

Written Evidence submitted by the Institute of Physics and Engineering in Medicine on “The effect of cuts to non-NHS England health budgets e.g. health education”

1. The Institute of Physics and Engineering in Medicine

Physicists, engineers and technologists play vital roles in delivering our healthcare. The Institute of Physics and Engineering in Medicine (IPEM) is the professional organisation that represents this workforce. We are a charity with over 4,000 members from healthcare, academia and industry.

Our members help to ensure that patients are correctly diagnosed and safely treated for illnesses such as cancer and stroke. They also maintain and manage medical equipment such as MRI and ultrasound scanners, X-ray machines, linear accelerators delivering radiotherapy, drug delivery systems and patient monitors.

Their research and innovation leads to new technologies and methods that improve on existing medical treatments. They provide new solutions that enable older people and patients with injuries or long-term conditions to complete everyday tasks.

IPEM's objectives are to:

- Ensure and improve the quality, safety and effectiveness of science and technology in healthcare.
- Maintain high standards of professional development for healthcare scientists, engineers and technicians.
- Ensure that the right medical physics and biomedical engineering workforce is in place and provide our members with the support that they need.
- Encourage research and development and increase the uptake of new knowledge and innovations by the medical physics and biomedical engineering sectors.
- Raise the profile of medical physics and biomedical engineering.
- Build two-way engagement with patients and public.

IPEM's Workforce Intelligence Unit aims to provide high-quality robust data on the medical physics and clinical engineering workforce. Both Radiotherapy Physics and Nuclear Medicine Physics are listed on the National Shortage Occupation List, owing to an on-going shortage of trained UK staff. The medical physics workforce comprises both Clinical Scientists and Practitioners, who many also be termed technologists. Recent (2015) IPEM surveys have identified:

- 9% vacancy rate in Radiotherapy Physics (Clinical Scientists)

- 9% vacancy rate in Radiotherapy Physics (Practitioners)
- 12.8% vacancy rate Rehabilitation Engineers (Clinical Scientists)
- 9.8% vacancy rate in Rehabilitation Engineers (Practitioners)
- A reduction in commissioned STP places will threaten the Scientist workforce
- Extremely low numbers exiting from the Practitioner Training Programme (<10 in engineering, 0 in physics)
- Evidence that funding makes a difference : In Wales, where the Welsh Assembly has funded PTP places, sufficient (5) are recruited to meet the needs of Wales
- Reduction in planned PTP funding will threaten the Practitioner Workforce

2. Background on Training in Medical Physics and Clinical Engineering

Training places for Clinical Scientists (physics and engineering) are commissioned and funded by Health Education England. The training routes for Scientists, Engineers and Practitioners have changed significantly since 2011 with the introduction of the Modernising Scientific Careers program.

Clinical Scientist Trainees (both physicists and engineers) are recruited nationally onto the Scientist Training Programme (STP) through the National School of Healthcare Science. This comprises a 3-year training scheme and leads to registration with the Health & Care Professions Council. There is an additional route to registration, termed Route 2, through which candidates with an appropriate level of educational attainment and experience gained through employment can submit for examination. Individuals opting for Route 2 usually take 6 years to progress to registration, and the numbers choosing this route are accordingly very low. Agenda for Change Band 7 is the entry-level in NHS employers for a HCPC registered Clinical Scientist. Those expecting to achieve registration within 12 months are usually also invited to apply for Band 7 posts.

When first introduced, the Practitioner Training Programme required potential Practitioners to apply to a university offering an accredited course through the UCAS application procedure, in an analogous way to applying for radiography, nursing or midwifery. However, unlike other healthcare disciplines, students on healthcare science undergraduate degrees are not eligible for an NHS bursary or any financial assistance with course fees. To date there has been an extremely low take up of PTP accredited degree courses, leading to an acute shortage of practitioners. Only four universities have become accredited to operate the Radiotherapy Physics course, and only Swansea University has ever recruited studentsⁱ. The Welsh Assembly provides financial assistance for a small number of students (approximately 5 p.a.) undertaking this course and no English students have been recruited. Two cohorts of students have received HEE funding to follow a Graduate Diploma in radiotherapy physics at the University of Cumbria (commenced September 2013 and September 2014), and two further cohorts will be funded to commence in September 2015 and 2016. This graduate diploma route has prevented the acute shortage from becoming a crisis shortage but funding for this route is not expected to continue in the future. ***This past experience demonstrates that an un-funded undergraduate course does not attract students.***

In September 2015, following evidence submitted by IPEMⁱⁱ, and an HEE-led review of the PTP, it was announced that, in order to ensure the future supply of practitioners, HEE would commission PTP places in

Radiotherapy Physics, Nuclear Medicine Physics and Radiation Physics at Swansea University, and pay tuition fees. There was also an option for individual Trusts or Local Education Training boards to pay a bursary to trainees.

In January 2016, the number of commissioned of STP places has been announced:

- 61 medical physics (compared to 72 in 2015)
- 7 engineering (compared to 14 in 2015)

This reduction in funding will threaten the future supply of the medical physics and clinical engineering workforce. The UK's radiotherapy provision is set to expand over the next 3 years, with two NHS Proton Beam Therapy centres due to open for patient treatment in 2018, and three independent sector Proton Beam and new conventional centres also planned. This expansion, alone, taken aside from an intended move to 7-day working for radiotherapy will further increase the pressure on the workforce, leading to a high vacancy rate and greater difficulty in recruiting.

3. Workforce Data

Clinical Scientists (Radiotherapy Physics)

A survey carried out by IPEM in 2014 identified a Clinical Scientist shortage of around 58 WTE and predicted that the shortfall in the workforce could only be redressed if STP commissions were increased annually over the next five years, assuming no significant expansion of the workforce such as would be required for routine 7-day radiotherapy workingⁱⁱⁱ. This represents approximately a 9% vacancy rate. A repeat survey in 2015 confirmed that there continues to be a significant shortage, and this has increased to 68 WTE (9% vacancy rate), rather than reducing as had been anticipated. This is because the rate of expansion of the workforce is higher than modelled, and also partly because the 2015 census achieved greater coverage than the 2014 census. This additional data demonstrates that it is not possible to make up the shortfall over the next 5 years, even at the 2015 proposed level of commissioned STP places. The graph overleaf predicts the development of the workforce over the next 5 years, based on 2015 commissions, not the recently announced reduced commissions, which will deepen the shortfall still further.

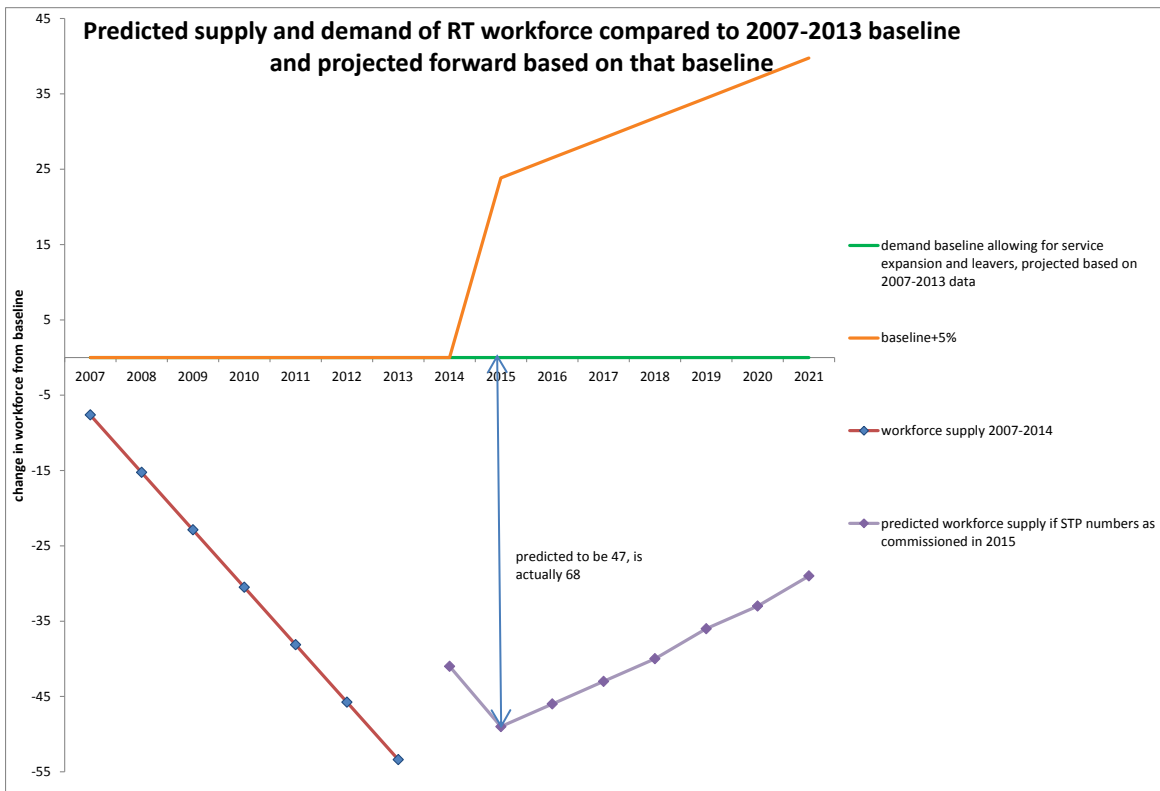


Figure 1: Predicted supply and demand of RT Physics (CS) workforce based on 2014 data. Based on IPEM report, showing predicted growth in the the workforce to 2021.

Practitioners (Radiotherapy Physics and Engineering)

The 2014 survey identified an acute shortage of practitioners, in both physics and engineering. The shortfall in the radiotherapy physics practitioners workforce has been modelled and shown that it will be redressed over the next two years through the out turn from the commissioned graduate diploma at Cumbria, but since this training route is intended to cease, then from 2016 there will be no further supply. Some centres have filled practitioner roles by recruiting radiographers, who can then achieve registration in 12-24 months dependent on background. However, experience has shown that these individuals often return to radiography after 4-5 years, and furthermore the removal of NHS bursary funding from undergraduate radiography degrees may well reduce this supply. The Practitioner Training Programme is only training a very few individuals in radiotherapy physics per annum, through funding by the Welsh Assembly. Over the next five years a severe shortage will develop unless a training route is facilitated. At the 2015 census the vacancy rate was found to be 9.2%, a shortfall of 40 WTE, in line with the predictions based on the 2014 survey data. The graph is shown overleaf.

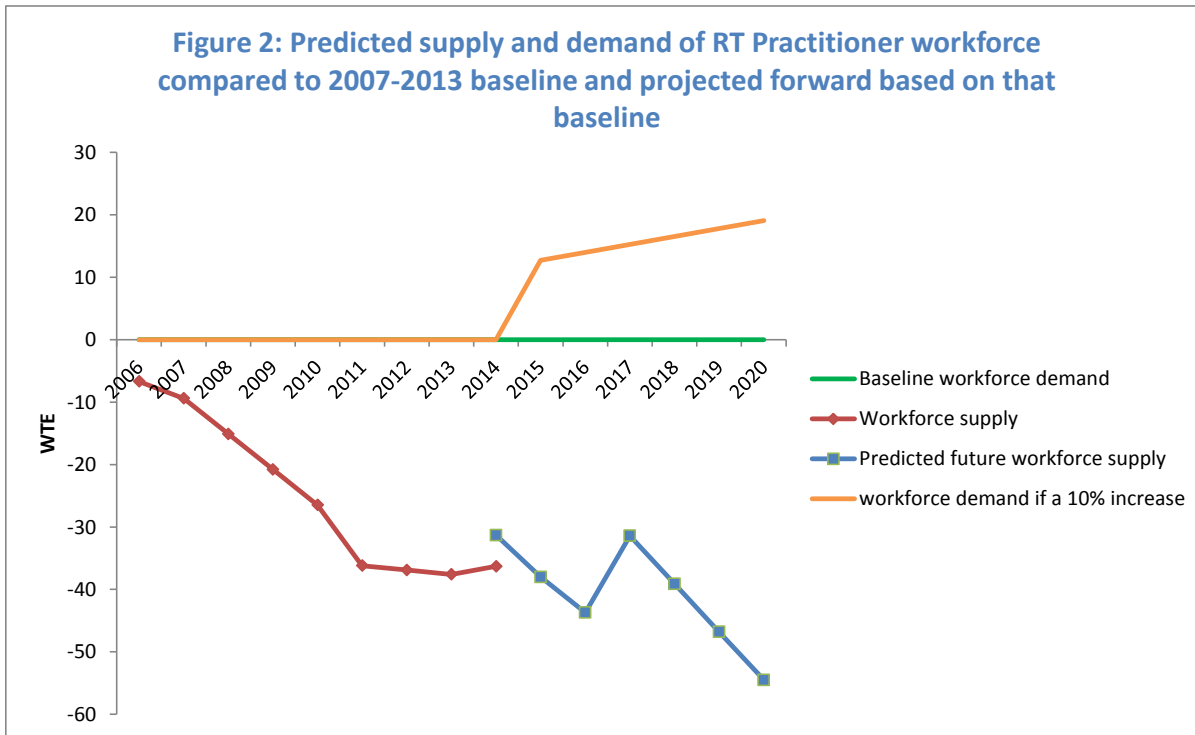


Figure 2: Predicted supply and demand of radiotherapy physics practitioner workforce based on 2014 survey data. Extracted from IPEM report.

Only approximately two students per annum are anticipated to exit from the only PTP accredited Radiation Engineering course, at Bradford University, and recent information suggests that Bradford will no longer recruit after 2015. There is a high level of concern amongst the profession over recruitment of radiation engineers.

Clinical Scientists & Technologists/Practitioners (Rehabilitation Engineering)

A 2015 survey of the Rehabilitation Engineering Workforce conducted by IPEM identified a 12.8% vacancy rate amongst Clinical Scientists, and this is against a background of 38% of centres being understaffed in terms of establishment. The same survey identified a 9.8% vacancy rate in the technologist workforce, with 21% of centres understaffed in terms of establishment. 30% of the technologist workforce is aged over 55, meaning without a functional training scheme, this workforce will be in an acute shortage within the next five years.

Nuclear Medicine, Radiation Physics, Clinical Computing and other medical physics and engineering specialisms report similar workforce shortage, and difficulty in recruiting, although IPEM does not have any specific data relating to these workforces.

4. Case Study

The Colney Centre, Norwich

The Colney Centre is a medium sized radiotherapy Department, with five linear accelerators; one is a service continuity machine, ensuring that no patient misses a treatment owing to breakdown or routine servicing. The department operates 8am-8pm Monday-Friday, and for 2015 has also carried out treatments on Saturdays. In 2015 the department treated over 2600 patients with a total of 39370 fractions of radiation treatment.

Recruitment of Clinical Scientists (Radiotherapy Physics) to Norwich has been challenging for a number of years, despite the Department's positive reputation. The establishment staffing level is 13.28 Whole Time Equivalent (WTE) Clinical Scientists, but the department is currently carrying 3 WTE vacancies, and has done for most of 2015 which has put extreme pressure on existing staff. During 2015 the following vacancies were advertised:

- Post 1 (Agenda for Change 8b)
 - 1 external applicant, not shortlisted, internal appointment made
- Post 2 (Agenda for Change 8b)
 - 1 external applicant, shortlisted but withdrew prior to interview. Internal appointment made.
 - 1 external applicant, withdrew prior to interview, internal candidate appointed
- Post 3 (Agenda for Change post 8A)
 - On first advertisement: 2 applicants, 1 shortlisted. No appointment made
 - Second advertisement 2 applicants, 1 shortlisted. Internal candidate appointed to a 1-year interim appointment
- Post 4 (Agenda for Change post 8A)
 - Not advertised owing to recruitment difficulties
- Post 5 (Agenda for Change Band 7, entry level for HCPC registered Clinical Scientist)
 - 10 applicants, field poor, 3 shortlisted, none registered, one appointed as a trainee pursuing Route 2 to registration, expected to take four years
- Post 6 (Agenda for Change Band 7, one year fixed-term post)
 - 7 applicants, none shortlisted
- Post 7 (Agenda for Change Band 7)
 - 3 shortlisted, 2 withdrew prior to interview, 3rd interviewed but not appointed (and was not registered)

In summary:

- 3 senior vacancies advertised, attracting 7 external candidates. All 3 roles were appointed to internally.
- 1 senior vacancy not advertised, owing to previous unsuccessful recruitment
- 3 entry-level vacancies advertised: 20 applicants, 6 shortlisted, and none of the shortlisted candidates had gained state-registration. 1 trainee appointed on Route 2 instead.

The department has been unable to appoint an external candidate with state-registration since December 2013, and currently has 4 staff following a Route 2 program to State Registration. Training also puts a burden on experienced staff in an already under-staffed department.

5. Conclusions:

- Medical Physics and Clinical Engineering are already shortage occupations with high vacancy rates in all specialties
- Practitioner/technologist workforce in engineering specialties is aging, with a high percentage aged over 55
- The extremely small PTP uptake demonstrates the lack of attraction of an unfunded training route
- Reduction in STP commissions will deepen the acute shortage of MPCE Scientists, despite recruiting from overseas
- Removal of PTP commissions will create a shortage of MPCE practitioners
- Workforce shortages increase the time taken to introduce new and innovative treatments, such as Image Guided Radiotherapy
- The Tavistock Institute's report "Recommendations for achieving a world-class radiotherapy service in the UK"^{iv} 2014 identified a shortage of medical physicists as one of the key improvements required for the UK to provide a world-class service
- Workforce shortages remove the time available for research and innovation, which is a barrier to remaining a world-class service
- IPEM recommend that STP commissions be restored to their 2015 level
- IPEM recommend that PTP commissions be reintroduced

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ⁱ "Radiotherapy Physics Workforce Review and Predictions", 2015 IPEM

ⁱⁱ IPEM evidence to PTP review

ⁱⁱⁱ "Radiotherapy Physics Workforce Review and Predictions", 2015 IPEM

^{iv} "Recommendations for achieving a world-class radiotherapy service in the UK", Tavistock Institute 2014