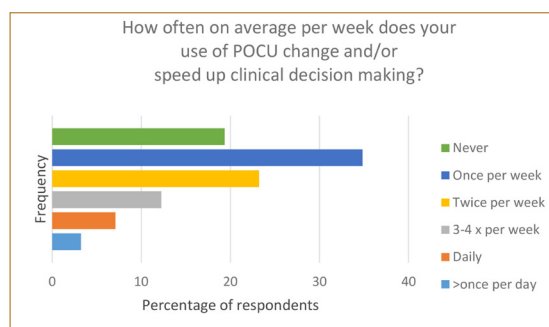


Figure 2. Ultrasound and echocardiography use in altering clinical decisions

respondents were able to achieve the ‘numbers’ of scans required for sign off in a given competency but unable to get formally signed off, and the same number were unable to achieve the ongoing exposure to their skill to maintain competency.

Ultrasound and echocardiography use in clinical practice

A total of 167 people answered the question of how often they use POCU on average in clinical practice. The majority of people (143; 85.6%) who have some experience of ultrasound use it at least once per week, while 16 (9.6%) respondents use it at least once per day on average. These results are summarised in figure 1.

Ultrasound and echocardiography use in altering clinical decisions

Respondents were asked how often their use of POCU changed and/or sped up clinical decision making. A total of 155 (56.2%) people answered this question.

30 people (19.4%) said that their use of these modalities never changed or altered their speed of clinical decision making, while a further 54 (34.8%) said that on average only once per week did it affect their decision making.

In contrast, for 16 (10.3%) respondents their use of POCU altered clinical decision making at least once per day on average. These results are summarised in figure 2.

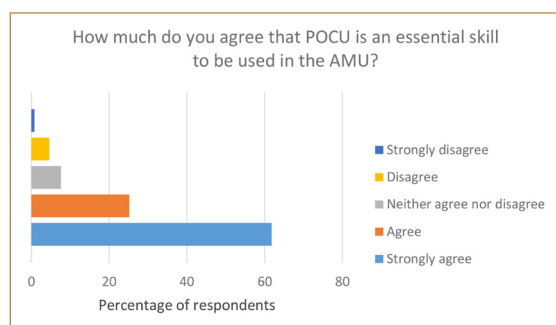


Figure 3. Point of care ultrasound on the AMU

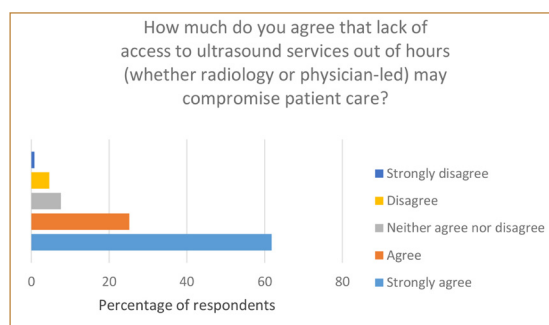


Figure 4. Access to ultrasound and patient care

Point of care ultrasound on the AMU

Participants were asked how strongly they felt that POCU is an essential skill to be used on the AMU. The results were overwhelmingly in favour of it being an essential skill with 228 of 262 respondents (87.0%) agreeing or strongly agreeing with the statement. Only 14 (5.3%) respondents disagreed or strongly disagreed with the statement. Figure 3 summarises these results.

Access to ultrasound and patient care

The survey participants were asked how much they agreed that a lack of access to ultrasound services out of hours (whether radiology- or physician-led) may compromise patient care. 262 people answered this question and the majority (200; 76.3%) agreed or strongly agreed with the statement. 22 (8.4%) people neither agreed or disagreed while 40 respondents (15.3%) disagreed or strongly disagreed, see figure 4.

The reporting and/or archiving of POCU images

Participants were asked their views on whether images obtained during POCU examinations should be archived within their organisation’s picture archiving and communication system (PACS). A total of 250 people responded to this question and their results are shown in table 2.

Access to an ultrasound machine on the AMU

Respondents were asked how much they agreed that every AMU should have a dedicated ultrasound

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Table 2. The reporting and/or archiving of point of care images

Yes, and all scans should be reported on PACS	71 (28.4%)
Yes (images only on PACS), with results documented in the notes	65 (26.0%)
No, if results documented in the notes	93 (37.2%)
No, and no requirement for results to be documented in the notes	6 (2.4%)
No opinion	15 (6.0%)

machine for the use of appropriately trained individuals. Of 259 respondents, 246 (95.0%) agreed or strongly agreed with the statement. Only 5 (1.9%) respondents disagreed (see figure 5).

Discussion

These data provide an insight into the experience of clinicians in POCU within the AMU setting. To our knowledge this is the first survey interrogating the current effectiveness of training in POCU, barriers to training and the extent of its utilisation within the hospital environment. It highlights that while a significant body of clinicians are utilising POCU on a regular basis, many of them are doing this without formal accreditation or training.

Ultrasound results depend on the operator's training and experience. The operator should be very familiar with the ultrasound machine, the type of transducers used, how to improve the image quality and therefore maximise the available information. The operator should be especially knowledgeable of sonographic artefacts and have a clear understanding of how to interpret them. Therefore there is a clear need for a robust training and accreditation programme to ensure the safe utilisation of POCU on the AMU. Our survey showed that the training of POCU amongst the respondents has been heterogeneous, ranging from informal use to postgraduate MSc level qualifications. The lack of formal accreditation and training is worrying, particularly with regards to patient safety and the governance of POCU. The response from the survey clearly illustrates a need for a formal training program and accreditation of POCU. It is also necessary to ensure that such training is accessible and achievable particularly when those who have acquired accreditation have endured many challenges previously. This survey also confirms the enthusiasm and belief amongst the respondents that such training in POCU would be achievable. Previous studies show clearly there is awareness that clinicians who use ultrasound in critically-ill patients should pass a credentialing process before using their own

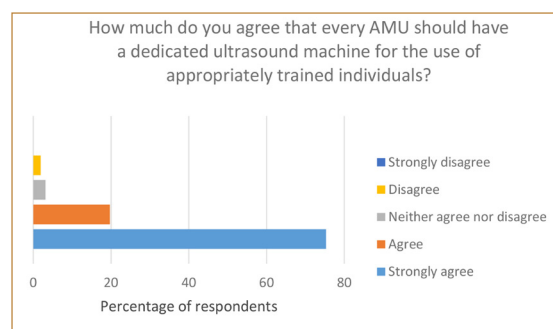


Figure 5. Access to an ultrasound machine on the AMU

ultrasound results for decision-making.¹⁰ The period of training will be shortened when the operator aims at mastering limited and focused studies.¹¹

When looking at ultrasound training specifically, by far the most common qualification is that of RCR Level 1 thoracic ultrasound, by 17.7% respondents. No other single qualification had been achieved by more than 3% of respondents. Two factors may have influenced this finding. The use of ultrasound in chest drain insertion has been strongly recommended since a 2008 National Patient Safety Alert⁴, and was probably the first procedure in routine general medical practice which required ultrasound guidance (although since 2002 central venous catheter insertion is recommended to be ultrasound guided⁵ it is not routinely undertaken outside Anaesthetic or Critical Care departments). This has placed a pressure on those undertaking pleural procedures to seek training in thoracic ultrasound, and AMUs see a lot of pleural disease. There is also a well-defined training pathway for thoracic ultrasound which allows trainees to become trainers, and so the pool of available supervisors is relatively large.

The lack of uptake of RCEM ultrasound standards among this cohort is best explained by the different case mix seen between the Emergency Department and the AMU, and presumably AMU clinicians don't see the RCEM standards as relevant to their practice. This provides further support for the idea of AMU specific training standards.

No single echocardiography qualification had been completed by more than 7% respondents, of which FEEL/ELS was the most common. FEEL/ELS are focussed echo qualifications which require a minimum of 50 supervised cases to be completed before the candidate can be signed off as competent, and are among a growing number of similar standards available (FAME, FICE, FATE for example). These standards are invariably based on the acutely unwell patient and allow the practitioner to make focussed and dichotomous judgements to aid clinical decision making. Formal BSE qualification requires a logbook of at least 250 cases with a written and practical exam,

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alongside a logbook of cases that may be performed on both in- and outpatients. This is both time consuming and requires close supervision; both of these factors were highlighted as barriers to training by this survey. Arguably, a complete BSE study is not relevant in the acutely unwell patient. Traditionally, full BSE accreditation has been difficult for AIM trainees to complete,¹² reflected by the fact that only 7 (2.73%) respondents in this survey had achieved it. Since this survey was undertaken the AIM Specialty Advisory Committee (SAC) have approved FICE echocardiography as a specialist skill for AIM trainees and it is expected that this will increase the number of trainees undertaking this qualification.

Of those practitioners who have ultrasound/echocardiography experience, the vast majority (85%) use these skills at least once per week suggesting plenty of opportunity within the AMU environment for POCU to be utilised. In addition, it suggests that once these skills are learnt there will be plenty of clinical opportunities to maintain them. Alongside this, over 80% of 155 respondents who use POCU feel it changes and/or speeds up clinical decision making at least once a week, which could have significant implications for patient safety and potential effects on reducing length of stay. It is of course impossible to quantify these potential benefits with this study, and further work in this area would provide useful information. The data does highlight a feeling among clinicians that ready access to ultrasound may have a significant role to play in the future on the AMU.

It is worth noting that a potential source of bias within these results is that respondents' participation was voluntary, and those who took part are liable to have specific opinions on the use of point of care ultrasound. It could be speculated that those who are enthusiastic about ultrasound may be more likely to respond, and this may skew the results towards the use of ultrasound. It is not possible to quantify this potential bias, nor any possible balance from responses of those whose decision to participate stemmed from disagreement with the use of POCU. The response rate achieved (27.3%) implies a reasonable overall representation of views.

It must be acknowledged that the significant body of clinicians using POCU without formal qualifications could be considered a clinical risk and a governance issue. The survey was not designed to investigate this further so it is impossible to comment on the nature of this usage, but it is entirely possible that this cohort represents clinicians experienced in ultrasound who merely do not have this formally accredited. Similar clinicians were

afforded 'Grandfather clause' status when the RCEM guidelines were drawn up and so there is precedent for ultrasound usage without formal accreditation. In this survey 15% of the respondents had achieved the numbers required for a given sign-off but were not accredited, and these clinicians would fall into the category 'without formal qualifications'.

The survey was not designed to assess the views of other General Internal Medicine (GIM) clinicians but it might be suspected that similar views are held by others who partake in the GIM on call rota (and therefore spend periods of time on the AMU). This data would be interesting to collect and may help inform future direction of the role of the medical registrar and the Shape of Training. Other specialties such as respiratory medicine have reported difficulties with achieving training in core ultrasound standards¹³ and it is therefore not a unique problem within the AMU.

Overall this survey provides good evidence that there is a strong desire among those working on the AMU to be empowered to use ultrasound and echocardiography on their units to improve patient care and safety. This could only be done through appropriate training pathways which would allow a clear structure of training and ongoing governance to be agreed, ensuring patient safety remains a priority whilst increasing access.

Conclusion and Recommendations

We recommend that a training pathway is developed to equip AMU clinicians with the skills necessary to utilise POCU safely and effectively on the AMU. In addition, we recommend that trainers are identified to deliver this pathway and formal accreditation, and that in the longer term consideration is given to POCU competencies becoming a core part of the AIM curriculum. The working group, to which the authors belong, has been set up with this aim and are drafting standards that are considered both relevant and achievable to clinicians working on the AMU. This will enable training pathways to be developed alongside courses to allow interested trainees to achieve a focussed ultrasound standard for acute medicine. The timeframe for introduction of this is hoped to be within the next 12-18 months, and both the SAC and SAM are in agreement with the need to develop such standards.

Competing Interest

The authors are part of a working group developing point of care ultrasound standards for use on the acute medical unit

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