

Comments of the European Federation of Organizations for Medical Physics (EFOMP) on the ICRP draft report: *Radiological Protection Education and Training for Healthcare Staff and Students*

Introduction

This report is an important step forward in the improvement of the optimization of radiation protection of patients and staff. Medical physicists globally expend a lot of energy on researching new techniques and methods for patient dose optimization and reduction of risk to staff. However, we find in general that not enough curriculum time and resources are allocated to make it possible for us to transfer the knowledge generated to the medical and healthcare professions who refer patients or who deliver the radiation. In addition, research indicates that owing to pressures on curriculum time unless radiation protection education (RP) and training is made mandatory it often simply does not happen. We are actively researching our education and training role with regard to the medical and healthcare professions. In fact, the EFOMP Council in 2005 set up a Special Interest Group in the area ‘Biomedical physics education for the medical / healthcare professions’ to study such issues (ref: 1 - 4). A strategic plan to ensure systematic curriculum development has been developed and is being implemented. An additional term of reference has been assigned to the EFOMP Education and Training committee – to ‘Contribute to the Education, Training and CPD of other Healthcare Professions in cooperation with the corresponding committees of the respective Professions’. Since RP education for the medical / healthcare professions has historically been one of the most important roles of biomedical physics educators (ref: 1), one of the aims of the group is to increase the effectiveness and efficiency of RP education and training. It is our view that a system for assessment of the training received should be an important component of any training programme.

General comments

The general comments listed below as background explanations have been included as proposed changes to the relevant parts of the document.

1. We suggest that the title should be ‘Radiological Protection Education and Training for Healthcare Staff and Students (Diagnostic and Interventional Radiology and Nuclear Medicine)’ to make its scope more clear.
2. The report is well structured. We notice some inconsistency in some spellings e.g., ionizing / ionising.
3. Although the report does mention the central role that medical physicists have in RP education and training (e.g., line 221) we suggest that this has not been sufficiently

emphasized. Medical physicists are the healthcare professionals / clinical scientists who have always been at the forefront in patient and occupational radiation protection in the healthcare domain. This role is being challenged in a number of countries by some members of other healthcare professions through unwise resistance to multi-disciplinarity in medical and healthcare professional education. Some professions insist that they undertake all the teaching of their own profession themselves even though, in practice, a multi-disciplinary approach is much more effective and mono-disciplinary approaches lead to reduced standards (ref 2). Medical physics educators as experts in radiation protection should be supported by all who believe in the team approach to healthcare and who put the interest of patient and staff before all else.

4. Owing to the responsibility of Medical Physicists for providing advice and expertise at the highest level in radiation protection for all imaging modalities and who are in the forefront of training of healthcare professions in these aspects of practice (and the education regarding medical devices and risks from associated physical agents in general) the following points are relevant:
 - a. We seriously question putting Radiographers and ‘Nuclear Medicine Physicists’ (Line 487) together when the responsibilities (and therefore level of knowledge) in RP required of Medical Physicists are so much higher. Moreover, Medical Physicists involved in Diagnostic & Interventional Radiology are not included at all in this list. We strongly recommend that Radiographers and Medical Physicists are put in separate categories. In addition the terminology for physicists should be ‘Medical Physicists’ not ‘Nuclear Medicine Physicists’ etc. the former is the internationally accepted title of the profession. In Table 2 there should be a separate column specifically for Medical Physicists with all rows being given the value h = high level of knowledge. However, it should also be made clear that Medical Physicists study other much more advanced topics in radiation protection that are not included in Table 2 as their role involves an ongoing evaluation of clinical procedures in terms of radiation protection, the critical appraisal of published evidence and the transfer of appropriate research results to the clinical environment. The suggested number of education / training hours for Medical Physicists should be 150 - 200.
 - b. Ideally a detailed description of the radiation protection knowledge / skills/ competences of medical physicists involved in radiation protection should be included in the document. If this is considered too long for the present document references to such syllabi elsewhere should be included. Both the IAEA and EFOMP are producing updated syllabi for medical physicists (example <http://www-naweb.iaea.org/nahu/dmrp/syllabus.shtm>).

- c. Because of their important role in the training of healthcare professionals in radiation protection we suggest that there should be a recommendation that pedagogical / training skills be included in the future education of medical physicists.
 - d. The report should include a recommendation that medical device manufacturers have the responsibility of supplying all information about their devices to medical physicists whenever such devices are introduced to the clinical areas. This would make physicists more effective as knowledge transfer vehicles for medical and healthcare staff in an ongoing manner particularly after the company engineers / application specialists leave. Device companies are sometimes unwilling to provide sufficient information to medical physicists because of the commercial nature of the information. Owing to the safety concerns involved this issue is particularly important in the case of those devices which produce ionizing radiation.
5. The report emphasizes the more overtly visible and dramatic deterministic effects from high dose procedures to the individual (e.g., cataracts, skin lesions) but pays little attention to the much less noticeable yet perhaps more important collective carcinogenic risk to the population and potential damage to the genetic pool arising from low-dose yet much more frequently used procedures. The incidence of cancer is increasing and the increased use of radiation for medical imaging is one of the contributing factors. We therefore consider that low-dose yet much more frequently used procedures should be emphasized as much as the higher dose procedures.
 6. The report does not address the issue of who will be the authorized body to accredit training. We suggest that this should be a central body with representation from all stakeholders (training organizations such as universities, healthcare administrators, clinicians, trainers, healthcare professional associations). Perhaps an indication of the conditions for the accreditation of training organizations should be included.
 7. There is a need to address the extended role played by some healthcare professionals in certain countries (such as nurse practitioners, physiotherapy practitioners, speech and language therapists who may be referrers). It is important that their RP education should match that of the equivalent medical role.
 8. The report does not acknowledge sufficiently that a primary means of reducing doses to patients (and in interventional radiology and nuclear medicine also staff) is to avoid repeat exposures. A fundamental requirement for avoiding repeat exposures is adequate knowledge of the technological physics aspects of the functioning of imaging devices and of their use. Healthcare professional curriculum developers in some parts of the world have reduced the curriculum time for physics as opposed to other subjects such as management and principles of reporting. The result of all this is that the technology is advancing at a much faster rate

than the education and training, and students are leaving educational institutions less prepared for technological change (ref 5).

9. Although training is important at pre-qualification levels, continuing education is also vital. Over 10 years, medical practices evolve and new devices and techniques are introduced. Without continuing professional development (CPD), training (except for the basic RP concepts) can quickly become out of date. Consequently, we feel that initial training should be valid only for a given period and evidence of CPD in RP should be a requirement particularly when new equipment is installed or new or different techniques are used.

Specific comments

Line 136: we suggest that CT is included in this list (including interventional CT).

Line 150-151: we suggest rephrasing the sentence to read: “radiation procedures are justified requires that awareness of benefits and risks be raised among those who refer patients to or justify the procedures.”

Lines 180-184: We disagree that ‘methods for delivery that focus on relevant content and highlight practical issues’ are an ‘unresolved issue’. There are many resources available, although these are often in the English language and may therefore not be suitable for non-English speakers. Some medical physicist educators have been working on this issue for many years. The major problem has been persuading the medical and healthcare professions to attend training. The long term nature of carcinogenesis creates a perception that it is somehow less of a problem. Research indicates that unless radiation protection education and training be made mandatory some healthcare professionals do not feel obliged to attend. We are therefore of the opinion that such courses should be made a legal requirement for the relevant healthcare professionals.

Line 214-5: The terms ‘prescriber’ and ‘referrer’ are effectively equivalent. 97/43/Euratom uses ‘prescriber’ whilst the new revised BSS in Europe uses ‘referrer’, but the definitions given in the two documents are identical. It seems that at least in Europe the word ‘prescriber’ is being replaced by ‘referrer’. However the present text seems to indicate that they are not completely equivalent. We therefore suggest that in order to avoid confusion the word ‘prescriber’ be replaced by ‘referrer’ in the whole document and an explanatory note inserted.

Line 219: the term ‘equipment’ should be replaced by the preferred term ‘medical device’ here and throughout the document (the terms ‘device’ is in fact the legal term in some areas of the world).

Line 294 - 6: Carcinogenesis is presently considered as a stochastic not a deterministic effect and therefore there is no threshold. Therefore the statement ‘approach or exceed levels known from

epidemiological studies to increase the probability of cancer' may be misinterpreted if 'level' is perceived to mean 'threshold'.

Line 307- 8: We recommend that to improve the emphasis, "and that images of the highest quality that require higher doses are not essential for all diagnostic tasks" be replaced by "and not all diagnostic tasks require high quality images. This is an important consideration since the latter often lead to higher doses"

Line 487: We believe this is a typographical error and recommend that the word Physicists is removed from this title 9, in line with line 579. Indeed an additional title is warranted, as mentioned earlier and we recommend this is added as "Medical Physicist". The wording below the title could then be "Individuals with responsibility for providing advice and expertise at the highest level in radiation protection for all imaging technologies and who are in the forefront of training the other professions in these aspects.

Line 489: we recommend that "injecting radiopharmaceuticals" is added because this is a common task for nuclear medicine technologists

Line 551-552: We recommend that this reads "Consequently, a similar level of education in RP needs to be given to present and future potential referrers:"

Line 573: The first sentence would have better emphasis if it would be changed to: "Training for healthcare professionals in RP should be related to their specific jobs and roles. All these professionals are in the frontline to have a major impact on patient protection."

Line 576: Sentence should be amended: "Medical Physicists working in RP and diagnostic and interventional radiology and nuclear medicine ..."

Line 656: We suggest that the title should be 'Course topics for medical students and medical practitioners'

Line 684: We suggest that you replace 'values' with 'usefulness'

Lines 846 - 849: There is a statement that 'the enforcing authority will also need to receive a limited amount of training 15-20 h of instruction'. We believe that this statement is inappropriate. The enforcing authority for radiation protection in healthcare will have both an enforcement and advisory role particularly during inspections. For each of these roles very strong RP competences are required. We recommend that such authorities should be manned by senior medical physicists of high standing to provide appropriate authority.

Lines 856 - 858: The following sentence is very generally out of date and needs correction: "While much of the training in sciences such as physics or biology is based on knowledge transmission, there is much greater emphasis in clinical training on imparting skills to solve day-to-day problems". We recommend replacement by "While non-medical training, particularly in

the past, has often been based on knowledge transmission, there has always been great emphasis in clinical training on imparting skills to solve day-to-day problems. Indeed, most training these days is practice-oriented in many non-medical subject areas". The theory-practice gap which the original sentence seems to allude to has long been solved in physics / biology / medical / healthcare education and extensive educational research has been carried out. Unfortunately, many educators / trainers do not make use of this educational research as much as they should and still believe that knowledge of a topic is sufficient for effective education. Today both physics and biology courses are very much practice oriented. The days theory imparted via simple knowledge transmission are over in many universities and active learning is the norm.

Lines 877 - 879: Although there are still trainers in RP who still go into unnecessary detail the word 'some' seems more realistic than 'many'.

Line 880: "such that they make sense" should be replaced "is appropriate for the purpose in hand".

Line 881: "ego-centric" should be replaced by an expression which is more appropriate for a report such as "will not concentrate on".

Line 890: We suggest that after "strongly recommended." you add "However, to support the practising clinician who may not always have the necessary updated theoretical and regulatory knowledge, it may be useful for the RP trainer".

Line 900: We recommend that you add "and prior knowledge of the trainee" after "evaluation methodology".

Line 914: We recommend that you add "the frequency of the procedure" after "work".

Lines 915 – 917: We feel that the reference to radiotherapy should be removed as it is not the subject of this document. The following sentence should then be changed to "Interventional procedures could deliver skin doses in the range of a few gray to specific patients."

Line 918 - 919 : Stating that "The level of radiation employed in radiography practice is much lower than ..." tends to minimize the high importance of minimizing doses in low dose high frequent procedures. We recommend this is altered to "Although the level of radiation employed in most imaging procedures is much lower than the above example and also the probability of significant over-exposure is lower, care should always be taken to minimize doses in high frequency procedures."

Line 939: We feel that perhaps a better title should be 'Accreditation of training organizations and certification of the training'

Line 1094 – 1248: The list of 38 recommendations is excellent but seems daunting. We suggest that the recommendations are grouped into more manageable subsets with appropriate sub-

headings. We also suggest that some of these recommendations would need to be modified according to our suggestions, if accepted, in the above text.

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