IPEM
Institute of Physics and Engineering in Medicine

Laser Workforce Survey Summary Report 2022

IPEM Institute of Physics and Engineering in Medicine

Introduction

The data in this report is compiled from IPEM's Laser Workforce Survey 2022, carried out in September 2022.

The purpose of this survey was to gather information on the size and configuration of the Medical Physics and Clinical Engineering (MPCE) workforce supporting the use of medical and surgical lasers across the NHS.

At the time of compiling this report, we achieved responses from 34 organisations that provide laser support. Information was gathered relating to the number of lasers supported, the physics services provided, staff whole time equivalent (WTE) spent on lasers and current staffing vacancies.

This survey investigated the establishment and provision of MPCE staff working with lasers within healthcare, to enable an overview of the services provided by this workforce and the specific challenges that they face.

Executive summary

Clinical Scientists and Technologists working with laser radiation are a small sub-group of Non-Ionising Radiation specialists, often splitting their time between supporting lasers and supporting optical radiation or ultrasound services. The total reported establishment of MPCE staff within the laser workforce is 17.2 whole time equivalent (WTE), which is 8% of the reported non-ionising radiation workforce and is less than 1% of the Radiotherapy MPCE workforce.

Despite the small establishment of MPCE staff working with lasers, the responsibilities and duties performed are of the utmost importance. If used in an unsafe manner, lasers can result in burns, eye injuries, fires, and smoke inhalation.

Due to the dangers presented by the use of lasers in healthcare, the Medicines and Healthcare products Regulatory Agency (MHRA) have published guidelines[1] specifically relating to the safe use of lasers. In particular, these guidelines highlight the requirement for a Laser Protection Adviser (LPA), who must have significant experience in Radiation Protection and therefore is typically a staff member from MPCE.

Across the 34 organisations involved in this survey, 147 laser services are supported. All laser services have a provision of laser protection safety measures, however routine tasks such as output/maintenance measures vary across each organisation. 17 organisations stated that they contract external service providers to perform output measurements, due to in-post staff having insufficient time to perform these duties. 9 organisations stated that they do not perform output measurements, nor do they contract externally, indicating that the lasers supported within these organisations are unable to be maintained fully due to limited staff and limited funding.

The majority of lasers included in this survey are between 5–7 years old, indicating that laser replacements may be necessary over the coming years, thereby putting further pressure on laser MPCE staff to support the procurement and commissioning of new equipment.

This illustrates the need for effective action to be taken to help support the laser workforce and to ensure that laser equipment used in healthcare is safe and patient care is preserved.

Key findings

Participants from all known laser support services were contacted and asked to complete the survey. The regional distribution of respondents is shown in Fig. 1, with the workforce establishment shown in Table 1, and compared to the establishment in other areas of Non-Ionising Radiation.

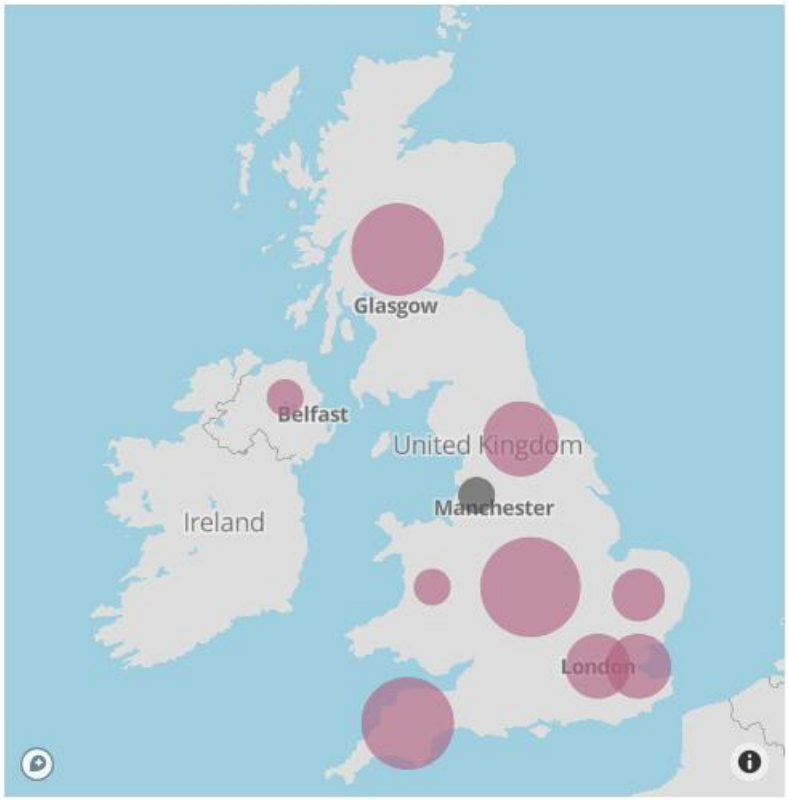

Figure 1: Map of respondents – size of markers indicate number of participants within the region that have responded, ranging from 1 (NI and Wales)– 7 (Midlands). Black markers indicate no responses.

	Clinical Scientists	Clinical Technologists	Proportion
Laser	**12.8**	**4.6**	**9%**
Ultrasound	28.5	28.3	30%
MR	116.0	1.3	61%

Table 1: Laser establishment for Clinical Scientists and Technologists compared to other INIR specialisms.

Establishment

Participants were asked to provide their establishment for Clinical Scientists and Clinical Technologists working specifically with lasers, which includes both in-post and vacant staff (Table 1). The laser workforce makes up only 9% of the reported non-ionising workforce.

6 of the 34 organisations reported no establishment of Clinical Scientists working in lasers, and 22 organisations reported no establishment of Clinical Technologists. Two organisations reported no Clinical Scientists or Technologists whatsoever, which appears to be due to all laser posts in their departments standing frozen, due to being unable to fill vacant posts.

The range of reported WTE for Clinical Scientists and Technologists supporting laser use in each organisation is shown in Fig. 2. The majority of organisations have between 0.2-0.5 WTE Clinical Scientists dedicated to lasers, and 0.2-0.6 WTE for Clinical Technologists.

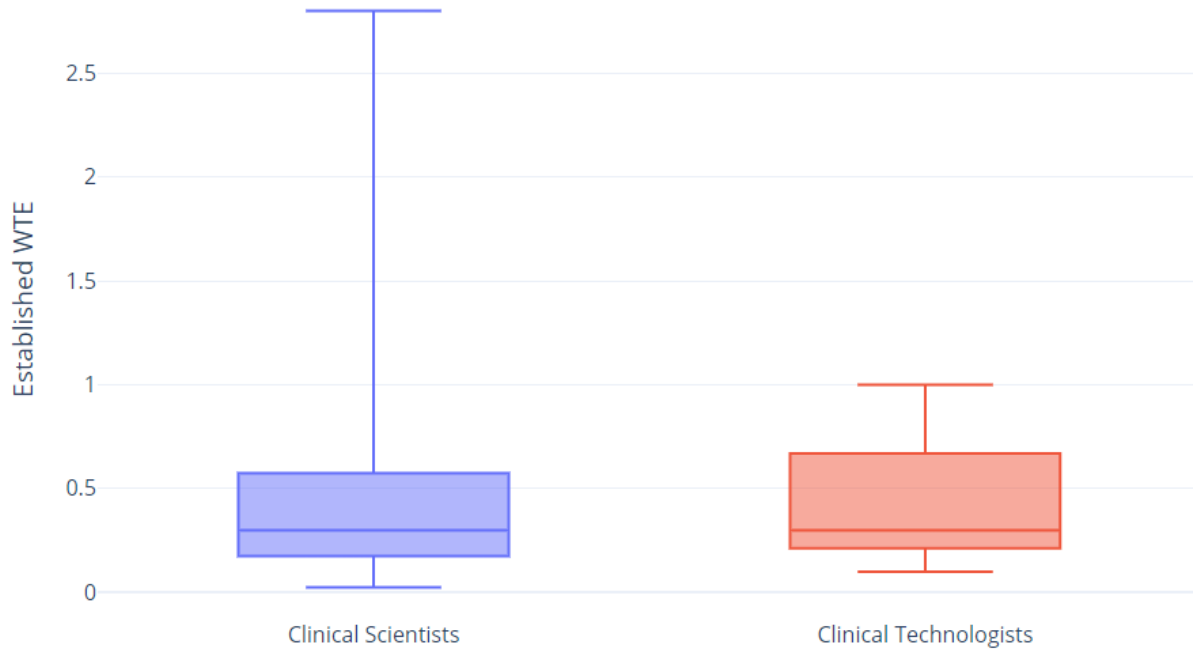

Figure 2: Range of reported Clinical Scientist establishment (left: Min – 0.03, Median – 0.3, Max – 2.80) and Clinical Technologist establishment (right: Min – 0.10, Median – 0.30, Max – 1.00) reported from all centres.

The regional establishment of the total laser workforce is shown in Fig. 3, with separate establishments for Clinical Scientists and Clinical Technologists shown in Fig. 4.

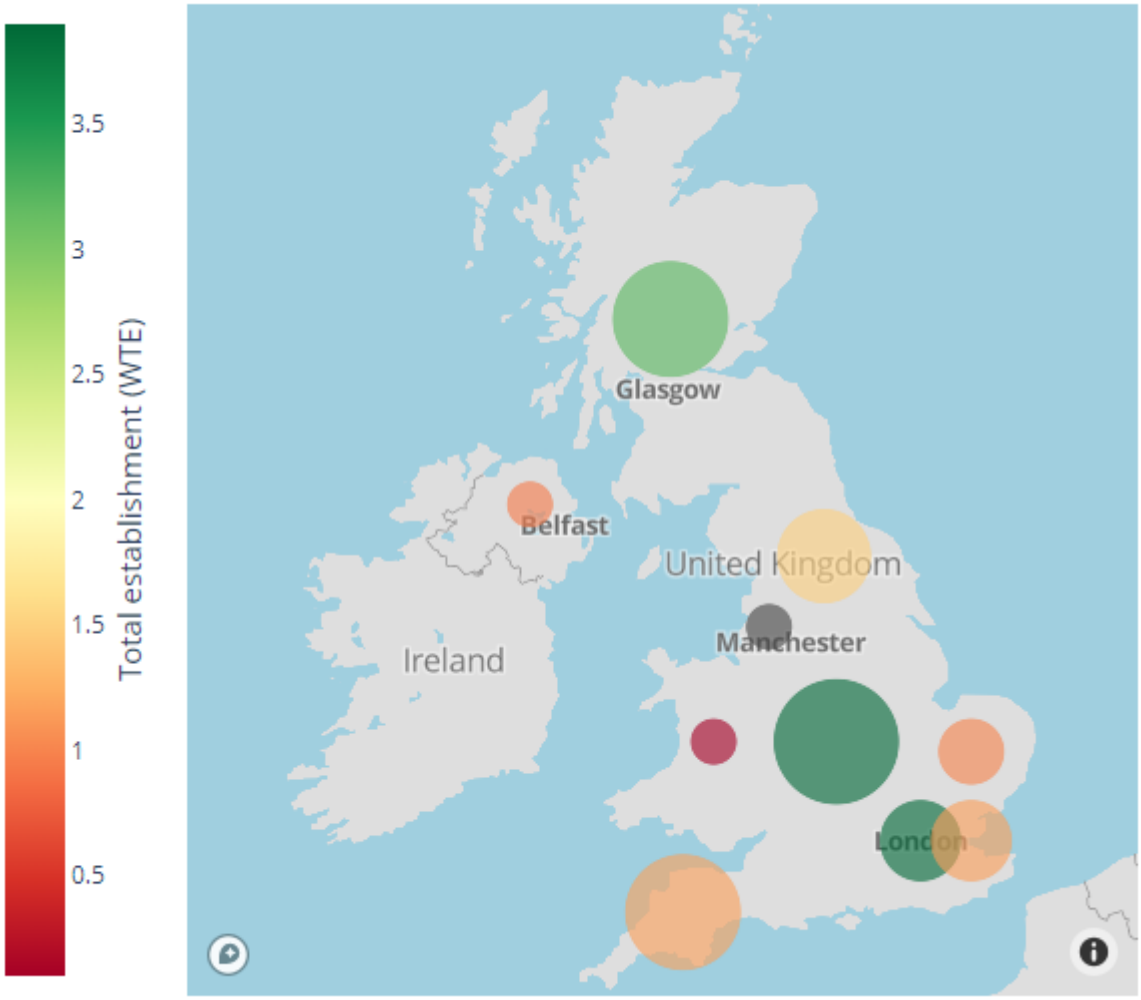

Figure 3: Regional establishment of all staff in the laser workforce. Size of markers indicate the number of organisations in the region (ranging from 1 in NI and Wales, to 7 in the Midlands), with colours indicating the range of WTE established. Black markers indicate 0 WTE or no response.

From these figures, Wales has the lowest staffing provision with a total of 0.1 WTE Clinical Scientist. London and the Midlands have the highest establishment, at 3.9 WTE.

In terms of Clinical Technologists, Wales and South East England have no Clinical Technologist establishment, with the Midlands having the highest technologist establishment at 1.6 WTE.

This data clearly illustrates the dwindling laser workforce across the UK, in particular in Wales and Northern Ireland.

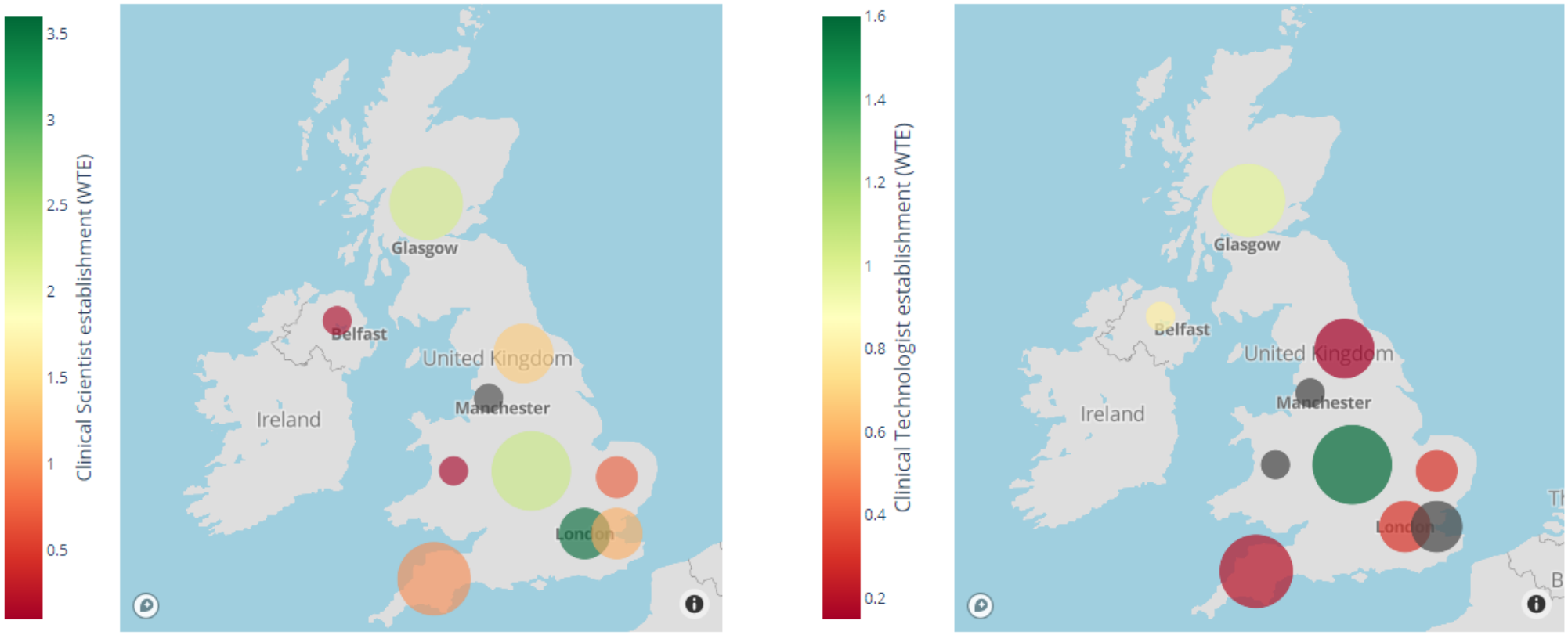

Figure 4: Regional WTE establishment for Clinical Scientists (left) and Clinical Technologists (right). Size of markers indicate the number of centres in the region (ranging from 1-7), with colours indicating the range of WTE established. Black markers indicate 0 WTE or no response.

Respondents were asked to provide information relating to their representative department and specific job roles. Fig. 5 illustrates the department that respondents to the survey stated that they represented.

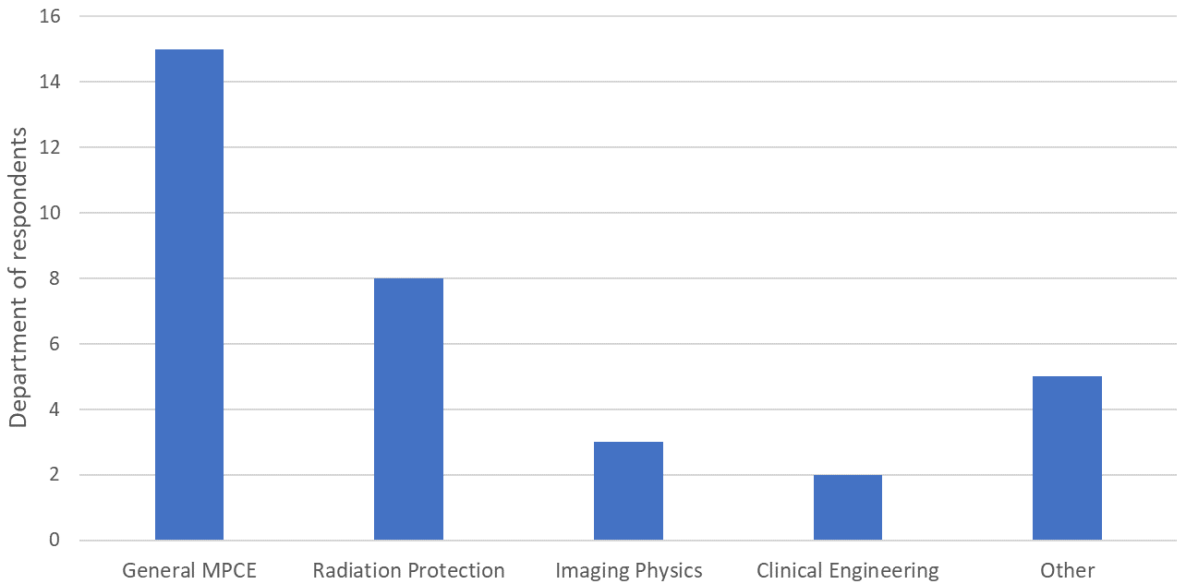

Figure 5: Department types that respondents were representing.

The category labelled 'Other' consists of Laser Clinics, Clinical/Health Physics and Photobiology/Dermatology departments. From this data, it is evident that laser MPCE support is provided by a range of different departments, thereby illustrating that each laser workforce operates in a slightly different way.

Fig. 6 indicates the job roles of the respondents who participated in the survey, to enable an insight into the range of staff involved in lasers.

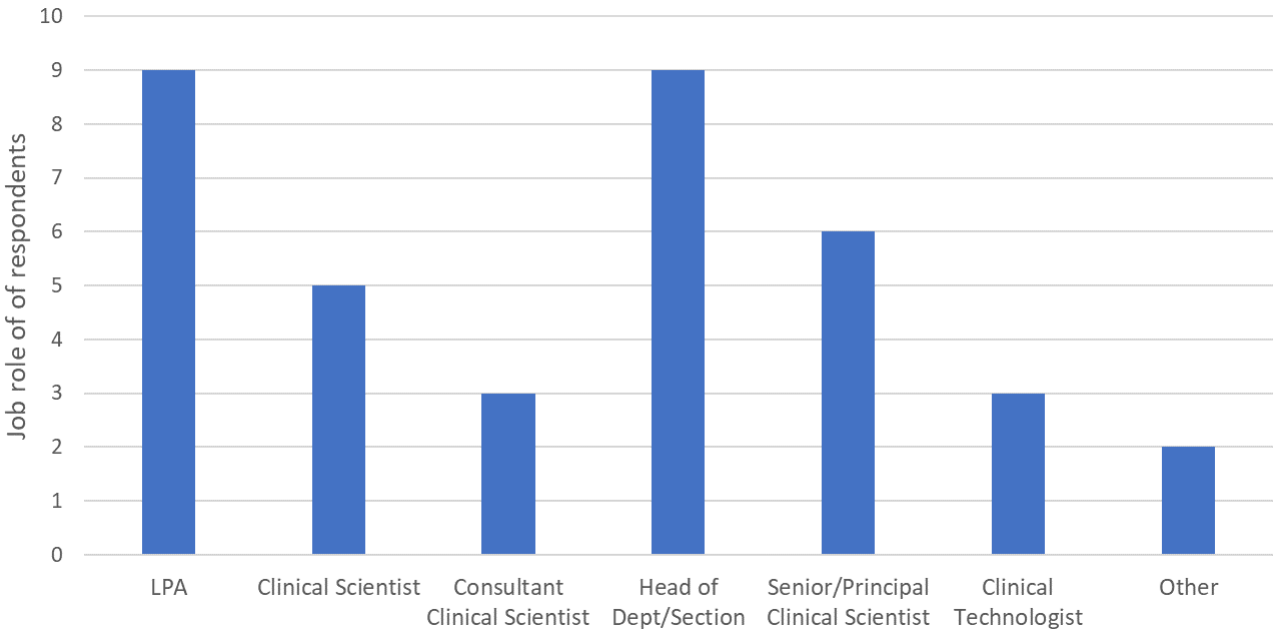

Figure 6: Job roles of participating respondents.

The category labelled 'Other' consists of a Trainee Clinical Scientist and a Laser Support Service. Of the 9 staff that were designated LPA, 2 are also Principal Clinical Scientists, 1 is Head of Department and 1 is a Clinical Technologist. Again, this demonstrates that the laser workforce is often governed differently in different trusts.

Staffing provision

Participants were asked to indicate how many additional laser services they provide support to, and the number and age of lasers supported (Figs. 7-8). Of the 34 organisations responding to the survey, 147 laser services are supported, with a total of 1475 lasers across these services.

On average, a typical organisation supports 4 laser services, having between 5 and 15 lasers, but some departments having over 70.

The typical age of lasers are between 5 and 7.5 years old, ranging to as old as 12.8 years. There is no clear guidance relating to the recommended lifetime of a clinical laser, however a review of the literature has suggested 6-10 years[2-3]. Therefore, a significant proportion of lasers included in this survey will likely require replacement within the next 5 years, meaning that extra support will be required from Clinical Scientists and Technologists.

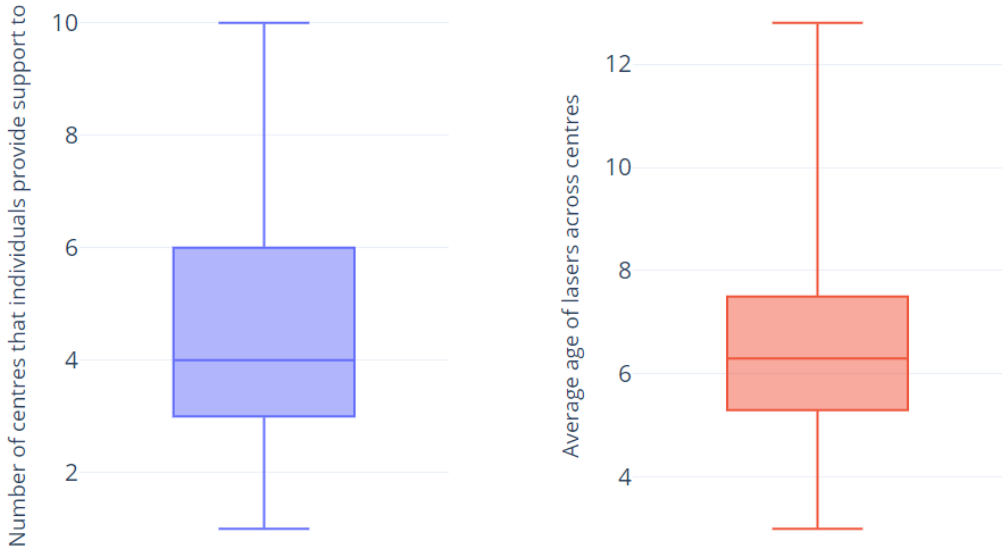

Figure 7: Stated number of centres that participants support (left: min - 1, median - 4, max - 10) and average age of lasers in years across these centres (right: min – 3.0, median 6.3, max - 12.8).

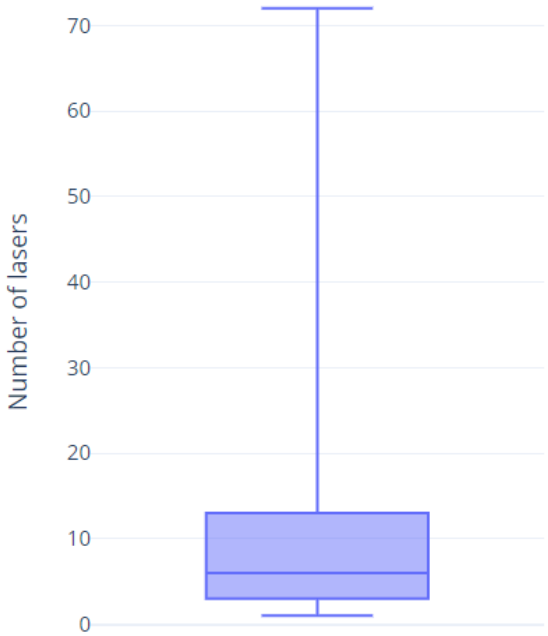

Figure 8: Number of lasers quoted for each service (min: 1, median: 6, max: 72).

Participants were also asked to indicate the type of services provided by their staff, including:

- Medical Physics/Laser safety advice to other centres for Class 3B/4 lasers
- Laser output measurements
- Laser Safety Advice (i.e. local rules, risk assessments etc)
- Feedback of laser safety issues to the Radiation Safety Committee/Trust by the Laser Protection Adviser
- Administering laser services directly to patients

The results of the above are shown in Fig. 9, with all organisations stating that they provide laser safety advice. The majority of respondents have an LPA responsible for feeding back laser safety issues to the local Radiation Safety Committee and provide safety advice for Class 3B/4 lasers.

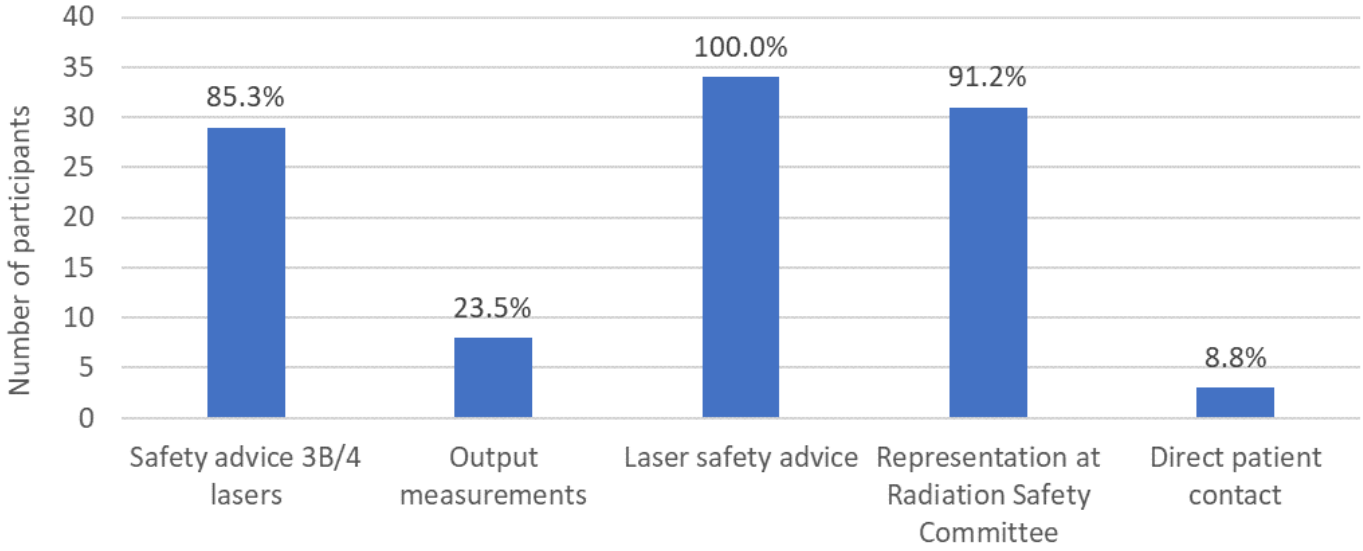

Figure 9: Services supported by survey respondents, with data label indicating proportion relative to total number of respondents.

In terms of measuring outputs, 8 organisations stated that they provide output measurements. Combined, these organisations provide output measurements to 34 laser services in total. 17 organisations stated that they do not provide output measurements, but there are external contractors who provide clinical and technical support in terms of output measurements.

9 organisations stated that no output measurements are performed at all, either in-house or externally contracted. Combined, this comprises 44 of the 147 laser services supported.

Fig. 10 illustrates the amount of staff time dedicated to different responsibilities within the laser workforce. As expected, based on Fig. 9, the majority of time is spent performing tasks relating to laser safety, indicating that Radiation Protection and Laser Protection qualifications and skills are crucial within this workforce.

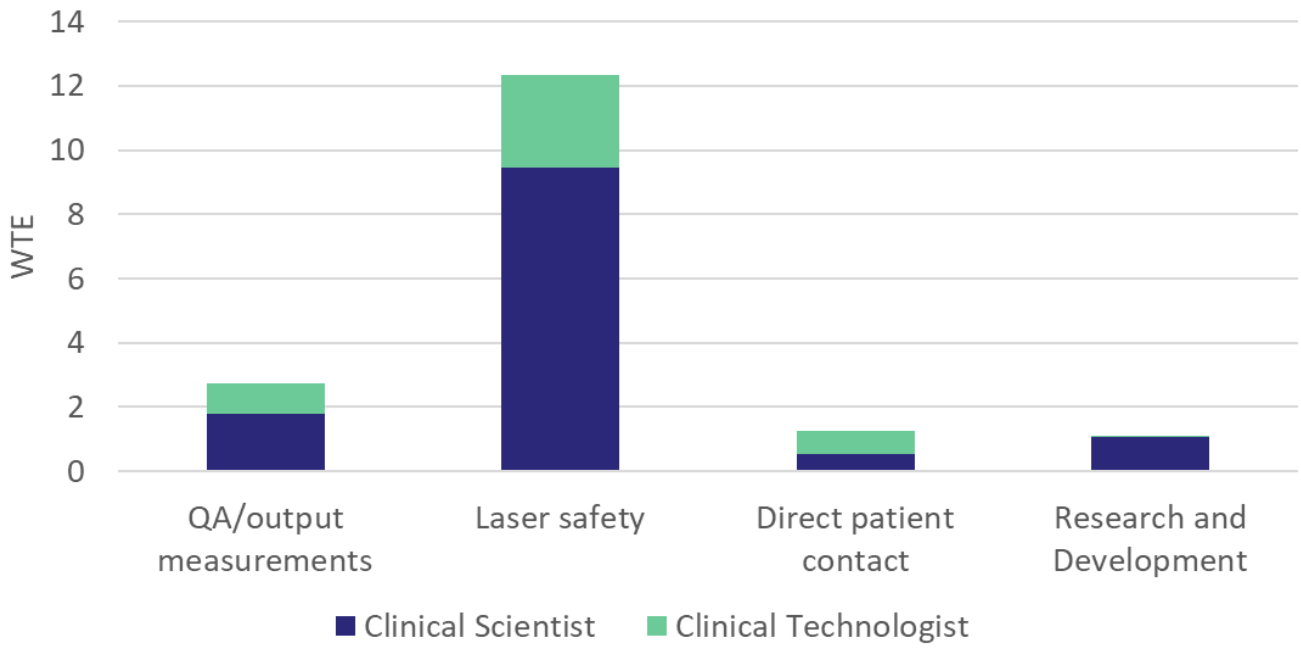

Figure 10: WTE provision of Clinical Scientists and Clinical Technologists in the laser workforce.

Of the organisations that do perform output measurements, participants were asked to indicate how frequently these measurements were performed, shown in Fig. 11. The participant in the 'Other' category stated that outputs are performed after installation and annually, except for Physiotherapy lasers which were measured every 3 years.

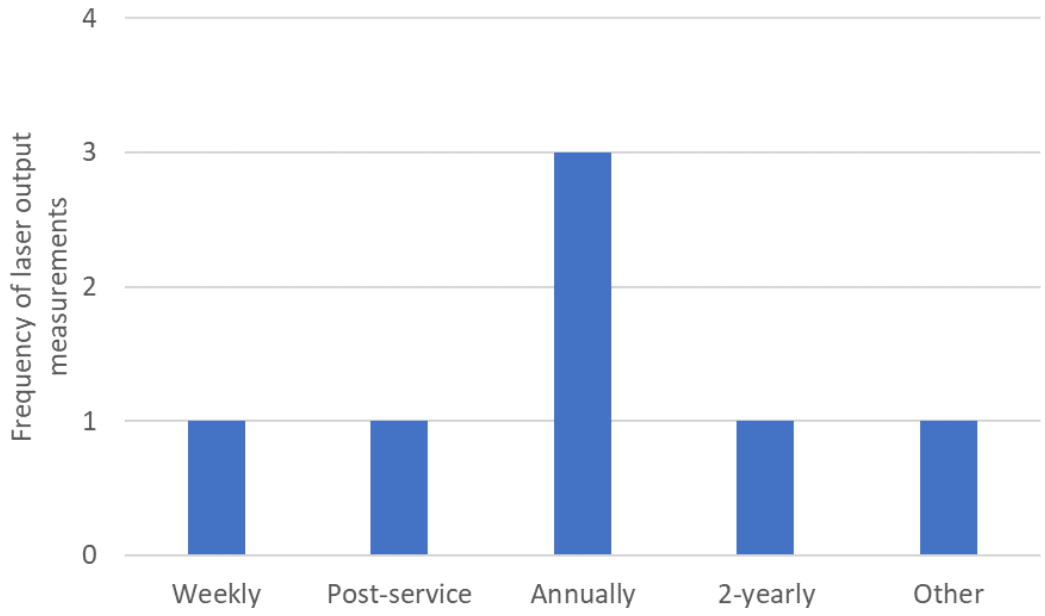

Figure 11: Frequency of output measurements performed.

The total staff establishment in each organisation was compared to the reported number of lasers supported to determine whether the number of lasers had a strong impact on the number of staff required for support.

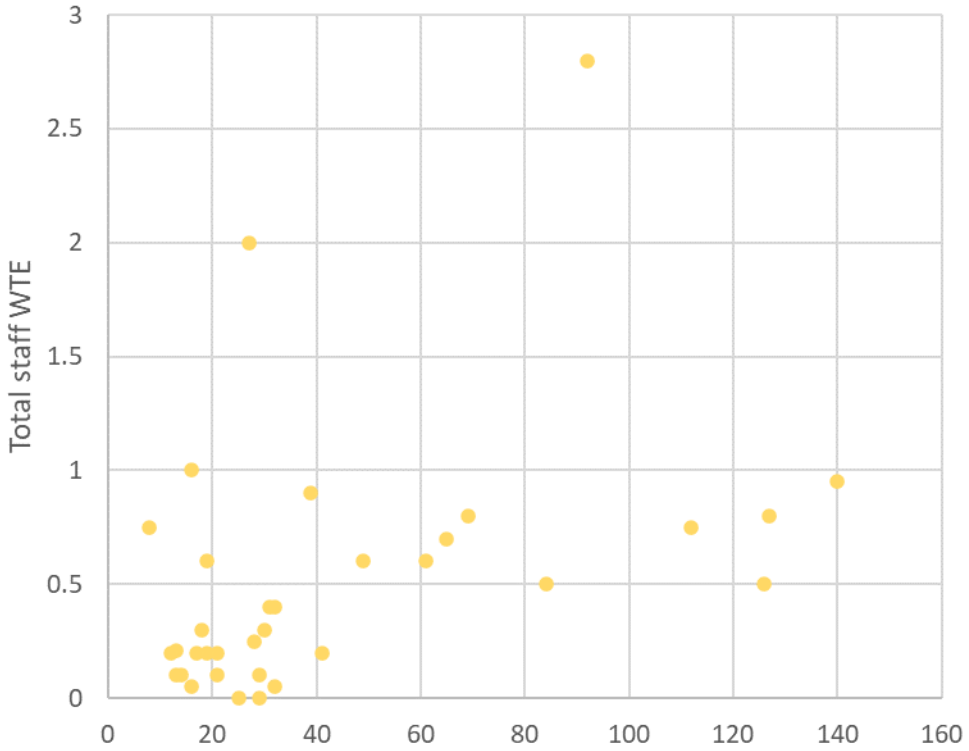

Figure 12: Number of lasers quoted being supported relative to total established staff.

In broad terms, it appears that there is a somewhat positive correlation between the number of lasers supported and the total staff WTE dedicated to lasers.

Developing the future workforce

IPEM conducted an Ultrasound workforce survey in March 2023 and will conduct an Optical Physics survey in Summer 2023, which will give a considerable overview of the non-ionising radiation workforce, in an effort to establish guidelines relating to minimum staffing levels.

Conclusions

The laser workforce is very small – with staff splitting their time between lasers and other areas such as Ultrasound or Optical Physics. For this reason, this workforce is often overlooked regarding staffing provision.

This survey has demonstrated that laser safety is paramount, and this is clearly prioritised by laser MPCE staff, as all participants stated that laser safety advice is provided to their departments. Minimal staff time is dedicated to equipment measurements or research and development due to the low numbers of staff within the workforce. However, laser equipment is required to be properly maintained under the Medicines and Healthcare products Regulatory Agency (MHRA), including performing routine quality assurance. Therefore, the workforce requires further funding to enable sufficient staffing to ensure that laser equipment can be maintained fully. Furthermore, additional funding will be required in the short-term future to replace aging lasers, with the current average age of a laser being 6-7 years old. An increase in new equipment will result in an increased need for MPCE laser staff, to ensure that laser protection advice is implemented effectively, in addition to acceptance testing/commissioning measurements.

[1] "Lasers, intense light source systems and LEDs – guidance for safe use in medical, surgical, dental and aesthetic practices" (2015), Medicines & Healthcare products Regulatory Agency

[2] "Laser protection adviser (LPA) support in England" (2022), Laser Safety Advisory

[3] "Medical lasers – Laws, Regulations & Performance Standards" (2020), US Food and Drug Administration