

IPEM

Institute of Physics and
Engineering in Medicine

Magnetic Resonance Workforce Survey

Summary Report 2022





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Introduction

The data in this report is compiled from IPEM's Magnetic Resonance Workforce Survey, carried out in June 2022. An invitation to respond was sent to Heads of Magnetic Resonance Physics (MR) of all known MR Physics centres in the UK. Responses were also sought from any group (for example Radiation Protection groups) who may also provide an MR physics service (or aspire to do so in future).

The aim of this survey was to identify the extent of the workforce gap within MR Physics and to gather information to determine the current and future needs of the workforce using a workforce model^[1] developed by the IPEM MR Physics Workforce Task & Finish Group. This model provides IPEM recommended staffing levels for MR Physics, akin to those used in Radiotherapy Physics and Diagnostic Radiology and Radiation Protection.

At the time of compiling this report a response rate of 83% was achieved, covering 38 MR centres across the UK. Data was gathered on two professional groups: Clinical Scientists and clinical technologists.



This survey utilised the newly developed MR Physics workforce model to provide recommended staffing levels



[1] Recommendations for the Medical Physics support of a Magnetic Resonance Service (2023), *Institute of Physics and Engineering in Medicine*.



Executive Summary

The MR Physics workforce is estimated to consist of 166 individuals across the UK, comprising 46 centres. From this survey, there is an establishment of 140.8 whole time equivalent (WTE) of Clinical Scientists, and 1.6 WTE clinical technologists. This report has indicated that whilst the MR Physics workforce is small compared to other Medical Physics and Clinical Engineering (MPCE) specialisms, it has a higher than average vacancy rate of 12%. The largest vacancy rates are at Bands 7 and 8A, with a 13–14% vacancy rate.

In addition to more routine tasks, MR Physics staff support research and development and have also indicated that they have aspirations to advance clinical services further, by performing sequence optimisation, utilising advanced applications and increasing their clinical support provision.

The purpose of this survey was to ask respondents to use the MR Physics workforce calculator to help identify their current workforce establishment requirements, and their workforce needs in 3 years' time.

The calculator specified that the current MR Physics clinical science workforce needs to increase by 45%, which equates to over 54 WTE. This was predicted to increase further in 3 years to an additional required workforce of over 118 WTE.

The workforce calculator indicated that the MR Physics workforce needs to increase by

54

WTE to meet current demand, and to increase by over

118

WTE to meet the anticipated demand in 3 years' time



Key findings

38 centres responded to the survey, with a response rate of 83%. The below figure illustrates the responding centres and their respective MR Physics staff headcount.

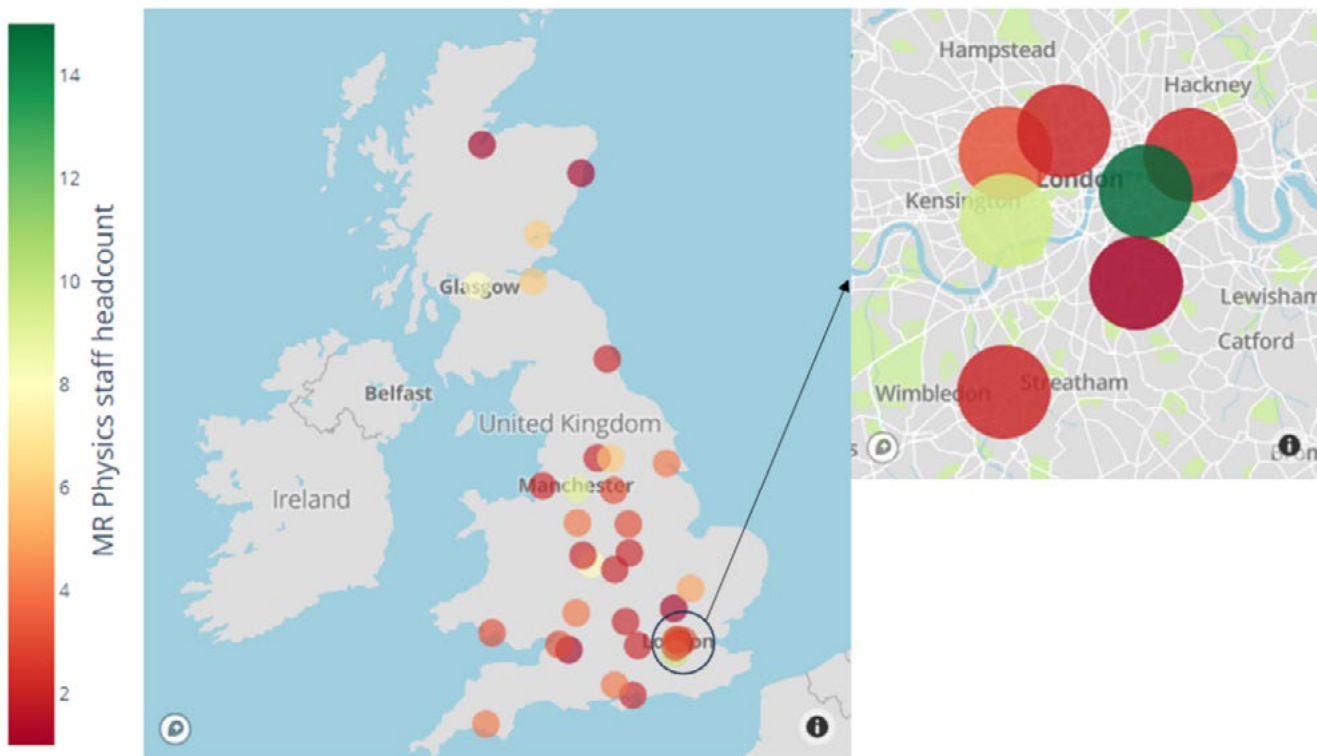


Figure 1: Participating centres in the survey. Colour scale indicates the number of MR Physics staff, therefore giving some indication towards the 'size' of the centre.

Data from the responding centres was analysed to determine the headcount and corresponding WTE of staff working within MR 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 of responding centres	Vacancy rate of responding centres
Clinical Scientists	137	166	116	140.8	14.4	12%
Clinical technologists	5	6	1.3	1.6	0.0	0%

Table 1: Headcounts, WTE and vacancies for Clinical Scientists and technologists within Magnetic Resonance Physics. Table headers marked with * indicate that estimates are derived from previous workforce surveys and averaging responses.



“ The MR Physics workforce establishment is predicted to be required to double in size over the next 3 years ”

Participants were asked to use the MR Physics workforce calculator to help identify their current workforce establishment requirements, and their workforce needs in 3 years' time (Table 2). This information was gathered by participants using the workforce calculator to indicate their typical levels of activity, including physics support, patient factors, research and development, training and leadership/management activities. Fig. 2 indicates the spread of additional WTE centres currently required and in 3 years' time.

	Current reported established WTE	Current total establishment required		Estimated 3 year total establishment required	
		WTE	Increase as a factor of current workforce	WTE	Increase as a factor of current workforce
Clinical Scientists	115.0	167.3	1.5 x	224.8	2.0 x
Clinical technologists	1.3	3.3	2.5 x	10.1	6.7 x

Table 2: Current and 3-year recommended staffing levels based on the MR Physics workforce calculator.

The increase in 3-year establishment is defined as an 'estimate' in Table 2, as some participants anticipated their realistic future additional workforce requirements, rather than the exact requirements that they will need in 3 years' time.

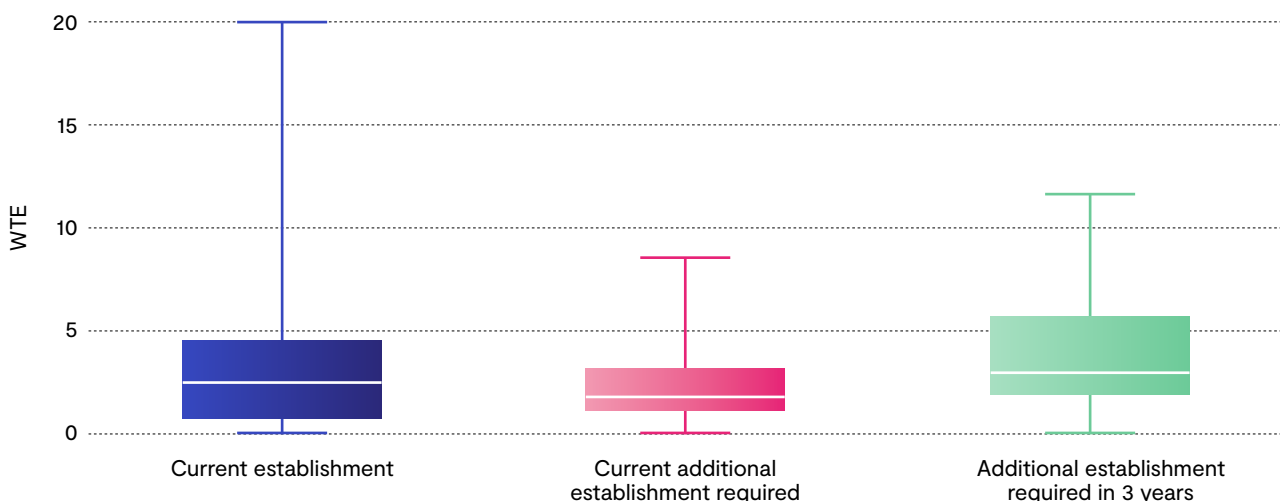


Figure 2: Left – spread of current establishment, centre – spread of current additional WTE required based on centre's calculator results. Right – 3 year additional WTE required based on centre's calculator results.

From this figure and from Table 2, the additional workforce required based on current needs broadly ranges from 1.2–3.2 WTE, which in total is an increase of 50% of the current workforce establishment. This will increase further in 3 years' time, to 2–6 WTE, which would require the current workforce establishment to double.



Establishment and vacancies

Establishment and vacancy rates



The MR Physics establishment and vacancy rates were compared to other specialisms in MPCE, as shown in Table 3. The MR Physics establishment is significantly smaller than other specialisms, but with a higher-than-average vacancy rate of 12% for Clinical Scientists.

	Current Clinical Scientist establishment	Clinical Scientist vacancy rate	Recommended Clinical Scientist establishment
Magnetic Resonance	116.0	12%	167.3
Radiotherapy	884.0	7%	903.1
Diagnostic Radiology and Radiation Protection	330.0	9%	692.0
Nuclear Medicine	352.0	8%	–

Table 3: Vacancy rates assessed across other specialisms in Medical Physics and Clinical Engineering. No data is provided for Nuclear Medicine recommended Clinical Scientist establishment as recommended staffing levels have not yet been developed.

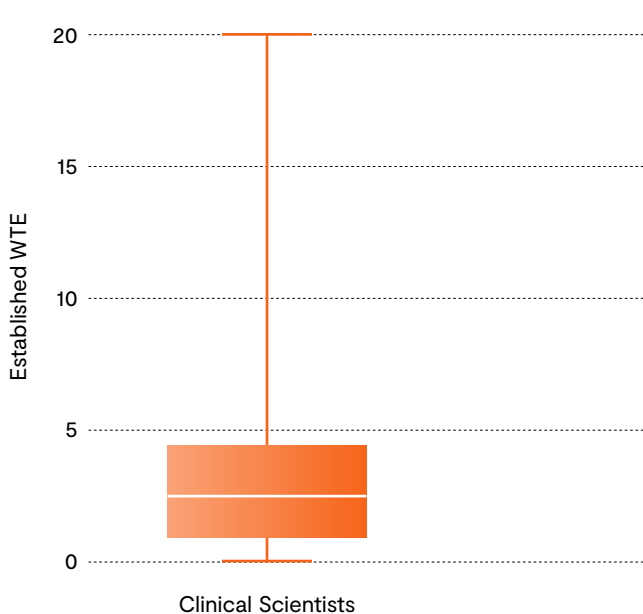


The MR Physics establishment is significantly smaller than other specialisms, but with a higher-than-average vacancy rate of 12% for Clinical Scientists



Table 3 illustrates that all specialisms in MPCE have high vacancy rates, highlighting the overall requirement for additional training opportunities across all areas of MPCE, including MR Physics. Locally, individual centres may use workforce planning to assess the most appropriate training specialism posts.

Fig. 3 indicates the reported Clinical Scientist establishment across the 38 centres, illustrating the variation in Clinical Scientist support across the UK. The majority of centres have between 1 and 4 WTE Clinical Scientists established in their MR Physics department, but the establishment across the centres range from 0.02 - 20 WTE.



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All specialisms in Medical Physics and Clinical Engineering have high vacancy rates, highlighting the overall requirement for additional training opportunities across all specialisms

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Figure 3: Range of Clinical Scientist WTE per centre (Min: 0.02, Median: 2.5, Max: 20.0).



Establishment by region



Analysis was performed to assess the variation in establishment and vacancies by UK region.

Clinical Scientists

Fig. 4 indicates the vacancy rates of Clinical Scientists working in MR Physics.

Wales has the smallest number of established Clinical Scientists, with a headcount of 3 staff (corresponding to 3 WTE). In England, the East of England has the smallest establishment, with 6 staff (4.9 WTE) across 2 centres.

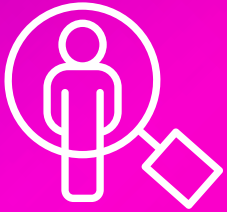
Conversely, London has the highest number of Clinical Scientists, with a headcount of 40 staff (35.5 WTE in-post) across 7 centres. Scotland has the next highest Clinical Scientist establishment, with a headcount of 20 staff (17.2 WTE) across the 5 participating centres in these regions.

London, the South West and the South East of England have the largest vacancy rates as a proportion of their WTE establishment, with an average vacancy rate of 21% across these regions.

The data suggests there is a proportional relationship between the established Clinical Scientist WTE and the rate of vacant positions, with regions having a larger establishment consequently having a larger number of vacancies. However, the South East and South West of England have small establishments and high vacancy rates.



Figure 4: Geographical establishment of vacancy rates of Clinical Scientists working in MR Physics across the UK. Colour scale indicates the vacancy rates, with size of marker indicating the WTE of Clinical Scientists established in those regions (ranging from 3-46). Black marker indicates no response.



Workforce banding profile

Clinical Scientists

Established Clinical Scientist WTE posts were stratified in terms of their Agenda for Change (AfC) banding to assess the skill mix within Magnetic Resonance Physics. Fig. 5 indicates the established WTE and the vacancy rates by AfC band.

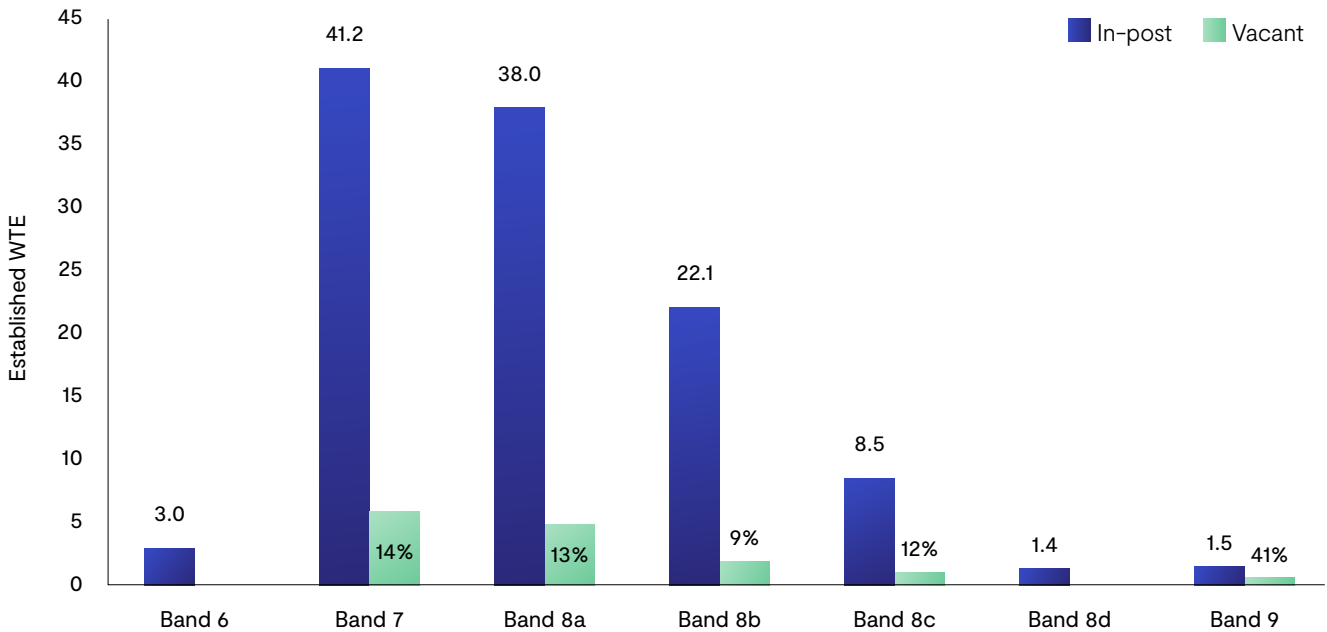


Figure 5: Establishment and vacancy rates for Clinical Scientists by Agenda for Change banding. The data labels for the “In post” bar are in WTE, with the labels for “Vacant” bar in terms of vacancy rate.

Band 7 posts are the largest staff group within the workforce, with the largest WTE vacant, at a rate of 14%. Band 8A posts also have a large proportion of WTE vacant, with a vacancy rate of 13%.

There are fewer Consultant Clinical Scientist (CCS) posts (those on bands 8C, 8D or 9) in MR Physics in comparison to other Medical Physics and Engineering specialisms, as shown in Table 4.

Band 7 and 8A posts have the largest vacancy rate, standing at

13.5%
on average

	Proportion of workforce
Magnetic Resonance Physics	10%
Radiotherapy Physics	15%
Diagnostic Radiology and Radiation Protection	19%

10%

of the MR Physics workforce operate at a consultant level

Table 4: Proportion of Consultant Clinical Scientists in MR Physics compared to other Medical Physics and Engineering specialisms.



Training provision

Centres were asked several questions relating to Clinical Scientist training within their departments, including the total number of trainees completing the Imaging with Non-Ionising STP specialism training within the last 5 years. The total for STP trainees, and their equivalents in Scotland, over the preceding 5-year period (2017–2022) was 43. Currently, there are 58 MR Physics Clinical Scientist trainees estimated to be in training (across all training routes and throughout all stages of training).

Further questions about Route 2 training, current trainee numbers and capacity to train going forward were also asked. This additional information will be crucial to enable workforce projections and potential shortfalls and will be presented in the full survey report in due course.

There are currently

58

MR Physics Clinical Scientist trainees estimated to be in training across all stages and all training routes





Research workload and other priorities

Research workload and other priorities



In addition to routine clinical support, many staff also support research involving MR. Participants were asked to identify the proportion of time spent on research, in addition to whether funding was provided for research posts.

Do you provide research support?

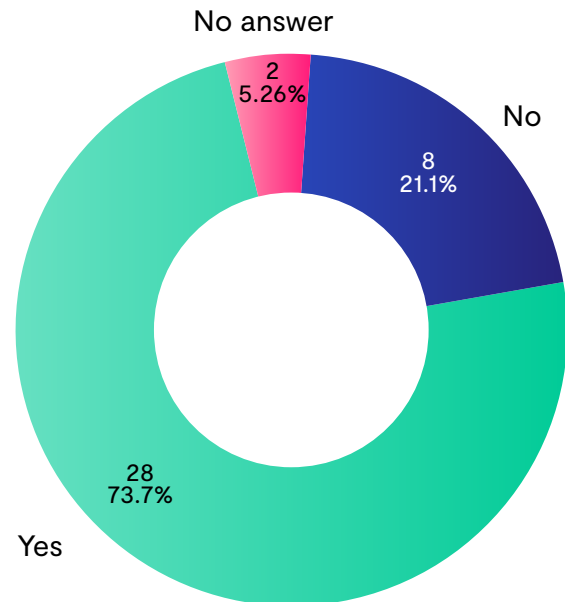


Figure 6: Proportion of survey respondents providing research support in their department.

18%

of the MR Physics establishment is dedicated to research

Of the 74% of centres that provide research support, a total of 21.3 WTE is dedicated to research across the workforce, which equates to 18% of employee WTE nationally. Fig. 7 indicates the spread of reported WTE spent on research across the survey participants.

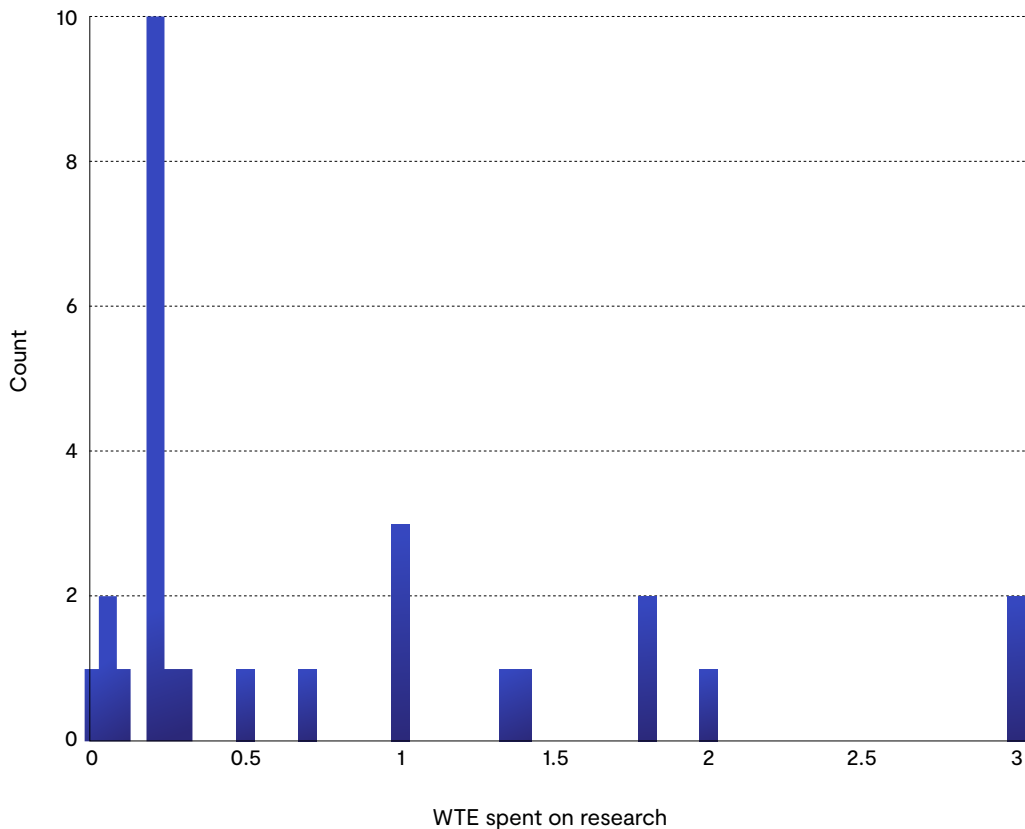


Figure 7: Range of stated staff time dedicated to research in WTE per centre.

This data indicates a general spread in staff time dedicated to research, ranging from 0.01 WTE to 3 WTE, with the average centre dedicating 0.2 WTE.

Participants were asked to provide details relating to any external funding provided for MR Physics research posts, with 50% of respondents stating that they receive funding for research.

Are any posts funded by research?

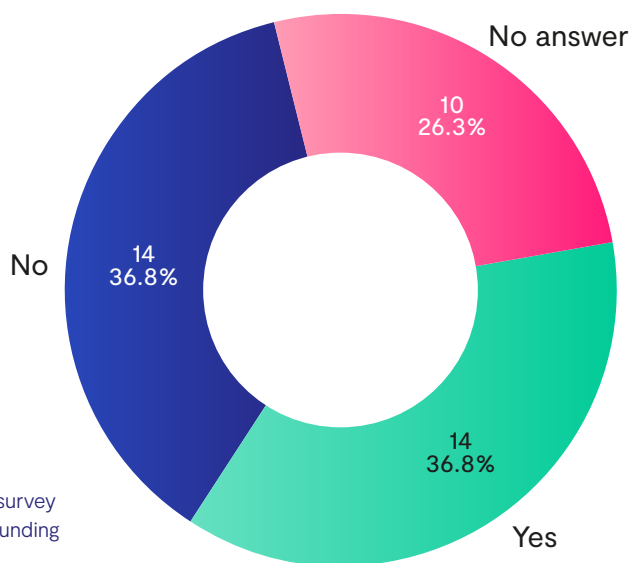


Figure 8: Proportion of survey respondents receiving funding for research posts.

Respondents were also asked which services or work they would like to support further if they had sufficient resources (Fig.9).

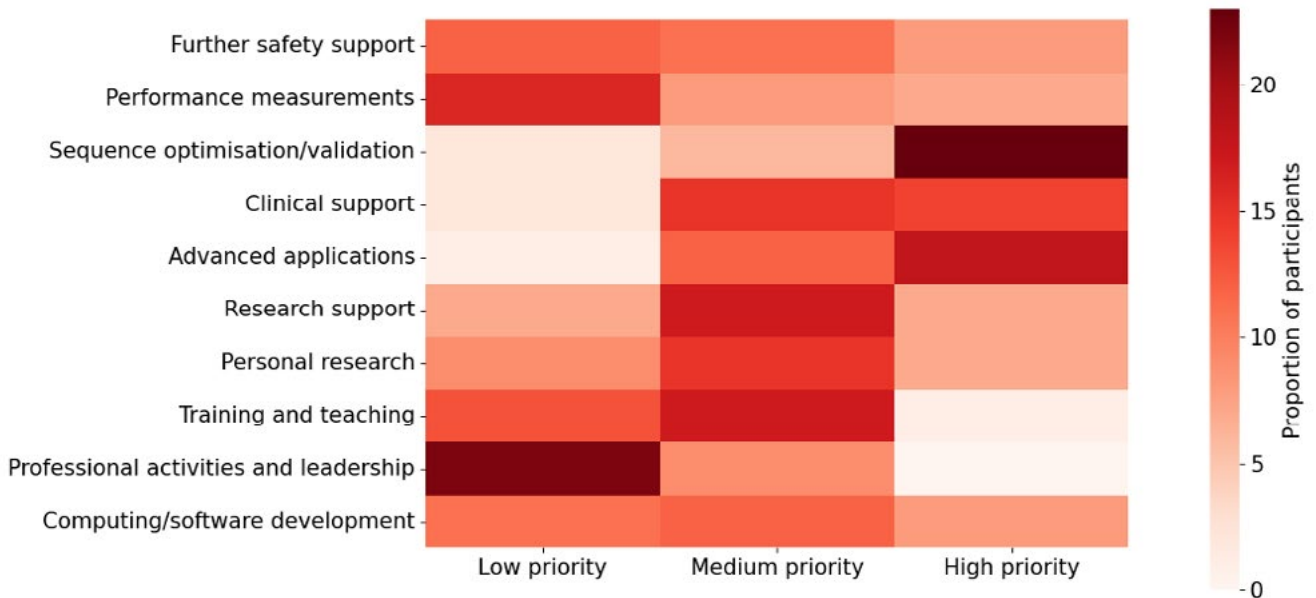


Fig 9: Heatmap illustrating the clinical aspirations of respondents. The darker colours indicate a higher number of participants selecting the option into the relevant priority section.

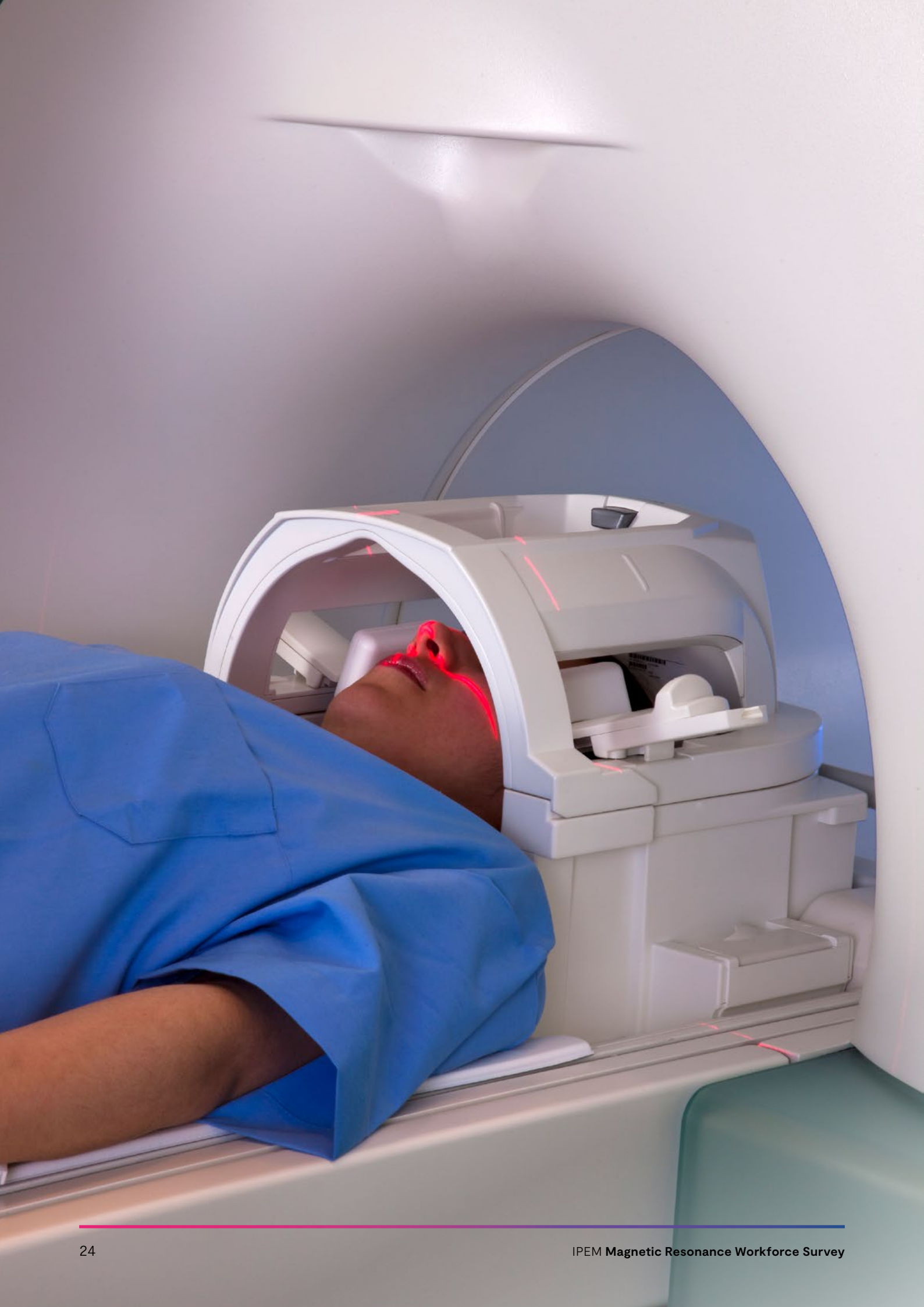
Three respondents selected the ‘Other’ category, which consisted of service development (rated medium priority), supporting MR guided focused ultrasound (rated medium priority) and updating documentation (rated low priority).

Sequence optimisation/validation and advanced applications are the categories voted the highest priority to dedicate further resources to, with performance measurements and professional activities and leadership voted the lowest priority.

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The MR Physics profession would like to dedicate more time to performing sequence optimisation and advanced applications, if there were enough resources to do so.

_____ ||



Conclusions

The MR Physics workforce across the country has an average vacancy rate of 12%, which is higher than other MPCE specialisms which currently have a 7-10% vacancy rate. There are very few clinical technologists working within MR Physics, illustrating that the MR workforce does not utilise this staff group. A professional consensus is required in order to establish the scope of practice for clinical technologists in the MR Physics workforce.

In terms of vacancies, these are greatest for Band 7 and Band 8A posts, with 14% and 13% of positions at this level not filled, respectively. There are currently 58 MR Physics Clinical Scientist trainees estimated to be in training across all routes and all stages.

From the MR Physics staffing calculator, the majority of centres require an increase in establishment of approximately 2 WTE per department, based on current workforce needs. In 3 years' time, this is predicted to increase further, to an average of an additional 3 WTE increase in staff establishment. This translates into a 54 WTE increase required across all centres at present to meet current workforce needs, and a predicted 118 WTE increase required in 3 years' time from current workforce levels.

A full report describing the newly developed MR Physics staffing calculator in detail will be published in due course, in addition to further in-depth analyses of this survey.

“ **A full report with in-depth survey analyses and details regarding the newly developed MR Physics staffing calculator will be published in due course** ”

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