IAEA Technical Cooperation Programme

Improving medical physics through education and training in Asia and the Pacific

The challenge

The expansion of technically sophisticated radiotherapy services and the strengthening of safety requirements present a challenge for medical physics practitioners in the Asia and the Pacific region: how best to keep pace with changing technologies to deliver the highest standard of services.

In radiation medicine, the role of the medical physicist is critical to ensure the safe, effective and economic delivery of medical services, typically including radiation oncology, diagnostic radiology and nuclear medicine. Due to higher living standards, an ageing population and greater expectations of medical services in the region, the application of radiation medicine is expanding in the Asia and the Pacific region, both in complexity and in general application. In addition, the human resources needed for medical physics services are not always available in the region, and the expansion in radiation medicine services will place further stress on the current medical physics workforce.

The project

This four-year project was developed by the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA). It built on an earlier project that had developed clinical training guides and associated documentation to train medical physicists in their own environment with the support of internal national experts, where available, and expert regional support.

Under the project, national and regional needs and existing resources for sustainable medical physics

IAEA expert demonstrating linear accelerator quality control procedures to Bangladeshi medical physics residents enrolled in radiotherapy clinical training. (Photo: Brendan Healy/IAEA)

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training and education were first evaluated through a survey questionnaire and the conduct of a gap analysis. Common standards for education and clinical training were then established through a series of technical meetings. These standards were published on the IAEA website, together with a common statement on what constitutes a qualified medical physicist and proposals for these criteria to be adopted nationally or regionally by means including professional recognition by appropriate regulatory authorities, government bodies, professional bodies and other stakeholders.

An e-learning platform called AMPLE (Advanced Medical Physics Learning Environment) was also developed under the project, running on the IAEA CLP4NET platform. AMPLE was tested through pilot training programmes, typically of two to three years duration, for all medical physics specialities in Government Parties to the agreement such as Bangladesh, Thailand, Philippines, Singapore, India, and Indonesia.

The impact

The project contributed directly to increasing the number of clinical training programmes in the region through the establishment of the e-learning platform AMPLE. The pilot clinical training programmes allowed medical physicists to learn from regional centres with more experience. In total, around 110 residents were enrolled in clinical training established during the project.

In line with the objectives of the project, Member States implemented the tools provided to build capacity among their medical physics workforces. Bangladesh successfully trained four nuclear medicine medical physicists, who all successfully completed the training programme. In Indonesia 12 radiotherapy medical physicists were certified. Nepal is also applying these new standards to staff training, ahead of the planned procurement of three new radiotherapy machines in 2018. Myanmar founded the Myanmar Medical Physicists Association (MMPA) in 2015, drawing on the standards established by the project. MMPA also contributed to the development of a four-year Radiation Technologist Bachelor Programme as part of the education and training programme for radiation technologists at the University of Medical Technology, Yangon, with an annual intake of approximately 10 students.

PROJECT INFORMATION

Project No: RAS6077

Project title: Strengthening the Effectiveness and Extent of Medical Physics Education and Training (RCA)

Duration: 2014-2017 (4 years)

Budget: €289 550 (including extrabudgetary contributions from Australia and Japan)

Contributing to:

Partnerships and counterparts

A follow up project on enhancing medical physics through regional cooperation is focusing on collaborating with the Asia-Oceania Federation of Organizations for Medical Physics, the Association of Southeast Asian Nations (ASEAN) College of Medical Physics, the International Organization for Medical Physics, the International Medical Physics Certification Board and the International Centre for Theoretical Physics to enhance outcomes on a regional scale.

The science

Nuclear medicine is a medical specialty that uses radioactive materials, called radionuclides, to help diagnose and treat a wide variety of diseases, and for biomedical research. A nuclear medicine team commonly consists of a nuclear medicine physician, a nuclear medicine technologist, a nuclear medicine physicist and a radiopharmacist.

Medical physicists are highly trained professionals specializing in the medical application of radiation physics to prevent, diagnose and treat many kinds of diseases, in particular cancer. Together with other healthcare professionals, the medical physicist plays a central role in developing, planning and implementing cancer patient treatment, as well as in research and development.

Working with equipment such as medical linacs generating x rays, ultrasound, magnetic and electric fields and lasers, medical physicists ensure that radiation is used safely and effectively in order to achieve the best diagnostic or therapeutic outcome. Their skills are essential for the safe use of nuclear technology in medical imaging, nuclear medicine and radiation oncology. While a doctor focuses on the diagnosis and treatment of disease, a medical physicist concentrates on the delivery of treatment, ensuring its effectiveness as well as patient protection.

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