TASK GROUP 112
Emergency Dosimetry

ICRP 2023
6-9 NOVEMBER 2023 • TOKYO, JAPAN

Mandate

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

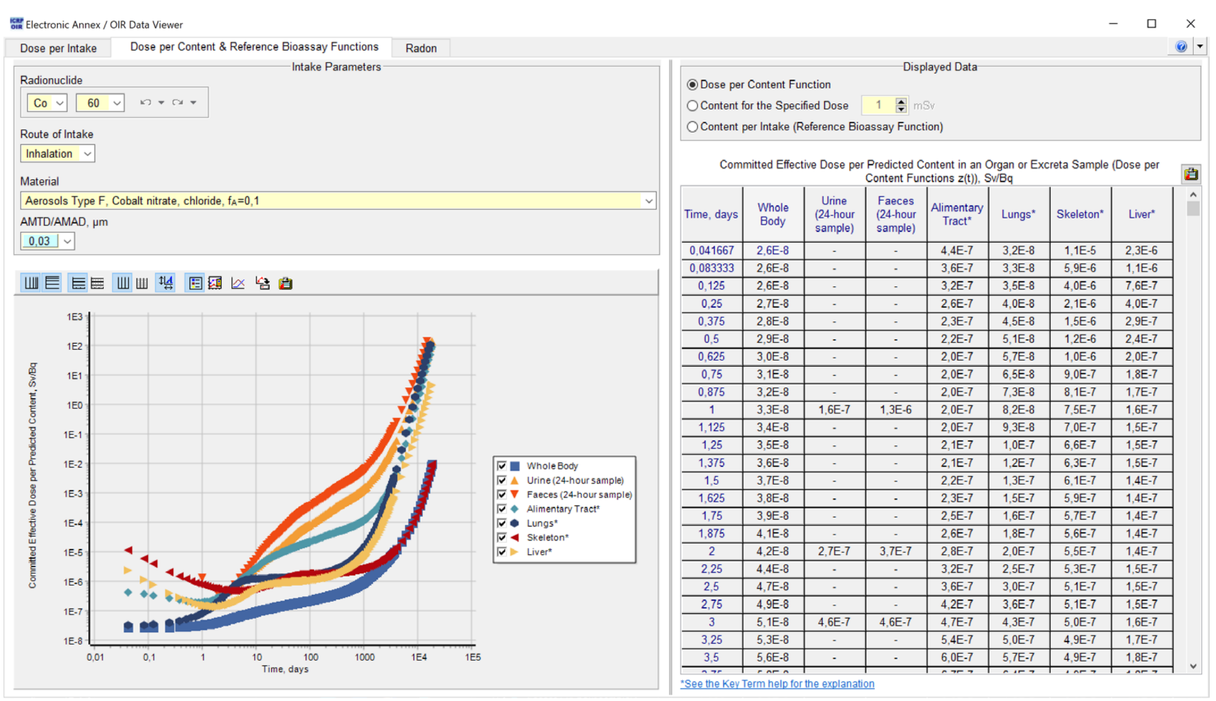
Background

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 applied internationally to control radiation exposures at low doses. Although some dose restrictions are set to prevent tissue reactions, dosimetric assessments during emergencies have not been addressed in detail. Fit-for-purpose prospectively assessed group-specific dose estimates are needed for:

- prevention of severe health effects, irreversible tissue damages or irreversible changes in the quality of life, such as mental retardation after in utero exposure;
- prevention or minimisation of the number of occurrences of non-severe tissue reactions;
- management of the risks of stochastic effects.

The adjustment of protective actions in the course of an emergency necessitates retrospective reassessments based on environmental or bioassay measurements. The medical triage and follow-up of exposed individuals usually require individual-related retrospective dose estimates.

In the case of intake of radionuclides, a set of tabulated time-dependent organ and tissue absorbed dose rates will be a basis for end-user assessments of various derived dosimetric quantities, such as delivered, projected, and avertable organ/tissue absorbed doses for arbitrary time intervals. Non-standard geometry of external exposure in an emergency will be addressed by software that allows end-user calculations of the spatial distribution of tissue absorbed dose rates in an organ or tissue.



Time, days	Whole Body	Urine (24-hour sample)	Faeces (24-hour sample)	Alimentary Tract*	Lungs*	Skeleton*	Liver*
0,041667	2,6E-8	-	-	4,4E-7	3,2E-8	1,1E-5	2,3E-6
0,083333	2,6E-8	-	-	3,6E-7	3,3E-8	5,9E-6	1,1E-6
0,125	2,6E-8	-	-	3,2E-7	3,5E-8	4,0E-6	7,6E-7
0,25	2,7E-8	-	-	2,6E-7	4,0E-8	2,1E-6	4,0E-7
0,375	2,8E-8	-	-	2,3E-7	4,5E-8	1,5E-6	2,9E-7
0,5	2,9E-8	-	-	2,2E-7	5,1E-8	1,2E-6	2,4E-7
0,625	3,0E-8	-	-	2,0E-7	5,7E-8	1,0E-6	2,0E-7
0,75	3,1E-8	-	-	2,0E-7	6,5E-8	9,0E-7	1,8E-7
0,875	3,2E-8	-	-	2,0E-7	7,3E-8	8,1E-7	1,7E-7
1	3,3E-8	1,6E-7	1,3E-6	2,0E-7	8,2E-8	7,5E-7	1,6E-7
1,125	3,4E-8	-	-	2,0E-7	9,3E-8	7,0E-7	1,5E-7
1,25	3,5E-8	-	-	2,1E-7	1,0E-7	6,6E-7	1,5E-7
1,375	3,6E-8	-	-	2,1E-7	1,2E-7	6,3E-7	1,5E-7
1,5	3,7E-8	-	-	2,2E-7	1,3E-7	6,1E-7	1,4E-7
1,625	3,8E-8	-	-	2,3E-7	1,5E-7	5,9E-7	1,4E-7
1,75	3,9E-8	-	-	2,5E-7	1,6E-7	5,7E-7	1,4E-7
1,875	4,1E-8	-	-	2,6E-7	1,8E-7	5,6E-7	1,4E-7
2	4,2E-8	2,7E-7	3,7E-7	2,8E-7	2,0E-7	5,5E-7	1,4E-7
2,25	4,4E-8	-	-	3,2E-7	2,5E-7	5,3E-7	1,5E-7
2,5	4,7E-8	-	-	3,6E-7	3,0E-7	5,1E-7	1,5E-7
2,75	4,9E-8	-	-	4,2E-7	3,6E-7	5,1E-7	1,5E-7
3	5,1E-8	4,6E-7	4,6E-7	4,7E-7	4,3E-7	5,0E-7	1,6E-7
3,25	5,3E-8	-	-	5,4E-7	5,0E-7	4,9E-7	1,7E-7
3,5	5,6E-8	-	-	6,0E-7	5,7E-7	4,9E-7	1,8E-7

Related Publications

Members

Volodymyr Berkovskyy (Chair), Ukrainian Radiation Protection Institute (RPI) and National Research Center for Radiation Medicine (NRCRM), Ukraine

Luiz Bertelli, Los Alamos National Laboratory, USA

Eric Blanchardon, French Institute for Radiological Protection and Nuclear Safety (IRSN), France

Bastian Breustedt, Karlsruhe Institue of Technology (KIT), Germany

Demetrio Gregoratto, UKHSA, United Kingdom

John Hunt, The Instituto de Radioproteção e Dosimetria - retired, Brazil

Catrin Baureus Koch, OKG NPP, Sweden

Maria Antonia Lopez, CIEMAT, Spain

Dunstana Melo, Melohill Technology, USA

Gennadii Ratia, Ukrainian Radiation Protection Institute (RPI) and National Research Center for Radiation Medicine (NRCRM), Ukraine

Kotaro Tani, Japan

Minoru Tanigaki, Japan

Abdulkadir Alaydarous (Technical Secretary), USA