IPEM
Institute of Physics and Engineering in Medicine

Ultrasound Workforce Survey

Summary Report 2023

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Introduction

The data in this report is compiled from IPEM's Ultrasound Workforce Survey, carried out in March 2023. We identified 60 NHS trusts and organisations in the UK that provide ultrasound services and an invitation to respond was sent to all heads and leads of these departments and services.

The aim of this survey was to identify the extent of the workforce gap within Ultrasound Physics and to gather information to aid the development of a workforce model by IPEM's Ultrasound and Non-Ionising Radiation Special Interest Group (UNIRSIG). This workforce model will be used to create IPEM recommended staffing levels for Ultrasound Physics, akin to those used in Radiotherapy Physics, Diagnostic Radiology and Radiation Protection, and MR Physics.

At the time of compiling this report, we achieved a response rate of 75%, covering 45 organisations that provide Ultrasound support. Data was gathered on 2 professional groups: clinical scientists and clinical technologists, along with information about any additional staff essential to the clinical service provision.

The vacancy rate in ultrasound physics is currently 23% for clinical scientists and 14% for clinical technologists

The ultrasound physics workforce is over-worked and under-appreciated and is in crucial need of support

Executive Summary

There are around 1 million ultrasound scans carried out in the UK each year, performing an essential role in cardiology and vascular health, antenatal services, gynaecology and urology, rheumatology, surgery and a growing number of other clinical specialisms. Simultaneously, diagnostic ultrasound at the bedside, and the use of ultrasound for image guidance have both seen huge growth in the past few years, including in critical and emergency care and in primary care. Therapeutic ultrasound is also available in various forms, including physiotherapy, ultrasound lithotripsy and high-intensity focused ultrasound (HIFU). It is vital that ultrasound is used safely in healthcare, with suitable, quality assured equipment and up-to-date techniques to ensure that patients are protected from harm and get accurate diagnoses. All of this can only be achieved with a robust and well-trained ultrasound physics workforce.

The complexity and quantity of ultrasound equipment and the number of staff trained to carry out scans has grown substantially over the last decade and continues to grow. The results of this survey demonstrate that the ultrasound physics workforce has not grown with these increased demands and is under significant stress, with little capacity or resources for training. This compromises patient safety, primarily due to undetected defective or poor-quality ultrasound probes and scanners in clinical use. The vacancy rate in ultrasound physics is currently at 23% for clinical scientists and 14% for clinical technologists; this is significantly higher than other Medical Physics specialisms.

Ultrasound physics is a complex workforce, with many staff dividing their time between ultrasound and other specialisms rather than dedicating their time to ultrasound alone. In addition, ultrasound physics teams across different centres support different services, meaning that each centre has their own specific challenges and staffing requirements.

> **It is vital that ultrasound is used safely in healthcare to ensure that patients are protected from harm and receive accurate diagnoses**

Almost 76% of respondents stated that the current staffing provision is insufficient, raising concerns around difficulties in improving input into the workforce via training due to staff capacity. Without intervention to support effective and comprehensive training opportunities and workforce input, it is feared that this problem will only worsen, as 17% of the workforce are approaching retirement age.

Additionally, concerns were raised relating to difficulty in justifying expansion and investment, perceiving that budget-holders within organisations are often unaware of the importance of an ultrasound physics presence, with the attention generally being drawn more towards improving staffing in areas working with ionising radiation. This is often due to poor representation of non-ionising physics at senior levels within the workforce, and its lack of mandatory legislation for safety and quality.

The results of this survey demonstrate that the ultrasound physics workforce is in urgent need of support, in terms of improving training opportunities to fill existing vacancies and develop/consolidate the current workforce, and in justifying the creation of further established posts. Without swift and effective action, the ultrasound physics workforce will decrease further, thereby stretching an already over-worked and under-appreciated workforce and further compromising patient safety and care.

Key findings

There are a total of 60 known centres providing ultrasound physics services in the UK, with 45 centres responding to the survey, giving an overall response rate of 75%. The response rate by region is shown in Fig. 1.

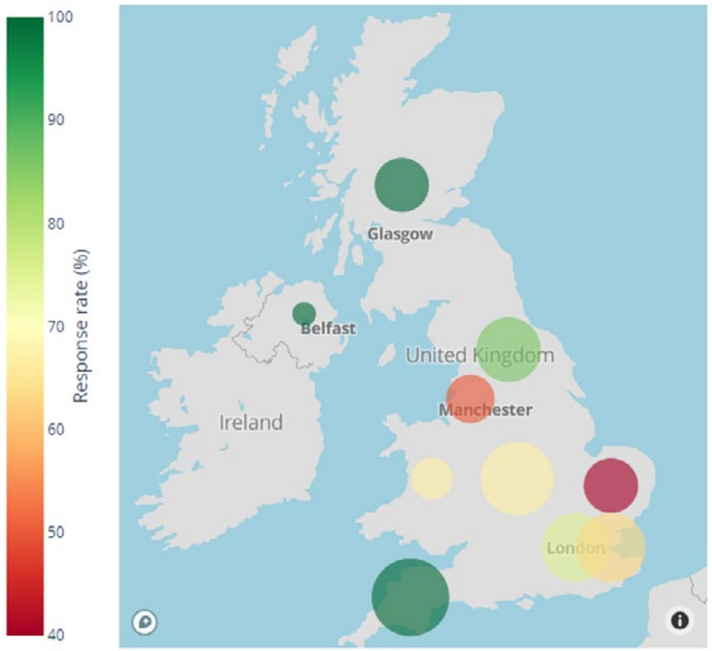


Figure 1: Response rate across different UK regions. Size of markers indicate number of centres within each region (ranging from 1–10), with colour scale indicating response rate. Scotland (n=5), Northern Ireland (n=1) and South West England (n=10) have a 100% response rate

Data from the responding centres was analysed to determine the headcount and corresponding whole time equivalent (WTE) of staff working in ultrasound physics. Estimates were gathered from centres that did not respond based on historical survey data.

	Headcount of responding centres	Estimated headcount across UK*	WTE of responding centres	Estimated WTE across UK*	Vacancy WTE	Vacancy Rate
Clinical Scientists	80	100	29.5	36.9	6.9	23%
Clinical Technologists	56	70	26.4	33.0	3.6	14%
Other Staff	8	10	5.9	7.4	1.5	25%

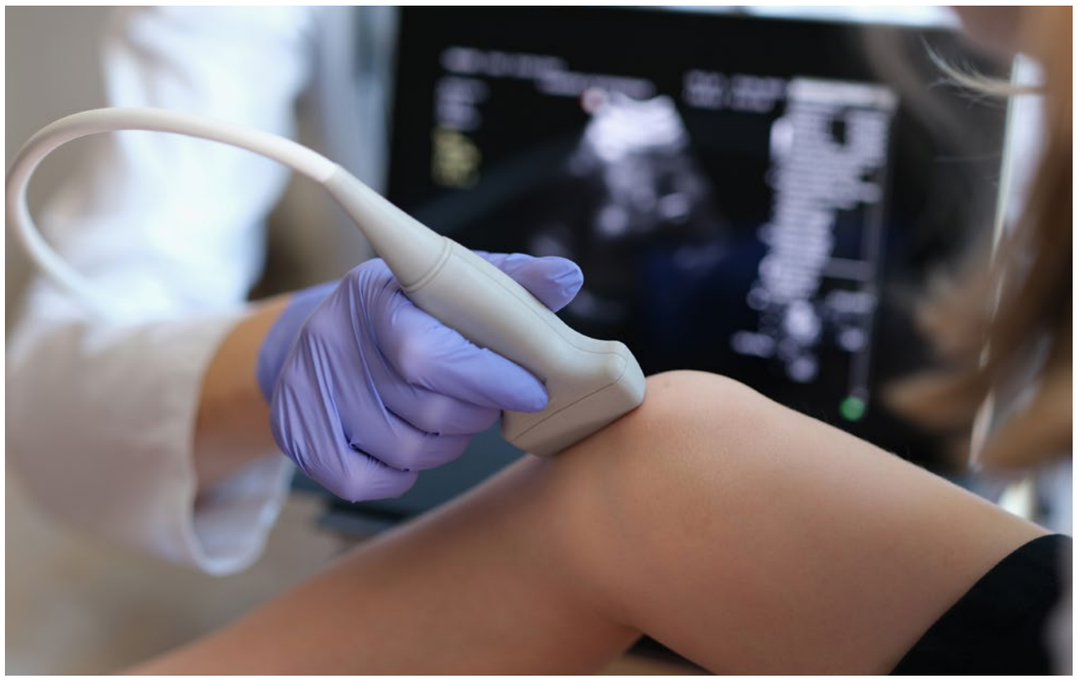
Table 1: Headcounts, WTE and vacancies for clinical scientists and technologists within ultrasound physics. Table header marked with * indicate that estimates are derived from previous workforce surveys and averaging responses.

This was compared to other specialisms in Medical Physics and Clinical Engineering (MPCE), shown in Table 2.

	Clinical Scientists	Clinical Technologists
Ultrasound	23%	14%
Magnetic Resonance	11%	0%
Radiotherapy	7%	8%
Diagnostic Radiology and Radiation Protection	9%	7%
Nuclear Medicine	8%	8%

Table 2: Vacancy rates assessed across other specialisms in Medical Physics and Clinical Engineering.

The vacancy rates for both roles are larger in ultrasound than in any other MPCE specialism, indicating that the ultrasound physics workforce requires considerable support to meet current staffing levels.



Establishment and vacancies

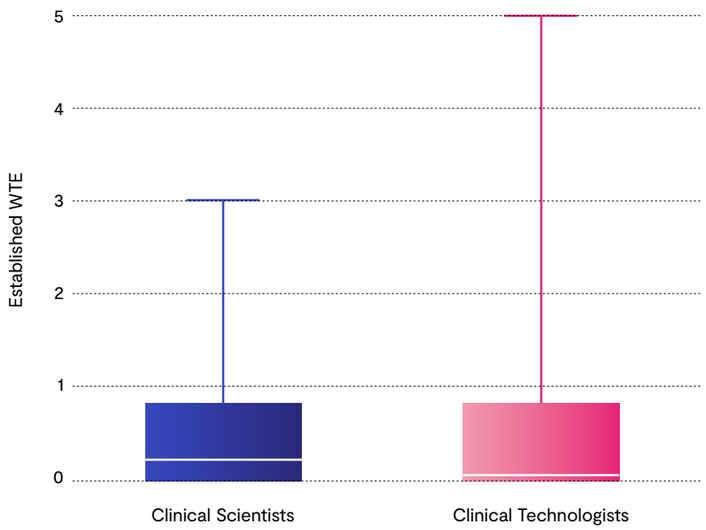
Establishment and vacancy rates

From Table 1, the total confirmed WTE of MPCE staff working in ultrasound physics in the UK is just under 62 WTE, which is far less than in any other MPCE specialism. Although ultrasound in diagnostic and therapeutic settings is currently not as regulated as the use of other radiation types, MPCE staff involvement remains crucial in the clinical governance and future developments of this widespread and versatile tool.

	Total WTE	Total vacancy rate
Ultrasound	61.8	19%
Magnetic Resonance	116.3	11%
Radiotherapy	1909.0	8%
Diagnostic Radiology and Radiation Protection	493.0	8%
Nuclear Medicine	990.0	6%

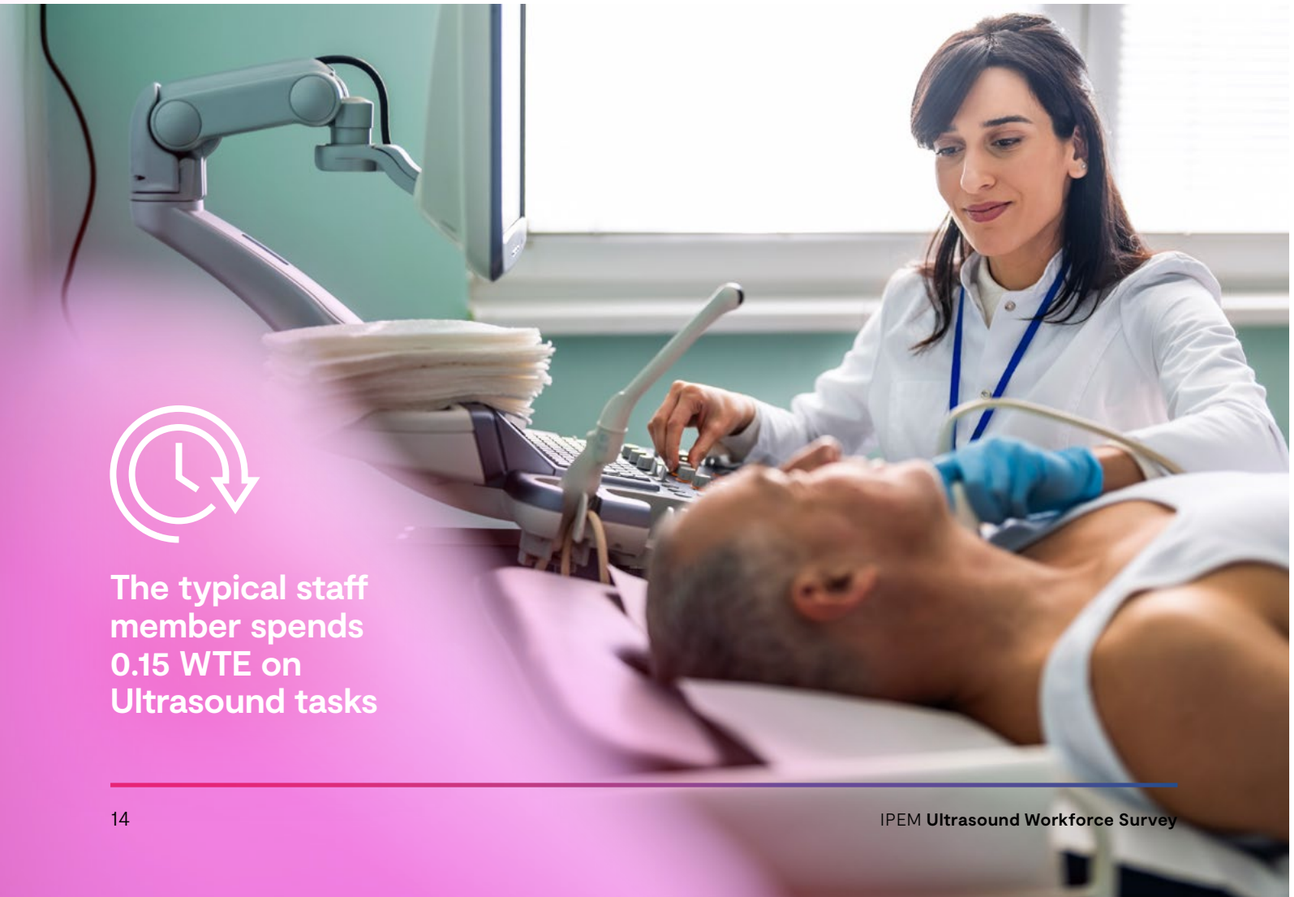
Table 3: Total WTE and vacancy rates of established staff in ultrasound compared to other MPCE specialisms – for these specialisms, vacancies may include technical staff who are neither clinical scientists nor clinical technologists.

"The total number of staff working in Ultrasound is around 62 WTE - this is almost half of the staff working in MRI, and 3% of staff working in Radiotherapy"



The spread of reported WTE for clinical scientists and technologists in ultrasound physics are shown in Fig. 2. Staff working within ultrasound often split their time between multiple areas of responsibility, usually across other non-ionising modalities. As a result the average WTE quoted to be spent on ultrasound is 0.1–0.2 WTE.

Figure 2: Range of established WTE quoted from all participants for clinical scientists (left – min: 0.0, median: 0.2, max: 3.0) and clinical technologists (right – min: 0.0, median: 0.1, max: 5.0).



The typical staff member spends 0.15 WTE on Ultrasound tasks

Establishment by region

The workforce establishment was also analysed regionally to assess any significant variation in establishment or vacancies across the UK.

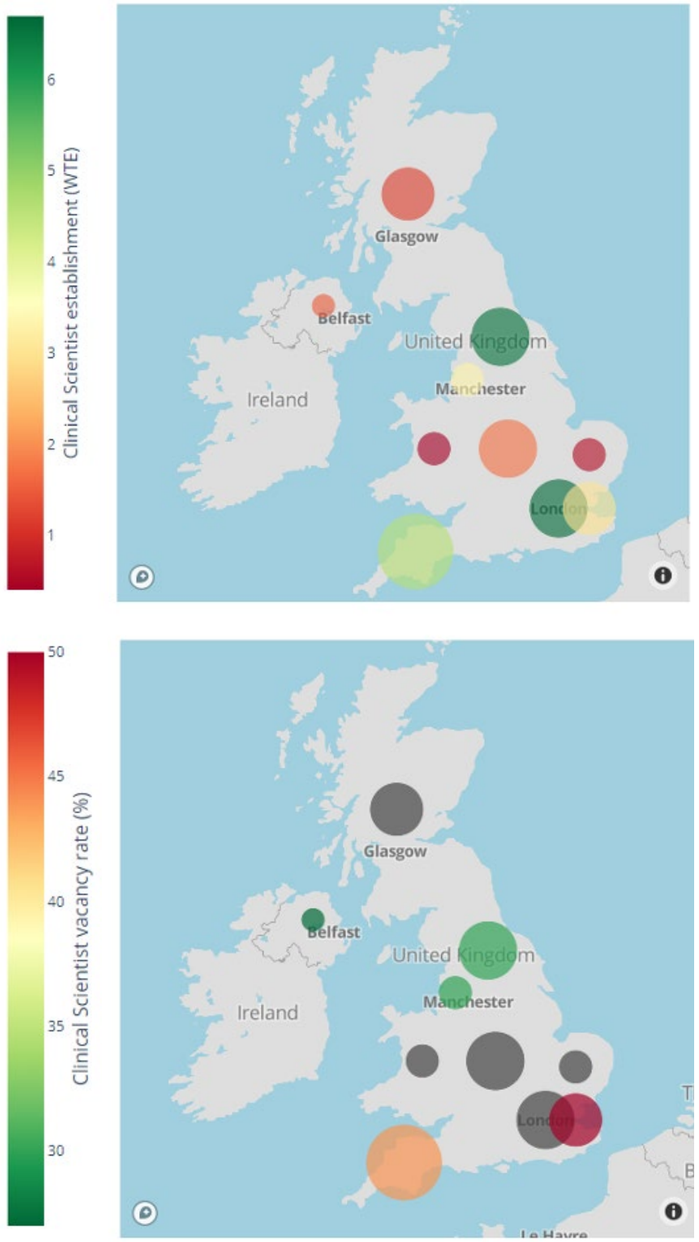


Figure 3: Clinical Scientist data across UK regions – size of markers indicate number of centres included in responses, colour indicates established WTE (top) and vacancy rates (bottom). Black markers indicate vacancy rates of 0%.

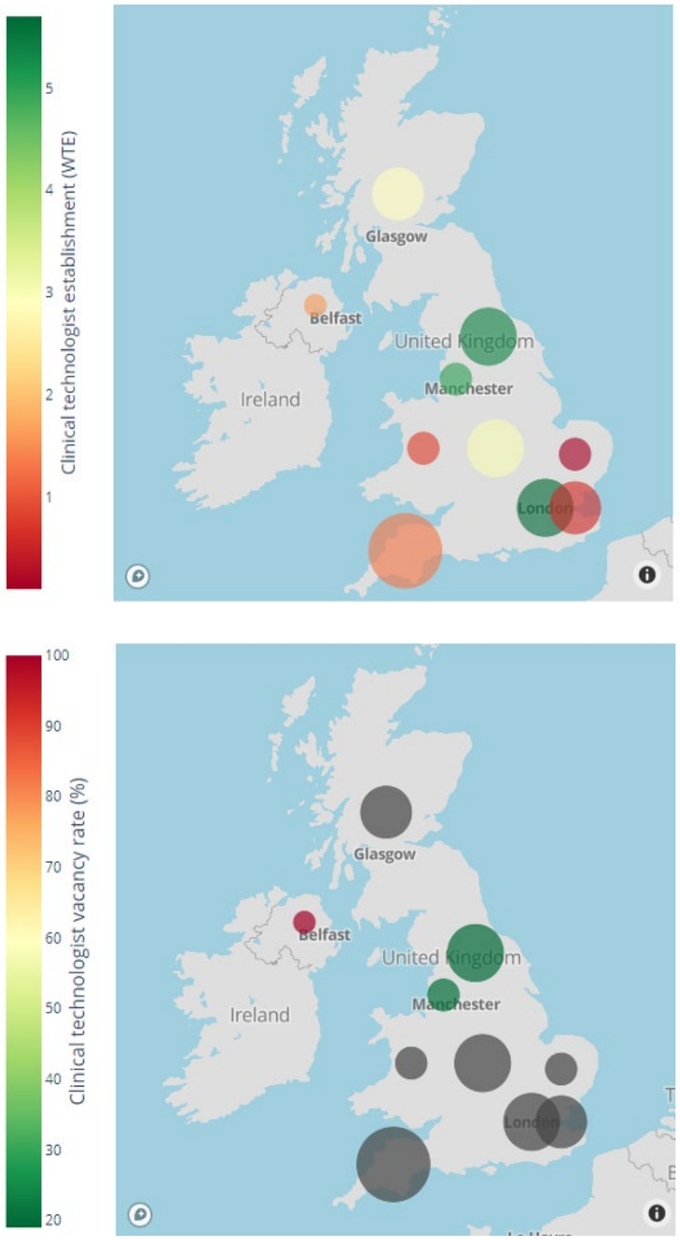


Figure 4: Clinical technologist data across UK regions – size of markers indicate number of centres included in responses, colour indicates established WTE (top) and vacancy rates (bottom). Black markers indicate vacancy rates of 0%.

Workforce profile

Established staff WTE posts were stratified in terms of their Agenda for Change (AfC) banding to assess the skill mix within ultrasound physics. Most senior posts (Band 8B or higher) are fully staffed, indicating that issues relating to vacancies stem from insufficient entry-level and training posts.

Clinical Scientists

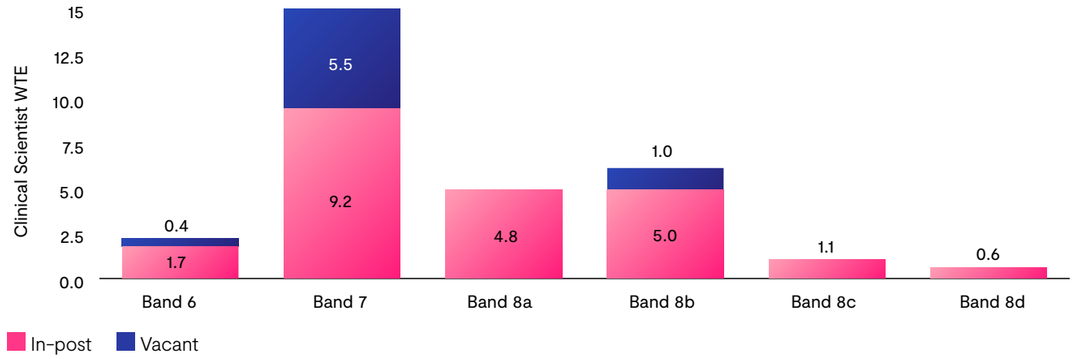


Figure 5: Established, in-post and vacant WTE for clinical scientists by Agenda for Change banding.

Band 7 clinical scientists staff have the largest WTE establishment, however 37% of these established posts are currently vacant.

37%

of Band 7 clinical scientists posts are vacant, indicating that there are insufficient newly-qualified scientists entering the profession

Clinical Technologists

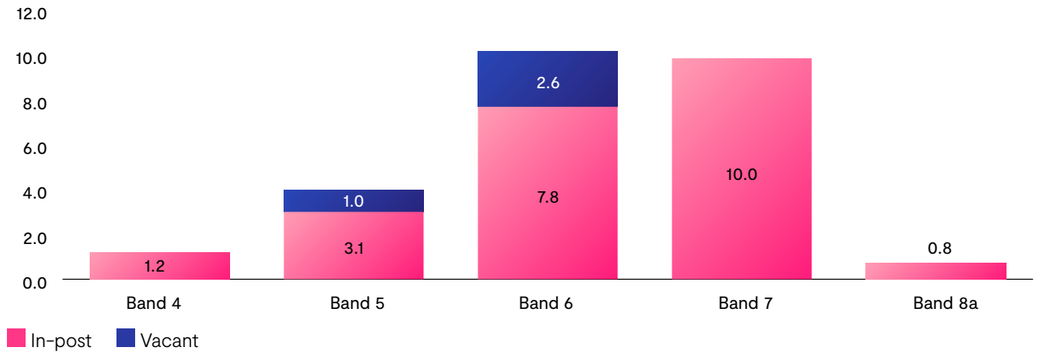


Figure 6: WTE established, in-post and vacant for clinical technologists by Agenda for Change banding.

The majority of clinical technologists are employed at Band 6 and Band 7 AfC posts, with the highest number of vacancies at Band 6.

25%

of Band 6 clinical technologist posts are vacant

Staffing provision

Routine ultrasound service provision

Respondents were asked to provide information relating to the ultrasound activities they routinely support, shown by the bar chart in Fig. 7. The majority of participants provide support to breast screening, radiology, maternity/obstetrics and gynaecology.

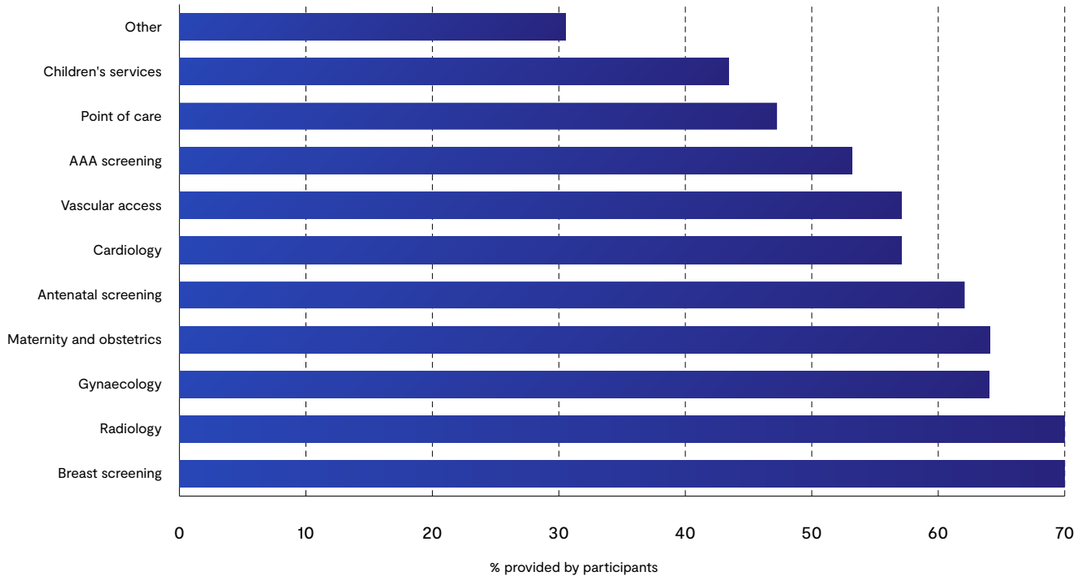


Figure 7: Proportion of activities performed by respondents.

15 participants listed that they provide services in the ‘Other’ category, which consisted of:

- Accident and Emergency/Intensive Care
- Clinical research
- Endoanal
- Endoscopy
- MR-guided focused ultrasound
- Neurology
- Ophthalmology
- Physiotherapy
- Radiotherapy and brachytherapy
- Rheumatology
- Theatres
- Urology

This indicates that ultrasound is used in a wide range of healthcare settings and clinical specialisms, with different ultrasound physics services supporting different areas of the wider healthcare system.

The majority of participants provide support to breast screening, radiology, maternity/obstetrics and gynaecology

Staffing provision satisfaction

Participants were asked whether they felt their current staffing provision was sufficient, with an overwhelming 76% stating that they felt it was insufficient, as shown in Fig. 8. This demonstrates that a huge proportion of this workforce is overstretched and overworked. This is concerning from a general workforce point of view, but also from a retention point of view. Low morale attributed to work related stress/dissatisfaction could lead to more people moving away from the profession, thereby creating additional vacancies and adding further pressures to the workforce.

Do you feel that the current staffing provision is sufficient?

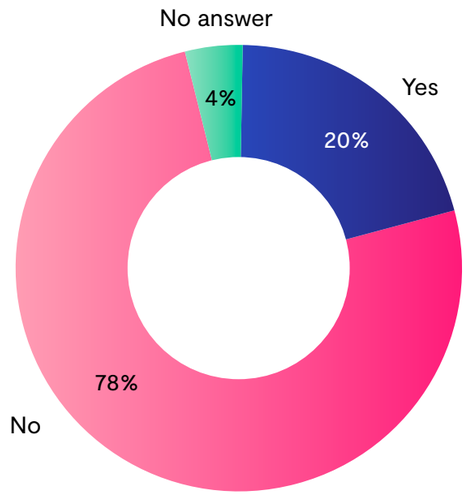


Figure 8: Chart indicating staffing provision satisfaction.

76%

of respondents stated that their staffing was insufficient

Retirement

Survey respondents were asked to indicate how many staff working within ultrasound physics were approaching retirement age (i.e. 55 or over). Of the 144 headcount, 24 staff are approaching retirement age, which constitutes 17% of the total workforce. If this workforce is not replaced, this will create a significant further dissonance between the desired establishment and in-post positions.

17%

of the total ultrasound physics workforce are estimated to be approaching retirement age

Developing the future workforce

A key purpose of this survey was to gather data to aid the development of an Ultrasound Physics workforce model, similar to those produced in other specialisms such as Radiotherapy, Diagnostic Radiology & Radiation Protection, and MR Physics. To develop this model effectively, participants were asked to indicate the increase in WTE required (Table 4) and to indicate parameters that were most important when considering optimal staffing levels. This information will be used to inform the development of the workforce calculator.

			Current increase required	
	Current reported established WTE	Desirable staffing level WTE	WTE	Factor of current workforce
Clinical Scientists	28.5	56.9	28.4	2.0 x
Clinical Technologists	28.3	59.0	30.7	

Table 4: Increase in current establishment required to meet survey participant's desirable staffing levels.

Parameters for participants to consider were:

- Clinical support and training
- Number of patients scanned per year
- Number of sites covered
- Number of ultrasound machines
- Number of ultrasound probes
- Research and development
- Screening services

Participants state that to reach their ideal staffing level, the current workforce must double in size

Participants were asked to assign to each of the categories above a number between 1–5, with 1 being very unimportant and 5 being extremely important. The heatmap below indicates the number of participants that ranked each of the categories by importance.

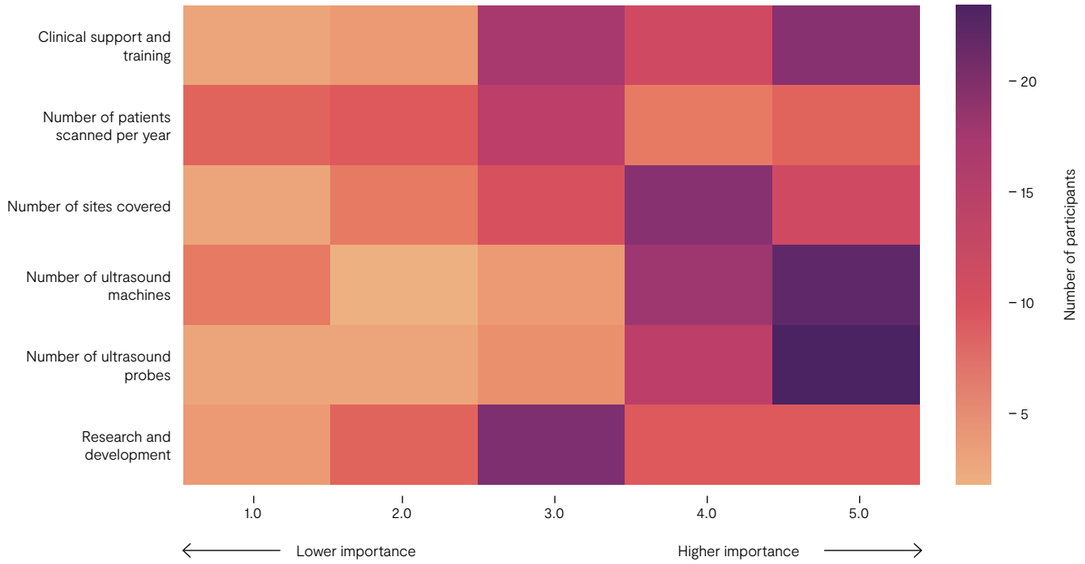


Figure 9: Heat map illustrating the proportion of participants ranking different parameters relating to ultrasound in terms of importance.

From Fig. 9, the majority of respondents felt that number of probes/machines were the most important factor to consider in developing the workforce calculator, followed by clinical support/ training and number of sites covered. Many respondents felt that number of patients scanned per year was not an effective measure of staff capacity requirement.

Focus should also be drawn to screening programme specifications (mammography, foetal anomaly, AAA = Abdominal aortic aneurysm) that specify the involvement of qualified professionals and stipulate a programme of servicing and quality assurance on the corresponding clinical scanners.

The workforce model will be developed by the UNIRSIG and will consider the categories and stated workforce needs listed above. Separate to this workforce model, UNIRSIG are working on the development of training opportunities for medical ultrasound physics.

Conclusions

This report illustrates the significant and growing challenges faced by staff working within ultrasound physics, with unsustainably high vacancy rates, limited training provision and difficulties raising these concerns with influential budget-holders. The workforce calculator in development by UNIRSIG will allow for a more standardised approach to combatting the workforce challenges.

> **"The data collected will inform the development of an ultrasound physics workforce calculator"**

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