IAEA
International Atomic Energy Agency

Medical Physics:
Safety and Accuracy in Radiation Medical Procedures

IOMP

Medicine has undergone remarkable developments and highly advanced technology is used in imaging and treatment of diseases with radiation. Medical Physicists play a fundamental role in the development, commissioning, management and application of such technologies, and ensure the quality of imaging and treatment procedures, while minimizing radiation risks to patients.



What is a medical physicist?

Medical physicists are highly qualified health professionals, with an advanced postgraduate university degree, such as MSc or PhD, followed by specialized clinical training in one or more medical physics disciplines, such as radiation oncology, diagnostic and interventional radiology, nuclear medicine and radiation protection. They are members of comprehensive medical teams in radiation medicine.



What do medical physicists do?

They contribute to the safe and accurate use of radiation to achieve the best outcome of the prescribed medical procedure for either diagnosis or therapy. They assess radiation doses and associated risks to patients and personnel, especially for pregnant women and children. In addition, medical physicists play an important role in radiation protection education and training of health care professionals, and participate in research and development to improve patient care.



How do medical physicists ensure that radiation medical procedures are safe?

Medical physicists optimize the delivery of radiation procedures prescribed by medical radiological practitioners. They do so by performing accurate measurements and calculations, maximizing the expected benefit against the potential risk in the use of radiation, and contributing to the development and implementation of quality assurance programmes.



What can go wrong without a medical physicist?

Without a clinically qualified medical physicist, the implementation of medical radiation procedures can lead to the following events:

- the patient may receive an incorrect dose which can jeopardize the success of the medical treatment or the quality of diagnosis
- the medical staff and the public might be in danger of inadvertent or unnecessary radiation exposure

In extreme cases, this could lead to a serious accident.

13-24461