

EURADOS Working Group 12

Dosimetry in Medical Imaging

Motivation

Medical procedures using ionising radiation constitute by far the largest contribution to people by man-made sources. Although the benefit for the patients exposed will normally outweigh the risk associated with the radiation, there is concern that patients may undergo radiological examinations that will not have any impact on their diagnosis/healthcare, or that unnecessary high doses could be delivered with regard to the diagnostic outcome. Moreover, the increasing use of ionising radiation in the medical sector has also an impact on occupational exposures, and there are concerns that practices such as interventional procedures may cause high individual doses both to staff and patients. Tissue reactions to both categories have been reported. Furthermore, the recent decrease in the eye lens limit for the occupationally exposed personnel sets stricter scenery in individual monitoring from a technical and regulatory point of view. This means that it is essential to foster the implementation of the basic principles in radiation protection, justification and optimisation, and for occupational exposures also dose limitation. Radiation dose measurement and assessment is an essential part of radiation protection framework.

Aims

- WG12 would focus on patient and staff dosimetry in the medical field, excluding radiotherapy.
- The radiation exposures in the medical field are getting more and more attention on all levels. Also the members of EURADOS are extremely active in this field, as proven by the several projects with EURADOS participants, and the interest shown for this WG12. Through WG12, EURADOS can position itself as the expert organisation concerning dosimetric aspects both for patients and staff in medical applications.
- The aim of the WG12 will be focussing on harmonization, intercomparisons, literature reviews, overviews through collecting data, set-up measurements campaigns, etc. Through the work of WG12 and its members EURADOS is becoming more and more visible in the medical sector. Part of the results are spread in typical medical conferences and journals.

Actions

- **Staff dosimetry in medical imaging (SG1):**
 - Task 2: Eye lens dosimetry - data collection and measurements. Action in progress
 - Task 4: Intercomparison of eye lens dosimeters for medical applications
 - Task 5: Eye lens dosimetry: guidelines/double dosimetry: A thorough literature was performed and together with the results from task 6 the recommendations will be prepared Action in progress
 - Task 6: Active personal dosimeters in hospitals: 5 Actions in progress
 - Subtasks:
 - Sub-task 1: Questionnaire to European Hospitals

- Sub-task 2/3: Tests in continuous fields and in standardised pulsed fields
- Sub-task 4: Tests in realistic pulsed fields
- Sub-task 5: Tests in hospitals: APD worn by staff
- Sub-task 6: Influence of lead apron on calibration of dosimeters
- Task 7: Doses received by personnel involved in complex interventional procedures – action in progress
- Task 8: New task Extremity doses in nuclear medicine focused on the new radionuclides- new task

> Patient dosimetry (SG2):

- Task 0: EURADOS report on Trigger levels in interventional radiology and cardiology. Literature review and summary of WG12 activities – finished editorial changes in progress, final publishing in 2019.
 - Task 1: Skin dose in interventional radiology – activities parallel to VERIDIC project
 - Task 2a: Cone beam CT CBCT
 - a: Dental CBCT dosimetry – Publication on Questionnaire
 - Task 2b: On board imaging CBCT (joint work between WG9 and WG12) joint action between EURADOS and EFOMP
 - Sub tasks Update of literature review and summary of existing approaches
 - Sub tasks Formalism for combining imaging and RT doses (from point dose to organ dose and DVH/isodose)
 - Sub task: Measurements of point organ doses + conversion to DVH
 - Task 3: European RLs for interventional cardiology – database - The paper is accepted for publication- task is finished
- Proposal of new Task: Review of guidelines/recommendations on use of out-of-field shielding in X-ray imaging

Members

Chairperson

- > Željka Knežević Ruđer Bošković Institute, Croatia
Email: zknez@irb.hr

Full members: 23 (from 14 countries)

Corresponding members: 31 (from 23 countries)

SG1: Staff dosimetry in medical imaging: Isabelle Clairand supported by Eleftheria Carinou

SG2: Patient dosimetry: Jad Farah supported by Olivera Ciraj Bjelac

Publications

The latest publications :

T. Siiskonen, O. Ciraj Bjelac, J. Dabin, A. Diklic, J. Domienik Andrzejewska, J. Farah, J.M. Fernandez, A. Gallagher, C.J. Hourdakakis, S. Jurkovic, H. Järvinen, J. Järvinen, Ž. Knežević, C. Koukorava, C. Maccia, M. Majer, F. Malchair, L. Riccardi, C. Rizk, R. Sanchez, M. Sandborg, M. Sans Merce, D. Segota,

J. Sierpowska, G. Simantirakis, L. Sukupova, Z. Thrapsanioti, E. Vano, Establishing the European diagnostic reference levels for interventional cardiology, *Physica Medica*, 54 (2018) 42-48.

H. Jarvinen, J. Farah, T. Siiskonen, O. Ciraj-Bjelac, J. Dabin, E. Carinou, J. Domienik-A., Dariusz Kluszczynski, Ž. Knežević, R. Kopec, M. Majer, F. Malchair, A. Negri, P. Pankowski, S. Sarmento, A. Trianni, Feasibility of setting up generic alert levels for maximum skin dose in fluoroscopically guided procedures, *Physica Medica* 46 (2018) 67–74.

Ciraj-Bjelac O., Carinou E., Vanhavere F., Use of active personal dosimeters in hospitals: EURADOS survey, *J Radiol Prot.* 38(2) (2018) 702-715.

I. Clairand, R. Behrens, M. Brodecki, E. Carinou, J. Domienik-Andrzejewska, M. Ginjaume, O. Hupe and M. Roig, EURADOS 2016 intercomparison exercise of eye lens doseimeters. *Radiat. Prot. Dosim.* 182(3), (2018) 317-322.

Other publications: http://www.eurados.org/en/Documents_Publications/List_of_publications

Additional information

See EURADOS web site (www.euroados.org).