Dose reconstruction and epidemiological studies in the Southern Ural

A view of the ICRP Committee 2
"Doses of radiation exposure"

ICRP Workshop
"30 Years of Scientific Achievements for International Radiological Protection: Summary of the Southern Urals Health Studies Program"
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on behalf of ICRP C2:
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ICRP C2 – multifaceted activity

The Committee 2 (C2) of the International Commission on Radiological Protection (ICRP) implements **multifaceted activity** in the field of radiological protection of people and the environment from natural and anthropogenic sources of ionising radiation.

The committee members, supported by the members of the associated ICRP task groups (TG), contribute to:

- **dosimetric methodology** for assessing doses from internal and external exposures to ionising radiation
- reference **biokinetic and dosimetric models** for human, animals and plants
- **reference** data, protection quantities and dose coefficients
- development of the **ICRP recommendations**
- **advise** other ICRP committees and TGs

ICRP C2 and associated groups – the numbers…

ICRP C2

18 Members

(14 countries: Austria, Brazil, China, France, Germany, India, Japan, R. of Korea, Spain, Sweden, Switzerland, Ukraine, USA, UK)

1 Emeritus member

(USA)

3 Representatives

(IAEA, ICRU, EURADOS)

TG36 (13 + TC)
Diagnostic nuclear medicine

TG95 (14 + TC)
Internal dose coefficients

TG96 (13 + TC)
Computational phantoms and radiation transport

TG103 (20 + TC)
Mesh-type reference computational phantoms

TG112 (14 + TC)
Emergency dosimetry

TG113 (21 + TC)
Dose coefficients for diagnostic X-rays

TG115 (15)
Risk and dose for RP in space

TG118 (12 + TC)
Radiobiological effectiveness (RBE, Q and w_R)

TG128 (13 + TC)
Individualization and stratification of RP

C2 view on the studies in the Southern Urals

- **Sources**: fission decay products (irradiated nuclear fuel, operational and accidental releases, waste from radiochemical processing facility), including radioiodine and noble gases, longer-living ^{137}Cs, ^{90}Sr and actinides
- **Exposure types**: occupational and public
- Exposure **pathways**: intake of radionuclides and external exposures at workplaces, in-door and in the environment
- Exposure **periods**: short-term (emergency) and long-term
- Wide and systematic application of advanced **dose assessment and reconstruction** techniques, use of individual data and independent **instrumental** data (in-situ measurements, WBC, TLD, EPR) for **verification**
- Studied **cohorts**: Mayak workers and Ozersk residents, Techa River and EURT populations

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Studies in the Southern Urals → C2 internal dosimetry

- Contribution to ICRP systemic **biokinetic models** for radionuclides, including **actinides and ^{90}Sr**
- Information on radionuclide retention and distribution in the body, based on **bioassay**, **in-vivo** measurements and **tissue bank** data
- Data on **uncertainty and variability** of dose estimates help in **verification** of the **ICRP reference human data**
- Realistic scenarios for **emergency dosimetry** (occupation and population exposures)

Studies in the Southern Urals → C2 external dosimetry

- Scenarios for **external dose assessment** and relevant exposure situations (sources, exposure geometry, dynamics, location factors, etc)
- Data on **uncertainty and variability** of external dose estimates help in verification and development of the ICRP reference data and methodology
- Realistic scenarios for **emergency dosimetry** (occupation and population exposures)

Studies in the Southern Urals → advancing radiological knowledge and building future expertise worldwide

- Long-term and highly professional international studies create **new knowledge**, advance methods, provide evidence and improve understanding – all these are **for a benefit** of the international community and of the ICRP with its Committee 2
- **Experience** gained in dose assessment and dose reconstruction studies **can be generalised by the ICRP** and presented in the form of **a supporting guidance** on application of the ICRP-recommended data in real life exposure scenarios.
  See e.g., ICRP Supporting Guidance 3. Guide for the Practical Application of the ICRP Human Respiratory Tract Model (2002)
- Scientifically-sound long-standing research programs provide opportunities for **development of new scientists and specialists**, who will support the future activities of the ICRP, thus assuring knowledge transfer and preservation

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Summary

From the ICRP C2 view, the outcomes of the dosimetric and epidemiological studies in the Southern Urals can be regarded as:

- **unique** high-quality scientific data of **global importance** and applicability;
- **valuable input** to the activities of the C2 in the field of internal and external **dosimetry of human** occupational, emergency and environmental **exposures**;
- **potential input** to the activities of the C2 in the field of **environmental dosimetry** and doses for non-human organisms

Thank you!

Stay tuned for examples in the next talk! ☺

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