

Abstract

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Patient Safety in Medical Imaging: The IAEA Vision

Radiation protection in medicine has unique aspects and is an essential element of medical practice. Medical uses of radiation occur throughout the world, from large cities to rural clinics. It has been estimated that the number of medical imaging procedures worldwide using ionizing radiation surpasses 10 million per day. In spite of these large numbers, there are many parts of the world without adequate equipment, where the ability to perform additional medical procedures would likely result in a net benefit. Medical uses of ionizing radiation constitute more than 98% of radiation exposure to the world's population from man-made sources.

All medical exposure procedures involve the purposeful, deliberate and direct exposure of humans to ionizing radiation. In typical industrial and research uses, radiation protection programs are almost exclusively focused on reducing doses. The situation in medicine is more complex. While doses that are higher than necessary are a problem, doses that are reduced too far may cause images to be too poor to make a diagnosis. Under these circumstances, a low dose is worse than the correct or necessary dose. While most radiation protection programs in non-medical settings are aimed at reducing collective population doses, it may be argued that in medicine, increasing the use of medical procedures should carry a net benefit and thus under the correct conditions, increasing medical exposures (particularly in developing countries) can be beneficial.

Current issues in radiation protection of patients include not only addressing the rapidly increasing collective dose to the global population from medical exposure, but also that a substantial percentage of diagnostic imaging examinations are unnecessary, and the cumulative dose to individuals from medical exposure is growing. In addition to this, continued reports on deterministic injuries from safety related events in the medical use of ionizing radiation are raising awareness on the necessity for incident prevention measures. The International Atomic Energy Agency is engaged in several activities to reverse the negative trends of these current issues, including improvement of the justification process, the tracking of radiation exposure history of individual patients, shared learning of safety significant events, and the use of comprehensive quality audits in the clinical environment.

The International Atomic Energy Agency established an International Action Plan (IAP) in 2002 in cooperation with international organisations and professional bodies. The achievements of the IAP, include harmonised training material, guidance documents, a number of publications, a website on radiation protection of patients (<http://rpop.iaea.org>) and a series of actions in Member States that have shown positive impacts on patient protection. In 2013, the joint IAEA and WHO Position Statement on the Bonn Call-for-Action was released. It is a statement that identifies the main actions considered to be essential for the strengthening of radiation protection in medicine, including in medical imaging, for the next decade. The IAEA vision about patient safety in medical imaging can be clearly seen in this document.