

Heart disease and cancer are the world's number one and two killers. According to the World Health Organization, heart disease is responsible for almost one third of deaths worldwide, and cancer causes 10% of deaths every year.

Early and accurate diagnosis is vital for the effective treatment of both heart disease and cancer. Nuclear medicine techniques are helping to provide vital information that doctors need to make decisions about treatment and disease management for patients.

What is Nuclear Medicine?

Nuclear medicine is a branch of medicine that uses radiopharmaceuticals (i.e. a drug or substance suitable for human administration that has been linked to a radioactive atom (radioisotope) to identify or to treat illnesses and diseases. Radioisotopes release energy in the form of radiation, which can be detected and transformed into images. This is the basis of nuclear medicine imaging techniques such as single photon emission computed tomography in cardiology and positron emission tomography in oncology.

In therapeutic applications, the energy released by the radioisotopes brought to malfunctioning cells is used to kill cancerous cells. Treating these cells with a therapeutic dose of radiation may lead to the regression or cure of some diseases. The patient experiences no discomfort during the test and typically after a few hours there is no trace of the test. Once a radiopharmaceutical enters the body, it is incorporated into natural biological processes and excreted normally.

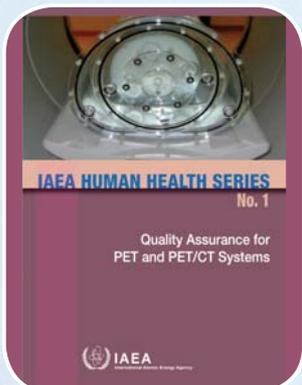
The Role of the IAEA: Technical Cooperation and Coordinated Research Projects

The IAEA provides technical assistance and advice to its Member States in addressing major health problems such as heart disease and cancer using nuclear medicine techniques. This assistance is requested by Member States according to their needs and interests, and delivered through technical cooperation projects, coordinated research activities, education and training opportunities, quality assurance and standard setting, as well as technology transfer.

In Cuba, for example, an IAEA technical cooperation project aimed at capacity building and quality assurance of nuclear medicine in cardiology resulted in improved provision of services in the country. The highly skilled and committed medical professionals in Cuba continue to collaborate closely with IAEA experts. The refurbished facilities, complete with sophisticated equipment that they have gained through the project, now allow for further sharing of knowledge and capacity building in the region.

Safe and Effective Use of Nuclear Medicine Procedures

For nuclear medicine to be an effective method of diagnosis and treatment, a certain standard of clinical practice must be in place. The IAEA has established a quality audit process (QUANUM) to help nuclear medicine departments and laboratories provide quality care for their patients. During such an audit, a team of professionals conducts an internal review of an institution. The quality of staff, equipment and procedures, patient protection and safety, the overall performance of the nuclear medicine department as well as its interaction with external and internal service providers are reviewed and evaluated. The review provides valuable information to strengthen the quality of the services provided, and introduce a culture of conducting annual audits with the aim of improving the standard of care, thus providing optimal services to their patients.



Capacity Building for Professionals

The IAEA provides on-site local training and professional advice from IAEA staff and external experts. IAEA organized consultant and technical meetings produce guidelines, manuals and technical reports to ensure the good practice of nuclear medicine. These are available free of charge to experts worldwide and often set international standards as well as serving as a reference in many areas of nuclear medicine.



The IAEA has developed the Nuclear Medicine Database (NUMDAB) at nucmedicine.iaea.org to gather and maintain information on nuclear medicine practices around the world. The database provides information on the current status of nuclear medicine infrastructures and educational systems, and assists in planning for emerging needs in nuclear medicine.

International conferences, hosted and organized by the IAEA on a range of topics (such as IPET 2011), bring together hundreds of nuclear medicine professionals from all over the world. This is especially important for IAEA supported experts from developing countries who may otherwise not have the opportunity to participate in a professional international meeting. By facilitating appropriate human resource capacity building, the IAEA helps to establish new, and improve existing, nuclear medicine facilities.



One of the key tools used to expand human resource capacity in nuclear medicine is the IAEA's fellowship programme. Fellowships provide individuals in low and middle income Member States with the opportunity to receive training in their field. This training is completed at universities, hospitals, government agencies and private corporations in countries that already maintain considerable capacity in a particular field of expertise. In addition to fellowships, the IAEA also supports regional training courses in nuclear medicine. These training courses are held locally in low and middle income Member States with the necessary support provided by the IAEA.

Human Health Campus

To provide health professionals, including nuclear medicine specialists, with up-to-date developments in their area of expertise, the IAEA has developed a virtual learning platform, the Human Health Campus, available in broadband and mobile versions at <http://humanhealth.iaea.org>. Through collaboration with universities, teaching hospitals and specialists from around the world, the platform provides health practitioners in Member States with the resources necessary to improve their clinical practices. It includes case studies, guidelines, scientific papers and reports and a library of valuable materials related to nuclear medicine.

