

Extremity dosimetry in medical applications within Europe: An overview of doses and monitoring practices

L. Donadille^{*1}, E. Carinou², M. Ginjaume³, J. Jankowski⁴, A. Rimpler⁵, M. Sans Merce⁶
and F. Vanhavere⁷,

¹*Institut de Radioprotection et de Sûreté Nucléaire, BP 17, 92262 Fontenay-aux-Roses Cedex, France*

²*Greek Atomic Energy Commission, Ag. Paraskevi, 15310, Greece*

³*Institut de Tècniques Energètiques, Universitat Politècnica de Catalunya, Diagonal 647, 08028 Barcelona, Spain*

⁴*Nofer Institute of Occupational Medicine, St. Teresa Street 8, 90-950 Lodz, Poland*

⁵*Bundesamt für Strahlenschutz, Koepenicker Allee 120-130, 10312 Berlin, Germany*

⁶*Institut Universitaire de Radiophysique Appliquée, rue du Grand Pré 1, 1007 Lausanne, Switzerland*

⁷*Belgian Nuclear Research Centre, Boeretang 200, 2400 Mol, Belgium*

Abstract

Some activities of the EURADOS Working Group 9 (WG9) related to the radiation protection dosimetry of medical staff were funded by the European Commission in the framework of the CONRAD project, Work Package 7. The objective of WG9 was to promote and co-ordinate research activities for the assessment of occupational exposure to staff at workplaces in therapeutic and diagnostic radiology and nuclear medicine. At these workplaces, from the point of view of the individual monitoring for external radiation, the skin of the fingers is generally the limiting organ. Subgroup 1 of WG9 had as main objective the study of the use of extremity dosimeters in medical radiation fields.

The wide variety of radiation field characteristics present in medicine together with the difficulties of measuring a local dose which should be representative for the maximum skin dose using one single detector, makes it difficult to perform extremity dosimetry with an accuracy similar to that of whole-body one. A recent intercomparison organised by WG9 showed that some types of dosimeters significantly underestimate or overestimate skin doses.

Subgroup 1 carried out a thorough literature review on extremity dosimetry issues. It covered diagnostic and therapeutic nuclear medicine and PET, interventional radiology and cardiology, and brachytherapy. It has notably pointed out the consensus about the requirement of regular extremity dose monitoring for nuclear medicine and PET, and the great difficulty of measuring extremity doses for procedures in interventional radiology and cardiology, activities for which routine extremity dose monitoring has been found to be poor.

Furthermore, information on the status of extremity dosimetry in medical applications and associated monitoring practices was gathered from 7 European countries: France, Germany, Greece, Ireland, Poland, Spain and Switzerland. Interpretation of the data was not easy because of the wide range of procedures involved and also because of the lack of criteria for the unification of activities in the medical field. However, the overview

* Presenting author, E-mail: laurent.donadille@irsn.fr

highlighted fields where there is a greater need for improvement and harmonization.

In this paper, the main results of this work are presented.

KEYWORDS: *extremity dosimetry; nuclear medicine; interventional radiology; brachytherapy.*