

# Human Health

## Objective

*To enhance capabilities in Member States to address needs related to the prevention, diagnosis and treatment of health problems through the development and application of nuclear techniques within a framework of quality assurance.*

## Quality Assurance and Metrology in Radiation Medicine

Nuclear applications in human health, predominantly in radiation medicine, constitute the single largest technical area in which Member States request support. Having in place a robust quality assurance (QA) system ensures that the technology is being used safely and effectively.

To support the implementation of QA programmes in radiation medicine in Member States, the Agency published *Roles and Responsibilities, and Education and Training Requirements for Clinically Qualified Medical Physicists* (IAEA Human Health Series No. 25). The book presents internationally harmonized guidelines on the roles and responsibilities of clinically qualified medical physicists as well as recommended minimum requirements for their academic education and clinical training. The publication has been endorsed by the International Organization for Medical Physics and is expected to serve as a basis for the preparation and updating of regional and national policy documents governing the medical radiation physics profession. The clinical training requirements in medical radiation physics proposed by the Agency were adopted in 2013 by the Abdus Salam International Centre for Theoretical Physics for its newly established graduate programme.

It is widely recognized that independent quality audits constitute an important part of QA programmes in radiotherapy. Although several national dosimetry audit networks exist, radiotherapy centres continue to have insufficient access to such audits. Increased availability of dosimetry audits is necessary to improve dosimetry practices in radiotherapy and to improve safety for patients undergoing radiation treatments. A Technical Meeting on Harmonizing Quality Audit in Radiotherapy and Promoting the Concept of Audit in Member States was held in December in Vienna, in conjunction with three regional technical cooperation projects. The meeting, which attracted about 100 participants from 63 Member States, focused on acquiring a better understanding of the operation of national networks for quality audits in radiotherapy and sought to strengthen interregional networking in this area. The meeting produced a list of 14 recommendations that may be used in defining best QA approaches for radiotherapy audits.

The Agency provides dosimetry services to Member States having no capabilities in this area. In 2013, the Agency calibrated 75 national dosimetry standards and carried out ten bilateral dosimetry comparisons with national reference laboratories to verify their traceability to the international measurement system. The IAEA–WHO postal dosimetry audit service checked 700 radiotherapy beams in Member States over the course of the year.

## Accredited Training in Integrated Medical Imaging of Cardiovascular Diseases

To build capacity in the use of nuclear techniques for the management of cardiovascular diseases, the Agency organized an International Conference on Integrated Medical Imaging in Cardiovascular Diseases (IMIC 2013) in cooperation with 11 professional organizations. The conference, held from 30 September to 4 October in Vienna, was attended by 240 professionals from 70 countries. For the first time, IMIC participants were granted 26 European continuing medical education credits by the European Accreditation Council for Continuing Medical Education.

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These credits are considered to be objective evidence of continuous professional development. The IMIC 2013 programme emphasized the importance of understanding a patient’s pathology through imaging and the strategic advantages of patient tailored diagnostic, therapeutic and prognostic decision making. Appropriate interpretation of imaging and its application in cardiovascular diseases — particularly imaging of coronary artery disease and heart failure — were addressed. Special attention was given to the appropriate use and clinical applications of hybrid imaging. Other topics reviewed included anatomy, physics and radiochemistry, as well as quality, safety and reporting considerations. The conference confirmed the continuing need for capacity building efforts in cardiology and highlighted the importance of using multidisciplinary methods and accredited training to ensure quality and safe practice in this field.



FIG. 1. St John's Research Institute in Bengaluru, India, an IAEA Collaborating Centre in nutrition.  
(Photograph courtesy of St John's Research Institute.)

## Development of Standards for Paediatric Radiation Oncology for Low Income Countries

Whereas mortality among children is decreasing worldwide, deaths from cancer are on the rise. While the incidence of paediatric cancer is slightly lower in low and middle income countries (LMICs) than in high income countries (HICs), paediatric cancers make up a much higher proportion of all cancers in LMICs (3–6%) than in HICs (<1%). With proper treatment, it is possible to cure over 70% of all paediatric cancer patients. However, cure rates in LMICs are only 20–50%, creating a survival gap between HICs and LMICs. The Agency recognizes paediatric cancer as a critical issue and is working to enhance Member State capacity in paediatric radiation oncology (PRO), particularly in LMICs.

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A Technical Meeting on Paediatric Radiation Oncology: Closing the Gap, aimed at the development of PRO standards for LMICs, assessed the PRO situation worldwide and strategies to close the outcome gap between HICs and LMICs. Forty-one participants from 26 Member States prioritized problems and challenges faced by radiotherapy centres in LMICs in this area, studied

treatment outcomes and adverse effects, and developed a set of recommendations on desirable standards for the practice of radiation therapy in children. For example, some of the recommendations emphasized the need to include paediatric cancers on health agendas, to enhance Member State capacity in PRO and to form partnerships between PRO centres in HICs and centres in LMICs.

## Stable Isotopes for Assessing Vitamin A Interventions

Vitamin A deficiency can have tragic consequences, including blindness, illness and premature death. For this reason, WHO recommends that children between six months and five years of age living in vitamin A deficient regions of the world receive high potency vitamin A supplements every four to six months. In October, a Technical Meeting with the IAEA Collaborating Centre in nutrition at St. John's Research Institute, in Bengaluru (Bangalore), India (Fig. 1), brought together international experts to discuss progress on the vitamin A labelled isotope dilution (VALID) technique. This technique provides a sensitive means of estimating the total amount of vitamin A in the body, and can be used to safely evaluate vitamin A supplementation or fortification efforts (Fig. 2). VALID can also be used to determine the amounts of vitamin A that humans require, as well as how well pro-vitamin A compounds from plant foods are converted into beneficial vitamin A in the body.

## Programme of Action for Cancer Therapy (PACT)

In response to Member State demand for support in cancer control, the Agency, through its Programme of Action for Cancer Therapy (PACT), continued to assist



FIG. 2. Children participating in a study of the effectiveness of vitamin A fortified rice in northern Thailand. (Photograph courtesy of T. Pongcharoen, Mahidol University, Thailand.)

LMICs in strengthening cancer control capacity through partnerships with WHO, the International Agency for Research on Cancer, the Union for International Cancer Control and the National Cancer Institute (USA), among others, while integrating radiation medicine in a comprehensive national cancer control strategy.

In 2013, the Agency carried out comprehensive cancer control assessments, known as integrated missions of PACT (imPACT) Reviews, in 12 Member States. Conducted in collaboration with WHO, imPACT Reviews provide Member States with a situation analysis of cancer control capacity and recommend actions to establish or strengthen a national cancer control programme. To improve the quality of imPACT Review reporting, the Agency and its partners undertook an effort to review and revise guidelines utilized during imPACT Review missions. Since PACT's inception, a total of 59 Member States have received an imPACT Review.

The Virtual University for Cancer Control and Regional Training Network (VUCCnet) pilot project entered a new phase in 2013. During the year, the Agency facilitated discussions among founding Member States and agreement was reached on establishing VUCCnet as a pan-African intergovernmental organization.

The fourth meeting of the Advisory Group on Increasing Access to Radiotherapy Technology (AGaRT) in LMICs convened in Vienna in October. Group members recommended affordable, appropriate and suitable radiotherapy equipment packages for low and middle income settings, and began drafting guidelines to ensure long term functionality of equipment, including sales and servicing parameters. Once established, these equipment packages are expected to contribute to increased

access to affordable and appropriate radiotherapy treatment in LMICs.

In collaboration with WHO, the Agency organized meetings in Europe and Latin America to assess regional progress and identify common challenges in cancer control among Member States. Both meetings provided participants with a platform to discuss and share practical experience in cancer control planning.

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With the increased global focus on cancer and other non-communicable diseases (NCDs) brought about by the UN Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases, donors have continued to support actions to strengthen cancer control capacity. For example, in 2013, PACT received and accepted over €1.8 million in contributions and pledges from partner organizations and Agency Member States.

In November, the Agency participated in the World Cancer Leaders' Summit on the theme 'Closing the Cancer Divide by 2025', which highlighted the urgent

need to globally address glaring disparities in cancer control. Summit participants called for increased access to treatment and a 25% reduction of premature deaths from NCDs by 2025, a goal recently set in a World Health Assembly resolution.

Throughout 2013, the Agency continued to participate in the Global Initiative for Cancer Registry Development. This initiative seeks to increase the quality, coverage and usage of cancer registry data in LMICs and advocates the establishment of population based cancer registries in planning, monitoring and evaluation of cancer control

activities. Cancer incidence information is a critical component of national planning related to radiotherapy and other radiation medicine related services.

Preparations were completed for PACT to be integrated into the Agency's technical cooperation programme as of January 2014. The move is intended to make optimum use of synergies between technical cooperation and PACT activities. PACT will continue to mobilize resources for cancer related activities and provide support to Member States for developing sustainable comprehensive cancer control systems.