ACPSEM
Australasian College of Physical Scientists & Engineers in Medicine

Expert Working Group Framework for Education 2030 Project

Topic 2: Radiation Applications in Surgery for Medical Physicists

This document provides a framework and guidance for the Expert Working Group on Radiation Applications in Surgery, with a specific focus on the roles and responsibilities of medical physicists in surgical environments. The goal is to identify research needs, gaps in professional education, university foundation knowledge, and CPD requirements, ensuring that medical physicists are equipped to contribute to the evolving use of radiation technologies in surgery.

:: 2.1: Fundamentals of Radiation in Surgical Environments ::

POTENTIAL KEY AREAS TO EXPLORE

- **Overview of Radiation Uses in Surgical Environments:**
  - What are the key uses of radiation in surgery (e.g., intraoperative imaging, radiation therapy during surgery, endovascular procedures)?
  - What are the roles of medical physicists in ensuring safe and effective radiation use during surgery?
  - How do medical physicists work alongside surgeons and other specialists to ensure the proper application of radiation in the operating room?
- **Multimodality Imaging and Real-Time Guidance:**
  - How is multimodality imaging (CT, fluoroscopy, ultrasound, etc.) integrated into surgical planning and execution?
  - What are the technical challenges medical physicists face when combining multiple imaging modalities for real-time guidance during surgery?

POTENTIAL EVALUATION QUESTIONS AND APPROACHES

- **Research Needs:** What gaps exist in the research regarding the application of radiation in surgery, especially in multimodal environments?
- **Future Education Courses:** Should medical physics programs include more specialized training in radiation safety, imaging physics, and real-time guidance in surgical settings?
- **University Foundation Knowledge:** What core knowledge in radiation physics, multimodal imaging, and clinical integration should be included in medical physics curricula to prepare students for the unique challenges of radiation in surgery?
- **CPD Requirements:** What CPD modules are needed to ensure practicing medical physicists are adequately trained to support radiation applications in surgery?

:: 2.2: Image-Guided Endovascular Procedures ::

POTENTIAL KEY AREAS TO EXPLORE

- **Use of Fluoroscopy and 3D Imaging:**
  - What are the key principles of fluoroscopy and 3D imaging in endovascular surgery?
  - How can medical physicists contribute to optimising fluoroscopic techniques in a real-time surgical environment, particularly regarding image quality, dose reduction, and patient safety?
- **Dose Management and Workflow Integration:**
  - What strategies can medical physicists employ to ensure proper dose management in endovascular procedures while maintaining the image quality needed for precision?
  - How can medical physicists work with the surgical team to integrate radiation safety protocols and improve workflow during image-guided procedures?

POTENTIAL EVALUATION QUESTIONS AND APPROACHES

- **Research Needs:** What advancements are required to improve fluoroscopy, 3D imaging, and dose management in endovascular procedures? What role do medical physicists play in advancing these technologies?
- **Future Education Courses:** Should medical physics education programs incorporate specific training on fluoroscopy, 3D imaging, and endovascular procedures?
- **University Foundation Knowledge:** What foundational knowledge in imaging physics, radiation protection, and dose management is required to equip students with the skills necessary for image-guided procedures in surgery?
- **CPD Requirements:** What ongoing training is needed for medical physicists to stay up-to-date on the latest fluoroscopic and 3D imaging techniques used in endovascular surgery?

:: 2.3: Intraoperative Brachytherapy ::

POTENTIAL KEY AREAS TO EXPLORE

- **Planning and Shielding in Theatre Settings:**
  - How do medical physicists ensure proper planning and shielding in the operating room during intraoperative brachytherapy?
  - What are the unique challenges of performing brachytherapy in a surgical environment, especially regarding patient positioning, source placement, and radiation safety?
- **Source Handling and Regulatory Logistics:**
  - What regulatory requirements and safety protocols must be adhered to in handling brachytherapy sources during surgery?
  - How do medical physicists ensure that source handling and logistics meet safety and compliance standards in the operating room?

POTENTIAL EVALUATION QUESTIONS AND APPROACHES

- **Research Needs:** What are the current gaps in the research on intraoperative brachytherapy techniques, source handling, and shielding in surgical settings?
- **Future Education Courses:** How should medical physics programs incorporate training in brachytherapy, radiation protection, and real-time planning for surgical environments?
- **University Foundation Knowledge:** What key knowledge in radiation therapy planning, shielding, and regulatory compliance is necessary for medical physicists to operate effectively in surgical settings?
- **CPD Requirements:** What specific CPD modules are needed to train medical physicists on the intricacies of intraoperative brachytherapy, particularly regarding source handling and radiation safety?