

# Radiation and Transport Safety

## Objective

To achieve global harmonization of the development and application of the Agency's radiation and transport safety standards, and to increase the safety and security of radiation sources and thereby raise the levels of protection of people, including Agency staff, against the harmful effects of radiation exposure.

## Radiation Protection of Patients

Approximately 180 million X ray examinations of children are performed annually. At its 55th General Conference in September, the Agency hosted a side event on 'Children and Radiation in Medicine – Protecting Young Patients'. The need to further develop and disseminate information and training material on radiation protection of children was highlighted (Fig. 1). A Safety Report on radiation protection for modern paediatric radiology was completed for publication.

The IAEA safety standards state that the justification of medical exposure for an individual patient shall be carried out through consultation between the radiological medical practitioner and the referring medical physician. However, there is limited awareness among referring medical physicians, including general practitioners and primary care physicians, about radiation exposure and the risks involved regarding different procedures, making it essential to reach this group. To address this issue, the Agency organized a technical meeting on radiation protection for referring physicians. At the meeting, held in Vienna in September, recommendations were made to national medical societies on training and promotion of best practices.

Safety in radiotherapy remained an important issue during the year, with the Agency continuing its work on the 'Safety in Radiation Oncology' (SAFRON) reporting system. SAFRON is a web based, voluntary reporting system for radiotherapy that can be used to report, share and learn from incidents and near incidents. It is expected to be

**Radiation risk in paediatric radiology**

- Every Radiology Department should have information for parents

**X-rays**  
How safe are they?  
SAFE QUESTION

IAEA | Radiation Protection of Patients (RPOP)

Information for: **Pregnancy & Children**

1. Can I undergo X ray investigations while I am pregnant?
2. How long after radiiodine treatment should I wait before getting pregnant?
3. Can I breast feed following radio-iodine treatment?
4. Can a young person undergo radiiodine treatment for hyperthyroidism?
5. Can a pregnant patient receive radiotherapy?
6. Can I undergo a CT scan while I am pregnant?
7. Is it important to know if I am pregnant for undergoing a CT scan?
8. Should I be concerned about radiation if my child has been prescribed a CT?

**1. Can I undergo X ray investigations while I am pregnant?**  
Yes, but with certain precautions. The aim is to minimize exposure of the unborn child. The unborn child is considered to be more sensitive than adults or children to potential adverse radiation effects. For many investigations such as a CT examination of the head (including dental X rays), chest and arms, where the unborn child is not in the direct X ray beam, the dose to the unborn child would be very low. These investigations can be conducted without concern provided there is medical justification. With these procedures the radiographer or technologist might provide you with some shielding to cover your pelvic region just as an added precaution. If a procedure is being considered in which the pelvic region and the unborn child will be in the direct path of the X ray beam, especially fluoroscopy or CT, which can produce a higher dose than plain X ray examinations, the doctor might consider delaying the procedure, using an alternative investigation such as ultrasound, or taking special actions to keep the dose to the unborn child as low as possible when the procedure is essential to the mother's health. If you have additional questions, discuss these with your doctor.

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**2. How long after radiiodine treatment should I wait before getting pregnant?**

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FIG. 1. Training material for health professionals on the radiation protection of children is available on the Agency's patient protection web site: rpop.iaea.org.

released for general use in 2012, following a pilot study involving selected hospitals around the world.

## International Basic Safety Standards

The Agency's Safety Requirements on *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards – Interim Edition* (IAEA Safety Standards Series No. GSR Part 3 (Interim)) were approved by the Board of Governors in September 2011. The revision of the BSS was carried out in collaboration with the co-sponsoring organizations – the European Commission, FAO, ILO, OECD/NEA, PAHO, UNEP and WHO. An interim edition of the BSS was published in November 2011. The final edition will be published after the co-sponsoring organizations have formally endorsed the revised BSS.

The estimates of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) as well as the 2007 recommendations of the International Commission for Radiological Protection (ICRP) are fully taken into account in the new BSS. Requirements relating to the safety of radiation sources, the protection of patients undergoing medical exposures and the imaging of persons for non-medical purposes have been considerably strengthened. In addition, new requirements have been included on exposure of the public due to radon, exposure of aircrew to cosmic radiation, the remediation of areas contaminated by residual radioactive material and protection of the environment. A new reduced dose limit for the lens of the eye for occupational exposure of workers has been added.

## Enhancing Occupational Radiation Protection

The Agency developed guidance on radiation protection in industries processing naturally occurring radioactive material (NORM), publishing a report entitled *Radiation Protection and NORM Residue Management in the Production of Rare Earths from Thorium Containing Minerals* (Safety Reports Series No. 68). It also developed criteria for the NORM industry for determining which materials need to be considered for regulatory control, as well as additional guidance entitled *Exposure of the Public from Large Deposits of Mineral Residues* (IAEA TECDOC-1660). The Agency also published the proceedings of the Sixth International Conference on Naturally Occurring Radioactive Material (NORM VI).

The Fifth Meeting of the Steering Committee of the International Action Plan for Occupational Radiation Protection was held in Vienna in June. Achievements in the implementation of the action plan include the setting up of regional and international ALARA (as low as reasonably achievable) networks; the development of education and training material; and the creation of an Occupational Radiation Protection Networks (ORPNET) web site as a focal point for occupational radiation protection matters. The Steering Committee evaluated these outputs and proposed that the action plan be concluded. It also suggested that the Agency consider a new mechanism to coordinate occupational radiation protection, and the Secretariat was encouraged

*“The Agency developed guidance on radiation protection in industries processing naturally occurring radioactive material (NORM) ...”*

to organize a second international conference on occupational radiation protection.

The Agency's testing laboratory for radiation protection is required to maintain its ISO-17025 accreditation for radiation protection services. The external audit was conducted in November, with the testing laboratory successfully passing the re-accreditation by the Austrian authority. The experience of the re-accreditation will be shared with radiation protection monitoring service laboratories in Member States.

## Code of Conduct on the Safety and Security of Radioactive Sources

Following the recommendations of the 2010 open-ended meeting of technical and legal experts on the implementation of the Code of Conduct on the Safety and Security of Radioactive Sources (the Code), the Agency organized the review and revision of the Guidance on the Import and Export of Radioactive Sources (the Guidance). The revised version, based on five years of experience in implementing the Guidance, was approved by the Board of Governors and endorsed by the General Conference in September 2011. The Agency also organized regional workshops on the implementation of the Code in Africa and Latin America to facilitate regional cooperation and harmonization of regulatory practices.

An open-ended meeting of technical and legal experts took place in July to discuss the development of a non-binding instrument on the transboundary movement of scrap metal that may inadvertently contain radioactive material. The meeting made progress on drafting the instrument and recommended that it be developed as a 'code of conduct' so that it can be easily identified but is also

*“Public awareness of measures to achieve the safe and secure transport of radioactive material was also noted as being important.”*

understood to be non-binding, following the well established process for other codes of conduct.

### **Strengthening Radiation Safety Infrastructures**

Following a Thematic Safety Area structure, the Agency provided technical support — including appraisal and advisory missions, procurement of equipment, training courses and fellowships — to more than 120 Member States, with the specific aim of strengthening: regulatory infrastructure; protection of workers; protection of patients; protection of the public; and waste safety. In each case, information about the national infrastructure was recorded and evaluated in the Agency's Radiation Safety Information Management System (RASIMS), in coordination with Member States.

Agency efforts to build competence in this area included evaluating national infrastructure for education and training in radiation protection through Education and Training Appraisal (EduTA) missions to Belarus, the Republic of Korea and Malaysia, and conducting a regional postgraduate educational course in radiation protection and the safety of sources in Argentina, Greece, Malaysia and Morocco. Additionally, more than 30 specialized

training events were held for regulators, operators, and scientific and technical staff. A 'Long-Term Agreement' related to education and training in radiation safety was signed between the Agency and Greece, and memoranda of understanding on the same subject were concluded between AFRA and Algeria, Ghana and Morocco, respectively.

### **Transport of Radioactive Material**

At an international conference on the safe, secure and sustainable transport of radioactive material, held in Vienna in October, participants reviewed current practice and examined issues of importance for the future. The major conclusions of the conference included the need for harmonization, at all levels, of safety and security requirements as well as of Member State regulatory requirements. Harmonization of activities between the Agency and other United Nations organizations was also considered to be important. Participants also felt that consistency between Agency, IMO and ICAO regulations, as well as IATA and national regulations, was necessary to avoid denials of shipment and to foster greater compliance. The participants concluded that harmonizing how regulations were implemented was just as important in preventing denials of shipment. For example, the Agency's Regulations for the Safe Transport of Radioactive Material were being implemented by Member States in very different ways, with different editions of the regulations being used. Conference attendees also pointed out that communication continues to be an issue of interest to a number of coastal States, and they proposed that best practice guidelines be developed for systematic and timely government-to-government communication. Public awareness of measures to achieve the safe and secure transport of radioactive material was also noted as being important. Finally, concerns were expressed about the appropriateness, practicality and legal aspects of prior notification, which was noted as being an issue that required the involvement of IMO.