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Ultrasound Clinical Teaching Capacity in England: A Scoping Exercise

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Introduction:

Ultrasound is undertaken by many health care professionals, some as part of an extended role within their main area of practice for example midwives, gynaecology nurses, physiotherapists, urologists and for others it is their main role. The latter, if not medical practitioners, are known as 'sonographers'(1). If medically qualified, are most likely to be radiologists in the UK. The majority of sonographers are radiographers registered with the Health and Care Professions Council (HCPC), and having undertaken postgraduate qualifications(2).

In the UK Sonographers are on the shortage occupation list of the Migratory Advisory Committee(3,4) and in a report by the Centre for Workforce Intelligence (CfWI)(2) sonographer vacancy rates across England were approximately 10%. Health Education England are working with stakeholders to increase the capacity for ultrasound clinical education, in association with other projects to help address the shortage of sonographers and other ultrasound practitioners(5). This is part of a wider strategy to increase the imaging and sonographer workforce(6)(7) and NHS workforce as part of the NHS long term plan(8).

Literature review:

The demand for ultrasound and the shortage of sonographers and radiologists have been reported in recent publications(2,9–14). The CQC highlighted the shortage of radiologists in their review of radiology reporting, suggesting vacancy rates for radiologists of 14%(10). One of their recommendations was that '*staffing and other resources are used effectively*', which might include the delegation of further ultrasound workload to sonographers(10). The RCR(12) predict a shortfall of 1,600 consultant radiologists by 2022 and the CfWI(2) suggested a 10% vacancy rate for sonographers, which is slightly less than the 12.6% vacancy rate reported by the SCoR survey in 2019(13) and 18% 2014(14). Added to the challenges with staffing, the number of ultrasound examinations have been increasing year on year, with a 5.1% increase reported from 2015-16 to 2016-17(15) and figures for 2018 suggest a 23% increase in non-obstetric ultrasound over a five year period(11). National figures for obstetric ultrasound workload are less clear, however Health Education England(16) estimate that an increase in the maternity sonography workforce of between 400 and 700 people would be required by 2021, to meet the demands of obstetric ultrasound services alone.

The CfWI(2) also reported that approximately 12% of sonographers were due to retire within five years, in some regions this figure is up to 20%. They reported that 270 sonographers were expected to retire within 5 years, as well as there being 258 sonographer posts vacant at the time of the survey(2). The number of sonographers expected to be trained within the 12 month period following the survey was 143 leading to a significant shortfall in sonographers to manage the current service demands(2). The 2019 SCoR survey(13) demonstrated that 30% of sonographers are over the age of 50, compared

with 33% in 2014(14), 76% had vacant sonographer posts in their units and 78% had at least one sonographer in training but due to qualify within a year.

To help ensure a sustainable future workforce, ultrasound education for sonographers is undergoing rapid changes, with the introduction of direct entry post graduate and undergraduate programmes and the development of an ultrasound apprenticeship standard at BSc (Hons) level.(5,9,17,18). The direct entry undergraduate BSc (Hons) level courses will take three years to achieve a qualification in ultrasound, meeting the Consortium for the Accreditation of Sonographic Education (CASE) level 6 learning outcomes(9), so are by no means a quick solution to the workforce challenges. These programmes are in addition to focused courses, which provide an existing health care professional with the ability to undertake ultrasound examinations in a well-defined, focused area of practice(19). Currently, ultrasound education involves predominantly academic theory taught in the higher education institution (HEI) setting and clinical skills developed within the clinical placement site, often an NHS Trust ultrasound department. As demands on the ultrasound service increase and more students enter onto these new ultrasound programmes, the pressure on clinical departments would be unsustainable using existing models of clinical education. Health Education England (HEE) are working with key stakeholders to review the career structure for sonographers and consider ways to reduce the pressure on clinical departments during the education of sonographers.

The overarching aim of this work was to understand the strategies already in place across England to increase ultrasound clinical teaching capacity and identify issues which might impact on capacity for sonography education in the workplace.

Additional objectives were to:

- Ascertain if there was a sonographer shortage in relation to current workload requirements
- Estimate if there was any predicted shortfall of sonographers in 5 years' time
- Understand current ultrasound clinical placements numbers
- Gain an estimate of current capacity for clinical education.

Methods:

The first part of the scoping exercise was the design of an on-line survey using SurveyMonkey® which was sent to 196 imaging department managers on the Society of Radiographers (SoR) membership database and 23 SoR local representatives. They were asked to disseminate the survey to ultrasound managers or the most appropriate person, to complete. The link to the survey was also shared via the SCoR Facebook, LinkedIn and Twitter accounts, asking for innovative ideas to be shared either via questions 7 to 9, the free text questions of the survey, or by directly emailing the professional officer for ultrasound. A small pilot of five colleagues was undertaken, to ensure the questions were relevant and clear.

The survey was anonymous. Participants accepted the statement that the anonymous results could be used in publications, posters and presentations by the SCoR, before starting the survey and general data protection information was provided as is standard SCoR practice for on-line surveys.

There were five questions. The first two asked about sonographer staffing levels for the provision of the current service and estimated additional staff needed to provide the service in five years. A further three questions were related to clinical ultrasound capacity for teaching ultrasound. Participants were also asked if they had implemented any innovative methods of educating ultrasound students, to increase capacity within the department/Trust and for details of these, if applicable. Finally there was a comments box for additional feedback or information.

Following review of the questionnaire, a number of respondents provided contact details. Some were contacted by telephone or e-mail to explore innovations further.

Results:

There were 182 responses to the questionnaire, however only 72 were complete. Those that did not complete, generally failed to answer any questions, however partially completed survey results were used, if free text responses were provided. Due to the use of social media for dissemination, a response rate could not be calculated accurately, although based on the original emails sent it is approximately 33%. Some respondents said they were already staffed to full capacity, whilst others had current vacancies. The average number of staff needed to meet current clinical demands being 2.65. Four departments (5%) reported a shortfall of 10 sonographers, when asked about the number of additional sonographers needed to provide the current service, whilst seven (10%) estimated 10 or more additional staff would be needed to provide the service in five years. A mean shortfall of 4.6 sonographers per department is the anticipated additional number of sonographers needed to provide the service in five years (Figure 1).

Question	Mean	Minimum	Maximum
Number of additional sonographers needed to provide current service	2.65	0	10
Additional sonographers predicted to need to provide service in five years' time	4.6	0	20
Number of sonography students currently training	2	0	8
Number of other (non-sonographers) currently training	2	0	24
How many sonography students could be trained each year	2.26	0.2	5

Figure 1: Responses to questions relating to staffing needs and clinical teaching capacity

In total, across the 72 respondents 280.5 people were being taught ultrasound in the clinical departments, of which 143 (51%) were student sonographers. The number of students in a department ranged from 0 to 25. Eleven departments (15%) were not teaching any sonographers, of these, seven (64%) were teaching other health care professionals (not sonographers), with numbers of trainees ranging from one to eleven (mean = 3.9 per department). One respondent provided no answer. The 60 (84 %) departments who were teaching sonographers had an average of 2 sonography students (ranging from 1 to 8 students). Of these departments 41 (58%) were also teaching non-sonographers, giving a total of 137.5 non-sonographer trainees, again an average of 2 students per department.

On review of the clinical teaching capacity there were 30 (42%) departments that had the capacity to teach more students. The total capacity for additional students within these departments combined, was 45.2. One department reported having the capacity to teach two sonographers, however they said they had *'No vacancies so wouldn't have a job after'*.

Where feedback was provided in the free text, comments included a number of issues affecting workforce or capacity to teach in the clinical environment (Figure 2). These included funding, increased demand and reduced radiologist capacity, being fully staffed, retention of students upon qualification due to different Agenda for Change pay bands offered by other local Trusts, the competing demands between clinical needs/targets and training needs, lack of capacity to train more students. Comments included:

- 'Funding for training is always an issue'
- 'Clinical need tends to clash with training capacity'
- 'More provision is not physically possible'
- 'Due to the intense nature of teaching u/s, it is difficult to train more than one student at a time'

- ‘Being short staffed puts incredible pressure on staff making it difficult to train more students. Full lists have to run and it’s hard to fit in extra patients ... when you are teaching a student.’
- ‘The training of students to increase staff numbers has a detrimental effect on the further training / development / CPD of our staff as there is not the capacity to do both’

In the feedback it was evident that succession planning was important, due to sonographers planning to retire. This was cited as *‘the main pressure and drives the need to train our own’*. Two respondents made comments relating to issues with training and student competence. One department manager has changed the way they recruit students, to reduce attrition rates and ensure the trainee selection includes written skills, assessment of basic scanning in addition to an interview. Another respondent stated that *‘trainees are not all passing which has implications for the following year. A very difficult situation to solve quickly!!!’*

Other responses emphasised the shortages within radiology, leading to doubling the *‘number of SpR1 training to address the shortfall in Radiologists’*, which impacted on the training of sonographers. One respondent suggested that they could not take *‘additional US student without a dedicated training room and training staff’*. The use of teaching lists was noted to have an impact on capacity to meet the increasing demands of the clinical workload and one respondent quoted *‘Lack of training room and staff to support trainee sonographers’*. Another respondent referred to the registration with the Health and Care Professions Council (HCPC), stating that *‘Direct entry students are not recognised by HCPC.’*

Issues	Number of respondents
Challenges managing training and clinical workload	6
Sonographer retirement	4
Competing demands for training e.g. radiology trainees, point of care training, midwives	3
No capacity / limited capacity	3
Lack of funding for training / financial constraints	3
Mentor availability / lack senior staff to train students / staff shortages	3
Increased workload	2
Fully staffed/ no vacancies	2
Not all trainees passing the course	2
Long periods of not taking students, making it difficult now	2
Training sonographers who then move elsewhere	1
Direct entry students are not recognised by HCPC	1
Detrimental effect on further training for staff	1

Figure 2: Factors which were highlighted as issues within the free text comments (n=16)

Innovations to increase clinical capacity:

A number of different methods were identified, by respondents, to increase capacity or improve the clinical educational experience (Figure 3).

Methods	Number of respondents
Extended working days	12
Weekend training lists	11
Dedicated training lists with extended time	7
Rolling / on-going training programme for sonographers / train in-house radiographers	5
Two students working with one sonographer	3
Ultrasound training academy (for sonographers)	2
Simulator	2
Training return to work sonographers	2
Staggering training start dates / stagger modules	2
Scan in other departments e.g. FMU, fetal echo, EGU	2
Use of peripheral sites	2
Funding for training posts	2
Self-funding students	2
Focussed courses	2
Scanning lists at the university	1
Swap students with other centres	1
Training lead co-ordinator for all ultrasound trainees	1
Business case for a new machine to extend appointment times without impacting on activity	1
Support internationally trained non-reporting sonographers to become reporting sonographers	1
Targeted training to meet service needs	1
Training posts offered to external staff and other HCPs	1
Training as part of the direct entry undergraduate course	1
Clinical Specialist Sonographers – expert opinion and additional trainee support	1

Figure 3: Ways in which clinical departments have increased clinical capacity (n=21)

Key:

EGU = emergency gynaecology unit

Fetal echo = fetal echocardiography

FMU = fetal medicine unit

Free text comments included:

- 'We believe all students should get the best possible training which requires training lists with longer scan times. This has an impact on capacity.'
- 'Teaching lists incorporate film viewing and viva type discussions'
- 'Focussed training post enabled [sic] to employ specifically for target areas. Short term training has led to long term gains... Post holders continuing with studying'

One department takes self-funding students, who they employ upon completion of the PgC and then support through to the PgD.

A respondent suggested that they would support '*regional training hubs*' or sharing training with other Trusts, with different sites focussing on specific areas of practice or expertise. This would benefit students as they would '*train where the expertise is.*'

Discussion:

Clinical staff raised a number of issues impacting on their ability to teach more sonographers, these included already being at capacity, competing demands, insufficient staff or experienced mentors and funding. These findings were similar to those from the CfWI survey in 2017(2) and other recent publications(20–23). A small number of departments had capacity for sonographer placements, amounting to 45 additional places. One recommendation would be to explore this additional capacity for direct entry ultrasound programmes, where the education provider places students in a clinical department, working in partnership to provide ultrasound education. Reasons were not always given for the underutilisation of the places, but lack of funding or lack of posts for the trainee at the end of the course were given by some respondents. There were 11 (16%) departments not training any sonography students, which is lower than the figure from the CfWI report in 2017(2), when 25% of departments had no plans to have a trainee sonographer.

A number of local initiatives have been deployed or suggested to increase sonographer clinical teaching capacity, some of which are easily implemented such as extended working days, utilising the pilot/co-pilot model of two students to one sonographer(24). The development of simulation centres and/or regional clinical education centres have been supported by one-off funding in some cases, for the refurbishment of existing departments and equipment(25). Other regions have funded peripatetic educators to support trainees within a geographical area(26). These staff work across a large area, providing hands-on scanning sessions with learners, offering consistency of education and also reducing the demands on the permanent staff within the clinical departments(27). Both the academy and peripatetic educator options relied upon funding from Health Education England, either at a national or local level. The need for sustainable on-going funding models for experienced staff or replacement equipment was highlighted in discussions with clinical staff.

Simulation was discussed by some respondents as a way to assist with ultrasound education and is already being used in ultrasound education(28–30), this is likely to continue to develop in the future. Simulation can provide a more consistent educational experience for learners(31) and similar discussions are happening amongst other professional groups(23). Whilst there are many benefits and limitations of simulation, further developments in technology, are likely in the near future which could benefit ultrasound clinical education(31).

There are limitations with the survey, in that it can only capture information from departments that completed the questionnaire, non-respondents may have different staffing issues or challenges. Survey responses did not enable further evaluation of issues or innovations, although a number of follow-up phone calls and emails did allow for more detailed exploration in some cases. There are inherent difficulties in predicting staffing needs in five years' time, however the information is still useful to gauge current opinions of projected shortfalls and challenges in relation to increasing the numbers of sonographers that need to be trained to meet service demands. The large number of incomplete surveys is likely to be due to the use of social media for dissemination, it is suspected that people looked at the survey, but did not go beyond the first page declarations, as they were not in the target audience.

Conclusion:

The survey suggests that there is a shortage of sonographers, as evidenced in other studies, and that departments anticipate this to increase in the next five years if the service demand continues. There are a few places underutilised at present for clinical education, which could potentially be exploited to increase capacity for sonographer clinical education, particularly for direct entry sonography education. There is still a growing need for more sonographers to enter the workforce to meet service requirements.

A number of challenges have been highlighted throughout the report. The most common issues are lack of funding, capacity within the system to support a high quality student learning experience, shortages of experienced staff to mentor and teach students and the ongoing challenges of balancing teaching with managing clinical workloads.

Innovations and suggestions to expand clinical ultrasound capacity include using two students to one experienced sonographer, extending the working day / week, providing dedicated training lists to speed up the skills development, utilising academy style centres or peripatetic educators and/or the use of simulation.

A further e-mail survey of ultrasound educators was also carried out to explore the challenges from their perspective, although this is outside the scope of the current article. Together with the results from this survey, findings will be used to help guide discussions with Health Education England, to review options for increasing ultrasound clinical teaching capacity.

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