Potential Ways to Increase Sonographer Training Capacity: case studies

ISBN: 978-1-911738-17-6
May 2025 | First Edition

SoR THE SOCIETY OF RADIOGRAPHERS

NHS England

207 Providence Square
Mill Street, London
SE1 2EW, UK

020 7740 7200
info@sor.org

www.sor.org

This work was commissioned and funded by NHS England. This project is part of a commissioned programme of work led by the Society of Radiographers.

Disclaimer

SoR and CoR are separate companies (CoR is also a registered charity) but work together as the Society and College of Radiographers ("SoR" and the "CoR") and as part of their roles prepare and publish guidance.

All guidance published by the SoR and/or the CoR is for the purpose of assisting members, professionals, patients and the general public and sets out what the SoR and the CoR consider to be recommended practice. While the intention of the guidance published is to set out best practice and to influence practices across the sector, any local procedures implemented by local NHS trusts, health boards, independent providers (or other employing authorities) will always take precedence. The SoR and the CoR have no role in enforcing the application of any guidance.

The rights and benefits of members of the SoR are set out in the SoR Handbook.

Contents

1. Introduction

In response to changes within sonographic education and to workforce shortages, the Sonographer Training Group (STG) worked together, as part of a wider project by the previous Health Education England's Integrated Imaging Workforce Group, to consider ways to increase ultrasound clinical training capacity and provide suggestions for local and regional development of ultrasound clinical education to meet the increasing demands.[1]

There are several barriers to the provision of sonographer clinical training at scale using the existing methods of one-to-one teaching in the clinical workplace. These include staff time and capacity as the waiting list continues to grow, reduced capacity if extended training lists are provided, and additional stress for both learner and supervisor balancing patient care, learning and teaching.[2] It is clear that overcoming these barriers can help to provide a more supportive and effective clinical learning environment in which learners can develop skills and confidence, thus increasing workforce numbers, reducing attrition and providing safe patient care.[2]

This document aims to provide case studies and suggestions, based on personal communication and/or published evidence, for increasing clinical capacity for sonographer education. It also aims to highlight a range of possible benefits, limitations and solutions for the various models discussed (section 14). The case studies could be used by academic staff, clinical leads, practice educators and funders to explore options that might be of value in their own region or institution. These can then be worked up to develop business cases to apply for funding or in advance of funding opportunities becoming available.

***Note:**

Where comments are made relating to Agenda for Change (AfC) pay grades in case studies, these relate to individual trusts or health boards and are not necessarily the views of the SoR. Individual employers should review AfC policies and Annex 21 before making local decisions. The CoR Education and Career Framework can be used as a guide to levels of practice.

The following case studies highlight some of the methods being implemented across the UK and elsewhere to increase sonographer clinical training capacity.

2. NHS trust and higher education institution (HEI) partnership

A number of initiatives have been introduced to assist with the clinical education of sonographers. These include seven-day working, extended appointment times for teaching sessions, making use of community sites, having two learners with one supervisor within the NHS trust and utilising the university as a centre for GP patient scanning lists.

Challenges include matching up a training session to mentor availability.

2.1 Case study: Overcoming some of the challenges

After completion of summative assessments, learners are encouraged to 'buddy up' with sonographers and undertake weekend lists. This allows them to gain more experience before completing their preceptorship period and being allocated their own lists.

Community lists allow for 30-minute appointments, instead of the usual 20 minutes, for general medical and gynaecology cases. Where possible, learners are paired up to enable them to learn from one another and have a community scanning list once a week, at least in their first year. They can ask questions of each other, which they may be more reluctant to ask their mentor, "who is often held in very high regard". The pairing can help in cases where one is struggling initially.

Once the learners become more capable, the appointment times are reduced to 20 minutes "so that the student is scanning a similar list to that of a qualified sonographer by the end of their training".

Community lists are usually between 9 a.m. and 5 p.m. during the working week. Evening lists for learners are facilitated until 8 p.m. when needed. Sometimes the evening lists have worked well for mature learners with family commitments. Specific lists have also been arranged for evenings, for example when more gynaecology ultrasound experience is required.

Some members of staff have expressed an interest in mentoring. The team try to match a learner to a specific mentor, depending on their learning needs at the time and the module they are studying. Using this method provides highly motivated mentors. Staff are generally happy to have learners working with them at weekends, particularly when learners are close to the end of their training and are nearing or have completed their final summative clinical assessments.

2.2 Case study: HEI satellite unit

The university has set up a satellite ultrasound unit,[3] taking patients from the NHS trust, but also

scanning simulated cases using 'experts by experience' (patients who volunteer to be scanned in an educational setting). Obstetric patients are also used as volunteers, following risk assessment, completion of the routine screening scans and working to strict safety guidelines. There is also access to the simulators in the adjacent room.

Investing in the Health and Social Care Network (HSCN) and Picture Archiving and Communication Systems (PACS) has enabled ultrasound lists to be offered at the university as an additional community-based service. Working in partnership with the trust and clinical colleagues, dedicated training lists are available and patients could be offered a campus-based appointment at the time of booking. This collaborative approach has been key to overcoming some of the considerable challenges in establishing an NHS service in a university setting, for example the fact that "the process around establishing the required IT infrastructure was complex and at times immensely frustrating".

The facility could also be used to work with trainees who need additional support. The long-term aim is to expand these sessions to include a broad range of examinations, particularly in applications where training capacity is limited in clinical settings.

The advantages of having the lists running in the university include the reduced pressure on learners, no interruptions or extra patients added to the list, and longer examination times. The sessions are staffed by NHS trust and university staff, with learners working in pairs on the dedicated training lists. Feedback from learners and mentors has been very positive. This is also an ideal setting for learners transitioning towards autonomous practice at the end of their period of training.

The university staff believe that there is a need to move as much early skills development as possible out of the clinical department for all ultrasound learners. They are also developing relationships with private, voluntary and independent healthcare providers, to expand clinical capacity. One key challenge with this method is funding.

3. Case study: NHS trust – 'pilot and co-pilot' model

Supporting learners on both traditional and direct entry programmes, one trust runs placement sessions using peer-to-peer lists, with two learners. One will scan and the other will guide the person performing the scan or assist with equipment manipulation. This method ensures that both have an active role in the examination, rather than sitting watching. The supervising sonographer is available if needed during the examination.[4]

This method has also been used successfully in educational centre settings, when scanning members of staff or volunteer patients or when using the simulator. By working together with peers, learners can develop their communication and clinical reasoning skills, in addition to building on their teaching skills by learning to explain clearly to other learners.[4]

4. Case study: NHS trust – various initiatives

One trust has a range of initiatives to increase sonographer capacity.

This includes dedicated teaching lists with two learners to one sonographer. The lists have 30-minute appointments (1 hour for 20-week screening scans) and as the learners' experience progresses, they will work together with the sonographer doing another list in the adjacent room. The sonographer can then review the images and report with the learners, and scan anything that needs further input from them.

The teaching lists incorporate film viewing and viva-type discussions. The lists can be at any time during the departmental extended opening hours or at the weekend.

Focused education has been used to meet local service needs, e.g. focused training to postgraduate (Pg) certificate obstetric ultrasound or in musculoskeletal (MSK) ultrasound, with completion within twelve months including steroid injection techniques. Staff are then employed as sonographers on a specific AfC band while they continue their education to Pg diploma level, after which they are moved to the next AfC banding [*see note]. Further skills will be included within the roles over time, including work-based learning modules to undertake additional clinical areas and techniques such as hystero-salpingo contrast sonography.

5. Case study: NHS trust – career progression workforce planning

A large teaching hospital that had challenges recruiting to band 7 sonographer positions (because local trusts were offering band 8a posts for similar roles) has developed a long-term strategy to improve recruitment, retention and service delivery. The structure of the department was reorganised to develop band 8a managerial posts for each site, but also to encourage sonographers working at band 7 to submit proposals for ways to develop their skills and enhance the service. These were assessed to ensure that they would meet band 8a criteria. Training was then offered, and staff supported to develop skills in specific areas of practice, to meet service needs. On completion of the initial one-year training, after developing further skills, an interview and presentation allowed staff to showcase the developments and to progress to band 8a clinical specialist sonographer. The specialist sonographers provide expert opinion, offer trainee support and develop the service in their particular area of specialism, for example musculoskeletal, obstetrics and gynaecology, vascular, or head and neck ultrasound. The roles comprise a 50:50 management and clinical split and the staff are highly skilled and respected within their field. Ongoing training opportunities are provided, and staff are encouraged to attend ultrasound conferences and disseminate their work.

Additionally, a training lead role for the trust was developed. This was a cross-site full-time appointment. As the role has developed and the number of specialist registrars (SpRs) in training increased, the role evolved to be predominantly working with the SpRs, with a small amount of time with the sonography trainees. Sonography learners work with a range of staff and have a named mentor/supervisor, but also benefit from working with the clinical specialist sonographers in their area of practice, attending local discrepancy meetings, teaching presentations and ‘drop-in’ sessions with the training lead.

Trainee sonographers start in a band 5 AfC role until completion of the Pg certificate, when they progress to band 6. Upon completion of the Pg diploma they undertake a period of preceptorship,

during which time they are given half lists, to enable them to consolidate experience and develop confidence. Once they feel they have achieved a level of competence to be working at full capacity, they are moved to band 7 [*see note]. Weekend and evening training lists are used, when required, to increase clinical training capacity.

The vascular ultrasound clinical specialist sonographer started to train band 3 staff, who will progress to band 4 on completion of their training for aortic aneurysm screening. The vision is to recruit high-quality members of the team, who might elect to progress onto the sonography apprenticeship pathway in the future.

Challenges

The increase in SpRs in training has also had an impact on capacity within the department, as training lists initially take longer than a routine scanning list.

As this is a large teaching hospital, the training lead spends the majority of time with the SpRs, limiting the time available for sonography learners.

Some sonography learners have moved to other NHS trusts before completing their preceptorship period, based on salary differences at other trusts (band 8a or recruitment and/or retention premium were being offered to newly qualified sonographers).

Proposals

It is proposed that a business case will be submitted to purchase an additional ultrasound machine, which would enable longer appointments for obstetric scans without impacting clinical activity levels further.

6. Imaging academies

A variety of different models have been used by imaging academies in England and Scotland to provide support for sonographer education (Table 1). Models include the following:

- A “spoke to an HEI hub” provides support for the HEI using its “well-equipped” skills lab and facilities.
- The academy uses lists from an NHS trust, in addition to the academy facilities, to provide a range of ultrasound placement options. Clinical departments being “under pressure” can reduce the capacity to offer this resource for ultrasound experience. Using patients at the academy who have had a previous scan and subsequently volunteer to attend the academy for another scan has “worked well”.

- The use of ultrasound simulation has "proven to be an extremely useful training tool, [and] all modules on this are incorporated into our trainees' ultrasound teaching".
- One suggestion was for the academy to loan a machine to the local trust for teaching purposes and employ a 'retire and return' sonographer to supervise the training lists.
- The SHIFT programme has been used to provide high-intensity focused training for radiologists, which could be utilised to support initial sonographer training.[5] This comprises two weeks of accelerated ultrasound simulation training before trainees go into clinical placement. Results to date have shown that the registrars are more confident in manipulating equipment settings and basic scanning skills.
- NHS Scotland Academy's National Ultrasound Training Programme (NUTP) has evolved from collaboration with the government, education providers and the national waiting times hospital (Golden Jubilee National Hospital). The programme provides each trainee sonographer with five dedicated week-long blocks spread over the academic year. All examinations are completed on training lists of 30 minutes with one-to-one instruction. NUTP works directly with access at government level to identify patients waiting the longest for scans across Scotland. Lists are individually tailored to the needs of the learner, e.g. gynaecology, or head and neck. NUTP also trains radiology, obstetric and gynaecology, and sexual and reproductive health medics. This bespoke, multidisciplinary approach has been hugely successful. The programme also offers masterclasses in key areas designed to upskill qualified sonographers. While trainees undoubtedly require experience in scanning acute patients, a blended approach provides a relaxed learning environment, results in accelerated learning, alleviates the training burden on acute sites and has made a significant impact on national waiting times (almost 10,000 patients were scanned in the first 20 months).

Region	Method of teaching clinical skills	Ultrasound learners
East of England	• Real patients in dedicated training room in trust with practice educator • Simulation • Peer-to-peer scanning • Theoretical teaching	• Sonographer trainees • Radiology trainees • Surgical trainees • Obs and gynae trainees • Urology trainees • Paediatric trainees/consultants • Respiratory medicine trainees • Sexual and reproductive health teams • Undergraduate radiographers • CPD for sonographers • Therapeutic radiographers

Region	Method of teaching clinical skills	Ultrasound learners
South East	• Real patients • Simulation (practical and reporting cases) • Peer-to-peer scanning	• Sonographer trainees • Sonographer upskilling radiology trainees [ST1–5]
South West	• Real patients • Simulation	• Sonographer trainees • Radiology • Apprentice radiographers • Undergraduate radiographers Plans include multi-professional training, such as: • Point-of-care ultrasound (POCUS) • Ultrasound guided intravenous cannulation • Support for internationally trained sonographers • Echocardiography
North West	• Real patients • Simulation • Volunteer patients and peer-to-peer scanning • Live demonstrations on large teaching screen • Theoretical teaching • Online use of instructional videos • Collaboration with established clinics within the university – sports rehabilitation • Workshops with workbooks to demonstrate the science and application to practice	• Sonographer trainees • Sonographer upskilling • Radiology • Sexual and reproductive health teams • Undergraduate radiographers • Therapeutic radiographers • Overseas POCUS project • Emergency medicine doctors • Internal medicine doctors • Family physicians
North East and Yorkshire		
Newcastle	• Real patients with peer support • Simulation	• Radiology
Leeds	• Real patients with peer support • Simulation (practical and reporting cases)	• Radiology • Occasional sessions run in collaboration with the university for trainee sonographers and medical students

Region	Method of teaching clinical skills	Ultrasound learners
London		
South West	• Real patients • Simulation	• Sonographer trainees • Radiology
North West	• Real patients with peer support • Simulation • Workshops to support theory to practice	• Sonographer trainees • Radiology • Obstetrics and gynaecology • Sexual and reproductive health medics • Physiotherapists
North East	• Real patients • Simulation • Volunteer patients and peer-to-peer scanning • Theoretical teaching	• Sonographer trainees • Sonographer upskilling • Radiology • Obstetrics and gynaecology • Sexual and reproductive health teams • Junior doctors
North Central	• Real patients • Volunteer patients • Simulation	• Sonographer trainees • Radiology
Midlands		
East Midlands	• Real patients • Simulation • Peer-to-peer scanning • Theoretical teaching	• Sonographer trainees • Radiology
West Midlands	• Real patients • Simulation • Volunteer patients and peer-to-peer scanning • Theoretical teaching • SHIFT (Sonography High Intensity Focused Training) programme	• Sonographer trainees • Sonographer upskilling • Radiology • Acute medicine / emergency medicine
Scotland	• Real patients	• Sonographer trainees • Radiology • Obstetrics and gynaecology • Sexual and reproductive health medics
Wales	• Unknown	• Radiology

Table 1: Imaging academies – current understanding (note: this is subject to change)

7. Case study: Regional ultrasound simulation centre and paramedic suite

A regional ultrasound simulation centre has a wide range of facilities for the education of sonographers, radiologists, acute medicine physicians, and obstetricians and gynaecologists, along with resources to teach interventional procedures. Facilities include simulators, phantoms, real machines and a Scotia Medical Observation and Training System (SMOTS) camera.

The SMOTS camera is used for demonstrations, live streaming of cases anywhere in the world, assessments and e-learning. For example, the camera has been used to record a 15-minute YouTube video demonstrating how to perform an abdominal scan.

Challenges

Some issues include the reality of the simulation. It was suggested that as soon as learners have been scanning real patients on actual ultrasound machines, the simulator is of less value. Some of the assessments on the current simulator are too difficult for learners (and qualified members of staff) to complete, because of the parameters set for passing.

Simulation and the regional centre need "a lot of manpower". Even with the simulator, learners need support from an experienced practitioner. Learners need the skills from the simulator up front. Thus, time is needed to ensure that all learners can access the facilities before starting to scan, so that no one is disadvantaged. Staffing the centre requires enough people and money.

8. Case study: Ultrasound academy

The London North West University Healthcare Trust launched an Ultrasound Training Academy in 2017 with funding support from Health Education England (HEE).[6]

The academy has been flourishing and now has:

- three dedicated scanning rooms
- Scantrainer simulator
- Bodyworks Eve trainer[7]

Along with Lead Tutor Haroon Qarib, from September 2024 there will be 4 practice educators (3.6 WTE) to support training for radiographers, sonographers, midwives and physiotherapists from the North West London area. Training is provided for a full range of clinical skills, including obstetrics,

gynaecology, general abdomen, small parts, groins, musculoskeletal, neck, lumps and bumps scanning.

The training lists provide learners with protected time to learn. In year 1, learners begin with full training lists and tutorials on the simulator. Gynaecology and abdominal cases are given a 30-minute appointment slot, compared with the recommended 20 minutes. The NHS Fetal Anomaly Screening Programme 20-week screening scans are booked for 45 minutes, compared with the recommended 30 minutes. As the learner becomes more confident, the appointment times are reduced. This change is on an individual basis, allowing support for learners to progress at their own pace. Learners are provided with two days per week in the academy, and they also spend additional time in the main department so that "they don't get lulled into a false sense of security". Patients are randomly assigned to the academy.

Learning needs are identified at the beginning of each session; this is communicated to the supervising sonographer and is linked to the curriculum for the HEI. Sonographers had found it difficult teaching learners within the normal clinical lists, but now state that they are enjoying teaching.

In the 2023/2024 academic year, nine learners were supported through Pg certificate or diploma courses, and in 2024/2025, this will expand to ten learners. Training is also provided for radiology registrars, ST1 and ST2.

Learner feedback

"There was time to discuss images after sessions and reflect on my learning requirements. There was not the pressure of running behind with lists as there were dedicated training lists, so I had more scanning time."

On the day when the learners were working on the service lists (normal scanning lists in the main department), they found that they got very little hands-on scanning experience, because sonographers were understandably worried about "running behind with their lists". One learner said "I found this quite a stressful learning environment… it was very rushed". They did, however, "appreciate the demands on the service, but [this was] not a good learning environment to learn the skill of ultrasound". Ultrasound is such an operator-dependent modality, and one learner commented on having seen "many good radiographers leave… due to the pressure of learning ultrasound" on normal lists.

The academy provided "a good learning environment as you had time to enhance your skills on the simulator". It was "a well-paced learning environment, considering how intense it can be learning how to scan".

Initially some sonographers were not fully sure of their role within the academy setting, but this was overcome by regular briefings and updates.

In summary, one learner said: “I think the academy is a very positive training tool for sonographers.”

The academy also ran a number of study days in 2023, which covered topics such as an introduction to 3D gynaecology scanning, ultrasound assessment of the groin and abdominal wall, and lumps and bumps. The courses were well received due to the multi-professional teaching faculty and inclusion of practical components into the day. Further courses will be running on an ongoing basis, following the positive feedback.

The academy has also participated in trust work experience for local schools. The students gain an insight into work undertaken by the imaging department.

9. Case study: Peripatetic educators

Three sonographers were seconded to work for Health Education Wessex, to increase the number of sonographers qualified in obstetrics and gynaecology in the region, share good practice and standardise ultrasound clinical education.[8,9] The sonographers travelled to hospital sites and supported local sonographers with the clinical education of sonographers, midwives and medics. This was particularly helpful for busy NHS trusts that have limited capacity to teach ultrasound and meet the service provision demands. As part of the role, the team of sonographers met with local hospital staff,

determined the local needs and available facilities, such as ultrasound rooms and equipment, and set ground rules.

The team developed a regional competence framework, based on the clinical competencies used at City, University of London,[10] to help standardise the monitoring of clinical progress and ensure consistency. This then led to the development of shared protocols throughout the region, which was helpful for the learners, but also increased standards and consistency across the region.

The implementation of individualised growth charts has significantly increased the number of third-trimester growth scans within the region.[9] To meet the demand, funding was obtained for an additional ultrasound room and machine to support four midwifes to undertake the training to perform third-trimester scans. This enabled learners to be taught without affecting current capacity during the learning period. One of the peripatetic trainers was involved in the selection process and reviewed hand-eye coordination as part of the process. Learners started with a limited numbers of patients and increased their caseload as their confidence grew. The midwives were able to complete the course and achieve competence within five to six months. Once qualified in the focused area of practice, local schemes of work were required to ensure that the midwives work within their scope of practice, for example no multiple pregnancies, no placental localisation scans, and no cases of less than 26 weeks' gestation. A preceptorship period and regular audit by the lead sonographer after qualification was an important part of the process.

By using this model, the team have been able to reduce the pressure on departments, taking patients from the regular lists while also providing time-consuming support for ultrasound learners. They also have an ultrasound simulator at one site that is shared with other learners and staff. The simulator is beneficial for developing transducer movements and learning some of the physics.

Challenges

The challenges include funding:

- The project was initially funded until March 2019. However, further financial support was required to continue beyond that date and also to extend the service to other areas of ultrasound practice.
- Funding for course fees became more difficult to access.
- Other departments have no backfill funding, so are unable to provide support for staff to gain the academic and/or clinical skills.

Other challenges include:

- Expectations. Some centres wanted the learners and the trainer to cover sickness or extra patients in the list. The peripatetic trainers had to set clear guidelines that they were not there to be a member of the departmental workforce.

The facilities were further developed into a regional ultrasound training academy that was accessed by multi-professional teams including doctors, sonographers and midwives learning ultrasound.[11] Funding enabled the team to expand from obstetrics and gynaecology to abdominal ultrasound and other areas of practice. The trainers reviewed the specific needs in each department to provide the most appropriate support for local and learner needs. It was evident that this is a long-term rather than a quick-fix solution.

10. Case study: University of Auckland – intensive training model

New Zealand model for an optional intensive twelve-week clinical ultrasound course[12]

The twelve-week intensive course is available to teach the basic skills for abdominal, renal, female pelvis and DVT scanning. It provides one-to-one tuition and peer interaction, having a "maximum of six students with a staff-student ratio of 1:3".[12] Using the intensive course prior to clinical placement allows learners to be six to nine months ahead of those using traditional learning methods, in addition to reducing the burden of clinical supervision in the early stages of training. The pilot study had 15 participants, state-of-the-art ultrasound machines within an ultrasound department, and volunteer patients.

The format has now been amended following feedback, and now runs as follows.

Weeks 1–6	2-week break	Weeks 7–12
Weeks 1–4: Task focused Volunteers and high-fidelity simulation to develop hand-eye coordination, and learn anatomy and ultrasound appearances Week 5–6: Scan volunteers If slower to develop clinical skills, a mix of simulation and volunteers is used 3:1 ratio of students to staff Tutorials – communication, professionalism, introduce clinical decision making	Mid-semester break Learners attend clinical department for two weeks to apply knowledge	Intensive block Two facilitators, learners rotate 4:1 ratio of students to facilitator in HEI 2:1 in clinical department Final week – mock exams at HEI Tutorials – clinical decision making, delivering difficult news, pathology Use critical conversational framework to discuss findings

The aim is that at the end of the 12-week intensive block, a learner can complete a non-complex abdominal scan in 45 minutes, identifying normal variants and pathology, while recognising when to seek help or a second opinion. Peer learning is encouraged during the short course and there is a maximum of six learners in a cohort per semester. The intensive course runs twice per year, allowing twelve learners to gain the benefits of this approach.

Challenges

Staff and volunteers:

- The course is staff-intensive, as there is one academic member of staff and one seconded clinical sonographer from hospitals.
- Hospitals find it difficult to release staff to undertake the secondment. Good relationships have been fostered with clinical departments, although the workload can impact on availability.
- Consistency of teaching has varied, due to volunteer staffing, leading to confusion for some of the learners.
- A large number of volunteer patients is required. Approximately 380 to 420 volunteers are needed per semester. To encourage volunteers, a $20 voucher is provided.

Funding:

- The initial pilot project was funded. However, this funding is no longer available.
- Clinical departments were able to opt in to the intensive three-month programme, before the learner starts in the hospital.
- Hospitals and private clinics have to pay for their student to undertake the intensive clinical course, in addition to the course fees.
- It is not profit-making, and possibly even runs at a loss, because of overheads and associated costs such as consumables and equipment.

An important aspect is that students have to be enrolled on the full programme, so the intensive course cannot be used as a short cut to educating sonographers.

11. Case study: Australian model: Four-year combined BSc and Graduate Diploma of Medical Sonography, CQUniversity Australia

Simulation is used prior to learners going out into clinical practice placements on this four-year BSc and graduate diploma programme. During the programme there are three simulation units to "train students in thyroid, whole abdomen, TA pelvis, DVT, carotid and TV pelvis studies to 'advanced beginner' level competency". Other units have some scanning experiences and assessments in different areas of practice. "In total each student experiences 209 hours of scanning simulation that includes small group tuition, deliberate practice and independent practice across three terms" in years 2 and 3. Learners also scan volunteers for some examinations and phantoms for intimate examinations: "TV, scrotal, breast, obstetrics". Student volunteers and peer observers provide feedback to the scanning student. "There is a solid body of evidence for timely tutor and peer feedback and the value of the 'patient' experience. The aim in the simulation sessions is to enable students to achieve a certain competency level in normal volunteers in a set timeframe. We have a day of clinical preparation before placement when students scan 'volunteer patients' from the campus staff with more challenging body habitus."

There are a number of dedicated clinical academics/sonographers who coordinate clinical units. Staff to student ratios are 1:4 in the simulation skills units, where learners reach 'advanced beginner' level competence. In follow-up practice sessions the ratio is 1:8. A "significant" amount of peer feedback is used in simulation training, for example peer-to-peer teaching.

Evaluation of this method has been published, with recommendations for the integration of "preclinical simulation into the core curriculum" to improve outcomes and reduce pressure on clinical departments.[13]

12. Models for radiography reporting

Models for radiographer reporting have been included to provide background information which may be helpful for exploring innovations in ultrasound clinical education.

12.1 Hub and spoke model for radiographer reporting

A hub and spoke model for supporting reporting radiographers was evaluated in a paper by Woznitza et al.[14] They reported utilising an HEI to provide the academic education for report writing and an academy setting for report writing practice. The academy provided support for radiographers by holding fortnightly tutorials, each lasting two hours, which are "aligned with the curriculum". The sessions were run predominantly by reporting radiographers from established centres, with input from expert radiologists and clinicians who provided support for image viewing, case discussion and

exam practice.

Findings from the evaluation suggested that the model of education was "more efficient" than other previous models. This format also enabled learners from departments with no existing reporting radiography practice to develop skills and competence. Suggestions for improvements included the use of "virtual tutorials", to save on travel time and resources to fund the reporting radiographers who manage and teach on the programme.

12.2 Clinical Academy for Radiographers Reporting (CARR)

A high level of mentorship is needed to support reporting radiographers to develop their skills. However, this is impeded by the shortage of radiologists to assist radiographers to develop their reporting practice.[15] The CARR used a pooled approach to provide clinical mentorship and support for radiography reporting, in addition to the academic programme. This enabled an intensive, accelerated approach to learning, reducing the time to achieve competence from approximately twelve months to nine months.

The programme was initially two days per week of intensive support in the academy, reducing to one day per week, and then eventually none in the academy but two in the learner's own department. Once back in their own department, pastoral visits from the academy team helped to support learners in their ongoing skills development.

The academy linked to a host trust PACS system, after ensuring appropriate governance arrangements were in place, e.g. the process for if a discrepancy was found and honorary contracts for all learners. A clinical coordinator worked with the clinical lead for radiography and radiology. There was an initial cohort of eight learners.

Image interpretation focused on different body parts and different pathologies. In addition to report writing, the academy incorporated other pillars of advanced clinical practice (ACP) leadership, education and research.[16] Various clinicians were invited to share expert knowledge and deliver sessions at the academy.

The aim of the academy was to develop ACPs, educated to Master's level. Learners found that peer support was one of the biggest benefits, in addition to learning in a safe environment, without interruptions. Dedicated and facilitated time allowed them to progress quickly and this was helped by having a clinical mentor and by the provision of pastoral support. In effect, the academy was providing a clinical placement and mentorship to the learners. It did not replace, but rather supported clinical departments and local mentors.

The pilot project had funding, so additional funding bids were needed to continue this work. The development of the project linked to the regional imaging academy could open up the resources to other healthcare professionals, such as nurses and physician associates.

The academy model is quite an expensive way to educate reporting radiographers. Commissioning groups will need to budget for this, if they want to utilise this model.

13. Additional suggestions for improving placement capacity for ultrasound

Feedback from the online survey and from talking with colleagues in the NHS, independent providers, education centres and HEE (now NHS England) included the following:

- There is a need for more 'buy in' for courses such as the direct entry route.
- The independent sector should contribute to clinical education.
- Regions (now integrated care boards (ICBs)) should be working together and developing working hubs:
  - These could be similar to the NHS Breast Screening Programme, where there are five 'training centres' across the country, with educational leads to provide week-long clinical placements and to support learners from other units, in addition to working in their own clinical units. Summative assessments are also undertaken in the training centre.
  - A model similar to the Breast Screening Programme model could be replicated across each ICB via a hub and spoke arrangement.
  - "The use of regional training hubs or shared training with other trusts in ICB. Potentially one site could concentrate on one area of core skills such as obstetrics with another trust/employer supporting training in gynaecology. This could help share clinical education across a region and benefit the learners who would have a more consistent education and work where the expertise is. This approach could also enable the delivery of masterclasses with regional expert sonographers or radiologists and enable shared learning with, for example, radiology or obstetrics."
  - "Perhaps regional hands-on type workshops could be delivered to demonstrate core skills. The learners then take these skills back to their placement site, with an option to have a follow-up review at another regional masterclass. Regional mentors/trainers could potentially deliver and facilitate these."

- There is a need to provide support and education for ACP roles and to develop a more standardised approach to report writing within regions. This would drive the service forward and improve consistency and evidence-based reporting, while developing skill sets.

- Educational support and development opportunities should be provided for BSc qualified sonographers to help them progress quickly in their role.

13.1 Lessons from other professions

Some universities have dedicated facilities, such as clinics to support the clinical education of Allied Health Professionals, where learners undertake examinations on real clients. Clinics include the following examples:

- **Podiatry:**

https://www.hud.ac.uk/about/community-impact/services/podiatry/the-podiatry-clinic/
https://www.northampton.ac.uk/about-us/services-and-facilities/podiatry-clinic/
https://www.salford.ac.uk/our-facilities/podiatry-clinic

- **Optometry:**

https://www.bradford.ac.uk/eye-clinic/
https://www.cardiff.ac.uk/optometry-vision-sciences/about-us/our-eye-clinic
https://www.city.ac.uk/about/facilities/specialist-facilities/city-sight

- **Speech and language therapy:**

https://www.reading.ac.uk/Psychology/Clinics/SpeechLanguageTherapy-Services.aspx
https://www.city.ac.uk/about/facilities/specialist-facilities/the-roberta-williams-speech-and-language-therapy-centre

14. Summary of pros and cons of some options

Members of the STG were asked to give their views on the range of possible options to increase capacity.

The following table summarises some of the pros and cons.

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Ultrasound simulation[17,18]	• Ultrasound simulation useful in the very early stages of training of radiology SpRs, but only to achieve basic skills; not as valuable after the first few months • Good for gaining initial skills and standardising learning • Ensures all users record the same pathology • Ultrasound simulation along with simulated volunteer patients can provide opportunities for developing professional skills such as communication, consent, ergonomics, and also enables immediate feedback and debriefing[3] • Useful tool for assessing learners across a wide range of pathology and differing levels of complexity, depending on the stage of learning	• Only one small aspect of ultrasound training and on its own will have a limited impact • No patient interaction (if using simulation equipment only) • Simulation is poor at mimicking patient type and the complexities introduced by scanning live patients • Some challenges with simulators, e.g. cases/assessment being too sensitive and possibly demotivating, although this continues to improve • Learners often prefer it in the early stages of their education, but less so as they develop clinical skills	• Implement as a part of other solutions (clinical centres, pre-course education) • Use as one of many tools • Use for audit purposes • Part of exam standardisation • Develop simulation scenarios and/or inter-professional cases, to encourage wider skills development and critical thinking

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Clinical centres, e.g. - imaging academy - ultrasound academy - spoke and hub	• Potential to provide intensive training and produce high-quality, competent sonographers within a reasonable timeframe if the training is carefully constructed and delivered by talented, committed and enthusiastic staff • Central base • Dedicated training list and protected scanning time • No capacity demands to meet • All resources centralised in one area • Could drive up standards in a region by having shared protocols, consistent teaching, monitoring and assessment • Clinical education aligned with academic components • Potential to reduce NHS waiting times, as patients will be taken from lists, so increasing clinical capacity • Can increase peer-to-peer learning (pilot/co-pilot model),[4] inter-professional education and peer mentoring • Potential to develop other roles such as research, education, leadership and management for advanced clinical practitioners • Can be utilised to assist with preceptorship	• Quality of the trainers will be critical for success and will need to attract the best people (clinically and educationally) • Number of suitable sites that currently exist where this could be implemented is limited • Could draw experienced clinical staff away from their current clinical roles with some loss of overall capacity and expertise • Probably expensive to implement • Funding is often annual • Central location – access for all learners? • Equipment – will it be fully utilised? • Ongoing cost • Staffing requirements • Patient access • Expensive, not representative of standard clinical practice	• Consider headhunting ultrasound experts who are nearing their retirement age who might find this an interesting challenge for their last few years of work • Directors and educators need good underpinning knowledge of educational processes and preceptorship; suggestion to include academic qualification and accreditation, e.g. Fellowship of the Higher Education Academy (FHEA) with AdvanceHE or CoR Practice Educator Accreditation Scheme • Good mentor and practice educator training and supervision • Partnership with ultrasound manufacturers • Possible training tariff, if applicable • Income from self-funding learners • Agreement/contract with the local hospital to scan routine patients • Use as one of many tools
Regional clinical education - sharing the learners across a region or ICB - each trust hospital concentrates on one clinical area - +/- deliver masterclasses	• Reduces the dependence on one particular trust/unit, particularly if suffering from a shortage of staff	• Difficult to see major benefits • All departments are slightly different; using different machines and protocols could be confusing for learners	• Delivery of masterclasses via videoconference might be a valuable contribution to other initiatives where there are individuals with particular expertise locally • Standardise machines and protocols across a region, ICB or country

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Peripatetic clinical educators	• Support not only the students but also substantive staff • More standardisation across a region • Drive up standards	• Likely to make a positive impact but will take people away from their clinical responsibilities, reducing current capacity; assuming they will need to travel from site to site, working/educational time will be lost in travelling from their base • Not always available when required • Limited resource	• Use as one of many tools
Blended approach with ultrasound clinical academy and peripatetic educators	• Might work well and avoids the need for frequent travel from site to site by peripatetic educators • Combine with ultrasound simulation set up in the academy • Central base for the trainers and trainees • Able to structure the list, offering a dedicated training list • Trainers to train at clinical sites – complex patients to train on • Trainers provide a link between clinical departments, the academy and education provider(s) • No capacity demands • Allows learners to experience the real clinical setting while having support	• Lack of academy space • Sourcing high-quality educators might further reduce current capacity • Funding • Central location • Equipment • Ongoing cost • Staff • Patients • Expensive to set up, educator not always available when required	• Partnership with ultrasound manufacturers • Possible training tariff • Income from self-funding students • Agreement/contract with the local hospital to scan routine cases • Use as one of many tools

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Ultrasound clinics in the HEI setting	• Attractive option as learners and ultrasound specialists are already together in the same place • Good for gaining initial skills • Potential to provide intensive training and produce high-quality, competent sonographers within a reasonable timeframe if the training is carefully constructed and delivered by talented, committed and enthusiastic staff • Dedicated training list and protected scanning time • No capacity demands to meet • Could drive up standards in a region by having shared protocols, consistent teaching and monitoring • Align clinical education with academic components • Potential to reduce NHS waiting times, as patients will be taken from lists, so increasing clinical capacity • Can increase peer-to-peer learning (pilot/co-pilot model),[4] inter-professional education and peer mentoring • Potential to develop other roles such as research, education, leadership and management for advanced clinical practitioners • Can be utilised to assist with preceptorship	• There will be many clinical governance issues to be addressed if NHS work is to be undertaken in HEI premises, not least indemnity, protocols, systems of work and audit • High-quality ultrasound platforms, suitable examination rooms, changing facilities, PACS connectivity and storage, and accessibility would all need to be arranged • Educational staff at HEI will all need to be currently practising NHS diagnostic ultrasound if supervising and training the learners on patients • Expensive • Not representative of standard clinical practice • Must meet Care Quality Commission and governance requirements	• Use as one of many tools

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Focused courses, educating people for specific focused areas of practice to meet local service needs	• Meets initial service needs	• There are very few areas of general ultrasound where focused ultrasound is in the patient's best interests or is safe practice • Does not address the bigger problem; staff can only undertake that scope of practice and will easily be out of scope, meaning repeat scans are required or multiple visits to undertake whole scan • Staff frustration • Lack of progression • Increased risk of work-related musculoskeletal injuries if focused scanning to one area only • Deskilling of other staff if one part of the workforce is completing the bulk of the 'focused' scans	• A quick fix, not a long-term solution
Link with imaging academies for clinical ultrasound education	• Great potential for interdisciplinary training and learning between trainee sonographers and radiologists who can benefit from each other's experiences and knowledge • Potential to train large groups together for theoretical knowledge • Good links already established with the local ultrasound departments and ultrasound trainers • All resources centralised in one area • High standard of clinical practice and good interaction between all levels of staff • Promotes increased awareness of roles and team working • Standardisation of practice • Potential to drive up standards	• Capacity at the academies for larger cohort inter-professional teaching may be a limiting factor • Expensive, not representative of standard clinical practice	• Use as one of many tools

Idea to increase capacity	Positives	Issues or concerns	Possible solutions
Intensive pre-course clinical education within an HEI, e.g. the twelve-week model piloted in New Zealand[19]	• Possible valuable addition to some of the other initiatives and would combine well with simulation training • Good to gain initial skills using a variety of tools and education, thus reducing the burden on overstretched departments • Speed up the development of hand-eye coordination • Standardisation of practice • Potential to drive up standards	• Staff to deliver the training without reducing capacity? • The education environment is quite different to the clinical setting	• Use as one of many tools • Need to try and standardise equipment and terminologies
Funding for placements in clinical departments	• Would be welcome • Income to the departments • Needs to include increase in space, equipment, substantive staff/locums	• Does not address the current capacity problems; clinical placements are time-intensive and reduce capacity • No dedicated lists • Service demands • Lack of staff or experienced mentors and practice educators • Expensive • Not all departments provide the high standard of training required	• Standard approach

15. References

1. Harrison G. Sonographer Workforce Developments. Synergy News 2018;April;12–13. Available: https://openaccess.city.ac.uk/id/eprint/20221/1/Sonographer%20career%20pathway%20update%20-%20SN%20Aug%202018.pdf

2. Khine R, Harrison G, Flinton D. What makes a good clinical practice experience in radiography and sonography? An exploration of qualified clinical staff and student perceptions. Radiography 2024;30(1);66–72. https://doi.org/10.1016/j.radi.2023.09.013

3. Venables H. Can we move practical ultrasound skills training out of the busy department and on to campus? Society of Radiographers 2018. Available: https://www.sor.org/news/advanced-practitioners/can-we-move-practical-ultrasound-skills-training-o

4. Harrison G. Case study 3.1: Pilot/co-pilot method of learning ultrasound clinical skills. In: Royal College of Physicians. Never too busy to learn: How the modern team can learn together in the busy workplace. 2018. Available: https://rcp.soutron.net/Portal/Default/en-GB/RecordView/Index/86629

5. NHS England. Midlands Imaging Training Academy (MITA) – A celebration of innovation: 29 November 2023. 2023. Available: https://www.hee.nhs.uk/sites/default/files/documents/20231129MITADigitalBrochure.pdf

6. LNW NHS Trust (London North West University Healthcare NHS Trust). Training Academy; 2017. Available: https://www.nwlondonicb.nhs.uk/professionals/referral-guidelines-and-clinical-documents/nw-london-imaging-network/Academy

7. SoR. Ultrasound academy installs “ultra-realistic” simulator. 2022. Available: https://www.sor.org/news/ultrasound/ultrasound-academy-installs-ultra-realistic-si-(1)

8. Sadak F. Transforming sonography training. TopTalk 2018;June;Issue 167 [Online]. Available: https://www.sor.org/news/ezine/transforming-sonography-training

9. Sadak F. Transforming Sonography training in Wessex. Synergy News 2018;April;13.

10. Harrison G, Harris A. Clinical Competencies. Ultrasound Clinical Handbook. City, University of London; 2017.

11. Sadak F. Our Journey from the Peripatetic Ultrasound Trainers to the Ultrasound Training Academy – HEE (South East). Cardiff: British Medical Ultrasound Society ASM; 2022. Available: https://www.bmus.org/bmus-publications-1/ultrapost/poster-presentation-2022/our-journey-from-the-peripatetic-ultrasound-trainers-to-the-ultrasound-training-academy-hee-south-east/

12. Sim J. Using Kirkpatrick Four Level Evaluation model to assess a 12-week accelerated ultrasound intensive course. Sonography 2017;4;110–19. https://doi.org/10.1002/sono.12116

13. Bowman A, Reid D, Bobby Harreveld R, Lawson C. Evaluation of students' clinical performance post-simulation training. Radiography 2021;27(2);404–13. https://doi.org/10.1016/j.radi.2020.10.002

14. Woznitza N, Steele R, Piper K, Burke S, Rowe S, Bhowmik A, et al. Increasing radiology capacity within the lung cancer pathway: centralised work-based support for trainee chest X-ray reporting radiographers. J Med Radiat Sci 2018;65;200–208. https://doi.org/10.1002/jmrs.285

15. Harcus J, Snaith B. The Clinical Academy for Radiographer Reporting (CARR): A New Model for Training Advanced Clinical Practitioners. J Med Imaging Radiat Sci 2018;49(3);S12. https://doi.org/10.1016/j.jmir.2018.06.040

16. Health Education England. Multi-professional Framework for Advanced Clinical Practice in England, 2017. Available: https://hee.nhs.uk/sites/default/files/documents/Multi-professional%20framework%20for%20advanced%20clinical%20practice%20in%20England.pdf

17. Dietrich C, Lucius C, Nielsen M, Burmester E, Westerway S, Chu C, et al. The ultrasound use of simulators, current view, and perspectives: Requirements and technical aspects (WFUMB state-of-the-art paper). Endoscopic Ultrasound 2023;12(1);38–49. https://doi.org/10.4103/EUS-D-22-00197

18. Lucius C, Nielsen M, Blaivas M, Burmester E, Westerway S, Chu C, et al. The use of simulation in medical ultrasound: Current perspectives on applications and practical implementation (WFUMB state-of-the-art paper). Endoscopic Ultrasound 2023;12(3);311–18. https://doi.org/10.1097/eus.0000000000000022

19. Sim J. Preparing work-ready sonography trainees: An accelerated model of ultrasound training by the University of Auckland. Sonography 2016;3;134–41. https://doi.org/10.1002/sono.12082

16. Appendix 1: Contributors and acknowledgements

16.1 Authors

The document was written by Gill Harrison (SoR) and Charlotte Beardmore (SoR).

16.2 Contributors

The STG is grateful to the following for contributing to the case studies:

- Anita Bowman. CQUniversity Australia
- Anne-Marie Scott. North West London Ultrasound Academy
- Anthea Ferguson and Penny Owens. Derby Teaching Hospitals NHS Foundation Trust
- Bev Snaith. Clinical Lead, CARR
- Christopher Edwards. Queensland University of Technology
- Claire Lindsay. National Ultrasound Training Programme. NHS Scotland Academy
- Colin Diment. St Helens and Knowsley Teaching Hospitals NHS Trust
- Famida Sadak. Health Education Wessex and University Hospital Southampton NHS Foundation Trust
- Haroon Qarib. North West London Ultrasound Academy
- Jenny Sim. University of Auckland
- Karen Glencross. Sheffield Teaching Hospitals NHS Foundation Trust
- Morag Stout. National Ultrasound Training Programme. NHS Scotland Academy
- Nick Woznitza. University College London
- Pam Parker. Hull and East Yorkshire Hospitals NHS Trust
- Peter Cantin. Peninsular Radiology Academy and University Hospitals Plymouth NHS Trust
- Roaya Zuhair. North West London Ultrasound Academy

- Sam Anderson. Norwich Radiology Academy
- Simon Richards. Teesside University
- Sujata Patel. North West London Ultrasound Academy
- Tanuja Khiroy. North West London Ultrasound Academy, London North West University Healthcare NHS Trust

16.3 Acknowledgements

Thanks to members of the STG who worked on developing this document:

- Suzanne Beattie-Jones
- Anne-Marie Culpan
- Simon Freeman
- Kevin Moore
- Famida Sadak

Ultrasound Advisory Group members who reviewed the final draft:

- Nicki Davidson
- Cat Lee

SoR
THE SOCIETY OF RADIOGRAPHERS

NHS England