International Commission on Radiological Protection

TG112: Emergency Dosimetry

The goal of the Task Group 112 is to develop reference methodologies and datasets that would expand the current dosimetry system of the ICRP for performing radiological assessments in emergency exposure situations. An expanded dosimetry system will consider both stochastic effects and harmful tissue reactions, situation-specific conditions (such as the contamination of wounds, thyroid blocking or DTPA treatment), and individual- or group-specific characteristics (such as a iodine-deficient diet in the affected region). Standard estimates of effective dose will be complemented by more detailed individualised assessments of absorbed doses/absorbed dose-rates in organs and tissues of individuals of various ages.

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Key Topics for Consideration

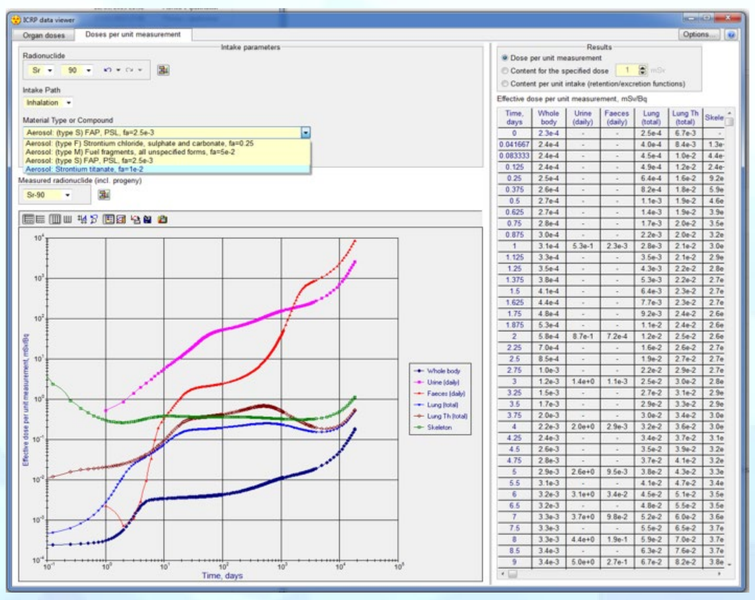
Dosimetry system and approaches for radiological assessments in emergency exposure situations

- Dosimetry for workers and members of the public: tissue reactions, estimation of short-term tissue absorbed doses, quantities for triage, individual monitoring, etc.;
- Prospective vs. retrospective assessments;
- Individualisation of dose estimates, assessments for non-reference persons, modifying factors, uncertainties and variabilities;
- Assessments for vulnerable groups: embryo and foetus, children, individuals with various medical conditions, etc.;
- Adequacy of the current ICRP list of target tissues, uncertainties in geometry (e.g. depth of the target layer of cells) and masses for the assessment of tissue reactions;
- Protection quantities;
- Absorbed doses and dose rates formed by several types of radiation.

Methodologies and datasets for radiological assessments in emergency exposure situation

- Prospective assessments for workers, responders and members of the public;
- Individual monitoring programmes and associated retrospective assessments of exposure of workers, responders and members of the public;
- Body-related modifying factors (“non-reference person”), sources of uncertainties and variabilities, such as masses and geometry of target tissues, individual biokinetics, iodine-deficient diet, non-euthyroid status, pregnancy, thyroid blocking, Prussian blue, chelation;
- New ICRP reference dataset for emergency exposure situations.

Related Publications



Nuclear or radiological emergencies are relatively rare but, when they occur, emergency workers, first responders and the general public may receive significant external and internal exposures. Radiological assessment and protective actions need to be implemented promptly to mitigate the impact on human health. A methodology for the quantitative description of exposures is among the essential elements of emergency management systems.

The current ICRP dosimetry system is focused mainly on situations in which doses and associated radiological risks are low and the primary objectives are optimisation of protection against stochastic health effects and demonstration of compliance with regulatory requirements. The central quantity used is effective dose and ICRP effective dose coefficients are used internationally in the control of radiation exposures at low doses. Although some dose restrictions are also set to prevent tissue reactions, the requirements for dosimetric assessments during emergencies have not been addressed in any detail.

Radiation monitoring of evacuees in Fukushima prefecture, Japan.
Wally Santana/AP
https://www.britannica.com/event/Fukushima-accident/

From: Broggio at al. Child and adult thyroid monitoring after a reactor accident (CAThyMARA): Technical recommendations and remaining gaps