

IPEM response to the Comprehensive Spending Review

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 around 4,700 members from healthcare, academia and industry. Our members help to ensure patients are correctly diagnosed and safely treated for illnesses including cancer and stroke. They also commission, 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 lead to new technologies and methods that improve on existing therapies thereby improving patient outcomes. They also 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 trained, in place and to provide our members with the support that they need
- Encourage research and development and increase the uptake of new knowledge and innovation by the medical physics and biomedical engineering sectors
- Raise the profile of medical physics and biomedical engineering through education of the public
- Build two-way engagement with patients and public.

IPEM's Workforce Intelligence Unit provides high-quality robust data on the Medical Physics and Clinical Engineering (MPCE) workforce. The medical physics workforce comprises both Clinical Scientists and practitioners, and many may also be termed technologists, and covers several separate specialisms.

Across all specialisms within the MPCE workforce there is a vacancy rate of between 9% and 11%, with some areas having even greater vacancy rates than this. This has led to all scientist and technologist specialisms being listed on the National Shortage Occupation List.

In addition, a 2017 survey by IPEM, which informed the Institute's response to the Migration Advisory Committee's call for evidence on European Economic Area (EEA) workers in the UK labour market, revealed 17.8% of the medical physics workforce in the UK comprises workers from overseas, with slightly over half that number (9.7%) from the EEA. This reveals a significant exposure to changes in migration such as might be precipitated by leaving the EU.

There is a workforce shortage within the radiation safety and diagnostic radiology specialism, which provides advice and perform measurements to ensure the ionising radiation required for many of these diagnostic scans is used safely. This includes ensuring adequate protection for staff carrying out the scans as well as for members of the public in and around the facilities, minimising and controlling any risk.

Figures reveal that 75 per cent of Trusts and Health Boards in the UK do not have as many of these staff as they need for optimum provision, causing hold ups and delays in diagnosis.

Radiotherapy physicists and radiation engineers make a key contribution to the safe and effective delivery of radiotherapy. They support the whole life-cycle of radiotherapy equipment, from evaluation, procurement, installation and commissioning, through to clinical implementation and routine maintenance and quality assurance. They lead and support primary research, developing new equipment and techniques to improve the effectiveness of radiotherapy. They also have key roles in personalising radiotherapy for individual patients by planning and optimising treatments to minimise the risk of side effects and maximise cure rates.

Clinical engineers and biomedical engineers design new devices and work with the development of existing ones, manage the technology used in hospitals, have been at the forefront of the fight against Covid-19. IPEM members played a crucial role in developing advice and guidance for previously unseen ventilators converting anaesthesia machines for use in intensive care and to how hospitals deal with donated equipment.

Members were involved in establishing a logistics hub to collect, service and redeploy centrally-procured equipment around London, and members represented the UK at an international seminar with four EU nations sharing information on the Clinical Engineering response to COVID-19.

At the same time an IPEM clinical engineer was instrumental in the national allocation programme for medical equipment during the pandemic to deal with four distinct types of equipment - that bought centrally through the NHS supply chain, the government's national ventilator challenge, equipment bought on the international market, and donations.

While items bought via the NHS supply chain and those designed in the UK as part of the ventilator challenge were assumed to be suitable for hospitals, those bought on the international markets and donated equipment needed to be evaluated before being distributed.

A process was established to provide technical due diligence, which saw items being assessed at Nottingham by the clinical engineering team before release into the NHS. Following technical review, recommendations were sent back to the centre on whether the equipment could be used in the NHS or not and, if they could, with what provisos. This system ensured equipment was technically evaluated before being allocated to NHS hospitals.

The MPCE workforce, especially those working in diagnostic radiology and the clinical engineering community, played a crucial role in response to the Covid-19 pandemic. We face a shortage in this area due to a perfect storm of insufficient people being trained and an impending retirement timebomb. We would urge an increase in the workforce by funding the 10 - 20 per cent increase in the professionals needed to run the service.

In terms of equipment, we would stress the need for investment in this area. The Clinical Imaging Board, which is made up of three professional bodies, IPEM, the Royal College of Radiologists and the Society and College of Radiographers, carried out a survey in 2017 of magnetic resonance imaging (MRI) equipment. The CIB's report assessed the state of the UK NHS MRI equipment base, together with its usage and replacement plans. The results received represented approximately 42% of the UK installed base of MRI systems.

The results demonstrated a wide variation in equipment ages:

- 29% of clinical systems were 10 years or more years old
- Only 44% were aged five years or under

This compares unfavourably with other European countries. Only half of the responding organisations stated they had a replacement plan in place. There were no replacement plans for nearly 40% of systems that were already seven or more years old.

Compared with data from the Organisation of Economic Cooperation and Development (OECD) the UK has one of the lowest number of MRI systems per million population (6.1) yet performs 56.3 scans per 1,000 population, just slightly under the OECD average, clearly demonstrating a very high level of utilisation.

IPEM would support the introduction of ring-fenced central funding for radiotherapy machine replacement to establish a year-on-year modernisation and replacement programme and address the £140 million backlog in machine replacement costs due to one fifth of England's radiotherapy machines being over the 10-year recommended lifespan.

Improved IT infrastructure for the NHS is also crucial. For the NHS England Radiotherapy service specification, a mitigation plan to support continued local delivery was defined as a 'must have', with IT infrastructure solutions being noted as a key component.

IT will be a key enabler for all services, particularly in light of the challenges posed by Covid-19. The ability to work from home or at a safe distance from hospitals, collaboration between healthcare professionals within networks and the need to adapt new technologies to help improve the efficiency of services artificial Intelligence / machine learning, for example, will all be helped with improved IT infrastructure, software and hardware.

Fully integrating IT systems across NHS Trusts and Health Boards is a long-held ambition dating back many years. While this ambition has floundered several times, it will be crucial for the NHS as we move into a post-Covid way of working for the continued provision of safe, effective healthcare.

In conclusion, IPEM would therefore ask:

- The Government to redress the deficit in the MPCE workforce in terms of funding shortfalls and workforce shortages. This is calculated to require investment of £37M for the radiotherapy physics workforce, and approximately £22M for other MPCE workforces
- Investment in equipment to include £140M to replace out-of-date linear accelerator machines, which are more than 10 years old. There are other equipment needs and requirements including, but not limited to, MRI, CT and other medical equipment, which must be addressed in order to optimally support future healthcare needs including the Covid-19 pandemic.
- Investment in the IT infrastructure of the NHS.

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