

EURADOS/REMPAN Project: Evaluation of Radionuclide Intakes via Wound

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The Wound Project started in 2022 as a collaboration between the European Radiation Dosimetry Group (EURADOS e.V.) and the WHO's Radiation Emergency Medical Preparedness and Assistance Network (REMPAN). This project, with the contribution of expert groups from United States (Los Alamos Nat. Lab, USTUR, etc.) and Europe (CEA, IRSN, etc.), reviews procedures for measurements, dose assessments, and medical management of workers with radionuclide intakes via contaminated wounds. The objective is to provide a gap analysis and to establish research needs and priorities for future developments. The results of the project will be presented as EURADOS/REMPAN Report, including practical tools for managing contaminated wound cases to support decision makers responding to an incident or a radiological emergency.

The management of a contaminated wound case requires reliable knowledge of the circumstances of the event, including the radionuclides involved, the physical and chemical form of the compound, and the location of the wound. Rapid response and decisions on clinical treatment regarding wound decontamination, excision of tissues and chelation therapy should be based on the measurement of the exposed individual and preliminary dose assessment using reasonable default assumptions. The absorbed dose to the area of skin and the committed effective dose should be assessed based on the monitoring data. The objective in making decisions treating wound cases is to reduce the risk of stochastic effects and to prevent tissue reactions. A special monitoring programme, consisting of direct measurements at the wound site together with in vivo and/or in vitro bioassay, should be established to estimate the uptake of radionuclides into the body and determine the committed absorbed dose and committed effective dose.

The management of wounds is always case-specific, but some general procedures may be recommended for a proper evaluation of the contamination event. Medical doctors and internal dosimetrists should work together in the management of the wound case, providing expert judgement in making decisions and in the communication with the patient. ISO 20031:2020 provides guidelines on the monitoring and dosimetry for internal exposures due to wound contamination with radionuclides. The CDG (Clinical Decision Guidance) quantity was proposed in NCRP Report 161 to assist physicians in making treatment decisions for individuals who have had radionuclide intakes.

Radionuclides may penetrate the subcutaneous tissue and then infiltrate into the rest of the body. As first approach to the internal dose, new ICRP/OIR injection models may be applied, assuming injection as route of intake. A more accurate assessment is achieved by applying the NCRP wound model for the interpretation of in vivo and/or in vitro bioassay data to obtain the absorbed dose and the committed effective dose. The NCRP Report 156 presents a biokinetic model developed for radionuclide-contaminated wounds and provides procedures for the assessments of wound cases, the dosimetry and treatment. Dosimetry tools are available to help dosimetrists in dose calculations (IMBA, TAURUS, AIDE, IDode and VARSKIN software).