

EDUCATION AND TRAINING IN RADIATION PROTECTION: BRIDGING THE GAP TO KEEP ICRP RECOMMENDATIONS FIT FOR PURPOSE

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Abstract- The quest for excellence in radiation protection calls for an integrated and holistic approach to education and training. Education and training are indispensable in ensuring that ICRP recommendations are applied, adopted and adhered to. In its program plan to the year 2000, the IAEA has attached considerable importance to the development of human resources for nuclear and radiation safety, in keeping with its ongoing emphasis on providing technical assistance to strengthen national infrastructures and promote the safe use of radiation.

From the international perspective, the problem can be more readily tackled through an integrated and dogged approach to education in radiation protection, harmonization of the contents of courses, and assistance in training the trainers. Priority can be placed on better dissemination of experience and knowledge that is already available, and improved coordination of support mechanisms. Through its program over the coming years, the IAEA should help countries address these challenges.

A system for credentialing RP training program should be established at national and regional level. This process should be undertaken by the Regulatory Authority, with the help of Academic Institutions and scientific or professional societies. A register of accredited bodies should be established with periodic reviews and policy on quality assurance and improvement in radiation protection education and training.

Recommendations for radiation protection of the patient for individuals undergoing training programs in health centers, continuing education and training after qualification and on implementation of new techniques should be inculcated.

There is a gap in education, awareness and training in radiation protection for developing

countries with low resource settings, reaching out to the community, rural areas, mining sites and high radioactivity areas in the community setting. There is an urgent need to bridge the gap between theory and practical approach to addressing it. To make ICRP recommendations fit for purpose we need to bridge the gap and extend this radiation protection outreach programs, education and training to low resource settings. The existing national system on education and training on radiation protection of the medical professionals, proved to be very useful for improving the general situation in this field³.

Keywords: Radiation Protection; Education; Training; Gap; IAEA; ICRP

Introduction

The international commission on radiological protection (ICRP) is the primary body in protection against ionizing radiation¹.

The ICRP has made basic recommendations for education and training in Radiation protection in ICRP Publications 103 and 105 (ICRP, 2007a,b)¹. However, this article focuses on the nitty gritty of achieving and actualizing a pragmatic pathway for making ICRP recommendations fit for purpose². Considerably on these basic recommendations with regard to various categories of medical practitioners and other healthcare professionals who perform or provide support for diagnostic and interventional procedures utilizing ionizing radiation and nuclear medicine therapy³. It provides guidance regarding the necessary radiological protection education and training for use by regulators, health authorities, medical institutions, and professional bodies with responsibility for radiological protection in medicine; the industry that produces and markets the equipment used in these procedures; and universities and other academic institutions responsible for the education of professionals involved in the use of ionizing radiation in health care.⁴ ‘Education’ refers to imparting knowledge and understanding on the topics of radiation health effects, radiation quantities and units, principles of radiological protection, radiological protection legislation, and the factors in practice that affect patient and staff doses⁵. Such education should be part of the curriculum in pursuit of medical, dental, radiography and other health care degrees, and for specialists such as radiologists, nuclear medicine specialists and medical physicists as part of the curriculum of postgraduate degrees⁶. The term ‘training’ refers to providing instruction with regard to radiological protection for the justified application of the specific ionizing radiation modalities that a medical practitioner or other healthcare or support professional will utilize in that individual’s role during medical practice.

Strategic plan and steps for making ICRP Recommendations fit for purpose

1. Training requirements for healthcare professionals

Training objectives should be achieved. The medical exposure must be justified. The medical profession should understand the radiation hazards to avoid. Lack of knowledge may result in more ionizing radiation¹. Medical and healthcare professionals directly in the use of ionizing radiation hence the need to receive education and training in RP at the start

of their career and this program should continue. Knowledge of the risks and precautions is required to minimize the exposure of healthcare professionals and their assistants

2. RP training and courses for non-radiation specialists.

For ICRP recommendations to be fit for purpose, training activities should be evaluated and analyzed systematically, progressively and cumulatively. Examination systems are performed to test competency. Assistants and supporting staff should be given basic training in RP².

The training is depending on the involvement of the different professionals in medical exposures. Practical training should be done in an environment similar to that of the participants. Adequate resources of a training program should take account of all aspects involved at the present and at the future³. With respect to lecturers and trainers there should be experts in the RP practice, by official certification. Training team should involve radiological professionals in related topics. Trainers must have sufficient knowledge of the procedures performed by the medical specialists. Evaluation systems online is necessary to develop a system-based approach to information dissemination. Continuing education is pivotal brings development of the professional skills in practice. Computer-based tools are good for this type of education⁵.

3. Responsibilities for training provision

RP should be promoted by; the regulatory and health authorities, professional bodies and scientific societies. Hence, tertiary institutions such as Universities have a critical role to play. Education and training at medical schools and physics departments should be updated and evaluated to satisfy RP requirements. For the relevant regulatory and health authorities they must strength the defects of the training. The professional bodies and scientific societies should enforce the program and encourage didactic and practical training. Equipment manufacturers have a responsibility to develop and make available appropriate tools viz a viz maintenance engineers should ensure adequate training for new technologies is inculcated in equipment procurement³.

4. Need for a greater awareness of radiological protection and risk

Radiation doses to patients need to be optimized to prevent the deterministic effects. Medical radiation procedures must justify. The procedures benefits / risks must be analyzed. The shortages of the medical staff in RP need to be avoided.

The justification of medical examination should be confirmed by a qualified radiation specialist. Professionals should receive education and training in RP throughout their professional life. Medical physicists, radiographers and radiologists should work closely. The radiological equipment manufacturers have an important role for optimization. They have a responsibility to aware the users of the dosimetric implemented in the procedures, to inform them about the proper application, to make available appropriate tools that are built into radiological equipment and to facilitate easy determination and recording of exposure with reasonable accuracy¹. There are potential health effects from radiation exposure. Management ensures the optimization of RP.

5. Training in interpretation of images

The medical exposure must be justified. An interpretation of the radiation images is a key of justification. Maintenance engineers understand how the settings of the x-ray systems and adjustments that they may make influence the radiation doses to patients. Nurses and healthcare assisting in fluoroscopic procedures require knowledge³.

7. Bridging the Gap between theory and practice

Training programs need to be devised in formal education and examination system to test competency. Delivery of training is important. The objective of any training is to acquire knowledge and skills. Practical training should be given in a similar environment to that the participants will be practicing. Training should be provided by a professional team. Each trainer should be an expert in his practice. He should be aware about national legislation, responsibilities of individuals and organizations and have a clear perception about the practicalities in the work that the training has to cover. There is not reference amount of training till now^{6,7}

. This guide gives just recommendations. Pre- and post-training evaluations are recommended; theoretically and practically. Self-assessment examination systems need to be encouraged to become more helpful, to confirm successful the training completion and hence, to allow the accreditation via several evaluation methods. The type of radiation work undertaken, level of the risk, frequency of the procedure and the probability of occurrence of over-exposures to the patient or to staff need to be considered.

8. Conclusion

Financing of training must be fully studied by organizations. The infrastructure availability and the financial requirements have to be taken into account. The co-operation of international organizations could be helpful to initiate the activities and provision of training materials. If certification in RP is required for practices it must be obtained before

commencement of the practice. The healthcare providers need to provide the resources available to train their own professionals in RP.

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