

TA1 - Radiation Effects

EFFECTIVE OPTIMIZATION OF MEDICAL EXPOSURE: CO-OPERATION BETWEEN RADIATION USERS AND AUTHORITIES

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Abstract

For the optimization of medical exposure in special radiological practices like in paediatric radiology, orthopaedics and cardiology, the Radiation and Nuclear Safety Authority (STUK) in Finland has used a six step model to achieve the aims of the Medical Exposure Directive (97/43/Euratom). The basis is to introduce the regulation and to meet the needs of the users for education and training. The aim is to educate some specialists to distribute information and good practices among their own professional groups. STUK makes continuous verification on site visits and improves the process.

1. Introduction

According to the Medical Exposure Directive (MED) all doses due to medical radiological practices, except for radiotherapeutic procedures, shall be kept as low as reasonably achievable, consistent with obtaining the required diagnostic information, taking into account economic and social factors. Optimization has to be continuously addressed in education and training. Its importance is emphasized, in particular, for clinical application of new techniques when the relevant radiation protection requirements have to be laid out.

2. Methods for the optimization of medical exposure in special radiological practices
For the optimization of medical exposure in special radiological practices like in paediatric radiology, orthopaedics and cardiology, STUK has used a six step model to achieve the aims of the MED directive:

- 1. Introducing regulations for all radiation users.**
- 2. Undertaking research supporting the regulations.**
- 3. Organizing discussions and meetings with different specialists and organizations in order to help the radiation users to meet the needs for education and training. The authority should be a sensitive listener and an intelligent observer.**
- 4. Preparing guidelines for radiation users together with the specialists.**
- 5. Educating and training a number of advisors who can distribute information among the specialists.**
- 6. Making verifications of the present situation and improving the process.**

2.1 Introducing regulations

The MED was implemented in Finland in the year 2000 by the Decree of the Ministry of Social Affairs and Health (423/2000), on Medical Use of Radiation. More detailed instructions were given by STUK in ST-guides, which are separately given to different radiation practices: nuclear medicine, radiotherapy and x-ray examinations. ST-guides are revised every five years.

A need for revising the ST-guides comes through the changes of regulation, or the issues are raised from the practices. Radiation users meet inspectors from STUK regularly on site visits, but special groups like medical doctors in paediatric radiology, orthopaedics and cardiology are not so often met. When the ST-guides are re-

vised, some specialists are contacted and the main issues are discussed with them in the very early phase.

2.2 Undertaking research supporting the regulations

Specific studies on patient doses in radiology have been carried out and guidance to the medical users of the radiation on the methods of patient dose determination was published as a STUK bulletin 1/2004. Guidance on good practices in paediatric x-ray examinations was published in the STUK bulletin 1/2005.

The object of the project surveying the use of CT equipment was to update and/or set diagnostic reference levels for CT examinations (in particular for children), to give recommendations on how to optimise CT examinations and to update STUK's recommendations for the quality control of CT equipment. The clinical image quality will be assessed from patient images by a group of radiologists using the published EC quality criteria.

In 2005-2007 STUK is participating in the EU Coordination Actions project "Safety and efficacy for new techniques and imaging using new equipment to support European legislation" (SENTINEL). This project is aimed to establish safety and efficacy for new radiological imaging techniques, with particular emphasis on frequent examinations, high-dose procedures and sensitive groups.

2.3 Meeting the needs for education and training

STUK organizes annual and biennial meetings for radiation users. The tradition has been started from early 80's. Participants have mostly been radiographers, medical physicists and radiologists. Other radiation users have their own meetings and radiation protection has not been traditionally involved in the meeting program. Participating in these meetings have made possible to make contacts with the key persons, and informal discussions with them have been most important in creating common strategies to education and training in radiation protection.

Also on site visits inspectors try to meet representatives from all radiation user groups. Particular attention is paid to working methods by observing and discussing. Feedback is given in a positive way and proposals for improvements are expressed. The inspectors can show a true situation by measuring the dose rate in practice and giving advice on radiation protection actions.

2.4 Making guidelines

Joint workgroups of radiation users and STUK have been established for special purposes. An example is the workgroup for paediatric radiology, where paediatric radiologists, medical physicists and radiographers were invited to prepare national instructions for paediatric examinations. These instructions are especially needed in those hospitals where there is no paediatric radiologist. The written guidelines were published by STUK.

In cardiological radiology the diagnostic reference levels were given in the end of the year 2005. Beforehand STUK had some meetings with a few cardiologists and both the instructions for taking the DRLs into use and the applicability of the values were tested. Valuable information was exchanged at the same time and some new ideas are in process. For cardiologists the most suitable form of training was found out to be a radiation protection training video instead of written guidelines.

For orthopaedists the first education has been given in their own national meeting. STUK was also connecting the orthopaedists to use their own medical physics experts to give some more education. Instead of specific guidelines a poster was pro-

duced in co-operation of a medical physicist. The issue is the basic radiation protection in the use of a C-arm.

The role of the authority in this work is more like a coordinator and contributor. Furthermore, STUK provides the workgroup with wide knowledge of radiation protection and a nationwide view of the Finnish practices in medical use of radiation.

2.5 Educating and training advisors

After launching the guidelines STUK provides education to advisors with the specialists (radiologists and medical physics experts) through thematic courses and annual meetings. Many of the advisors are involved in some research work with STUK and through these projects both education and practical training is executed. Medical physics experts have previously not had many contacts with cardiologists and orthopaedists but STUK has encouraged and catalysed communication between these groups. Because of limited resources STUK has not been able to give all the lectures requested, but if STUK has considered the issue to be suitable for some expert the call has been transmitted.

Individual guidance is given by inspectors during site visits. On the site visits, STUK verifies that medical exposures are optimized by measuring reference values that are compared to the reference levels, and by observing the practical use of radiation and radiation protection actions. Consulting radiologists have also been contracted to give opinions on some images of mammography and computed tomography.

2.6 Verifying and improving the process

The observations of inspectors are reported and this information forms the baseline for new co-operative education and for the improved optimization of medical exposure. In the annual report the trends in the national field of the radiation protection are described. All of the abnormal incidents or situations occurred or suspected are reported. These are also discussed in the annual meetings openly so that lessons are learned commonly and some weaknesses can be foreseen.

In Finland a private company is carrying out clinical audits. Inspectors have access to auditing reports and auditors read inspection reports. In that way both can take advantage of each others work.

3. Conclusions

In Finland STUK has actively participated in the professional meetings of the radiation users and organized some education and training. Regularity of the meetings and site visits by the inspectors has confirmed the relationships between the authority and the radiation users. It has also helped STUK to be aware of the status of the radiation protection in practice. The competence of the authority is strengthened with the practical knowledge from the radiation users. The advantage of the co-operation is to maximize the special knowledge with minimal resources.

References

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