Radiation protection training in radiologists

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Aims and objectives

Radiation protection is of fundamental importance in radiology practices today. With increasing patient radiation doses being noted in the literature, along with technology advances, never has it been a more important time to focus on education in radiation protection for the health professionals who control it. In 2007, it was estimated that one person in every 114 who are undergoing a cardiac CT scan are at risk of developing cancer [1]. It was also suggested that 1.5%-2% of cancers are likely to be related to CT scanning [2]. Consequently, radiation dose optimisation and management has migrated from being advised to being required by international legislation and best practise guidelines.

Radiologists are the fundamental gate-keepers on radiation protection in clinical departments, with the responsibility of overall governance lying with them. Thus, ongoing education in radiation protection is important for this profession, to maintain optimal standards.

The International Commission on Radiation Protection have devised recommendations on what radiation protection education is suitable for difference categories of health professionals [3]. Currently, they recommend that radiologists should have 30-50 hours training in radiation protection. The ICRP outline details of what the training should comprise of, which include physical principles, radiobiology, staff and patient protection, legislation and quality control.

Literature has suggested that knowledge of radiation protection in clinical practice is not sufficient across the medical profession [4-6], however current consultant radiologist training and education in radiation protection has not been quantified. The aim of the current work, in collaboration with the American Board of Radiology (ABR), was to establish radiologist current training and interest in radiation protection by means of a questionnaire survey.
Methods and materials

The population for the study were American consultant radiologists who were examiners with the American Board of Radiology. The questionnaire was distributed to all American Board of Radiology examiners at the annual examinations held in Louisville, KY, USA. Distribution was directly to each the examining room in the examination centre (Figure 1). Radiologists were asked to complete the questionnaire in their own time and to return it to one of the return boxes, which were located in the research venue, break rooms and reception area.

The questionnaire was developed by considering the structure of questions asked, appropriate response choices to be available and the overall arrangement of the questionnaire in line with the research objectives.

Several considerations were given to constructing the questions [7-8]. Questions were kept as short as possible and specific to the information required. Both open- and closed-ended questions were used. An open-ended question allows the respondent to give answers in their own way. These questions are useful for attaining unanticipated answers and for the respondents to state their opinions freely. Open-ended questions were used for the opinion questions and closed questions were used for the remainder of the questionnaire. Closed-ended questions require response choices to be known in advance and produced standardised data that can be easily analysed [7-8]. Response format is how answers are collected from the respondent [8]. As the questionnaire was dominated by closed-ended questions, developing the response categories for individual questions was particularly important. A mixture of numerical, ordinal and categorical response choices were used, depending on the nature of the question [8].

In the literature, various methods are reviewed to stimulate response rate in questionnaires [8-9]. All participants were entered into a draw to receive a gift, as a means of increasing response rates. In addition, an introductory letter was included with the questionnaire to explain its relevance and importance.
Images for this section:

Fig. 3: Research room

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Results

Overall 89 consultant radiologists that are ABR examiners answered the questionnaire survey. Of this group, the average time post ABR certification was 23.9 years, with a range from 5 years to 49 years. All specialities were represented by the respondents, with the exception being radiation oncology. The majority of respondents were general, breast and nuclear medicine respectively.

The majority of respondents (72%) had physics based training when they initially trained in the radiology specialty. Other areas that were covered included radiobiology and applied practical learning. Most training had been through the use of didactic lectures, with little evidence of on the job training. A variety of quantity of training was noted as displayed in Figure 1.

Respondents were asked to rate their overall knowledge of radiation protection on a scale of 1 to 5, with 1 being excellent and 5 being poor. 61% of respondents rated their knowledge either 2 or 3.

Ongoing education in radiation protection was investigated. Respondents were asked what percentage of their CME credits over the last 3 years were focused on radiation protection. Results are displayed in Figure 2.

The necessity of mandatory radiation protection focused CME credits was assessed. 81% of respondents agreed with mandatory radiation protection CME credits for radiologists.

Respondents were asked how important they rated radiation protection CME and ongoing education against other types of clinical updates. A majority of 65% felt it was equally important, whilst 8% actually felt that it was more important.

87.5% of respondents felt that certain specialities should have additional training in radiation protection compared to others, with the majority suggesting that interventional radiologists being the most important in this regard.

The ICRP recommend that radiologists should have 30-50 hours training in radiation protection. Respondents were asked to give their opinion on whether they thought that this amount of training was appropriate and whether the topics that are recommended by the ICRP are of importance. 77% of respondents felt that this amount of training was too much. Respondents felt that particular patient and staff radiation protection and operational radiation protection were the most important topics, whilst physics and international recommendations/legislation were rated as the least important.
Fig. 1: Training time in Radiation Protection

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Fig. 2: CME credits based on radiation protection

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Conclusion

It is evident from the results that varying practices and opinions exist around radiation protection education for radiologists. Alignment with the ICRP recommendations is queried by the majority of the group, with 77% of respondents stating the requirement was too high. There are no specific guidelines around what percentage of CME should be spent on radiation protection. Perhaps this would be of benefit, considering the high profile nature of this issue. This could be based on the radiologist's speciality area, whereby radiologists who work in areas such as interventional radiology, would have additional training. A case for this is strongly suggested in the current work, with 87.5% of respondents agreeing with this. Knowledge of radiation protection issues remains a concern, with 61% of respondents rating their knowledge either 2 or 3 on a scale of 1-5.

In conclusion, the results of this work would strongly support clear guidelines on ongoing education for radiologists, as the current knowledge and CME appears to be inappropriate, considering the importance of the issue.
References


