

# GOOD MEDICINE, GOOD HEALTH

## *The IAEA Promotes Radiation Protection of Patients and Health Professionals*



Patient beneath a multi-detector Computed Tomography (CT) scanner (left) which takes detailed images of his heart (right).  
(Photo: J. Vassileva/IAEA)

**M**edical radiation exposure in the form of computed tomography scans, X-rays, fluoroscopy and positron emission tomography scans are the greatest source of exposure to man-made sources of ionizing radiation.

According to the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), more than 10 million diagnostic radiology procedures and 100 000 diagnostic nuclear medicine procedures are performed every day. In addition, around five million radiotherapy treatments are given annually.

The use of radiation in medicine is one of the greatest medical discoveries of the past 120 years. Its use has vastly improved our understanding of the body's processes and functions, as well as our ability to diagnose and cure diseases.

But along with medical exposure to radiation comes a risk of inappropriate use.

The IAEA works to promote strategies and management planning that help protect patients, staff and the public from unnecessary and unintended exposure to ionizing radiation, while promoting good medicine and good health.

### **Keeping Tabs**

In 2012, the IAEA launched Safety in Radiation Oncology (SAFRON), a web-based voluntary

reporting system designed to prompt medical centre staff to identify the causes of accidents and near misses in the use of radiotherapy for cancer treatment at their centres, with the aim of preventing these occurrences in the future. By pooling information on the near misses and events, and causality and corrective actions, radiotherapy facilities can develop a safer system to prevent or reduce the likelihood of an event from occurring in the future.

SAFRAD (Safety in Radiological Procedures) is another voluntary reporting system where patients' dose reports and relevant data are included in an international database when these patients have exceeded the defined trigger levels or are submitted to events in fluoroscopically-guided diagnostic and interventional procedures. The primary objective of the system is academic in nature. It is believed that going through the process of using SAFRAD itself results in improved safety and quality of service.

The IAEA also spearheads the Smart Card/ SmartRadTrack project, developing methodologies to track radiation exposure of individual patients throughout their lives, no matter which facility/country they visit in order to seek medical care. The project is meant to raise awareness of the lifetime radiation exposure from medical procedures and help doctors treating a patient to confirm that another procedure is necessary and refraining from repeating procedures unnecessarily.

Under the International Action Plan for the Radiation Protection of Patients, a guidance document approved by the IAEA's governing bodies in 2002, the Agency provides standards and training, facilitates knowledge exchange, offers direct technical assistance and builds awareness to improve patient care. In 2013, the joint IAEA and World Health Organization position statement on strengthening radiation protection, the Bonn Call for Action, was issued, identifying responsibilities and proposing priorities for radiation protection in medicine over the next decade.

### The 'Triple A Campaign' in Patient Protection: Awareness, Appropriateness and Audit

The IAEA is also working with local authorities and health ministries to change physicians' approach to the use of ionizing radiation on patients via a programme called AAA (awareness, appropriateness and audit).

**Awareness:** the physician or radiologist must understand the risks associated with exposing patients to various radiation doses, be able to evaluate whether the patient's condition and the potential knowledge and benefits gained from any procedure is likely worth this risk, and be able to communicate the potential risks and benefits to the patient.

**Appropriateness:** each procedure using ionizing radiation should be suitable for obtaining the information needed to diagnose the patient. Appropriateness criteria, or clinical imaging guidelines, are recommendations that inform the decision of the health care provider on the best imaging test base on patient conditions and available equipment. This may also include a non-ionizing test.

**Audit:** assess how well and consistently the principles of awareness and appropriateness are being used in the clinical setting. The outcomes from an audit must be integrated in the hospital/clinic's operating life.

### Justify and Optimize

The principles of justification and optimization are very important when talking about radiation protection and safety in medicine.

Justification involves judging whether the procedure will potentially improve diagnosis

or provide necessary information about the patient, and whether or not the procedure will potentially do more good than harm.

Optimization involves ensuring that the equipment and procedures that are used produce good quality images, while transmitting the lowest possible radiation dose to the patient.

### Protecting Workers in Medicine

According to UNSCEAR, more than 7.4 million doctors, technicians, nurses and dentists are involved in the medical use of radiation.

In a report, UNSCEAR notes that the number of occupationally exposed workers in medicine has been increasing rapidly over the years, and individual occupational exposure varies widely among those involved in medical care. There are certain medical procedures that might give substantial doses to medical staff, and the education of medical professionals in radiation protection issues is a continuing problem.<sup>1</sup>

The IAEA initiated the Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR-IC) project, an international database specifically for interventional cardiology facilities that can be used to identify and improve optimization of occupational radiation protection. This is achieved by collecting information on the worker dose and the procedures used and then by sharing information on best practices for optimization.

The IAEA also provides detailed information on its website ([rpop.iaea.org](http://rpop.iaea.org)) about radiation-induced cataracts, which may be of concern to the staff involved with interventional medical procedures using X-rays.

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<sup>1</sup>UNITED NATIONS, "Annex B — Exposures of the Public and Workers from Various Sources of Radiation", Sources and Effects of Ionizing Radiation (Report to the General Assembly), Scientific Committee on the Effects of Atomic Radiation (UNSCEAR 2008), UN, New York (2010).