Institute of Physics and Engineering in Medicine

POLICY STATEMENT: Leadership and Management of Medical Physics and Clinical Engineering Services

1. Introduction

Physicists, engineers and technologists play vital roles in the delivery of modern healthcare. The Institute of Physics and Engineering in Medicine (IPEM) is the professional organisation that provides a voice for this workforce. We are a charity with over 4,000 members from healthcare, academia and industry and the principal object and purpose of the Institute is 'to promote for the public benefit the advancement of physics and engineering applied to medicine and biology, and to advance public education in the field.'

Our members provide a range of services that help to ensure that patients are correctly diagnosed and safely treated for illnesses such as cancer and stroke. They act as experts and advisors for the use of ionising and non-ionising radiation for diagnosis and treatment of disease. They also support and manage complex medical equipment such as MRI and ultrasound scanners, linear-accelerators, X-ray machines, drug delivery systems and patient monitors. Their research and innovation leads to new technologies and methods that improve on existing medical treatments. They design and provide new solutions that enable older people and patients with injuries or long-term conditions to complete everyday tasks.

This document sets out the key principles of effective and productive leadership and management of medical physics and clinical engineering services in the context of healthcare delivery. These principles are drawn from the extensive experience of practising healthcare science professionals specialising in medical physics and clinical engineering across many different UK organisations. While primarily aimed at NHS services, these principles also apply to independent healthcare providers.

The purpose of this document is to guide organisations whose aim is to create and develop a workforce able to sustain and deliver transformational change and deliver the highest quality services in the context of a rapidly evolving and complex scientific and technological environment that surrounds modern healthcare. The key principles and IPEM's recommendations to best effect their implementation are set out in Section 6.

2. Medical physics and clinical engineering professionals

Healthcare science professionals comprise only 5% of the total healthcare workforce (and medical physicists and clinical engineers only 1%) and yet 80% of diagnoses may be attributed to their work[1].

As registered Clinical Scientists and Healthcare Science Practitioners, they play a fundamental role in ensuring that the right medical technology is used with the right patient, in the right way, at the right time in order to get the best outcome[2,3].

Many Medical Physicists, Clinical Engineers and Clinical Technologists undertake this role in relation to specific patients as part of day to day service delivery either 'hands on' with individual patients or

‘behind the scenes’ assuring quality and safety. Many also have the expertise and experience to design and deliver systematic change fine-tuned to meet local circumstances and needs.

Supporting the healthcare ‘front line’, medical physics and clinical engineering professionals in research roles are building our understanding of new applications of physics and engineering to medicine and biology, developing next generation treatments and devices, working with and within industry so these discoveries can be translated into therapeutic interventions and diagnostic techniques.

3. What are medical physics and clinical engineering services?

Often working in multi-disciplinary teams with other health professionals, Medical Physicists, Clinical
Engineers and Clinical Technologists apply their physics, engineering and technological skills to scientific and technical problem solving as well as to the provision of clinical services. Their roles include:

- Providing specialised clinical services for patients, such as radiotherapy treatment planning and rehabilitation engineering.

- Providing advice on the application and interpretation of complex tests, for example, in nuclear medicine and other imaging modalities.

- Providing scientific and technical services in the clinical environment that have a direct impact on patient care and safety in areas such as equipment performance[4], medical device design and manufacture[4] and radiation protection[5].

- 'Future-proofing' services through research and development, introducing innovations in technology and practice to clinical service and undertaking clinical research.

- Providing organisational advice on the interpretation and application of regulations and the reduction of risk.

Medical physics and clinical engineering comprises multiple disciplines. The increasing use of rapidly developing technologies has resulted in an increased overlap and ‘cross fertilisation’ between these specialities. Examples of this can be found in the increased use of x- ray imaging technologies to improve the accuracy of delivery of radiotherapy treatments. Many services have close links to university departments and are developing links with industry.

4. Why are these services necessary?

Medical physics and clinical engineering impacts on virtually every care pathway, contributing significantly to the delivery of diagnostic and therapeutic procedures and to the management of risk. As such, medical physics and clinical engineering professionals are well placed to use their experience of the realities of service delivery and changes in technologies to inform service improvement, service development and cost reduction thus creating new and better ways of meeting patients’ needs.

They oversee the regulatory compliance, safe introduction and use in the adoption of new technology into the clinical environment. They develop and adapt technologies to meet local needs and undertake and support more basic research in partnership with other clinicians as part of organisational research strategies.

Like other complex and specialised services, the balance of medical physics and clinical engineering provision differs across the country. Variations are primarily due to local service configuration, level of specialism in different providers, the way local services have evolved to suit differing clinical needs and the available skills and interests of clinical and scientific staff.

Traditionally based in secondary and tertiary care, these services are impacting increasingly directly on patients in primary care as existing and emerging medical technologies contribute to more holistic and to more personalised health and social care. For example, services may support 'self-care' that may include 'care closer to home' (as an alternative to having to stay in hospital) thus enabling individuals to share in decision making that relates to their own care planning.

5. Consultant Clinical Scientists

The Consultant Clinical Scientist takes ultimate responsibility for the integrity of the scientific and technical knowledge base applicable to their specialty and demonstrate the leadership skills necessary to ensure scientific services meet the needs of the healthcare community[6].

The introduction of the Higher Specialist Scientist Training (HSST) programme provides a more consistent training process for Consultant Clinical Scientist and aims to increase the number of scientists able to work at very senior levels to lead scientific services and work within multi-professional clinical teams. The HSST programme is endorsed by Health Education England (HEE) and commissioners at Local Education and Training Boards (LETBs)[6]. The Higher Specialist Scientific Register (HSSR) held by the Academy for Healthcare Science (AHCS) was established in 2015[7]. The register is open to Clinical Scientists who have completed HSST or those who can demonstrate equivalence. Detailed guidance, including generic role descriptors and person specifications for Consultant Clinical Scientists is available from NHS Employers. Inclusion on the Higher Specialist Scientific register ensures that HSST standards of proficiency are met by eligible applicants for Consultant Clinical Scientists posts.

6. The key principles of and recommendations for effective and productive leadership of medical physics and clinical engineering services

Time and again, experience has shown that the most effective way to make the best use of this scarce, valuable and transformative resource is to release the potential of medical physics and clinical engineering professionals to analyse, organise and innovate. The principles that underpin this inform IPEM's recommendations which, upon implementation, will create and develop a medical physics and clinical engineering workforce able to deliver transformational change and sustain the highest quality services. Those principles and recommendations are as follows.

6.1 Service Accreditation

Quality assurance is a core competence of medical physics and clinical engineering professionals who, in turn, are very pro-active in leading the development of appropriate Quality Management Systems for the services that they deliver.

IPEM members have taken the lead in developing the content of standards applicable to medical physics and clinical engineering services which led to the development of BS70000 standard, 'Medical physics, clinical engineering and

associated services in healthcare – requirements for quality safety and competence'. MPACE is the only accreditation standard that is intended to cover all of MP & CE services. NHSE policy is to support and commission systems focused on the prioritisation of accredited healthcare services across all scientific and diagnostics services[8]. NHSE asked [9] the United Kingdom Accreditation Service (UKAS) to manage and deliver an accreditation scheme for Medical Physics and Clinical Engineering (MPACE) specialisms, and IPEM have contributed experts to its technical advisory committee. The overall aim of the MPACE scheme is to provide assurance of the quality and safety of services to patients, employers, commissioners, funding bodies and referrers. BS70000 will be considered as the standard, before establishing a robust assessment approach and process.

IPEM Recommendation: All medical physics and clinical engineering services should be appropriately accredited.

6.2 Professional Interaction

Regular interaction between medical physics and clinical engineering professionals is essential to stimulate the 'cross fertilisation' of ideas and to provide the peer support necessary for effective and safe service delivery at the 'cutting edge' of best practice.

In particular, a locally based 'critical mass' of professional expertise is necessary for the continuing personal and professional development (CPPD) of the existing workforce, for the education and training of the future workforce, and, crucially, for fruitful research, development and innovation all of which underpin the successful introduction and exploitation of new and evolving technologies into and within the clinical environment to improve care.

IPEM Recommendation: All medical physics and clinical engineering professionals should be enabled and encouraged to interact professionally with each other both locally and across departmental, organisational and sector boundaries.

6.3 Clinical Scientific and Strategic Leadership

Medical physics and clinical engineering professionals having 'one foot' in service delivery and 'the other foot' in service improvement, service development and cost reduction is the best way to ensure the most efficient and effective use of this very valuable staff resource. Indeed, it is often their experience of the realities of service delivery that drives medical physics and clinical engineering professionals to create new and better ways of delivering services. The challenge for healthcare providers is to effectively harness this motivation and expertise if initiatives such as 'Prudent Healthcare'[10], 'Choosing Wisely'[11] and 'Transforming Your Care'[12,13,14]are to realise their full potential.

Experience to date has shown that Consultant Clinical Scientists with a balance of these clinical, scientific, technical and management skills are often best placed to provide leadership to complex services with larger multidisciplinary teams and to support healthcare providers to deliver 'better and safer for less'.

IPEM Recommendation: All medical physics and clinical engineering services should be directly led by Consultant Clinical Scientists in Medical Physics or Clinical

Engineering, or have access to such expertise and leadership should this not be available within the organisation

6.4 Professional Representation

As exemplified by current practice in Wales[15] and Scotland[16], healthcare science professional representation at the executive and advisory levels of NHS and government is promoted and resourced in the same way as medical, nursing and other health professions.

More specifically, the Directors of Therapies and Health Science (DoTHS) in Wales jointly lead the clinical governance agenda in conjunction with the Medical Directors and Nurse Directors. The DoTHS role has an emphasis on professional leadership and continuing clinical and cost effective development and transformation of services, ensuring therapy and scientific staff contribute fully to the modernisation agenda, working in partnership with other agencies where appropriate.

In Scotland, the national healthcare science leads and NHS board healthcare science leads have key leadership roles in the delivery of optimised and sustainable services.

IPEM Recommendation: All medical physics and clinical engineering professionals should be represented at executive level within their respective organisations and at the advisory level of government.

7. References

1. Modernising Scientific Careers: the UK way forward (Department of Health 2010)
2. IPEM submission to the Welsh Government Health and Social Care Committee inquiry into 'Access to medical technologies in Wales' October 2013
3. Response to the Scottish Government's consultation on the Healthcare Science National Delivery Plan for Healthcare Science Professionals in Scotland 2014-2017 (IPEM September 2014)
4. Managing Medical Devices: Guidance for healthcare and social services organisations (MHRA 2014)
5. European Guidelines on Medical Physics Expert (European Commission 2014)
6. Making Prudent Healthcare Happen (Welsh Government June 2015)
7. NHS Employers, Consultant Clinical Scientist Guidance, 2016
8. NHS England. NHS position statement diagnostic accreditation.
9. NHS England. Joint statement on improving clinical engineering and physical science services.
10. Academy for Healthcare Science HSS Register, 2019
11. Academy of Medical Royal Colleges - 'Choosing Wisely' Briefing (May 2015)

12. Transforming Your Care: A Review of Health and Social Care in Northern Ireland (DHSSPSNI 2011)

13. The Right Time, The Right Place (Liam Donaldson et al. DHSSPSNI December 2014)

14. IPEM Response to Donaldson Report (May 2015)

15. The Local Health Boards (Constitution, Membership and Procedures) (Wales) Regulations 2009 - Membership of Local Health Boards 3(2)(i)

16. Driving Improvement, Delivering Results: The Scottish Healthcare Science National delivery Plan 2015-2020.

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